

Planning for



on Your Range

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Why? Oh, why me??

Droughts have been happening here since at least the Pleistocene. It's probably been happening since North America drifted into the zone of prevailing westerlies and the Laramide Orogeny created the Rocky Mountains rain shadow 50,000,000 years ago...as long as there have been cold ocean currents off the west coast.

- shared by Gene Gade

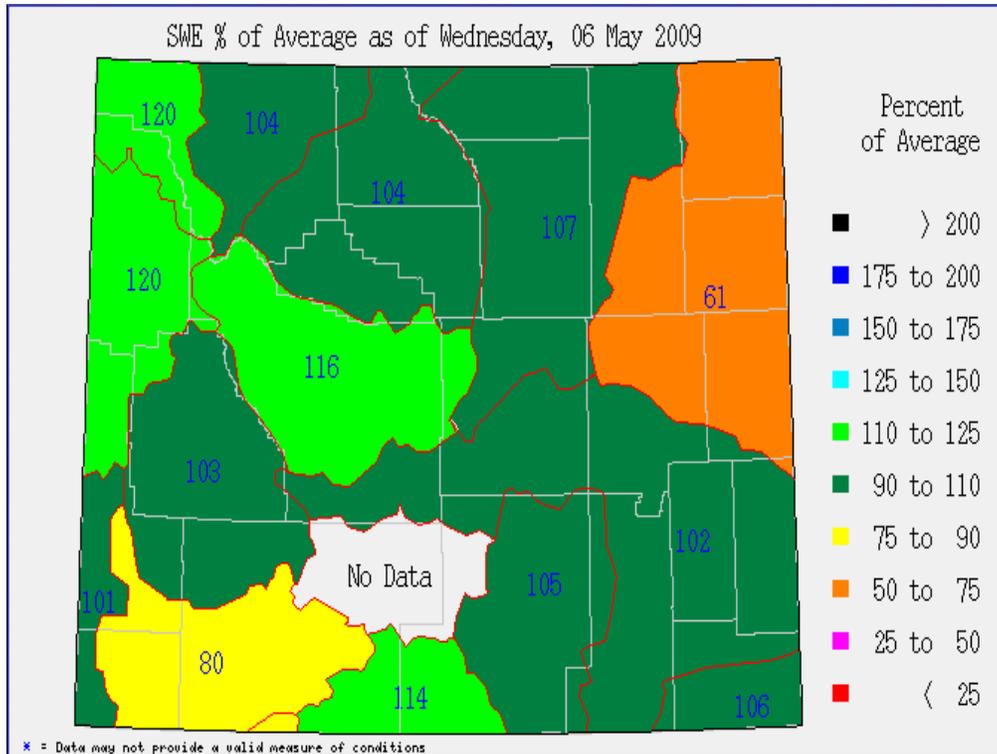
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First of all, put drought in perspective.

It was here first! The native range evolved in the presence of periodic drought

Over the last 300 years there have been both extended and short term droughts and the probability of either occurring are good.



Note: this graphic comes from
<http://www.wrds.uwyo.edu/images/wrds/nrcs/snowmap/snowmap.gif>
 It should be updated prior to the presentation

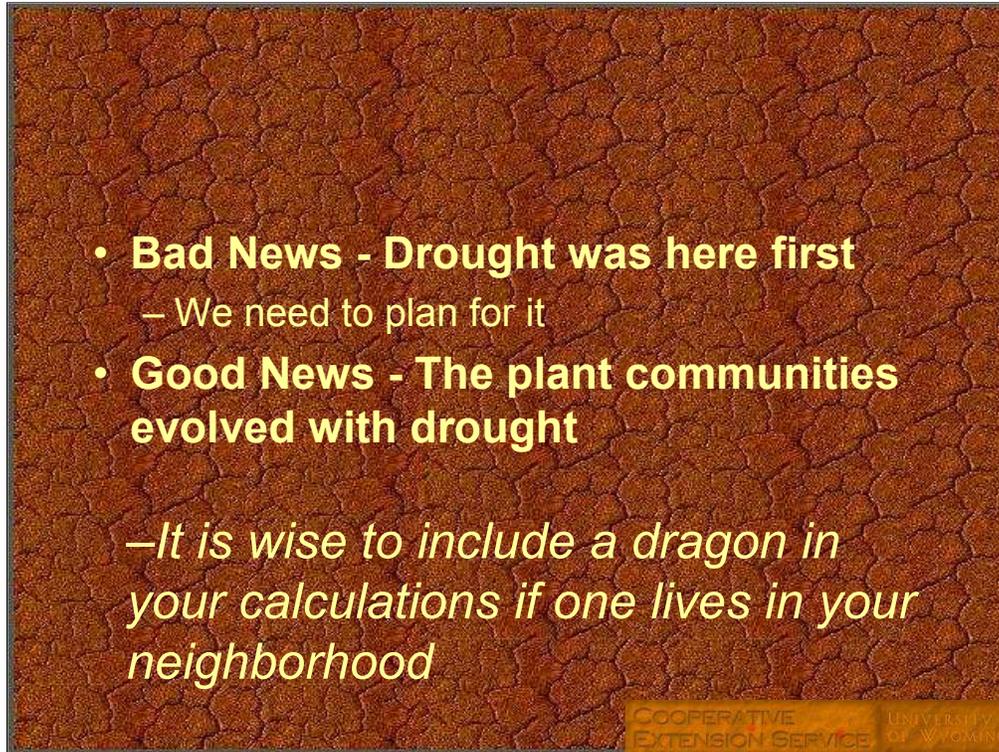
Talk about the current precipitation information statewide and specific to the region that you are in

