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How to Talk With Ranchers About Drought and Climate Resilience: Lessons From Knowledge Exchange Workshops in Montana

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Abstract

This article offers the Extension community a pathway to drought resilience and climate-related conversations through knowledge exchange workshops. In 2017, a "flash drought" affected eastern Montana, and ranchers in the region faced numerous challenges. Moreover, drought-favorable climate conditions are predicted to increase for the region. We held five workshops to facilitate an exchange of adaptive drought management strategies, focusing on key themes for drought resilience: (a) drought planning and adaptive management, (b) use of local knowledge networks, (c) flexible stocking and grazing, and (d) adaptation to shifting baselines. Extension can use this approach to foster multidirectional knowledge sharing to strengthen ranching resilience to drought conditions.

Keywords: [drought management](#), [agriculture](#), [Montana](#), [climate](#), [adaptation](#)

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Introduction

This article offers the Extension community a pathway for opening doors to climate-related conversations with ranchers by asking them first about the weather. A unifying theme for decision making in agriculture, weather is a familiar and relevant topic for ranchers. Conversations about their experiences with extreme weather often provide a natural gateway to conversations about longer term climate trends and variability. Ranchers in the U.S. Northern Plains, for example, have honed their management approaches through lifelong experiences with weather, including its short-term, dynamic, uncertain, and extreme nature. If one creates an opportunity for ranchers to share their experiences, the conversation inevitably turns to recent weather events that were so unusual or extreme that they caught even the most experienced ranchers off guard. In the Northern Plains, extreme drought is often the focus of conversation, especially when it emerges more rapidly than usual, is more intense than past events, or persists over multiple years (Libecap & Hansen, 2002). During the summer of 2017, a "flash drought"—a short period of very warm surface temperatures and declining soil moisture levels (Mo & Lettenmaier, 2016)—occurred, extending quickly and intensely throughout eastern Montana and the western Dakotas (Gerken et al., 2018). Ranchers faced rapid declines in forage availability and water quality as well as several large wildfires. This unusual event prompted questions among ranchers and researchers about how it developed, why we collectively missed the warning signs, and whether such an extreme event might become more likely in the future—that is, whether climate is changing (Jencso et al., 2019). In fact, predicted changes in the region's climate will challenge ranch management through more variable precipitation and warmer summer and fall temperatures (Derner et al., 2017; Easterling et al., 2017; Wehner et al., 2017; Whitlock et al., 2017).

Drought management is a complex social, economic, and ecological phenomenon with diverse impacts across operations (Coppock, 2011; Kachergis et al., 2014; Wilmer et al., 2016). Research and outreach efforts often focus on what ranchers *could be* doing to adapt to drought and other weather or climate challenges. Opportunities to learn about what they already know and already are doing are less common. Ranchers have in-depth local knowledge of weather and climate derived from spatial and temporal scales different from those of earth systems research (Carolan & Stuart, 2016; Grimberg et al., 2018). Multidirectional exchange of knowledge among ranching community members and researchers is key to strengthening the drought and weather resilience of rural communities and rangeland ecosystems (Breuer & Cabrera, 2010; Meadow et al., 2015). Following the 2017 flash drought, we hosted a series of Resilient Ranching Workshops across Montana. These workshops facilitated an exchange among ranchers and outreach specialists about adaptive drought management strategies for future droughts. In the workshops, we sought to explore and better understand four themes of drought and climate resilience from the adaptation literature:

1. drought planning and adaptive management (Derner & Augustine, 2016),
2. use of local knowledge networks (Joyce et al., 2013),
3. flexible stocking and grazing strategies (Torell et al., 2010), and
4. adaptation to shifting baselines (Jorgenson et al., 2019).

Objectives and Methods

We developed a research protocol to elicit conversation among ranchers and researchers/Extension staff around the themes identified above. We synthesized and illustrated transcript data relative to our four

themes, using supporting quotations where appropriate.

