



# Arizona Range and Livestock News

COCHISE COUNTY COOPERATIVE EXTENSION

April 2021

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## Welcome to our new Livestock Extension Specialist, Dr. Joslyn Beard!

The University of Arizona Cooperative Extension Range and Livestock group would like to welcome Dr. Joslyn Beard as our new Livestock Extension Specialist joining the team on May 3, 2021. Dr. Beard comes to us from the University of Nebraska-Lincoln, and we look forward to collaborating with her on many livestock programs around the state.

Joslyn Beard grew up with animal agriculture just outside Las Cruces, NM city limits raising and showing cattle, sheep, and hogs. Following her passion for animal agriculture, Beard decided to make a career of it and graduated from New Mexico State University with a Bachelor of Science degree. During her undergraduate program, Beard took an opportunity to be involved with animal science research working for Dr. Dennis Hallford as the flock manager of the West Sheep Unit and a lab technician in Hallford's endocrinology lab. During this period Beard found a new passion doing animal research and pursued a master's degree at New Mexico State University while simultaneously serving as the wool judging coach. Her master's research focused primarily on nutrition and reproduction interaction, looking at how maternal stimuli during gestation impacted beef progeny performance. Beard continued her education receiving her Ph.D. in Animal Physiology from the University of Nebraska-Lincoln. During her Ph.D. Beard was able to work on a large scope of projects from optimizing fatty acid mobilization from fat tissue, evaluating cow age effects on calf performance, and identifying mechanisms related to adaptation and resiliency in 2 yr old lactating range cows. Beard's future research aspirations focus on the nutrition and reproductive interaction associated with sustainability and resiliency of beef cattle grazing on extensive rangelands.

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## Featured Plant: Blue grama

*Bouteloua gracilis*

Rokelle Reeve

### Characteristics

Blue grama is a native low growing grass that is widely distributed across the western United States. Mature plants can reach 6-20 inches depending on precipitation. It can grow as either a bunch grass or form thick mats which resemble open sod. Patches can form ring patterns as blue grama spreads by tillering.

The seed heads of blue grama are a one-sided spike up to 2 inches long that resemble eye lashes. They become curved at maturity. The narrow leaf blades are mostly basal and 1-6 inches long, they can appear slightly curled.



### Occurrence

Blue grama is a warm season grass that is found from elevations of 3500-8000 feet. It occurs in a variety of ecological sites where annual rainfall is 8-15 inches. Growth starts in May or June and flowers in July to August. It thrives in areas with ample summer rainfall. Blue grama will grow in a variety of soils but not those that are wet or poorly drained. It is a very drought tolerant and efficient at using water it receives especially under warmer climatic conditions.

### Forage Value

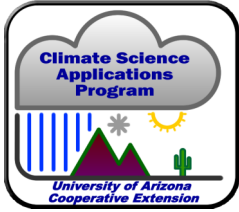
Blue grama is a highly palatable and valuable forage for all classes of domestic livestock. It is especially good for cattle and can make up as much as 40% of their diets in some locations. Because blue grama is the most productive after summer rains that is when it is most nutritious. It does cure well and still provides good palatable forage year-round, if grazing is managed properly to promote plant vigor. It may retain up to 50% of its forage value when dormant and can average 10% crude protein throughout the year. It also provides important forage for deer and other wildlife including birds and small mammals.