- **“We continue to approach each new drought as if it is a disaster rather than the norm, ignoring the past, and paying only lip service to sustainable uses of dry rangelands.”**

Thad Box – Rangelands April 2005

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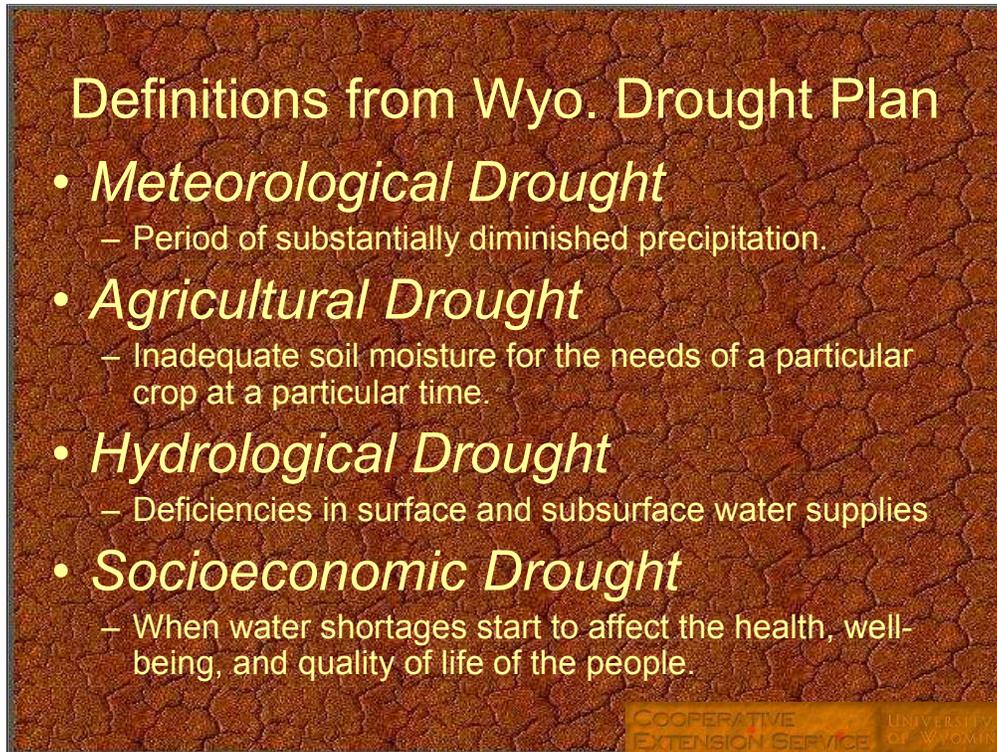


This bring us to the first punchline of understanding and planning for drought

Good news –

Bad news –

Drought or below average precip has occurred over half the time in the last 2 decades



There are four categories of drought which are meaningful in Wyoming. Lets talk about the two which are important to us, Agricultural and Hydrologic drought; where and why they occur – and the signals that the drought (at least the categories of drought) are over

Agricultural drought may not be an issue if the timing of the precip is favorable, ie , falls when needed.

<Click> → Agricultural Drought - read out loud.