Workshops were a collaborative effort by nonprofit organizations One Montana, U.S. Department of Agriculture (USDA) Agricultural Research Service (ARS), and Montana State University. We hosted five workshops in Montana communities—Billings (December 8, 2017), Forsyth (December 16, 2017), and Clyde Park, Two Dot, and Winnett (January 23–25, 2018)—with a total of approximately 100 ranchers and agency/Extension professionals in attendance. Attendees gave informed consent to participate and be audio recorded (University of Wyoming IRB protocol #20180417WK01963). Representatives of One Montana facilitated, recorded, and transcribed the proceedings of all workshops. We evaluated the transcripts for patterns in the strategies discussed across the workshops. For additional context, we conducted a single ranch case study of workshop attendee Alan Redfield, who owns and operates a cow-calf and hay ranch in Livingston, Montana, with his wife, Laurie (see appendix).

Findings and Discussion

Drought Planning and Adaptive Management

Proactive planning for drought was an important workshop topic. One participant expressed a representative comment: "Have a drought plan—good, bad, or indifferent—just have one. See how it works; change it for the next one."

Adaptive management research suggests that drought planning is enhanced with the use of thresholds (or "triggers") that indicate when to take specific actions (Nie & Schultz, 2012). An experiment conducted by the USDA ARS in Cheyenne, Wyoming, has been focused on evaluation of the use of triggers such as (a) prior fall soil moisture and residual plant biomass, (b) early spring drought conditions and seasonal (1- to 3-month) precipitation outlooks, (c) livestock market conditions, and (d) individual/family risk tolerance regarding adjusting stocking rates to more closely match animal demand with forage supply (Derner, 2019).

Weather, rangeland, and livestock market monitoring informs trigger-based decision making. Workshop participants said they made decisions based on ocular estimates of standing forage and precipitation records. One participant noted, "Our usable rainfall comes in such a little window that you really don't have to be a scientist to figure out that you're in trouble. If April's dry and May is looking bad, you better start having a plan."

The Montana Climate Office maintains a collection of daily climate data from over 4,000 monitoring stations (the Climate Stations of Montana) and 56 cooperative Mesonet stations, which provide measurements of various weather and soil moisture conditions (<http://climate.umont.edu/mesonet/>). The importance of user-friendly access to these data was illustrated by one participant: "I grew up ranching, but we just bought a place. We're essentially starting over somewhere different, and the ecological and weather patterns are so different." Ranchers are often aware of emerging regional drought conditions, but localized data could better inform their ranch-level drought decisions. They noted that localized data could assist government agencies in making timely and spatially relevant designations for federal emergency drought assistance.

Use of Local Knowledge Networks

Participants valued opportunities to communicate and share knowledge within "local knowledge networks" to

enhance ranch drought resilience (see also the appendix). Although ranchers can be fiercely independent, their local communities are important sources of support. One rancher said,

"We all get so busy managing our own ranch, a lot of times we don't talk with even our closest neighbors. So, things like this [workshop] are good for that, I think, to share ideas. And I think we probably need to do it more often than we do."

Local knowledge networks might encompass informal interactions with neighbors and other ranchers in the local area or more formal interactions with producer groups, commodity organizations, and county- or state-level drought committees. Local conservation districts and county Extension offices are trusted resources rooted in their communities (Borelli et al., 2018) and may be uniquely poised to facilitate knowledge exchange for ranch drought resilience.

Flexible Stocking and Grazing Strategies

Flexible stocking and grazing strategies involve changing stocking rates to better match animal demand with forage supply, both within and across years (Derner & Augustine, 2016). This alignment can be achieved in several ways, including through (a) stockpiling forage, (b) weaning early, (c) grazing dry cows (cows that either did not become pregnant or lost a calf) into late summer to increase marketing options, (d) retaining additional replacement heifers in the fall following weaning, and (e) purchasing or contract grazing yearlings when local knowledge and monitoring indicate a better than average forage year. Many participants described using a "two thirds cows, one third yearlings" stocking approach to achieve operational and stocking rate flexibility. These flexibility strategies described by participants align with economic evaluations of flexible stocking, which have predicted higher financial returns as compared to returns associated with fixed stocking (Torell et al., 2010). Such evaluations also have indicated that as precipitation variability increases in the future, the proportion of yearlings in an operation should be increased to maintain economic returns (Hamilton et al., 2016).

