

INTRODUCTION

One of the largest management challenges faced on a ranch in arid regions is balancing between grass supply and demand. Grass supply is influenced by the timing and extent of precipitation during the growing season and the grazing management implemented by the ranch manager. Many ranch managers find themselves worrying more about *the weather* than about implementing a grazing management plan that will focus on maintaining sustainable grazing resources during both normal and dry conditions. Therefore, this publication will focus on developing a better understanding of the impacts of drought on native rangelands and cattle performance, and how to manage rangelands and cattle during and between droughts in arid regions.

There are many approaches to defining drought, none of which satisfy all situations. Meteorological droughts are often defined as periods where moisture supply falls below a climatically set threshold, whereas an agricultural drought may be defined as a period of inadequate soil moisture for the needs of crops or growing native grass. However, it is not until the human population experiences shortages of water that affect quality of life and the demand of product (socioeconomic drought) that society and government begin to understand the impacts of drought. Regardless of the definition, those who live in arid regions recognize that in a majority of years these regions will experience periods of below-normal precipitation. Rangeland managers in arid climates have come to recognize it is not a matter of **if** but **when** the next drought will begin. Therefore, planning for drought is an important component in sustainable range management, which equals sustainable ranch operations.

Planning and preparing for extended dry periods in arid regions should be a beef business requisite. However, when extended dry periods are encountered, drier than normal conditions are commonly talked about, but the response seldom seems to be quick

enough to sustain both native rangelands and an adequate cattle inventory. It is critical to begin assessing and responding to the situation and to recognize both the short- and long-term impacts of drought on native rangelands, livestock, and the economics of a grazing operation.

IMPACTS OF DROUGHT ON RANGE RESOURCES

While most ranch managers understand the general scope of drought, it is important to respect the impacts of drought on native rangelands in arid regions. In most regions of North America where drought is common, the native rangelands are primarily composed of warm-season grasses and woody browse species. When inadequate rainfall occurs during the growing and reproductive periods of these species, it is common for grass species to have lower than normal production levels (lb/acre) and experience increased mortality. As the length and/or severity of drought increases, it is not uncommon for production to experience a sevenfold decline and plant mortality to exceed 50% (up to 50% on ungrazed rangelands).

It has long been accepted by rangeland professionals that the duration and intensity of grazing prior to the drought will influence the production and mortality of range plants during and after the drought. Why does this occur? Under normal precipitation conditions, perennial grasses require sufficient residual leaf for food production and a strong root system to efficiently absorb nutrients from the soil. If perennial grasses are intensively grazed over an extended period of time, the grass will not have the ability to survive or maximize production during drought conditions because of inadequate leaf mass and a weaker root system. Moreover, rangelands grazed at low to moderate intensity prior to the drought will require two years for every year of drought to recover to pre-drought conditions. In essence, a five-year drought will require

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a minimum of ten years to recover grass production and live grass plants to pre-drought levels if normal to above normal precipitation occurs. Therefore, grazing management practices before, during, and following a drought period will influence the time it takes for native rangeland vegetation to recover.

IMPACTS OF DROUGHT ON CATTLE PERFORMANCE

The objective of grazing management is to achieve optimum use of grazing resources to yield the highest achievable performance in grazing livestock without irreversible negative changes to the rangeland resources. While maximum gain (per animal basis) can be achieved in scenarios when range resources are underutilized, economic efficiency (gain per acre) is not achieved. Optimum economic efficiency is achieved when range resources are moderately grazed, achieving approximately 40 to 60% utilization. In situations where native rangelands are overstocked, efficiency is greatly reduced and typically results in reduced performance in cattle (commonly observed as body condition loss) and significant range resource deterioration. During drought, when cattle begin to lose body condition, it is a sign you are losing money—possibly at an alarming rate—and action is required.

Grass is the main source of energy in cattle diets. When grass reserves are diminished during drought, cattle are unable to obtain enough nutrition to maintain body condition. In these circumstances, it is common for cattle to compensate for a limited quantity of grass by changing the composition of their diet in an effort to meet nutrient requirements. As available grass supply is reduced, it has commonly been observed that cattle in arid regions will select a higher percentage of woody browse species if available. Additionally, cattle may tend to select more potentially toxic plants (e.g., broom snake weed or locoweed) not commonly selected during non-drought periods. Changes to diet composition typically reduce performance. In addition, more cases of toxic or lethal poisonings occur in grazing livestock because of increased consumption of depleted surface water sources that typically contain higher than recommended concentrations of minerals.