### Sources

<https://extension.usu.edu/rangeplants/grasses-and-grasslikes/blue-grama>

<https://www.fs.fed.us/database/feis/plants/graminoid/bougra/all.html>

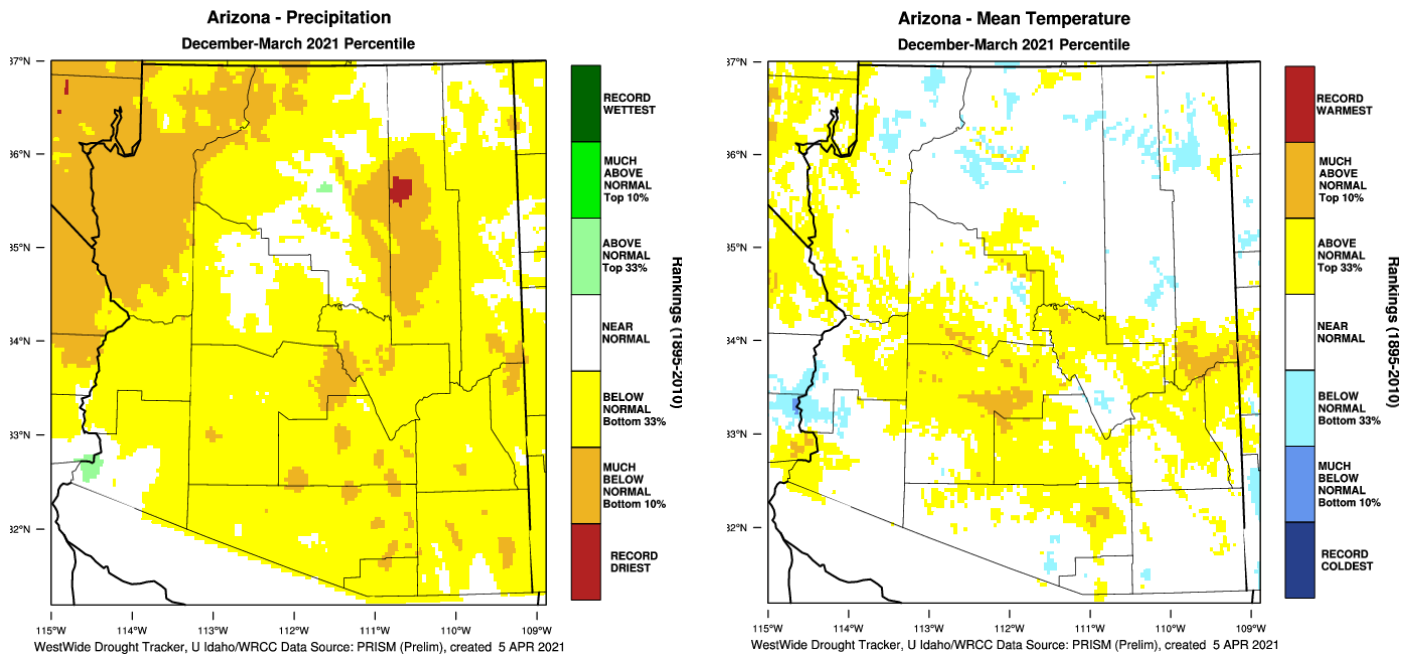
<https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1801-2019.pdf>



# Arizona Seasonal Climate Summary: Winter 2020-21

**April 6, 2021** - The December through March winter period in Arizona was certainly better climate-wise than last summer's record drought and heat, but still drier-than-average with intense drought conditions continuing. December and the first half of January were dry for most of Arizona with a handful of light precipitation events and near average temperatures. A significant and slow moving storm system impacted Arizona the third week of January bringing heavy rain to usually dry southwest Arizona and then rain and snow (even low elevation snow) to much of the state later that week. This widespread rain event briefly helped build a decent snowpack along the Mogollon Rim and contributed to some badly need soil moisture, but was the only significant precipitation event in the December through March period. Drier than average conditions continued through February and March, with snowpack quickly fading and soil moisture levels falling back to below-average levels.

The latest U.S. Drought Monitor map (April 1st, <https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?AZ>) changed very little over the past several months with all of Arizona still observing some level of drought and over half of the state at the 'D4' or 'Exceptional' drought level. This is the highest level of drought intensity and is only expected to occur once or twice a century pointing to the rare drought conditions being observed right now. Arizona has entered its climatologically dry season of April through June, so precipitation events will be harder to come by until the monsoon precipitation starts in late June to early July. Drought conditions will most likely stay at current levels until some relief comes in the form of summer thunderstorms.