<Click> → Hydrological Drought – read out loud

Agricultural Drought

Agricultural drought occurs when there is inadequate soil moisture to meet the needs of a particular crop at a particular time. Agricultural drought usually occurs after meteorological drought but before hydrological drought and can also affect livestock and other agricultural operations.

Hydrological Drought

Hydrological drought refers to deficiencies in surface and subsurface water supplies. It is measured as streamflow, snowpack, and as lake, reservoir and groundwater levels. There is usually a time lag between lack of rain or snow and less measurable water in streams, lakes and reservoirs, making hydrological measurements not the earliest indicators of drought.

Planning for Survival

- **Prioritize your strategic ranch goals**
 - Maintain the ranch's value and equity
 - Prevent long term damage to forage
 - Maintain livestock financial equity
 - Keep integrity of breeding herd intact
- **Specific, measurable, attainable goals**

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So, you've looked at the data and can see that you have a problem coming. You have come to understand that it really doesn't matter if it rains next week or the week after. You are screwed. What do you do?

Begin planning and executing that plan!!!!

First identify and prioritize your strategic ranch goals. Some examples might be. . .

You will need to set some parameters on your goals. Being specific and using measurable terms set for you boundaries on the decision-making process.

HOW TO SURVIVE A DROUGHT

- **Anticipate drought**
- **Flexible livestock management system**
- **Grazing management to preserve range condition**

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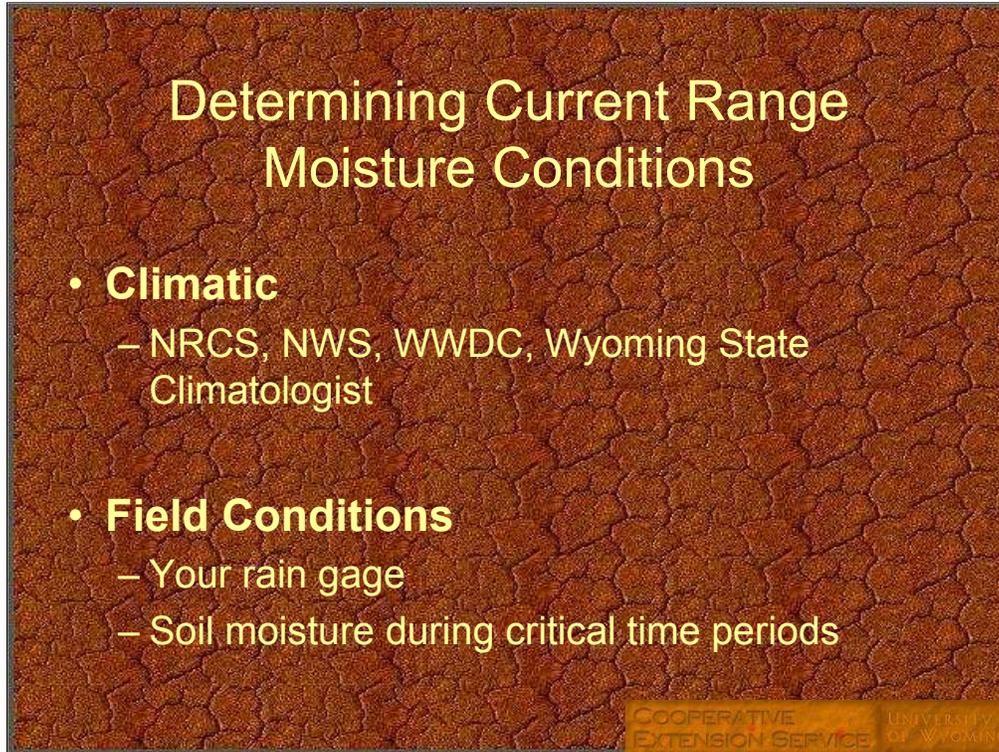
Here are the 3 major points to surviving a drought with minimal damage to the ranch/range production system.

HOW TO ANTICIPATE A DROUGHT AS WELL AS POSSIBLE

- **PROBABILITIES FOR PREDICTING IN THE FUTURE ARE RELATIVELY LOW**
- **SPRING SEASONAL PRECIPITATION IS KEY TO NEAR TERM PREDICTION**

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Note, this image is from:

<http://www-wwrc.uwyo.edu/wrds/nrcs/snowtrend/snowtrend.html>

It should be updated prior to the presentation, using the basin of importance to the audience

So, how do you determine, range drought???? Pronunciations of local old-time sages???

