GRAZING MANAGEMENT DURING AND AFTER EXTENDED DROUGHT IN MONTANA

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Introduction

A person's character sometimes is revealed most clearly by how he or she responds to adversity. Similarly, the long-term economic and environmental success of Montana ranches is often determined by how ranchers respond to the challenges created by drought. Most ranch businesses can readily adjust to one or two dry years in a row, and the effects of short-term drought do not necessitate major changes to most ranch grazing plans. However, three or more successive dry years challenge even the best graziers, stressing their livestock, their finances, and their grazing lands.

Years can pass without much apparent change to seeded pastures and rangelands, but extended drought can cause dramatic shifts in vegetation. The land then remains relatively unchanged until the next environmental trigger occurs. Three or more successive years of drought represent an environmental trigger for Montana's pastureland and rangeland, and failure to care for the land during and after extended drought can cause serious consequences for decades to come.

Assess Drought Impact

How much of an adjustment is needed to a ranch grazing plan during and after extended drought? The answer depends, of course, upon how hard the ranch has been hit by drought. Drought does not impact everyone to the same extent, and even pastures or portions of pastures within one ranch are not affected equally. Consider these questions to assess drought's impact:

Were weeds a problem before the drought?

If weeds were a problem before the drought, they will probably be even worse after drought. Drought stresses all plants, but weeds are usually stressed less than desirable forage plants because most weeds grow earlier in the growing season before soil moisture is fully depleted. Also, weeds are usually grazed less than other plants. When rainfall does occur, weeds are in better shape to respond and they get a jump-start on the desirable plants. Producers need to be especially vigilant about new weed infestations if they brought in hay from new sources during the past year. Inspect areas where the hay was fed and plan to control new infestations as soon as possible–before weeds get well established and before weed control becomes more costly.

Were poisonous plants common before the drought?

Poisonous plant problems often worsen after or during an extended drought, especially early in the growing season. Many poisonous plants are "weeds" that survive drought better than desirable forage plants, and many poisonous plants green-up early in the season (e.g., low larkspur, death camas, and locoweed). Poisonous plant infestations tend to thicken after serious drought, but toxicity problems can be more common after drought even when poisonous plants don't increase in density. One reason for increased toxicity problems is that, after successive dry years there is less (if any) residual carry-over forage from the year before to buffer the toxins. Thus, dietary

concentrations can reach toxic levels even when livestock don't increase their consumption of poisonous plants. A related concern for spring is grass tetany. Without the previous year's residual carry-over grass to buffer the new green forage in the gut, grass tetany becomes more likely and strategic supplementation is warranted.

When was the area grazed last year?

One silver lining about drought years is that much more of the grazing season usually occurs after seed ripe and when plants are dormant. Plants are more tolerant of grazing during these later stages of plant development, so some plants may have endured less stress from grazing than in normal years. The plants stressed most by drought during the previous year were those grazed in early summer because they were unable to regrow before soil moisture was depleted.

How heavily was the area grazed in previous years?

Light or moderate grazing (≤ 60% utilization) doesn't harm most plants, nor does heavy or severe use in one year if the plants are given an opportunity to recover. Plants are stressed when heavy or severe use occurs for 2 or more years in a row. When drought breaks, plants grazed lightly to moderately in the past will recover from drought faster than plants that have been heavily grazed for many years.

Do plants appear stressed in spring?

Stressed plants begin growth later and grow slower in spring, and most plants will be stressed after three or four drought years. Consequently, turnout in spring will likely need to be later during and after extended drought. The rooting depth of forage plants and the length of drought in an area can help indicate how long plant growth will be delayed in spring. After one or two dry years, growth usually begins earlier in deep-rooted versus shallow-rooted plants because deep-rooted plants had access to more soil water and were less stressed. After an extended drought, however, deep-rooted plants may rebound slower because they remained green longer into the growing season and probably received extra grazing pressure during extended drought.

Potential Grazing Strategies During and After Extended Drought

Early planning enables ranchers to carefully consider potential alternatives for their summer grazing plans during and after extended drought. Waiting to plan until June or July leaves fewer options available. Potential options include *Reduce the Amount of Forage Needed*, *Graze Somewhere Else*, and *Adjust the Timing of Grazing*.

Reduce the Amount of Forage Needed

- Cull more heavily before the grazing season begins and before the market becomes glutted. Reduce the number of replacements if possible. Mature cows will survive and reproduce better than young cows or heifers that are still growing.

- Wean calves early. Dry cows consume about 35% less forage than lactating cows and 400-lb calves consume about one-third as much as mature cows.

Graze Somewhere Else

- Lease additional pasture.

- Use tame pastures, especially subirrigated or irrigated ones, more heavily than usual. The improved forage species can tolerate heavy grazing more so than native rangeland, so allocate more of the load to those pastures that can tolerate it best.

- Try to graze areas that didn't get much or any grazing use during last year's drought.

For example, consider areas near reservoirs and springs that went dry during last summer's drought. These areas may have been grazed less than in a normal year when water is available. Herding, supplemental feeding, hauling or piping water, temporary fencing, or shutting off water in over-used areas can all be used to control where livestock graze. Be sure to carefully evaluate the costs and benefits of these practices versus the costs and benefits of reducing livestock numbers.

Adjust the Timing of Grazing

● Delay turnout in spring so that forage plants can recover vigor. Delayed turnout will also lessen problems with poisonous plants and grass tetany.

● In rotational grazing systems, rotate more frequently.