Workshop participants had extensive knowledge of flexible stocking strategies, despite a prevailing reluctance to cull cows during drought because of the cost of replacing animals having locally adapted genetics. "Home ranch genetics" developed over many years are often deemed as irreplaceable (Scasta et al., 2015). This attitude is reflected by one participant who stated, "Nobody wants to sell their cows. Nobody. . . . but sometimes you have to." Strategies for selling cattle prioritized "performance-based culls," or removing older and lower performing cows from the herd first and then reducing replacement heifer numbers during drought conditions.

Transporting livestock to areas with more forage or purchasing feed can be economically unfavorable. One participant said, "When it's dry, it's going to be dry in a fairly sizable area." Another participant noted that the philosophy of "leaving some grass but making your own place sustainable with your own numbers" allowed for flexibility without the need to cull deeply during moderately dry years.

Adaptation to Shifting Baselines

Weather conditions outside the historic range experienced by ranchers open the door for conversations about climate (Jorgenson et al., 2019). For example, shifts in the timing of precipitation and plant phenology may lead them to adjust to haying and shoulder season grazing, as highlighted in Redfield's interview (see

appendix). One Extension specialist summarized adaptations he had observed:

I'm not a climatologist, but it seems like spring is coming 3 weeks earlier than it did 40 years ago. And winter comes about 3 weeks later than it did. It's had effects on calving, with people trying to calve later—to time it with the green. It seems like the green is moving earlier in the spring. Now I know people who are starting to move their calving up again. The other thing is that hayfields used to be dormant around October 1st. Now, [you] don't really want to graze it then because it's still green and if [you] do, it's going to hurt those fields.

Another important challenge for ranchers dealing with shifting baselines is fewer reliable water resources for hay production and cattle water. One participant monitored local snowpack to anticipate growing season conditions: "The way it works, especially with our irrigating water, is to look up at the mountains and see what the snow drifts look like. If we don't have a good winter, then we usually have a dry summer." Unfortunately, snowpack in the western United States is expected to decline in the future (Easterling et al., 2017). This circumstance underscores the importance of planning and coordination at the watershed scale for adequate water storage, water access, and water rights enforcement. At the ranch scale some producers have invested in water storage and infrastructure: "Putting in cisterns and piping changed our place. In drier years, it's gold."

Conclusions

Extension programming that brings ranchers, researchers, and outreach specialists together in conversations about drought and climate resilience can facilitate multidirectional knowledge exchange. Rather than focus on what ranchers *could* do to improve resilience to drought, outreach efforts should engage ranchers with what they already are doing to link comfortable topics (weather) with less comfortable topics (climate). We identify four elements of climate resilience Extension professionals can address with ranchers in conversations about experiential knowledge and contexts and challenges of drought and climate in a region:

1. developing adaptive drought management plans, implementing formal and informal monitoring, and identifying "triggers" for decision making;
2. building local knowledge networks to share information and resources;
3. employing flexible grazing and stocking strategies to better adapt to dynamic forage production; and
4. adapting to shifting baselines with forward-looking planning at multiple scales.

Effective communication and efforts to establish trust among ranchers and Extension professionals will help build management–science relationships and increase the effectiveness of future Extension programming. In closing, a workshop participant noted that the take-home message for ranchers is this: "Stay flexible. In this day and age, people that stay written in stone, that's what they're going to end up being—a stone."

