Drought Management

THE SAMUEL ROBERTS NOBLE FOUNDATION

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NF-FO-11-01

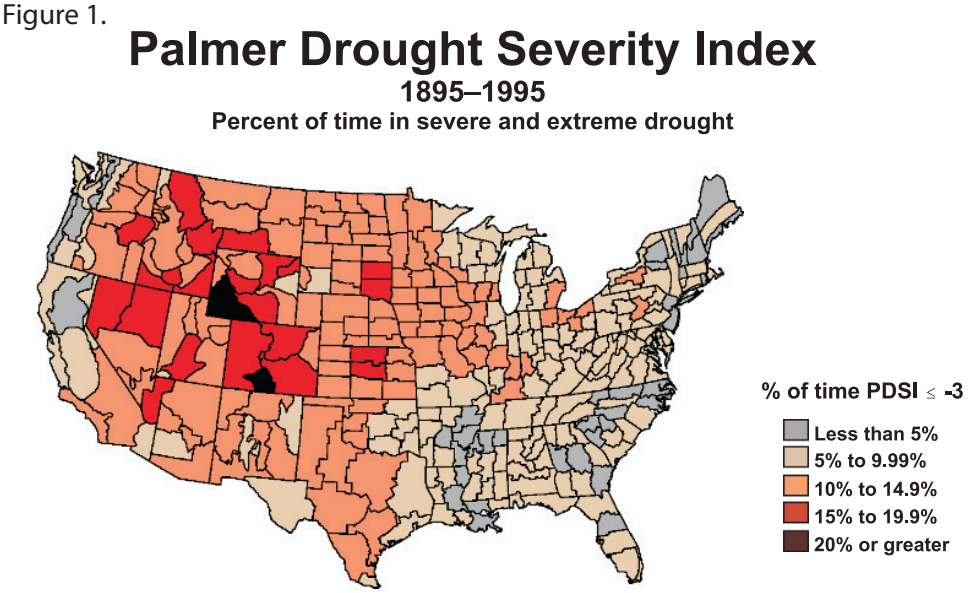
Drought can be defined simply as 75 percent of normal precipitation with the normal being based on a 30-year average. It can be further defined as long term, lasting for several months, or short term, which can last several weeks. Regardless of the length of time that drought occurs, the results can be far reaching and devastating for agricultural production.

Just about every climatic zone will experience drought at some point, and, in the Southern Great Plains, drought is a normal, recurring part of the climate. Fortunately, droughts are temporary and each will end eventually. Figure 1 is from the National Drought Mitigation Center and shows the percentage of time that areas within the continental United States were in severe or extreme drought between 1895 and 1995. No area of the lower 48 states has escaped drought, but the frequency varies by region. In the Southern Great Plains, the majority of the region experienced drought anywhere from 5 to 20 percent of the time period.

Knowing that drought is a recurring feature of our climate, developing a management strategy to deal with drought should become part of grazing management. Recognizing the warning signs that a drought is about to occur or realizing that you are in a drought is difficult, but there is a large amount of forecast and drought information available that can help grazing managers manage drought.

Rainfall and climatic conditions vary greatly across geographic regions. Even within a climatic zone, normal yearly rainfall can vary dramatically across a distance of 50 miles or less. Therefore, it is important for grazing managers to become familiar with their local rainfall patterns and yearly temperature and precipitation norms. Texas and Oklahoma have Mesonet systems. A Mesonet system is a network of weather stations across the state designed to collect meteorological weather phenomena in the mesoscale. Mesoscale weather systems are systems or events such as thunderstorms, dry lines and squall lines that can directly impact human activity. These local stations will also collect wind speed, temperature and rainfall data, and compile monthly and historical weather information related to climate and agricultural production. Other than Mesonet systems, there are many other sites that offer excellent information on climate, forecast information, drought, drought monitoring and drought prediction. A short list of some sites relevant to the Southern Great Plains is listed on page 4.

Figure 1.



