



Adjusting Livestock Stocking Rates in Good Years and Bad

Precipitation records can help ranchers adjust livestock numbers to match forage supply.

The long-term ecological and financial health of a ranch requires that the livestock population be balanced with the forage supply. Soils, plants, water quality, wildlife, livestock performance, and profit suffer when livestock numbers are too high or too low. Stocking rates that result in moderate grazing intensity (averaged across both grazed and rested pastures in rotational grazing systems) maximize long-term ranch profit and ecosystem health.

In Montana, the stocking rate that results in moderate grazing intensity is often a moving target. Fluctuations in

precipitation and temperature cause forage production to vary substantially from year-to-year. Consequently, the stocking rate that results in moderate grazing intensity is higher in wetter years when forage production is high and lower in drier years when forage production is low.

The stocking rate can be increased in wetter years by retaining more yearlings, purchasing additional animals, or leasing forage to other ranchers. Conversely, in drier years, the stocking rate can be lowered by weaning livestock earlier than normal, culling mature animals more heavily and earlier in the year, and retaining fewer yearlings. Stocking rate also can be reduced in pastures grazed during spring-early summer (May and June) by reducing the amount of time livestock spend in these pastures. In turn, the stocking rate is increased in subsequent pastures by lengthening their grazing periods, but grazing in these pastures occurs after plants have entered summer dormancy and are much less impacted by livestock grazing.

ESTABLISH A BASE STOCKING RATE

Trying to manipulate the stocking rate exactly according to forage production can be challenging, especially during

dry years and in Montana where our dry years can be very dry. Optimism that it will rain next week often leads to waiting to reduce livestock numbers until after overgrazing has occurred, and emergency livestock sales in dry years (when prices are normally low) and repurchasing in wetter years (when prices are normally high) can wreak havoc on cash flow. To mitigate these problems, many successful ranchers establish a long-term, base stocking rate from which they can adjust livestock numbers up or down slightly in response to annual fluctuations in forage supply. A good target is a stocking rate of about 80 to 85% of what the forage supply would support in a typical year, when it's not significantly drier than usual. This base stocking rate enables the ranch to withstand one dry year, or perhaps two dry years in a row, without needing to dramatically reduce their herd. This strategy 1) provides carry-over of old grass from normal years that can be grazed during subsequent drought years, 2) keeps plants healthy so they can better withstand heavier grazing during drought years, and 3) keeps plants healthy and able to recover faster in subsequent wetter years. However, during extended or extreme droughts, some amount of herd liquidation is likely inevitable.

HOW MUCH GRASS WILL I HAVE THIS SUMMER?

Stocking rate decisions would be much easier if somehow ranchers knew how much forage would be available during summer. Reliable estimates can be made by comparing this year's amount of precipitation to the long-term average or long-term median. There are three different but similar methods. One method compares the amount of precipitation received in a "crop year," while another compares the combined total precipitation received in April, May, and June. A third method averages the estimates provided by the crop year precipitation and the April + May + June precipitation. For example, if precipitation during the crop year from the first of September 2022 to the end of June 2023 equaled 70% of the past 30-year average or 30-year median, then forage production will likely be about 70% of normal in summer 2023. Similarly, if the combined total precipitation received in April, May, and June 2023 equaled 80% of the 30-year average or median for April + May + June precipitation, then forage production will likely be about 80% of normal in summer 2023. The average of the two methods would predict 75%

of normal forage production. The crop-year method is best-suited to areas in Montana west of the Continental Divide, the April + May + June method is best suited to eastern Montana, and the average of these two methods is best suited to central Montana.

These methods do not provide perfect estimates because they do not account for many other factors that also affect forage growth, such as air temperature, humidity, and wind. However, these simple procedures provide reliable estimates to help ranchers make informed stocking rate decisions.

CAN PRECIPITATION RECORDS HELP MANAGE RISK?

Forage production estimates derived from either the crop-year method, the April + May + June method, or the average of these two methods also can be used to manage risk. For example, if an area normally receives 4 inches of precipitation in April + May + June, and no moisture was received in April, one can examine the long-term weather records to find how often the area received four inches in May + June alone. The percentage of times this occurred in the past 30 years indicates the chances of it happening this year and thus, the likelihood that summer forage production will be normal following a dry April. Continuing the example, if two inches of precipitation were received in May, the long-term weather records could be examined to find how often the area received two inches in June alone. The percentage of times this occurred in the past 30 years indicates the odds that the area will receive its normal four inches by the end of April + May + June and the likelihood that summer forage production will be normal.

WHERE CAN I FIND PRECIPITATION RECORDS FOR MY AREA?

Without precipitation records for a ranch, the Western Regional Climate Center has long-term data from hundreds of weather stations across Montana: <http://www.wrcc.dri.edu>. The Agrimet system can also provide precipitation records: <https://www.usbr.gov/gp/agrimet/>.

For assistance accessing these data or for more information about livestock stocking rates, contact the local MSU Extension office, or send an email to jmosley@montana.edu.

Jeff Mosley, PhD, is the MSU Extension Range Management Specialist.