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Appendix

Interview With Workshop Attendee Alan Redfield

In the interview transcribed here, Alan Redfield discussed drought management and adaptation on the Warfield Ranch, owned and operated by Alan and Laurie Redfield.

Author's note: This transcript of a semistructured February 14, 2018, phone interview with Montana rancher Alan Redfield was transcribed and included in this article to provide additional context for the themes around drought resilience described herein. Mr. Redfield was a workshop attendee and provided informed consent to have his name and ranch name listed in this article with this interview, which was prompted by general open-ended questions about his decision-making processes and barriers and opportunities for drought resilience. Although it is conventional to edit spoken word transcripts for grammar and to remove repeated words and other informal speech patterns, these edits remove valuable data and meaning from the original text. We transcribed his speech without removing words to preserve his language. Where words are added to the transcript to enhance interpretation they are enclosed in brackets ([]). Researchers and Mr. Redfield are indicated by their initials.

AR: I'm Alan Redfield, and my wife and her family along with her sister operate the Warfield Ranch. We have a cow-calf operation in Paradise Valley, south of Livingston, with summer grass east of Livingston. I've been involved in ranching my whole life, growing up in eastern Montana and moving to Livingston 40 years ago. We raise primarily Angus cattle, hay, and timber on the ranch. We are a high-altitude ranch, starting 5,500 feet and going to 7,000, which provides some interesting and unique challenges with animal health, and, ah, breeding [to] prevent some high-altitude diseases in some of the cattle.

HW: Ok.

AR: We raise Angus cattle, Part of the reason for that is because they're more adaptable to high altitude, and we don't get the Brisket disease, which is caused by the altitude. Um, one of the unique things is we get more rainfall than the rest of the valley because of altitude, plus we're, we're on the north slope in the valley, and we also get about a third of the wind of the rest of the valley, which is a huge factor in what I see as affecting drought, drought and severity of drought. And we also have more water resources just because of the same thing.

HW: Because of your location?

AR: Because of the location.

HW: Ok.

AR: One of our challenges in the drought, and it's been a long-running experience, is in the summer grass, we are dependent on natural springs for our stock water. And with that, the snowpack and the drifting, you wouldn't think about it this way, but the drifting makes a huge impact on those springs.

HW: Right.

AR: On the high ridge east of Livingston when the snow, when they get snow, we also get high winds, like is happening today, the 88 mph gusts that are making things interesting. Put those drifts into a lot of the draws,

and they make really good hard drifts—they'll last till May and June—well those drifts also provide the source for a lot of our spring water. So it's really dependent on the snow. And, starting late '80s, '87-'88, which were a major drought, I mean, to me that was way worse than what we experienced the last year or two. Ah, starting, showing us that the way, the water situation, stock water situation, was set up on the ranch, previously we were just letting them drink out of the springs. So there was a lot of mud holes, they were drinking in that, and just little tanks, or [an] old bathtub was the tank. These were old homesteads that were put together, and my father-in-law bought it, and so when Laurie and I showed up and started looking at things, in the '80s, by then we decided we needed to do some things. So we started developing the springs more. Containing them, getting them into pipelines. And those big earth-moving tire tanks. We've been trying to put one or two of those in every year. Partly, that just, just a good water source, the cows come up and get a good drink. 100-gallon tanks, also, it stores it longer, so we don't, the cattle can do a little better job.

HW: Ok.

AR: And, the '17 drought affected us in that we had lower weaning weights. And, I guess, than we have had in the past couple years. Compared to some people. Some people said well that's not a big deal, but when you're off 40 pounds, you know that's 40 pounds times 2 bucks, or whatever you happen to get that year. This is a substantial hit to you. The other thing was this year we had amazing grass. My sister in eastern Montana was talking about the drought, and they were having to sell cattle in June, or sell pairs, because already could see they weren't going to have the grass available. So I sent her a picture, when I was spraying weeks up there. And you could barely see my tractor in the grass.