PREPARING FOR DROUGHT

Drought occurs over 60% of the time in arid regions of North America, and it is therefore important for cattle producers to be prepared. As a ranch manager, it is important to use not only experience but also ranch

records to recognize the onset of drought. Recording precipitation, identifying soil moisture characteristics throughout the ranch, and identifying where grass production is lagging are critical data entries to record several times a year. Estimating surface water capacity at drinking ponds is a great way to measure drought status. Caution should be taken with piped well water because it can be easy to not respond to a drought quick enough, resulting in damaged rangelands and poor cattle body condition. In addition, it is important for ranch managers to constantly monitor grass and water supply versus demand for these resources by cattle. Consider using a quantitative technique to determine the amount of grass that can be harvested. Visual estimates are used by most, but tend to involve a higher degree of subjectivity that can't always be trusted. Methods where representative grass samples are clipped and weighed and then converted to a pounds per acre basis are still an estimate, but are repeatable by just about anyone on the ranch. During drier periods, this data can help a manager estimate grazing days in specific pastures, adjust stocking rates, and minimize overgrazing.

Living in arid regions where drought is inevitable requires sufficient planning and preparation by ranch managers to minimize performance and economic losses on beef cattle operations. As part of an annual ranch planning exercise, consider taking time to develop and/or revise the drought plan for the ranch. To promote a healthy and vigorous forage base, a manager may want to establish a goal of maintaining as much residual forage as possible.

Consider the following recommendations to achieve this goal.

1. Implement a stocking rate to reflect your ranch goal of maintaining as much residual forage as possible. If an operation experiences extensive de-stocking during every drought event, it may prove beneficial to recalculate the stocking rate to a level that is more conservative. This may minimize dispersal of cattle during drought. Furthermore, consider diversifying the type of cattle within your grazing system. For example, if the ranch uses 100% of its grazing resources to graze cow-calf pairs, consider a stocking rate equation where 50 to 70% of the grazing resources are allocated to cow-calf pairs, and the remaining 30 to 50% are allocated to stocker/yearling type cattle. Allocating a segment of the grazing resources to stocker/yearlings will allow a ranch more flexibility during drought periods, while continuing to sustain a cow herd.

2. Consider developing a drought reserve pasture that has been rested for an entire growing season. This option will buy some time and minimize overgrazing.
3. Have a de-stocking plan in writing. As mentioned previously, many experienced ranch managers recognize drought events, but seldom tend to respond to the situation in a timely manner. Identify *critical dates* to ensure high market prices and, more importantly, identify *critical dates* relevant to the grass growing cycle from a range resource protection perspective. For example, if the rain does not arrive by a certain date, plan to de-stock, and initiate your de-stocking plan on critical dates outlined in your plan. Being caught with too many cattle can cause greater economic loss and range resource damage.
4. Consider early weaning of your calves on a cow-calf operation. Calves weaned early will reduce grass and water consumption of cows by more than 33%. This management option serves as a method to conserve forage by reducing the nutrient intake of the cow and eliminating the forage intake from the calf. Consult a nutritionist or Extension livestock specialist on how to best manage calves that are weaned at less than four months of age.
5. Identify options to improve grazing distribution to underutilized areas of the ranch. Even during drought, there will be areas of the ranch that are in better condition than others. Evaluate realistic options (e.g., placing salt and supplement away from the water) to distribute remaining cattle to these areas during drought, and consider more permanent options (e.g., fencing and water) in between droughts. In most situations, the simplest way to improve grazing distribution is to move salt, minerals, and supplements away from a primary water source to where cattle do not prefer to graze.

MANAGING BETWEEN DROUGHTS

When the drought subsides, it is important to not get *green grass fever*. Green grass and rain always seem to initiate an almost immediate response by ranch managers to re-stock native rangelands. However, the length and severity of the drought and the previous

grazing management (prior to and during the drought) will greatly impact the recovery (i.e., production and mortality) of the forage base. During periods of severe drought, many rangeland professionals recommend complete rest of pastures for at least one entire growing season following a severe drought as the most effective means of achieving recovery. In less severe drought situations, it is still not advisable to restock to pre-drought numbers too quickly.

CONCLUSIONS

As a ranch manager, you should recognize that it is difficult to define when a drought period will end. Have a written drought plan ready to implement. It is never too early to start de-stocking cattle during drier periods. Recognize that trying to feed out of a drought will only lead to overstocking, deteriorated ranges, and bankrupt ranchers. When a drought period begins to subside, recovery of the range resources should be a manager's top priority because range resources sustain the ranch operation. Between droughts, evaluate the ranch's grazing program to reduce the recovery period after the next drought, and, most importantly, recognize the forage base limitations of the ranch.

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