There are a number of agencies who make it their business to monitor conditions and issue drought assessments (not proclamations!) These include the NRCS (Natural Resources Conservation Service), the NWS (National Weather Service), WWDC (Wyoming Water Development Center.

In general terms, they can get it right. However, we need to be careful which of the four kinds of drought they are talking of. Also, we know how fickle precipitation storms can be. For YOUR range, you need to check the field conditions, and you need to check those field conditions at the right time. July 20 rain means little in cool season rangelands when you are looking at forage production.

On foothills and plains of Wy above 6500 ft April (precip) is probably the best month to watch. Lower elevations have a wider window starting earlier, running march thru may. In making decisions earlier dates for decisions often reduce risk of error.

Timing of Precipitation

- **Saratoga Study** (Dr. Mike Smith)
 - 20 years
 - Correlations between spring precip. and July forage standing crop:
 - Winter precip. (Oct-Mar) - no correlation
 - Winter plus April - 9%
 - April – 50+% (74% for April 12-19)
 - May - 27%
 - April plus May - 34%

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Univ. of Wyo. Professor Dr. Mike Smith has had a forage production study underway in the Saratoga area for over 18 years. He has found interesting correlations between the time of precipitation and resulting forage production.

Winter precip does essentially nothing for range production. As you can see, April is the really big month. This is really very striking data, and it provides us an opportunity to predict range production based on a pretty discrete and easy to obtain bit of data!

These numbers reflect the analysis through 2001. We have since done a different analysis that only looked for the very best window of precipitation. That was for Saratoga, 74% for 12-19 April. The correlations declined earlier, later, or with a wider window. This is a high totally cool season grass community unlike Cheyenne or Casper with lower elevations and more warm season grasses.

Now, one can argue (validly) that different areas may have different dates. AND, the impact of precipitation timing differs between cool season and warm season plant communities. To help us understand these variables, we have a study ongoing which will help us understand the critical dates across the state.

The key to this isn't so much rainfall in a month. From plant physiology viewpoints, it really boils down to the field condition of the soil in your range

Field Conditions

Guideline for Estimating Soil Moisture Conditions				
	Coarse Texture Fine Sand and Loamy Fine Sand	Moderately Coarse Texture- Sandy Loam and Fine Sandy Loam	Medium Texture - Sandy Clay Loam, Loam, and Silt Loam	Fine Texture-Clay, Clay Loam, or Silty Clay Loam
	Available Water Capacity (Inches/Foot)			
	0.6 - 1.2	1.3 - 1.7	1.5 - 2.1	1.8 - 2.4
Available Soil Moisture Percent	Soil Moisture Deficit (SMD) in inches/foot when the feel and appearance of the soil are as described			
0 - 25	Dry, loose, will hold together if not disturbed, loose sand grains on fingers with applied pressure.	Dry, forms a very weak ball, aggregated soil grains break away easily from ball.	Dry. Soil aggregations break away easily. no moisture staining on fingers, clods crumble with applied pressure.	Dry, soil aggregations easily separate, clods are hard to crumble with applied pressure

• Soil Moisture is KEY

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To help explain, here is a busy slide that I'm going to make even busier.

<click>. First, we must recognize that there are different textures of soils. You all have recognized this fact. From coarse sandy stuff to fine clays that crack when they dry

<click> The reason that clay soils crack when they dry is that they hold a great deal of water when wet, and when they dry, the soil takes up less space. Coarse soils hold much less water. This is because of the total amount of surface area on soil particles – where water sticks – is very much more on fine soils than on coarse soils. For the animal scientists out there, this is the same reason that ground feeds are much more quickly and easily digested – surface area!

<click> Now, these different soil types have different amounts of water that they can “hold” before the excess water moves on down through the soil profile. This is the soil’s “water capacity”. A plant can draw on this water capacity until the soils ability to hang on to the water becomes stronger than a plant’s ability to suck it off the soil particles.