HW: [Laughing]

AR: [Laughing] So we had really good growth, but what happened was in August it went to crispy-dry and turned it all to straw. Basically.

HW: In August.

AR: And, so, you know, you have your mind set, you're up there, looking at it, and you're doing things. And you're going, alright I've got all kinds of grass, well the quality started going all to heck, and I didn't get on, you know, I didn't get on it soon enough, by putting out Crystallex tubs, or molasses tubs, which would have helped the protein, helped them digest it. I think that hit the calves. The cows did fine, but I think it affected the calves.

HW: Wow, ok, I think that's really interesting. Yeah, we heard a lot about people selling in eastern Montana and the Dakotas. Before the weather people even really knew what was going on. That's an interesting point.

AR: Well, that's one of the things, you know, we talk about, and when you look at drought and preparation from drought. I look at it because, a little different, because, I'm, I'm understocked all the time.

HW: Ok.

AR: That's one of the main ways of going about it, is understocked. When a possible lease comes up for some pasture, say it is 20 or 30 head, you know, that's perfect, because I can lease that for that year. Well that takes, reduces the pasture I have on the other pastures, I can back it off, take 30, you take 30 pair out of your rotation and that, it makes, that really helps that pasture. I've been doing that for the last couple years.

HW: Ok.

AR: Plus, I do a lot of weed spraying. I've got a program, every year I try to spray about 40 acres of pasture with aerial spraying to control brush. I've got some of the sagebrush and nine-bark and a lot of the others that take over and small fir trees. If I spray a chunk every year it backs it off, allows grass to do better. And if you time it right, it doesn't take out all the forbs. If you get it too early in the spring, it will smack a lot of those forbs, whereas if you do it later, earlier in June, instead of May, the forbs, some of those are already going to seed, so you don't take those out. A lot of people worry, don't think about, they think grass, grass, grass—well, you start looking at what a cow eats, they consume a lot of forbs.

One of the other things that we do, we use a rotation system, but we're limited because of the amount of poison in some of the pastures. We have a tall-larkspur problem. I have to go to one pasture, the same pasture, every year early because the rest of the pastures have massive amounts of poison.

HW: Ok.

AR: But in a year, but a year like last year, we had to move our rotation up, because the fact, when the poison dries up, the cows aren't going to eat it, so if it's dried up, then I can rotate sooner or take them and put the cattle in smaller bunches and push them in other pastures. Then each one has a smaller group in it, and then they aren't so stressed on the water. They don't all try to hit the same tank.

HW: That's really interesting.

AR: One of the other things we do when we're working on the drought thing, and we've been doing for a number of years, it really helps out in drought years, is we identify our cull cows early on in the season. Before we go to summer grass, we pretty well know which cows are going to be headed to market that fall.

HW: Ok.

AR: And we usually bring them home in September. Wean the calves, ship the cows, put the calves on irrigated pasture with some pellets. Well, on drought years you just watch, and if, if it looks it's happening sooner, you just bring them home a month earlier. Bringing them home a month earlier gives you that bonus, that way. Ah, it's a twofold deal, and we've been doing it this way for a while. Just because the fact, the cull market is \$250–\$300 a head higher in August and September, then you go from October, November, December.

HW: Right.

AR: So, that's an important management tool we've been, we've been working on. So, ah, it takes, you know, getting them off early, get pressure off the grass, and that we can leave as much. We try to leave quite a little bit at the end of the year in case the next year is not so good.

HW: The, the grass?

AR: Right. And, on the grass. And so, you know, we knew it was going to be short, but we had good fall moisture this year. We ended up coming off of summer, we like to stay until Thanksgiving, but we came off way earlier, first part of November, we came off, and had good moisture but good warm-up after that snowstorms, and everything greened up good so we had real good regrowth. Regeneration on it. Ah, it will be,

there will be some good early grass there.

Another way that we work on drought is if it keeps getting bad, we have contingency plans, always. We have rolls of electric fence. If it looks like it's going to start to be that way, we'll start bringing the young pairs home, and then we fence off portions of the hay meadow and graze those cattle on the hay meadow.