SOURCE: McKee et al. (1993); NOAA (1990); High Plains Regional Climate Center (1996)
Albers Equal Area Projection; Map prepared at the National Drought Mitigation Center

A goal in drought management should be to develop the ability to plan ahead and manage a dry weather event and not become managed by the event. By combining historical seasonal rainfall information with current weather data and by knowing seasonal forage production, a management plan can be formulated. For example, Figure 2 shows the historical rainfall distribution for Carter County, Okla., from 1950 to 2005, the 2006 to 2008 average and 2009 monthly totals.

Compared to long-term trends, precipitation was average for the summer period of 2006-2008, but below normal during the fall and winter leading into 2009. Using this information, we could then extrapolate that fall and winter cool-season

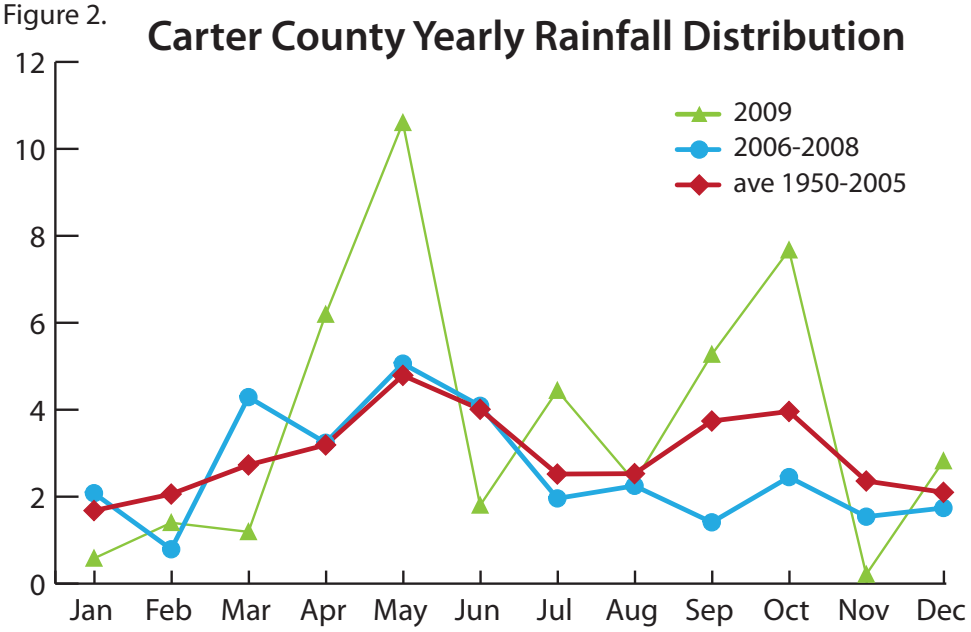
forage production was probably below normal due to lack of moisture. Even though April and May 2009 had above average precipitation, warm-season perennial production could be delayed and below normal because of previous moisture deficits, which could lead to tight or short forage supplies. Looking forward into the fall and winter, a shortage of forage could be anticipated and appropriate measures taken to adjust stocking rates or find supplemental forage or feed.

The ability to use climate data to anticipate future forage production is only one part of a long-term drought management plan. Again, the goal is for the producer to have the ability to manage a dry weather event and not allow the event to become the manager. Figure 1 serves as a reminder that there is no escaping a dry weather event – unfortunately, all will be faced with drought at some point. Knowing this, there are several strategies to put into place prior, during and after a dry weather event that will put you in the manager's seat.

Strategy 1 – Prior to drought, practice good grazing management. Good grazing management is the single most important drought management strategy. The implementation of this strategy starts with determining the carrying capacity of the property. Carrying capacity is defined as the maximum stocking rate that a grazing resource can support without limiting the production of the animal or deteriorating the grazing resource. Simply put, match the forage demand of the grazing animals with the amount of forage produced on the property in a year. Long term, the proper stocking of a property not only buffers drought, but tends to be the most profitable grazing strategy as well.

