Adaptive Management

Plan for drought while it's still raining.

*by **Troy Smith,** field editor*

According to conventional wisdom, managers of grazing lands should err on the side of conservatism. Many also find comfort in applying some kind of formula for determining stocking rate. Range Scientist Justin Derner thinks that's why so many managers stock their ranges and pastures according to what he calls a "traditional" method.

"They want to use a moderate stocking rate — the old take half, leave half approach. So they plan to use 50% of their average annual forage production, and that works about a third of the time," explains the Cheyenne, Wyo., based researcher for the USDA Agricultural Research Service (ARS).

PHOTO BY TROY SMITH

►"Let's make drought the default management plan," urges Justin Derner, suggesting that a conservative approach can be enhanced by applying grazing management systems that allow for pasture rest, and by applying flexible stocking rates.

According to Derner, the problem with always stocking grazing lands on the basis of average forage production is that so few years actually match the average. When growing conditions are most favorable — plenty of timely precipitation — forage production is higher. When rainfall amounts are low or are not timely, forage production will be less than average. Few people complain about abundance, but a drought-induced scarcity of forage can force a manager to make hard decisions.

Be proactive

Derner says managers may then respond reactively by trying to rent extra pasture. It's often hard to find and costly, too. The same may apply to hay purchased as supplemental feed. So, for some outfits, it may come down to selling off part of the herd. A drought-driven sale of cows may then result in a loss of hard-won genetic improvement at a time when market prices are at a low ebb.

A USDA ARS survey conducted after the droughty summer of 2012 suggested that only 60% of Wyoming ranchers had drought-management plans for their operations. Derner suspects the numbers may be similar or worse in other states. He encourages all managers of grazing operations to be more proactive.

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"We have to be adaptive managers and use flexible stocking rates to help match animal forage demand with fluctuating forage availability," Derner adds.

An example of applying conservative stocking to an entire ranch property might include resting some portion of the total acreage during the growing season, such that ungrazed forage is stockpiled or forage-banked. This leaves a forage supply as "insurance" and, long-term, this practice can increase diversity of plant communities, encourage development of plant root systems and improve drought resistance of the forage resource. Setting stocking rates based on expected forage supply during dry or drought years may also increase resilience of the plant-soil community and will reduce the chance of having to sell cows during periods of unfavorable prices.

Producers can lend added diversity to their operations and increase management flexibility by utilizing forage resources with more than one cattle enterprise, such as managing yearlings in addition to a breeding herd. A portion, perhaps a majority, of the grazing land can be devoted to the cow-calf enterprise with the remainder used to graze yearlings. Numbers of yearlings can fluctuate from year to year depending on expected forage availability. More yearlings could be managed during years of above-average precipitation and "extra" forage, and fewer yearlings would be grazed when a scarcity of rain limited forage production. If worsening drought prompted destocking, yearlings could be marketed early, avoiding forced reduction of cow numbers.

Derner cites New Mexico State University research showing the potential for doubling the long-term economic returns to a grazing operation, when flexible stocking rates are achieved with yearlings in addition to a cow-calf enterprise. Nimbleness and economic benefits might also be gained by using part of a ranch's forage resources for a custom-grazing enterprise involving cow-calf pairs or yearlings owned by others. Numbers of outside cattle accepted could be adjusted from year to year according to fluctuations in forage production.

Prediction tools

To better estimate what forage production will be, Derner recommends that producers take advantage of the available technology, including seasonal precipitation and temperature forecasts. The U.S. Drought Monitor, released weekly, reports the geographic range of abnormally dry to extreme and exceptional drought conditions.

Monthly and seasonal drought outlooks offer probabilities for persistence or improvement of existing drought, as well as the likelihood of drought development in different areas. Additionally, the National Weather Service Climate Prediction Center provides one-month and three-month precipitation and temperature probability outlooks for climate regions.

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An additional tool for estimating forage production is expected to become available soon. Derner says that, for many years, satellite-borne remote sensing technology has been used to measure photosynthetically active radiation (sunlight) absorbed by plant vegetation. Scientists used the data to establish the Normalized Difference Vegetation Index (NDVI) as an indicator of growing conditions relative to "normal" in a particular region, at a given time of year.

According to Derner, evidence suggests that early growing season NDVI in a particular climate region can be used to predict forage production. Efforts are under way to develop this technology for making forage production estimates at the county level.

Even with the application of technology, weather prediction is uncertain. Conditions can change rapidly and vary widely within a region. Due to localized variability of precipitation, Derner urges producers to maintain their own records, tracking precipitation received throughout the year. He notes that soil moisture at the end of the growing season significantly impacts the next year's forage production.

"In most areas, of course, it is spring precipitation that is really important, and 25% fluctuations in precipitation can have huge impacts. If we don't have favorable conditions for forage production at the start of the growing season, we need to make the decision to adjust stocking rates," Derner adds.

Managing grazing lands involves science, but Derner believes it also requires art. Combining science, economics and consideration of alternative practices to make proactive decisions, that's the art of adaptive management.

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Editor's Note: *Troy Smith is a cattleman and freelance writer from Sargent, Neb. Justin Derner presented at the Society for Range Management Nebraska Section meeting in October 2016.*