HW: At home. Ok.

AR: At home. Because we have a really good water right, so we're always irrigating. Our irrigation, you start in May and quit when you're tired, or it, or it freezes up because it will go that long, our water right goes that long.

HW: Wow, ok.

AR: We have really good soil, and we have good water retention in those soils. That's our way of dealing with it and our plan. Our drought plans.

HW: And do folks that don't have that option for irrigation, do they end up buying forage?

AR: A lot will buy forage. Some will just sell down their cows. I've got a friend in eastern Montana that they had the ongoing drought in the early '90s, and ah, talked with him, at a, at a meeting, I don't remember what the meeting was. Anyway, he'd fed cows for 380 days straight.

HW: Wow.

AR: He was down to, he started with 600 cows and was down to the last hundred. So those people, you think about, you know, you spend a long time developing a cow herd, well, he was down to his core hundred. And, boy that's hard, hard to build back from. When that happens. But a lot of the producers in eastern Montana will put up hay when they have hay, and store hay for years, for that reason. Or, they know they will sell cows. And, you know, they identify early on, they have their core set, and you have your different levels, which cows are going to go, which ones aren't. In fact, I've got, I was asked yesterday if I have any hay for sale, because I've a person from Sidney was coming up with semis to buy hay and wondering if I had any. I sold out the hay.

HW: I did have a question. Yesterday I was talking to someone about multiyear drought, you know, and the hypothesis was that people are sort of, pretty ready for 1 year, maybe 2 year, but, you know, you talked about the '90s, down here we had '02, '04, '06, '08 were dry. Anything different with, if, if drought is more prolonged? Or are you pretty well set up for something along that?

AR: Well, I think we're fairly set up for it. Prolonged drought. I mean, Montana, Montana's only 30 days away from a drought at any one point. Or two weeks. And, a lot of eastern Montana, they plan on it. Growing up in eastern Montana I thought 6-inch-tall grass was a bumper crop and 10 inches of rainfall was great. Until I moved to Livingston area, I thought, wow, this is like amazing. To have this kind of water and grass. Ah, but, regardless you have to plan for it. '87-'88 to me, those were the worst ones, you know, in my memory, because, we have, you had 2 years that were pretty bad, so you had to really, really plan. We had our cow number were down. We culled hard, and they were down. I know there was a lot of cattle went to market one of those years. In there. Somewhere. Big Timber was experiencing a major drought and I had all kinds of grass. So they were selling, they were selling pairs in Bozeman, they were splitting the pairs up. And I was, I

just went and bought the calves. I bought 550-pound calves, came off of some drought thing in Big Timber. Brought them home and put them on irrigated pasture, and put 200 pounds on them and sold them again that fall. There's just, everything is different, every area is different.

HW: There's variability across two counties or three counties that you're able to take advantage of.

AR: Ah, well, I, there's variability just in the valley.

HW: Yeah.

AR: Our ranch, where we're at is 5 miles from my wife's uncle's place. There was some, a lot of years, 10 inches difference in rainfall in that 5 miles.

HW: [Chuckling] Wow.

AR: They both kept, my father-in-law and he both kept extensive records. We've got rainfall records going into the '40s, and they kept records like that.

HW: That's neat.

AR: So we can compare them. And we knew what was going on.

HW: That's super interesting.

AR: To me, we have so many microclimates. You, you talk about, what weather, what do I use Mesonet or whatever. I've never used Mesonet. But we study rainfall, we study and watch the pattern, weather patterns. Today's weather forecasting is so much better than it used to be. I look, take and look at satellite maps, and you can kind of tell what's going to go on. This summer, last two summers, everything's a month early.

HW: Wow.