<click> This occurs at about 25% of the soil’s water capacity. When you get to this point, the soil’s handling properties are as described. (Read the descriptions, and emphasize the handling properties for each soil type)

When your soil reaches this stage in the root zone. Plant growth is done. This is not to say that they die, but there simply isn't enough water to carry out production processes, and the plant will go dormant – in water



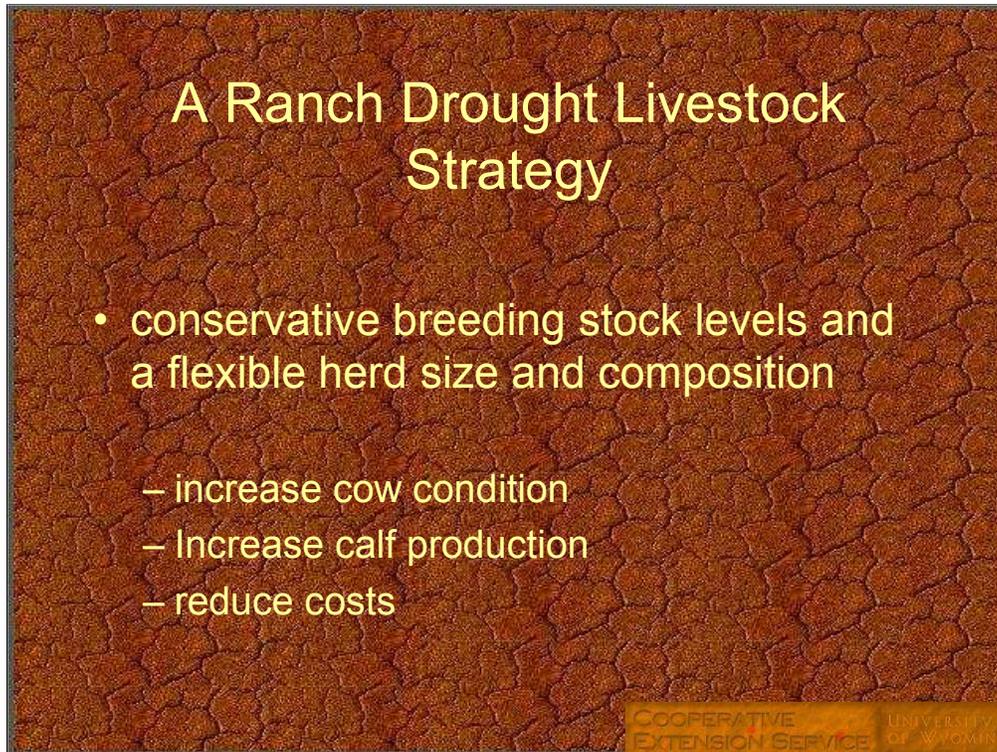
Inattention is the only reason for not knowing that forage production may be low.

Flexible livestock management system

- **Conservative permanent herd**
- **Easily sold component**

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Now, as we lift our eyes from the rangeland plants, their physiology and the range's ecology and think about ranch's sustainability— knowing full well that drought will return, let's talk about strategies which can help make <click> drought less of a problem in your operation.

Suppose that you would set your stock numbers at the maximum number that you can carry through a drought. What will that get you? Increased cow condition, which gives you increased calf production, and decreased winter feed costs.

In those years when rains come, you have opportunities. Opportunities to sell pasture, buy stockers, recover (bank ecological status), or combinations of the three.

The cow/calf/yearling operation that retains ownership in good years but sells weanling or short yearlings in bad years would appear to meet most of the need for flexibility in stocking and provide a better opportunity to take advantage of breeding programs.

Keep in mind that the precipitation shortfall may be largely manifest on water supply. Be prepared to provide water when and where needed.

Options in times of high production

retain ownership or buy stockers

sell pasture

give the range a break

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Optional practices for dry times

- **Preplanned marketing of cull cows**
- **Marketing calves or yearlings early**
- **Early weaning**

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Why flexible stocking?

- **Studies show**
 - it to be more profitable in the long term
 - year to year variability in income to be smaller
- **You preserve your herd's genetic base**
- **You have the ability to make considered management decisions**
- **You have the "cushion" to manage range trend upward.**

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Why follow this strategy??? On the face of it, it appears that you will have fewer cows, fewer calves to sell, and a smaller paycheck, right???

Well, the strategy has been studied, and it has been found that in portions of the world which we know drought to be a recurrent phenomena, in the long term it is the more profitable strategy and that year to year income variability is smaller. That is the economists talking.

From a rancher' perspective, you aren't always faced with the decision to liquidate some of your herd's genetic base, you have the freedom of making considered management decisions, and finally, you have the cushion to manage your rangeland into upward trend, which is a good thing – if for no other reason than it is much more resilient.