June-November precipitation and temperature rankings from the WestWide Drought Tracker

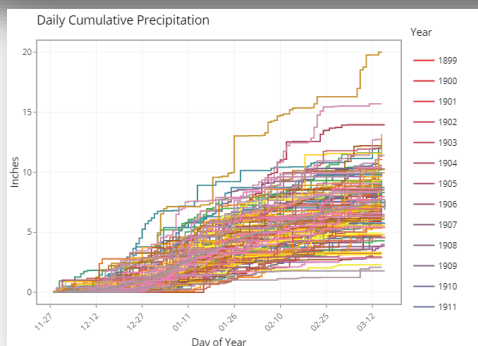
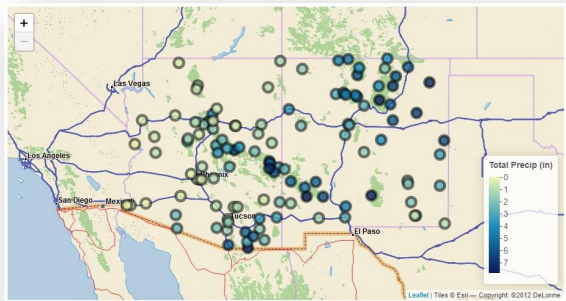
(<http://www.wrcc.dri.edu/wwdt/>)



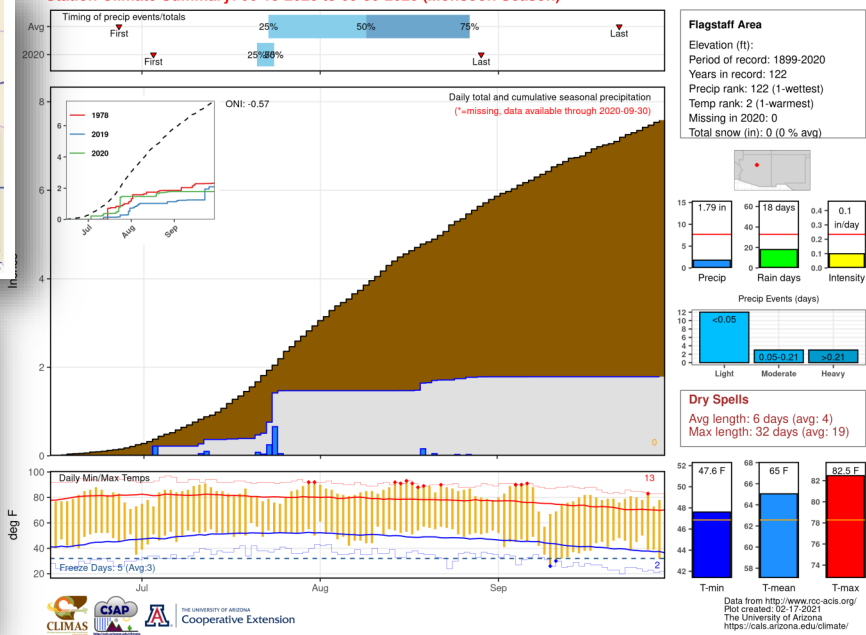
More information available at :  
<http://cals.arizona.edu/climate>  
<http://www.climas.arizona.edu>

Questions /comments? Contact Mike Crimmins, [crimmins@email.arizona.edu](mailto:crimmins@email.arizona.edu)





