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Natural Resources Research Update

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Title: Effect of Precipitation during Key Months on Forage Growth Potential

Abstract: Ranchers and range managers find themselves at the mercy of Mother Nature when making stocking decisions early in the spring. Most forage growth potential is determined by precipitation during key months in the spring (Heitschmidt et al., 1999) – often multiple spring months are important with respect to forage growth but one month is usually more important than the other months (Derner and Hart, 2007). Research results indicate that for Streeter, ND, May and June are the key months. For Miles City, MT, April plus May are key, while for Cheyenne, WY, three months, April, May and June, are the key months. The single most important month for Cheyenne, WY, and Streeter, ND, is May but for Miles City the month is April (Dunn et al. 2008, submitted). The object of the research in this paper is to find ways to advise ranchers and range managers on the forage growth potential for their areas based on early precipitation.

Scientists with the Agricultural Systems Research Unit and the Water Management Unit of USDA-ARS in Fort Collins, CO, have used long-term climate and yield data from three locations in the Great Plains to determine what month and/or months are the most important in determining forage growth potential. The locations were the Central Grasslands Extension Research Center near Streeter, ND, the Keogh Livestock and Range Research Laboratory in Miles City, MT, and the High Plains Grassland Research Station near Cheyenne, WY. All three are listed as “mixed-grass prairie” and have somewhat similar dominant grass species, but have different elevations and different average annual rainfall amounts.

For two locations, Streeter, ND, and Cheyenne, WY, May was the single most important month. For Miles City, April was the most important month. In all cases the key month was the first month of the key months. Key months were May plus June for Streeter, ND, April plus May for Miles City, MT, and April, May and June for Cheyenne, WY. The Streeter data showed two time periods when precipitation was closely related to forage growth potential: May + June and January through June. The January through June time period was not as well related to forage growth but the longer time period gives the rancher more information.

What this means for the ranchers and range managers is, depending on location, if precipitation is lacking during these key months and particularly the key month then there will be a negative effect on potential forage growth in that season. The severity of this negative effect will depend on how far below average the precipitation is in each key month and how many of the key months are below average.

One way to use this information is to consider the consequences of below average precipitation during the key month(s) For instance, if May precipitation is slightly below normal for Streeter, ND, but June is normal or above, the effect won't be as severe as if both months were below normal. At the same time if May is significantly below normal then even a normal or a slightly above normal precipitation in June will not completely offset the negative effect. If both months are below normal then a significant reduction in forage growth can be expected. A rule of thumb might be, if only half the normal precipitation falls during the key months then only about half the normal forage growth is likely to occur. If 40% of normal precipitation falls in the key month and/or months it is likely forage growth will be around 40% as well. Precipitation during the key month and months can be used as an early warning system for forage growth on grazinglands.

Derner, J.D., and R.H. Hart. 2007. Grazing induced modifications to peak standing crop in northern mixed-grass prairie. *Rangeland Ecology and Management* 60(3):270-276.

Dunn, G.H., L.J. Wiles, J. Printz, B. Patton, and A. Nyren. 2009. Effect of annual, growing season, and spring precipitation on peak standing crop at three locations. *Rangeland Ecology and Management* submitted

Heitschmidt, M.R. Haferkamp, M.G. Karl, and A.L. Hild. 1999. Drought and grazing: I. Effects on quality of forage produced. *Journal of Range Management* 52(5):440-446.

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