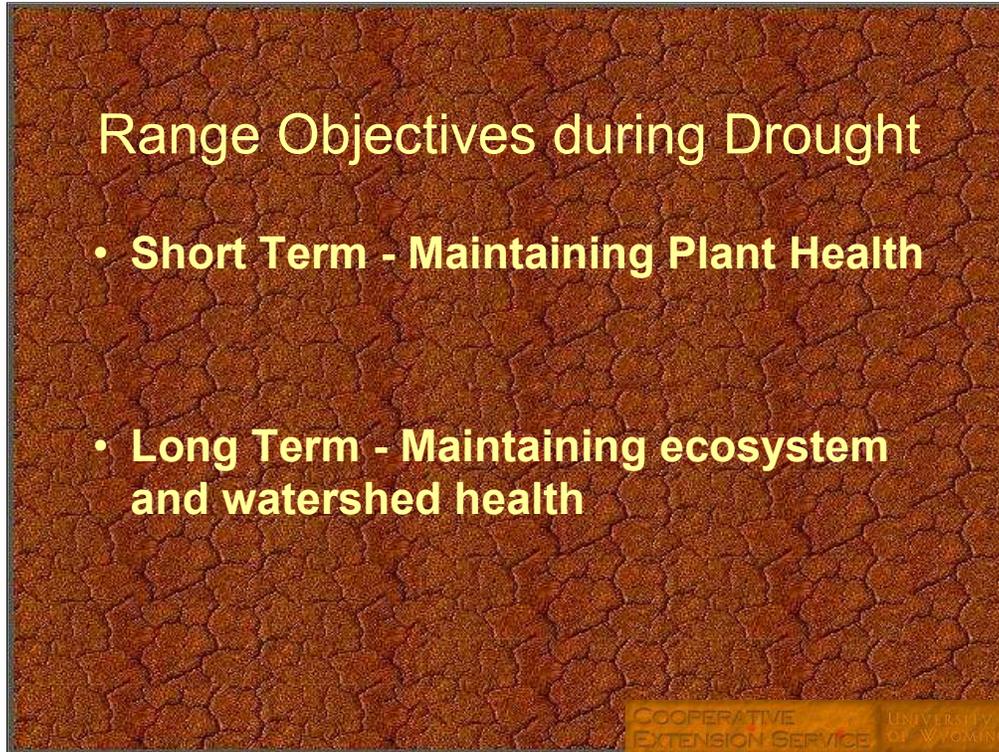
- **Conservative Stocking simplifies your life**
 - Sustainable profitability
 - Lowers risk, gives stability in income
 - Easier management options in tough times

–It is easier to sell pasture in a good year than to sell cattle in a bad year

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So, here is the 4th punchline of this deal. Conservative Stocking simplifies your life. It has been shown to be sustainably profitable, stable, and sure saves sleepless nights by erasing the needs to make tough management decisions during times of high stress.

Because, <click> For the vast majority of ranchers, it is easier to sell pasture in a good year than to sell cattle in a bad year.



Now, from the perspective of the range, there are a couple of objectives I would argue that you should buy-in on. In the short term, you should be interested in maintaining plant health, and in the long term you should be interested in maintaining ecosystem and watershed health. Short term plant health ultimately leads to long term plant watershed health. Take care of the short term to take care of the long term.

Minimizing grazing impact during the brief period of green growth especially seed stalk elongation takes care of the short term plant health issue. Longer term ecosystem health includes that, but is more tied to leaving sufficient residual forage.

Maintaining Plant Health

- **Roots are important - Plants must. . .**
 - have healthy root systems to absorb available water efficiently
 - Severe grazing will lead to stunted root systems and plants that are less able to
 - Compete, particularly against invasive weeds.
 - survive drought
 - recover

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So, to maintain plant health, you need to think about what you cant see. Think about the roots. Roots and plant crowns live year around. The leafy stuff that blows in the wind is only a transient (here today, gone tomorrow) result of the below ground plant's ability to support that growth.

The key to maintaining plant health and vigor is vigorous root systems. When plants are grazed during growth periods, they seek to replenish the photosynthetic material. They do this by mobilizing resources from the crown and rood material. Take to much from them, and they will loose their ability to out compete weeds. Go to far, and you've no roots and a dead crown! And!!!!!! When the drought is over, they need that mining ability of the root systems to recover quickly and completely.



So, hopefully I've sold you on the idea that a SHORT TERM GOAL should be to maintain plant health. Now, let's look at the long term stuff.

You may be able to push your drought stressed rangelands for a year if it was in otherwise good condition. However, you cannot maintain an out of balance condition for long. Persistent pressure on the range plant community that you desire WILL begin to move your community to less desirable plants which you've given the opportunity to compete.