● Consider using any rested pastures and thereby spreading the grazing use this year across all of the pastures.

● For early season grazing this year, try to graze any areas that were ungrazed last year or those areas that were grazed after plant dormancy during last summer's drought.

● For late season grazing this year, try to use those areas that were grazed heavily last year before plant dormancy.

How Much Forage Will Be Available During Summer?

Decisions about summer grazing plans during and after extended drought would be much easier if somehow ranchers knew how much forage would be available during summer. One simple, but reliable way to estimate summer grass production in Montana is to evaluate the total April+May+June precipitation. Compare this year's amount to the area's long-term median total for April+May+June precipitation. Be sure to use the median because it is a much better reflection of "normal" than the mean (i.e., average). The actual percentage of the long-term median total for April+May+June precipitation that an area receives correlates very well to the amount of forage that will be available in summer. For example, if this year the April+May+June total precipitation for an area equals 75% of the area's long-term median total for April+May+June precipitation, then forage production in summer will likely be 75% of normal. However, after extended drought, total summer forage production may be slightly less than the calculated percentage because of the stress that forage plants endured during the previous years of dry weather.

This approach can also be used to help manage risk. For example, if an area normally receives four inches of precipitation in April+May+June, and no moisture is received in April, examine the long-term weather records to find how often the area received four inches in May+June alone. Has this ever happened before? What is the likelihood that it will happen this year? Next, suppose the area received two inches of precipitation in May. Now examine the long-term weather records again to gauge the likelihood that two more inches will be received in June alone, so that by the end of April+May+June the area will have received its normal total of four inches. Although this method does not provide a large amount of lead time, this method can help ranchers estimate the amount of forage that will be available in summer, and thereby help them to adjust their grazing and marketing plans during and after extended drought.

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30-Year Precipitation Records for Helena

Year	April	May	June	May + June	April + May + June
1991	0.75	1.71	3.27	4.98	5.73
1992	0.55	0.64	2.36	3.00	3.55
1993	1.63	1.71	3.14	4.85	6.48
1994	1.45	1.23	0.84	2.07	3.52
1995	1.15	3.09	2.93	6.02	7.17
1996	0.70	2.42	1.20	3.62	4.32
1997	0.20	2.35	2.43	4.78	4.98
1998	0.64	2.27	3.03	5.30	5.94
1999	1.05	2.19	2.15	4.34	5.39
2000	0.73	0.98	1.42	2.40	3.13
2001	1.39	1.23	2.11	3.34	4.73
2002	0.61	1.86	4.36	6.22	6.83
2003	2.27	1.25	1.49	2.74	5.01
2004	1.82	2.21	1.07	3.28	5.10
2005	0.90	2.12	4.55	6.67	7.56
2006	2.95	1.77	2.69	4.46	7.41
2007	0.82	3.25	1.44	4.69	5.51
2008	0.49	2.62	1.58	4.20	4.69
2009	0.60	0.43	1.45	1.88	2.48
2010	0.74	2.13	2.85	4.98	5.72
2011	0.78	2.81	4.05	6.86	7.64
2012	0.59	1.35	0.54	1.89	2.48
2013	0.78	2.04	1.95	3.99	4.77
2014	0.87	0.28	1.71	1.99	2.86
2015	0.53	2.36	0.50	2.86	3.39
2016	1.01	1.45	1.38	2.83	3.84
2017	0.72	1.39	1.25	2.64	3.36
2018	1.61	3.26	3.36	6.62	8.23
2019	1.26	2.44	0.78	3.22	4.48
2020	0.72	1.57	3.15	4.72	5.44
Average	1.01	1.88	2.17	4.05	5.06
Median	0.78	1.95	2.03	4.10	5.00

Example with April + May + June Method using the median:

If 0.5 inch was received in April 2021:

5.00 - 0.5 = 4.5 (need to receive 4.5 inches in May + June to reach April + May + June median of 5.0 inches)

How many times in last 30 years has the area received at least 4.5 inches in May + June?

12 times, so 12/30 = 40% chance for normal amount of summer forage as of May 1st

If 1.5 inches more were received in May 2021, then April + May 2021 total = 2.0 inches

5.00 - 2.0 = 3.0 (need to receive 3.0 inches in June to reach April + May + June median of 5.0 inches)

How many times in last 30 years has the area received at least 3.0 inches in June?

8 times, so 8/30 = 27% chance for normal amount of summer forage as of June 1st

If 1.0 inch more was received in June 2021:

Total April + May + June = 3.0 inches compared with 5.00 median, 3/5 = 60% of normal summer forage

How to Access Precipitation Data from the Western Regional Climate Center

Historical precipitation data are available from the website of the Western Regional Climate Center. Unfortunately, these data are not very easy to find on the WRCC website. Listed below are instructions for accessing the historical precipitation totals for hundreds of sites across Montana.

1. Access the Western Regional Climate Center website: www.wrcc.dri.edu

2. Select "Climate Summaries".

3. Select "Western US Climate Summaries--NOAA Coop Stations".

4. Select either "Eastern Montana" or "Northern Idaho/Western Montana".

5. Select the weather station you want from the map or from the list on the left of the screen.

6. Select "General Climate Summary Tables", then "Precipitation", then "Monthly Precipitation Listings", then "Monthly Totals".

The web address of the map and list of weather stations in eastern Montana is: www.wrcc.dri.edu/summary/Climsmemt.html

The web address of the map and list of weather stations in western Montana is: www.wrcc.dri.edu/summary/Climsmnidwmt.html

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