

Managing during and after drought – Part I

Julie Elliott, USDA-NRCS, CO

I'd like to see a show of hands. How many of you considered yourself in drought in 2012? Keep your hands up if you considered yourself in drought last year at least until late summer or fall. Keep your hands up if this spring you thought drought might impact your operation. Keep your hands up if you feel drought is still impacting your operation today.

(See slides corresponding to below numbers immediately following the numbered list.)

1. Drought has certainly had an impact on much of the U.S. in 2012, which inspired scientists to work on ways to outdo Mother Nature. Anybody have some of these?
2. It is incredibly important that we understand the long-term effects of drought regardless of what the rain gauge tells us. Directly coupled with understanding the long-term effects of drought is knowing how to plan for recovery.
3. So, where are we today, August 12 of 2014? If the rain gauge says the drought has broken, does your land agree? The grass may be green, and it may even be growing, but does that mean there are not residual drought effects? How do we make management decisions? Perhaps, we should start by looking where we have been to figure out where we are today.
4. Drought means 75% or less of the long-term cumulative average ppt. Drought happens in NE Colorado about half of the time. No matter what number you use to define drought, when the cactus starts to look like this, you know you've reached dry.

Precipitation is only part of the story. It certainly is the driver of drought and drought recovery, but it is so much more important to know what is on the range. The only way to know is to go out and look at our range. We have to see what is happening on the ground.

5. It is helpful to take a yard stick and either sharpen it a bit to a point or tie it to a big staple or dowel rod to hold it up. Take your camera too, or a cell phone (as long as you or someone you know can download the photos off of it). Deep down you know you will not remember exactly how things looked in August of 2014. Take pictures!
6. Now, we're walking, remember? Even on foot however, we need to be careful not to make our assessment based on looking across the range. Here is a piece of range that looks pretty good on the 31st of May, particularly considering that this area was sitting at a 31% precipitation deficit for the year after ending at 50% of average precipitation from the previous year.
7. Here's that same piece of ground looking down. It's a different view, isn't it? No, I don't have my sharpened yard stick or a big staple to tie the yard stick to, so I used my pickup key. If we really want to know what is happening on our range, we have to look down. But what are we looking for? Roy Roath, CSU Extension Range Specialist, once made the point to me that cows

don't eat acres, they eat grass. It doesn't matter how many acres you have, it matters how much grass you have. So, how much grass do we really have here?

8. This pasture obviously isn't in stellar condition on the 17th of May. What do you think? If we let it sit for a month, until mid-June, we should be able to put some cows out there, right?
9. I promise, this is the same location we were just looking across. If you said, yeah, another month will be good, do you still think so? How much grass cover is out here? This is the same 3" pickup key, so we're looking at an area that is about 9 square feet. Remember, cows don't eat acres; they eat grass. When we are out in our pasture, the first thing we are going to note is how much grass is out there. The second thing we need to look at is what kind of grass is out there. Notice these plants here in the bottom right that are pulled out. What are they? This is 6-weeks fescue. Some people call it Junegrass or spitout grass 'cause that's exactly what the cows do when they get it in their mouths: they spit it out. Just because there's green out there does not mean there is something for the livestock to eat. It's not so important that you know all the names of the plants, but you do need to know which ones are tasty, and when they are tasty, and which ones are not tasty – ever. It's also important to know what the plants are telling you. Some plants tell you things are good, such as leadplant, winterfat, sand and big bluestem. Some plants tell you things are drastically wrong. Those include spitout grass, cheatgrass, and annual barley.
10. The next feature to note is what else is, or is not, on the ground. The most important of these are: dead grass plants, bare ground and litter.

Even in the best conditions, there are plants that die every year. In droughts those plant losses are even higher. Dead plants won't grow leaves no matter how much rain you pour on them. Dead plants are easy to find in the summer, at least in summers that turn green. The dead plants are the ones that aren't green.

11. When living grasses are dormant, whether winter or summer, they have a tan color to them. Dead grasses have a black or dark grey color. Here's a good close-up, down-looking photo. You can see the tan leaves with a little hint of red. These are living plants. What about these black/brown areas? These are dead. They may send up a new bud, but the old plants are done. They are not going to turn green. The green plants are 6-weeks fescue/spitout grass. On the yardstick, about half of the plants along this 9 inch length are dead. Now 9 inches is not a good measure for your entire pasture. You need to look in numerous areas and estimate how much of the plant cover is living vs. dead. Because – acres don't feed cows; grass feeds cows.
12. The next characteristic to note is bare ground. Just like crop ground, bare range ground heats up faster, causes more moisture to evaporate, soaks in water more slowly, and is more likely to wash or blow than ground that is covered. The hotter the ground is, the less friendly it is to roots or to the microorganisms living in the soil. Active micro-organisms release nutrients. Nutrients feed plants. Once these little micro-organisms die, or go into survival mode, it takes some time for them to reactivate.