Probably the one single best strategy to avoid harming the ecological status of rangeland is the implementation of a rotation grazing system which provides opportunities for plants to grow or regrow in the absence of grazing pressure.

These strategies (there are several) allow a plant to rest from growing season grazing every few years. The plant is allowed to regenerate itself, remaining vigorous and fiercely competitive against invaders.

<Click> because – it doesn't rain grass!

Invasives are vigorous and hungry and thirsty and once they establish a foothold, you find yourself halfway down a slippery slope. Rangeland has to be very carefully managed to recover from damaged condition in the

Acceptable Use

- **Live plant material remaining after grazing period provides for plant recovery**
- **Old rule of thumb? - Take 1/2, leave 1/2 of desirable species**
- **50% use is in the Moderate Category**

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Different rangeland condition also has different tolerance to use. And the manner in which it is used also affects what might be an acceptable level of use. A rest rotation grazing strategy, for example, should provide more leeway in use levels for the grazed pastures.

The venerable old rule of thumb is pretty good, and it is that you can take half and leave half of the dominant forage grasses. In the technical guides, you will find that 50% use is in the “Moderate Use Category”. Moderate use is ok, particularly on rangeland in good condition.

What does moderate look like?

–(41-60%) The rangeland appears entirely covered as uniformly as natural features and facilities will allow. Fifteen to 25% of the number of current seedstalks of herbaceous species remain intact. No more than 10 percent of the number of low-value herbaceous forage plants are utilized.

Landscape Appearance - Interagency Tech. Reference

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Here is what moderate grazing looks like on rangeland. And, the experienced cowman generally feels like it's time to go at this point. If the cattle have a good alternative, they've probably moved on by themselves!

Methods of Calculating Stocking Rate

- **Recent Stocking and monitoring**
 - Accurate
 - Requires monitoring animal days and use levels annually by pasture
- **Clip and weigh forage at the beginning of grazing season**
 - Requires follow-up monitoring

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There are two basic ways of calculating your stocking rate. The first is the most sensible. Stock and Monitor. Put the cattle in and take them out when you reach your target acceptable use. Figure out the animal unit days and there you are. It takes time, flexibility in animal numbers and management, and requires you to monitor the use.

-

The alternative is to clip and weigh production in a systematic fashion, run the calculations to estimate the carrying capacity and then crank into the calculations the time factor to figure out appropriate stocking rate. It is important to note that this is simply an estimate, and should be followed up with the stock and monitor method.

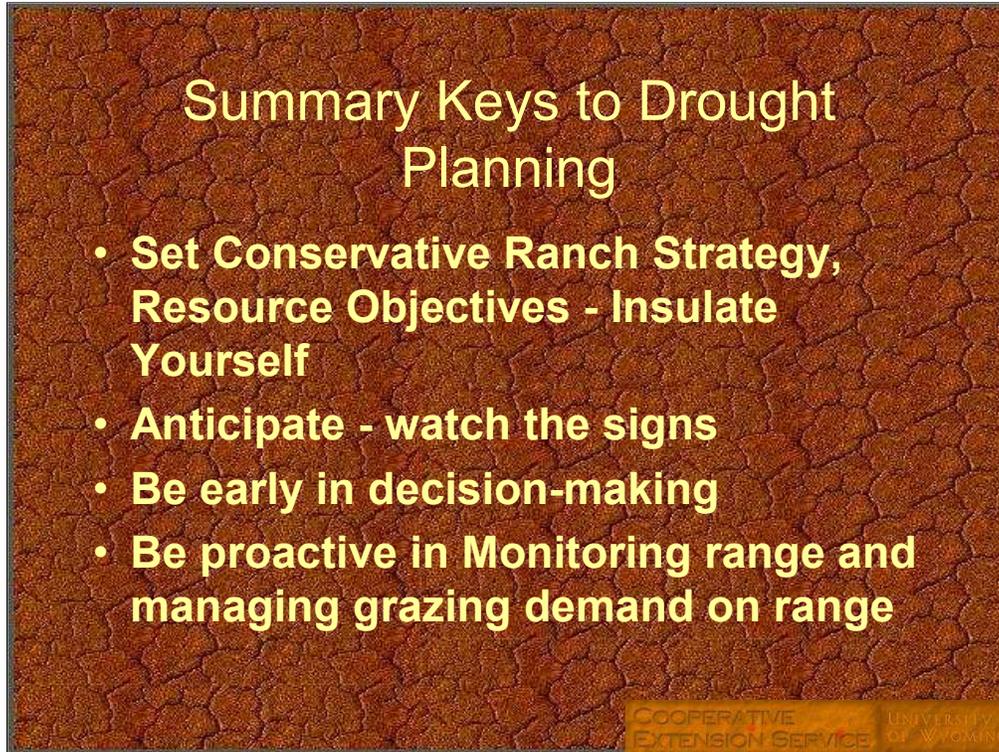
We'll work through an example to demonstrate why you will prefer to stock and monitor!!!