AR: Our frost-free period, early by about a month. And normally I can't plant alfalfa where I'm going to seed, where it gets new seedlings before about, you know, the middle or end of May, this year and last year about the end of April, I could have done it, and I should have done it. I have one crop that is fairly stunted because I couldn't get water across it fast enough. It dried up, and, boy, it was done. So those are the kind of things that, you know, that you observe, just spending time out there all the time, and you go, man, this is early. And frost is out, and, man, I can farm, and then I started looking back. We keep diaries and we have diaries from 1947 on. You back up into the '50s, you see that there was some of these kind of times, and there was a portion in the '60s where it was really dry, when the irrigation is shut off, to the neighbors, or when you were done haying. Things like that.

HW: That's interesting.

AR: Two years ago—we normally started haying on the 4th of July, buy after the 4th of July. And we were done by the 4th of July 2 years ago.

HW: You usually start. Hmm, ok.

AR: Yeah. So with, you know, we were done haying by the time we normally start. And I got a terrific second crop because, a month, you had more growing time. Lots of year, I never plan on a second cutting because of

the altitude and aspect of the ranch. Some of those differences, I think.

HW: Wow, you're really good at explaining this whole story.

AR: Well, and every ranch is so different. You know, and we have three different parcels. We have one on west side of the valley, one on the south side of the valley, which is the main place. And we have the stuff east side of Livingston. Every one of them has its own climate and its own thing. The one on the west side of the valley typically is drier, and we're coming out of there September. Well this year, every shower that hit went up there. It stayed green and lush through October. We were dumbfounded because we can only take 40, 30–40 pair up there. And had we known it was going to be like this, we would have taken 60 pair.

HW: So you would, actually, increase, or you might take them off. That was one hypothesis we had was that people weren't going to want to, ah, stock higher in the good years, certainly something we've observed down here.

AR: Well, ah, we stock higher on some.

HW: Ok.

AR: But we don't buy any extra. We have our cow herd size, and we're fairly limited, we know about what we can run, and, so move things around. And people have to realize, and this is where I think some people get in trouble, is that the cow size has increased in the last 15 years, quite substantially. Everybody talks about one animal unit. Well that's 1,100, 1,200-pound cow, per month, that's one animal unit, or cow–calf pair. The average cow now is 1,400 to 1,500 pounds. So they have to eat more, so you're using more grass. You have to take some of those things into consideration. Um, the high desert people in Nevada and Idaho, we have friends down there, which is interesting, because they run Forest Service in the summer and BLM on the desert in the winter. They don't even bring the cows home. After they're first calf heifers, those cows never see the home place.

HW: [Chuckle]

AR: I thought, wow! And we're, we, the area we're in, we have high costs because we have to feed so much. When winter hits in November, and you feed, we figure on having feed through the middle of May. Every year, so you've got, you've got at least 6 months of feed somewhere that's put up, or, and, after I was in Kansas a couple weeks ago, you've got grass dried up, but they feed cake. They don't hardly put up any hay. I look around and go, this is pretty low-cost deal here. They don't have to do anything but drive around with their feed truck and roll out a few pellets now and then. And meanwhile I'm chained up on all four on the tractor and turning through snow and sliding on the ice.

HW: That's so, those regional differences are so interesting to me. Well, I liked this question, if you could tell a range scientist, or a climate scientist, um, one thing to help us better understand ranching, what would it be?

AR: A range scientist, and as you know I've been involved in range for quite a while, and I've gone to every range workshop that they give out, and you need, what the, they need to understand the microclimate part of it. That everything, everybody's ranch has microclimates, and, ah, you can't just say, alright we have this drought in this area, and this is all bad. You need to get it pieced together a little closer because, and find spots that aren't in those areas. And that's where I was talking about climate. So locals do know about the

climate, and what, we've been a month early. Well, I thought maybe it was just Alan thinking that. I talked to other people, we were at the meeting that [you] put on, and I wasn't the only person that was thinking that. And, the thing that I think we need to get out there is that we've got a lot of new people that are buying ranches, whether they're buying for recreation, or whatever, and a lot of times they'll bring in a manager, not from the area. Well, they're at a severe disadvantage, and that's when they really need you guys' expertise, the range science expertise, Extension expertise, to help them out because they don't understand where we're at. With what's going on in the, in the cycles.