13. Litter is the driver in your grassland system. Litter protects the soil from wind and water erosion. It keeps the soil cooler, so the water that soaks in the soil stays longer. This improves living conditions for the root systems and the microorganisms. The more litter cover, the faster our range will recover. Most of the ground in this photo is covered with plant litter. The grasses here are all perennial plants we want. We do not see any stuff we don't want. This pasture is in a great position to withstand continued drought and to really recover once a favorable ppt pattern returns. Remember – acres don't feed cows; grass feeds cows.
14. If we only consider what's going on above ground, we're just getting half of the story. If our information is not balanced, then our decisions will not be balanced either. The most important thing to consider is what we can't readily see: the roots. Plants are like icebergs – what we see is only a small part of the whole. And, as the Captain of the Titanic learned, it's how we manage around what we can't see that will determine our fate.
15. Roots are remarkable beings, beautiful and worthy of our admiration. Roots are a vital supply line of moisture and minerals. They are more than the sheer depth of 7 feet to 9 feet. Look at the miles and miles of fine roots, on the right. The roots so dense you can't see through the mass. The plants here are all native tallgrass prairie species. If your rangeland plants have roots like these, there is not a drop of water that they won't find. But, maybe more importantly in droughts like this recent one, there is a lot of material that can be burned off for energy to keep the plant alive.
16. Plants replace about 30% of their roots every year, just like we replace our skin cells regularly. To replace roots, the plants must be healthy with a full array of leaves actively capturing sunlight energy and changing that light energy into carbohydrates and sugars for growth and food storage.

When the leaf volume is reduced, either due to overgrazing or drought, root growth and replacement is reduced. If enough of the leaves are removed, root growth is stopped, simply because the plant cannot make enough energy to grow any roots. In fact, just like our bodies burn fat and muscle when we get really sick or injured, grasses burn roots when they are stressed. Smaller root systems lead to plants that are less capable of recovering from drought or grazing.

17. Drought is an Olympic meet for our pastures – one that lasts not for a month, but for many months. West of the 100th meridian, these months can easily add up to years. This swimmer has been conditioning many years to prepare for the Olympics. Likewise, our rangeland needs to be conditioning many years to prepare for and survive the next drought. The better condition our rangeland is in, the faster it will recover once good growing conditions return.
18. Many of us had good moisture last fall. For some of us, the conditions last fall were the best in years. However, the moisture last fall did not undo the damage done during the drought. These prairie sandreed plants were grazed in early June of last year. I took the picture this March. They should be 4 to 5 feet tall, not 6 inches tall. Despite receiving more than 10 inches of rain between July 1 and October 1, these plants did not regrow, or grew only

minimally, after they were grazed. Ten inches is 153% of the long-term July-September average!

19. Your place needs to have its own rain gauge. Do not use the rainfall amounts in the paper, the official NWS reporter, or even your neighbor for your rainfall. Here's a perfect example of why. This is a CoCoRaHS (Community Collaborative Rain Hail and Snow - www.cocorahs.org) map for Perkins County on July 12 this year. Look at the variability. You must first have rain before you can have grass.
20. People might state we've had good moisture this summer, so the grass is good. Rain is just part of the story. Just because the total rainfall is good or even great does not mean the grass growth will reflect that rainfall. As Dr. Pat Reece told me, the soil takes its share of the rain first. Many people do not realize that there is still water in the soil even when a plant wilts. That water is just not available to the plants. Our soils were past the wilting point of dry. They were closer to oven dry. Even after all the rain we have had, ranchers have reported hitting dry soil at four feet. Where did all the water go? The soil profile below the wilting point has to be filled first, before we can start having plant-available water.
21. This sand bluestem has had over 5 inches of rain in the last 2 months and 150% of long-term average precipitation from July to October 1. It just had a half inch of rain in the last 3 days. The temperature is 76 degrees. The grazing period has not been during sand bluestem's primary growing period in several years. You wouldn't know it to look at it though, would you? The leaves are falling over, starting to roll up and just not right.
22. This blue grama plant is just a few feet away from the sand bluestem. You can see dead plants to the right of the tape measure and plants that are barely functioning on the left. We cannot make our grazing decisions at the rain gauge.

Remember, our grasses just went through one, or several months, or years of really hard work. It is going to take some time for them to recover fully. So how do we help our pasture recover? What about the "take ½, leave ½" idea? The problem with this philosophy is that it deceives a person into believing that there's always something for livestock to graze. It leaves the impression that there is never a time when cattle should no longer be in a pasture. Is that true? If the grass is 12" tall, can we take half? Maybe, depending on the species, the time of year and what other cover is out there. What if the plants are only 2-3" tall and 12 inches apart? Is it okay to graze that half, 1 to 1.5 inches? Take half/leave half is a recipe for disaster in a drought.