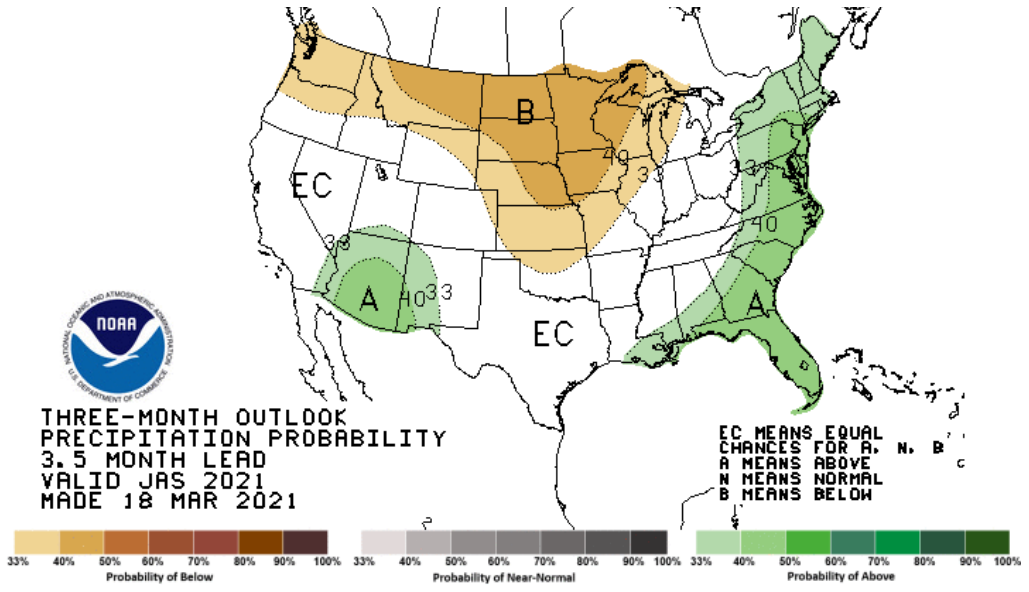
**Station Climate Summary: 06-15-2020 to 09-30-2020 (Monsoon Season)**



The timing and amount of precipitation are important variables to track to gauge changes in drought impacts and the timing of management decisions. A new tool that plots station-based, seasonal climate summaries for over 117 stations in real time to help track hydroclimate is available at <https://cals.arizona.edu/climate/misc/stations/index.html>. These plots update each morning with data through the previous day and are available for the current calendar year and water year as well as for the 'cool season' (Oct-June) and monsoon season (June-Sept). Each station has its own tracker page with access to current conditions and all historic data available at the site. Most stations have data that extend back at least 30 years with some sites having records that date back to the early 1900's (e.g. Tombstone, AZ). Plots are available for each season type and each year in the record as well as interactive charts to explore the daily data that goes into the creation of the plots. The station summary plots like the one shown above calculate and display numerous metrics including the timing of first and last rainfall in the season, timing of observing 50% of precipitation, the number of rain days, and the length of dry spells. More information on how to interpret the plots is available here <https://cals.arizona.edu/climate/misc/stations/guide.html>

The July-August-September seasonal precipitation outlook issued by the NOAA Climate Prediction Center in mid-March depicts an increased chance of above-average precipitation for all of Arizona for the upcoming summer monsoon season. The shift in odds towards above-average covers all of Arizona, but is slightly stronger from central through southern parts of the state. NOAA-CPC notes that a potential relationship with lower than average snowpack in the southern Rocky mountains may lead to an earlier starting and more robust monsoon circulation pattern. This is a low confidence outlook at this point and will need to be watched carefully for future updates. Several climate models also suggest at least average precipitation for July-Sept period, so cautious optimism is warranted at this point. Temperatures, due to long-term trends continuing, are expected to be above-average for the upcoming summer season.

(more info at: [https://www.cpc.ncep.noaa.gov/products/predictions/long\\_range/seasonal.php?lead=4](https://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=4))



## Monitoring Minute: Measuring Cover

Cover is widely adopted for both inventory and monitoring purposes because it is an attribute that provides rapid and repeatable data that are relevant to many practical interpretations regarding land use (e.g., forage availability, wildlife habitat) and resource status (e.g., erosion potential). Basal cover is generally considered a more stable measure than canopy cover to identify



herbaceous vegetation change, since it is less influenced by weather fluctuations, time of year, and immediate grazing history. Basal cover or basal area is determined by considering the cross-sectional area of plants near the ground, usually taken at a height of 1 in for herbaceous plants and 4.5 ft for trees. Although basal cover is generally regarded as a more stable measure of cover than canopy cover, particularly for perennial grasses, it can still be sensitive to factors including stage of growth, seasonal conditions, and the history of utilization by herbivores.

Cover refers to various aspects of the coverage of the soil surface. It is usually referred to as the percentage of the ground surface covered by vegetation, but can refer to cover of litter, rock, gravel, and bare ground. Crown (or canopy) cover is the vertical projection of the crown or shoot area of a species to the ground surface expressed as a fraction or percentage of a reference area. Instead of crown area, cover may also be determined by the plants basal outline near the soil surface. Canopy cover or crown cover describes the area represented by the vertical projection of plant foliage onto the ground. Canopy cover is determined as the perimeter of the plant at its widest horizontal plane. It generally assumes that small gaps within the foliage are included and an average crown perimeter is imagined to smooth irregular edges.