Grazing systems that minimize drought impacts

- **Rotate grazing among pastures**
- **Reduce grazing time during critical plant growth period; move faster, more pastures are better**
- **Any deferment during the critical growth period is better than none**

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So, to begin to wind this up, here is a recap of the Keys to surviving drought with the ranch intact.

Set Conservative Ranch Strategy - Insulate Yourself

Set Resource Objectives

Anticipate - watch the signs

Be early in decision-making

Be proactive in Monitoring range and managing demand on range

Good planning will...

- Reduce frequency of being **FORCED** to do something
- Decrease Variability in Income
- Increase Flexibility
- Increase Range Condition
- Let you **BECOME DROUGHT RESISTANT**
 - Just like plants have evolved!

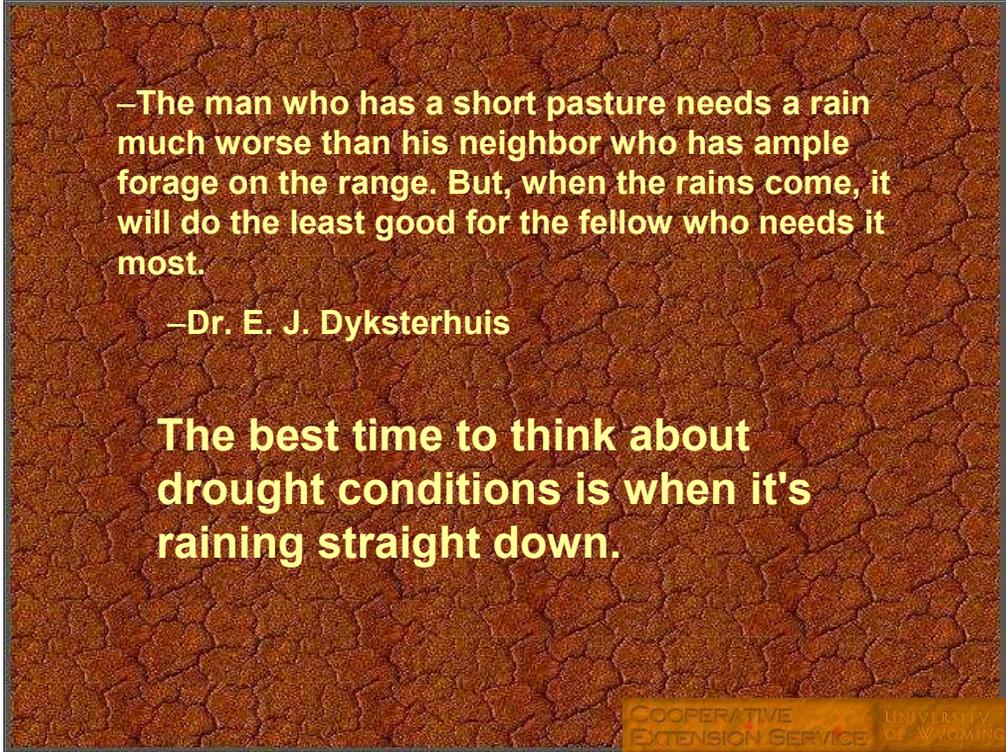
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And by being proactive, these are the things that you will find yourself being forced into decisions much less frequently. Your income will become much less variable from year to year. You will have much more flexibility in your operation. Range Condition will increase.

In other words, you will become drought resistant.

Just like the plants!



–The man who has a short pasture needs a rain much worse than his neighbor who has ample forage on the range. But, when the rains come, it will do the least good for the fellow who needs it most.

–Dr. E. J. Dyksterhuis

The best time to think about drought conditions is when it's raining straight down.

And so, here are a couple of bits of parting wisdom for you to digest as I prepare to answer your questions.



–THANKS!!