And also, and this is something that is maybe just a pet peeve of mine, and I found that out when I was driving around campaigning, is that, ah, there's an awful lot of ground out there that's covered with a lot of grass, and they're a fire hazard. Everyone gets worried about fire when there's one close, and a year later they forget about it. Well, boy, there's a real opportunity that we should be trying to figure out a way to tap is, grazing these smaller acreages.

In fact, in the Bitterroot Valley and Helena Valley, there's some people there who want to be in agriculture, don't have big places, don't have the opportunity to have places, but they've gone and leased up a lot of these 30-, 40-acre pieces, and they can run 10 or 20 cows here, there, and a lot, they're able to have a viable operation by doing that. And I think education for the John Q. Public on some of that would be real beneficial. Especially for the fire and the weed control issues.

HW: The benefits of grazing.

AR: Yeah, the benefits of grazing. Plus, you know, those people get a little bit of income, but what it does if you have a fire come through and it's been grazed, the intensity is down versus if it's been all grown up. I drive down the East River Road, and there's a subdivision there I went and found out, looked at their covenants: "There shall be no grazing." I'm going, it was an old hay meadow, and you've got 3-foot-high plants out there, and then they start worrying about fire, and there's no way to control if something hits those. You got a wind in the Paradise Valley, and you get one spark, and it goes the whole length if it could so.

HW: That's really insightful. Thanks for sharing those thoughts.

AR: The workshop, you know, you talk about, a lot of time I won't gather as much out of the workshops. What I was really tickled was to see, the one that we were up in Clyde Park, the number of younger producers that were there. I was really tickled to see that. Because there's some people that are trying to get started, for example [Name], and all he's wanted to do is be a rancher, and he's never been able to do it, now he's getting into it.

HW: Ah, that's good to hear.

AR: I mean, he just shows up. And I'm going, you know, he talks to me all the time because we're neighbors up there, so to me, that's, that's one of the things. You may not teach Alan a lot. I learn something every time I go. You're not going to get some big impact [like] you would with him, as he did, but for me there's always a little tidbit. And one of the examples when you're doing these Crystallex tubs, one of the guys talked about is, you don't want to do the biodegradable ones in our area because of the grizzly bears.

HW: Ah.

AR: Grizzly bears eat the biodegradable stuff, which is like a sugar wafer to them. And then they take and bury the rest of the tub. Big hunk of molasses, they dig a hole and bury it. Well then you're riding along on your horse and it steps in [the] hole. Steps in this mass of molasses that this bear has buried. You don't even think about it. I mean, I knew I've had problems with the bears using them, which is kind of why I don't like putting them out a lot of times because the bears, and they show up, and using them as much as the cattle do. But I didn't think about the biodegradable ones, which are nice, you don't have to go pick up the metal tubs. But, for me, I have to use the metal tubs because of the bears.

ZB: I forgot about that Alan. That was funny.

AR: You don't even, it doesn't even enter your mind, and you just go, wow! Those are just little tidbits. A lot of people aren't going to have that issue, but we're in the front zone where the bears are, I mean, a major issue.

AR: You know, sharing knowledge among ranchers is always helpful because you might hear something that somebody else does, and I never thought of that. Like, wow, that could work. And vice versa. And I think that, being able to share that knowledge, and kick ideas around, is extremely valuable. It gives it a form where you can do it, and I think that's always really helpful.

HW: That's good to hear. That's what we're trying to do, rather than the talking-head show, you know, but it's hard. [Laughing]

AR: [Laughing] I know. You've got to have an open mind on it. I'm getting to be a grumpy old guy, but, you know, I always look at it, I can always learn something. I can always take away something from everything I go to.

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