23. Remember this photo? In June, a 6-inch stubble is reasonable enough, but what happened? 150% of average precipitation later, it is still 6 inches! We don't know what the total growth will be until the end of the growing season. By then it's a bit late to determine half.
24. We must walk our pastures and see how the plants are doing. Every grazing decision we make should be set against these questions. If I do X, will it: Increase the number of new plants? Leave plants tall enough to capture snow and slow down wind speeds at the surface of the ground? Increase the amount of litter cover? Decrease bare ground?

25. You must properly anticipate how much supply you will have and what the demand will be. The trick is to anticipate how much grass will grow and making a plan for the livestock demand that is significantly less than forage supply. NRCS, Extension or private range consultants can help you determine how much grass you might reasonably expect.
26. I'm guessing that most of us like football. If you watched the Broncos last year, you saw this scene regularly. 'Ol number 18 here isn't creating a new play. He is changing the play based on the situation at the line of scrimmage, but it is not a new creation. The play he chooses is one of the options based on the where they are in the game, the score and the defense arrangement. The play clock is ticking and by the time 'ol #18 calls for the ball, there is very little time left. If his decision is not put into motion immediately, there is going to be a penalty.
27. Like a good football team, you need a playbook that has been well thought out long before you hit the field. If you don't get the play in motion before the play clock runs out, the penalty you pay is far higher than 5 yards. You may force a change in plant communities resulting in a lower livestock carrying capacity. This is a huge penalty that will last for years, or maybe even decades. Here are some critical situation questions you might want to include in your playbook. How did the pasture finish the growing season the last two years? How much moisture is in the soil profile on April 15? June 1? July 1? August 1? How much standing grass is there on each of these days, in the grazed and ungrazed pastures?
28. Critical to know: When the bulk of annual ppt comes – look at long-term averages. For most of the folks west of the 100th meridian, I bet it's by ~ July 15. When does most of the plant growth occur for the grasses on your ranch. I'll be darn, just like the rain, by ~July 15. Rain that comes after ~July 15 will result in big seed heads waving high in the breeze, not in leaves and forage for livestock.
29. Here are some example parts of real ranchers' playbooks. Notice they have trigger dates – rain begets grass. They have flexibility; these animals go. They stick with options in the playbook. They aren't making a new one. This kind of planning needs to be done at the kitchen table or the meeting room with all of those affected by the decisions so your team can think about what management to apply in what situation. This is not an "in-the-heat-of-battle" project – as in when the cows are out of grass. The indicators you will use and all of the management actions need to be thought out to the best of your ability and written down.
30. Until after your ranch has had at least one full growing season of near average ppt, the number of pounds of forage demanded by the animals needs to be substantially less than the expected pounds of forage supply. Notice I said until AFTER you have had ONE FULL growing season of near average precipitation, not WHILE you have near average, or when you THINK you will have near average. I said AFTER you have average precipitation.
31. Remember – acres don't feed cows; grass does. No matter how much it rains, plants that are dead will not grow. Water and nutrients beyond where the grass roots are today will not help the grass today. We have to work with what we have.

32. We have to take the time to see where we are by going to all of our pastures. We cannot be satisfied with one check. We're going to keep checking back. We're going to change our strategy, if needed. We're not going to do like the Broncos in the Super Bowl last year and wait until we're down 30 points to say: "Maybe we need to do something different."

We're going to look down at the ground, not across the pasture. We're going to see how much grass cover we have – taking a yard stick or ruler is helpful. We'll pay attention to the kinds of grasses we have – are they yummy or yucky? We're going to note the colors of the plants – are they living plants with a tan color or are they dead and a black or dark grey color? Lastly, we're going to pay attention to how much bare ground we have vs litter cover. Taking together all these things we can see, we can draw some reasonable conclusions about how the root system is doing, which is the lifeblood of plants. If the plants are short, it is reasonable to expect that the roots are, too.

We're going to go out and check our pastures on Thursday, or this weekend at the latest. Then we're going to check back at the end of the growing season and early next spring. And we're going to keep checking our pastures over next summer and for all of the years to come.

33. We're going to make absolutely sure we leave enough of the grass that grows this year to feed the root system and replace lost energy storage. Just as an Olympian needs to recover, our grasses also need to recover. This site was treated properly for drought. There's litter, good stubble height (see the keys), good species, and plenty of growing season for full recovery. The soil and the plants are armored against another drought year.

34. There are many great resources out there to learn more about grazing management. One of them is a publication titled, "Skillful Grazing Management on Semiarid Rangelands," by Patrick Reece, Walter Schacht and Jerry Volesky, which you can find online at <http://www.ianrpubs.unl.edu/live/ec162/build/ec162.pdf>.

35. We must manage our grass to be the best it can be under the current conditions. Acres don't feed cows; grass feeds cows.