If you have never determined the stocking rate for your property, here is a basic approach:

Figure 2.



1. Determine the number of grazeable acres available in each pasture or paddock.
2. Determine potential forage production in each pasture or paddock.
   • If you have historical production records, these are the best. Examples would be hay production records or the number of head you have traditionally run in a pasture and the length of time you have run them (this would assume you are currently practicing good grazing management).
   •If historical records are not available, forage production estimates can be found, based on soil series, in the county soil survey book. Copies of the county soil survey can be found at the local county extension office or Natural Resources Conservation Service (NRCS) office. These soil surveys can also be found online on the Web Soil Survey at websoilsurvey.nrcs.usda.gov. If you are unsure how to use the values in the soil survey book or navigate the online version, the Noble Foundation Agricultural Division, University Extension and NRCS all have staff that can help. When using values from the soil survey, be conservative and stick with production numbers based on a normal year.
3. Determine animal demand. The amount of forage that a grazing animal can consume in a day is basically based on size – the larger the animal, the higher the forage demand per day. The amount of forage that an animal can consume is largely dependent upon the quality of the forage and the amount of forage available. Here are some basic grazing terminology and values used to determine forage demand:
   • Animal unit (AU) is defined as the amount of forage on a dry matter basis that a 1,000- pound cow will consume over a year.
   • Animal unit day (AUD) – In general, a beef cow will consume 2.6 to 3 percent of her body weight per day in dry matter. Therefore, if her weight is 1,000 lbs, then 1,000 X 2.6 to 3 percent = 26 to 30 pounds per day of dry matter.
   • Animal unit month (AUM) – If a cow consumes 26 to 30 pounds per day over 30 days, she will consume 780 to 900 pounds per month.

• Animal unit year (AUY) – By taking monthly consumption and multiplying by 12 (780 to 900 pounds per month X 12 months), we can calculate that the forage demand for a year for one AU is 9,360-10,800 pounds of dry matter per year.

4. Determine the amount of forage to be utilized. It is physically impossible to graze 100 percent of forage grown because of physical losses from trampling, defecation, senescence, insect feeding, etc. Nor do we want to graze 100 percent of forage grown since the amount of forage used directly affects plant regrowth, persistence and total yield. Proper use of forage plants depends on the species, and managers should realize that all species cannot be grazed alike. As a general rule, to encourage long-term persistence, utilization of native grasses will run 25 to 35 percent, while introduced grasses will be 65 to 75 percent if some type of rotational grazing system is used. If continuous grazing is employed, use the values at the bottom of those ranges.
5. Do the math. If, for example, you have 100 grazeable acres of bermudagrass that have a yearly production of 6,000 pounds per acre and you expect 70 percent total forage utilization, this would equal 420,000 pounds (100 acres x 6,000 pounds per acre per year x .70 utilization) of forage available to graze for the year. To calculate the annual carrying capacity, divide 420,000 pounds of forage available by 10,000 pounds of forage demand (one animal unit year) and you arrive at 42 head. We could stock our 100 acres with 42 head of 1,000-pound cows for a year. This number would then be adjusted up or down depending upon actual cow size.

Strategy 2 – Prior to drought, use forages adapted to your environment.
Oklahoma has nine climatic zones with normal precipitation ranging from +-16 inches in the panhandle to +-52 inches in the southeastern corner of the state. Forages adapted to one corner of the state will be quite different from the opposite corner due to their moisture requirements. The forages that make up your grazing operation need to be adapted to your environment and your grazing management. If not, then forage production will be limited during times of dry weather stress, and stand thinning or loss is quite possible. When considering adding new forages to your operation, make sure that they are adapted to your area. A forage variety that has been most productive in a Pennsylvania variety trial will probably not last very long in west-central Oklahoma.

Strategy 3 – When drought occurs; continue to practice good grazing management.
When drought occurs, there is a tendency for many producers to open all the gates and allow animals to have free access to whatever they can find. This is the wrong approach to take because you lose management control. Keep gates closed and continue to practice a rotation, but adjust the rotation to the speed of grass growth. This allows continued growth ahead of the rotation, and perhaps most importantly it allows you to control the grazing intensity of pastures.

Strategy 4 – When drought occurs, inventory available forage.
By measuring the amount of forage available that is yet to be grazed, you can calculate the number of reserve herd days (RHD) available. This allows you to plan ahead and make sound decisions on de-stocking or purchasing additional feed based on forage inventory. Additional information on the calculation of RHD can be found at www.noble.org/Ag/Forage/RHD and www.noble.org/Ag/Forage/RHD-FallForage.

Strategy 5 – When drought occurs, monitor use of preferred plants.
Areas that are heavily grazed can suffer plant loss during drought. These areas can then be slow to recover after the drought has ended. Native grass pastures can be slow to recover after a drought if they have been overgrazed. In native grass pasture, watch key species such as big bluestem, indiangrass and switchgrass and, if they are being over-utilized, be prepared to move cattle out of these areas. By stocking conservatively during a drought, recovery is much quicker afterwards. If necessary, be prepared to move to a "sacrifice pasture" to preserve sensitive areas. Preferably, a sacrifice pasture will be made up of a sod-forming introduced grass, such as bermudagrass, that can be easily re-established if needed.

Strategy 6 – When drought occurs, monitor animal health.
Monitor animal body condition and health. If body condition begins to slip, it is difficult and expensive to put it back on without good forage availability. Be aware of plants in pastures that can cause animal toxicity problems during times of drought. Plants that are nitrate accumulators or have the potential of developing prussic acid such as johnsongrass, sorghum, sudan grass, milo, sargo and others should be noted and animal access monitored.

Strategy 7 – When drought occurs, keep some fertility on introduced pastures.
Introduced forages, especially ▸

bermudagrass, can greatly increase their water use efficiency by adding some fertilizer so that when you do get rain, you grow more grass. Be wise in the application. Fertilize only the most productive soils and most productive grasses, and cut back on normal application.

Strategy 8 – When drought occurs, monitor insect pressure.
Unfortunately, dry weather conditions often coincide with ideal conditions for the development of high populations of forage-feeding insects such as grasshoppers, armyworms and others. These insects can consume large amounts of forage when populations explode, and this is forage you cannot afford to lose during drought. Look for growing populations and be prepared to apply control when the timing is right.

Strategy 9 – When drought occurs, destock if necessary.
Don't be afraid to destock if necessary to preserve your grazing resource. However, if destocking becomes necessary, do so in a logical order. The goal in destocking should be to preserve cattle that are in their prime and can make you the most money when conditions improve. For more detailed culling strategies, visit www.noble.org/Ag/Livestock/FeedingCullingDuringDrought.

Weather and Drought Information Websites

Oklahoma Mesonet
www.mesonet.org

Texas Mesonet
mesonet.tamu.edu

Texas Water Development Board
www.twdb.state.tx.us

National Climatic Data Center
www.ncdc.noaa.gov/oa/ncdc.html

National Drought Mitigation Center
www.drought.unl.edu

National Oceanic and Atmospheric Administration (NOAA)
www.noaa.gov

ARS Grazinglands Research Laboratory
ars.usda.gov/main/site_main.htm?modecode=62-18-00-00

Strategy 10 – After drought has occurred, it is not full steam ahead.
After drought has occurred, conditions do not immediately return to normal. Pastures can be weak and stand losses could have occurred. Implement a grazing plan and allow ample rest for pastures to recover. Some pastures may require total deferment for a period to allow adequate recovery. Re-calculate your carrying capacity based on current levels of forage production. Restock slowly and as forage conditions improve.

Summary

A good drought management plan starts long before drought occurs. A thorough plan will encompass management strategies for before, during and after a drought. The single most important long-term drought management strategy is to calculate and implement an appropriate carrying capacity for the property. ■

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