Cover as a measurement of plant distribution is of ecological significance due to its relation to plant biomass and protection of the soil surface, or hydrological characteristics. Another advantage of cover as a quantitative measure is that various plant life forms can be evaluated by the same attribute and therefore in comparable terms.

Several different terms are used to describe cover. Vegetation cover is the total cover of vegetation on a site. Foliar cover is the area of ground covered by the vertical projection

of the aerial portions of the plants. Openings in the canopy and intraspecific overlap are excluded. Canopy cover is the area of ground covered by the vertical projection of the outer perimeter of the foliar vegetation. Small openings within the canopy are included. Canopy cover of a site may exceed 100 percent. Basal cover is the area of ground surface occupied by the basal portion of the plants. Ground cover is the cover of plants, litter, rocks, gravel, and bare ground on a site.

When evaluating whether to use cover in a monitoring program the following things should be considered.

Ground cover standards are difficult to establish or compare because of the different potentials associated with each ecological site.

Canopy and foliar cover are sensitive to climatic fluctuations that can cause errors in interpretation. This is particularly true of herbaceous canopy cover and fluctuations due to precipitation patterns, grazing, fire, or other disturbances.

Overlapping cover is difficult to measure and interpret. If watershed characteristics or soil protection are the objectives, only the uppermost canopy is generally counted.

Basal cover of herbaceous plant communities is generally considered for trend comparisons due to its relatively stable relationship with year to year climatic fluctuations, or current-year grazing or burning.

From: Guidelines for Monitoring Arizona Rangelands; George B. Ruyle, Kim H. McReynolds, Larry D. Howery, and Mitchel P. McClaran.

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## Another Drought Consideration: Toxic Plants

*Andrew Brischke*

Arizona is in a drought, SURPRISE!!! Arizona has been in an extended drought as far back as the mid-90's. There have been a few good years or seasons over the past 25 years, but lately we have been trending towards or are currently in exceptional drought conditions in many regions across the state. Most of Arizona has missed two consecutive summer growing seasons where warm-season forages have failed to even green up. Across many ranches, our forage savings accounts have been spent and range forage, any range forage, is at a premium.

During these desperate drought conditions animals are searching for green, any green.

In some cases, livestock and other animals are finding green we do not want them to find, toxic green. Since at least the beginning of summer 2020, livestock have been eating a lot of brown due to the absence of our summer monsoons. Our 2021 spring growing season has been less than ideal as well, but you may have been fortunate enough to have received enough winter/spring precipitation to start seeing some green pop on some of your forages.

Under “normal” conditions producers are aware of the more common, problematic toxic plants: our locoweeds, our lupines, our mustards, etc. However, some plants may not be considered toxic because they are generally not consumed and are probably considered more of a nuisance plant taking up space where a more palatable species could grow. But we are not in normal times and some of these plants are toxic, and some are being consumed.

Remember livestock prefer green over brown, new over old, and leaves over stems. If an animal has been eating brown, old, stems from perhaps as far back as the 2018 growing season, anything green might look appetizing. Livestock may look at those green, new, snakeweed (*Gutierrezia sarothrae*) leaves and think they may be pretty tasty. Burroweed (*Isocoma tenuisectus*), pigweed (*Amaranthus palmeri*), sneezeweed (*Hymenoxys hoopseii*) are some other common range plants we might see every day in our pastures and may not be aware of the toxicity because they are generally unpalatable and untouched. But because of the exceptional drought conditions we have been in, some of these plants are getting eaten. Avoidance of these plants by moving them to a different pasture may be difficult or impossible depending on the distribution of these plants throughout your pastures. Now is the time to be vigilant about observing your animals to see what they are eating and to catch any potential toxicity symptoms.

For more information about some toxic range plants see: Poisonous Plants on Rangelands (Hall et al., 2020) AZ1828.  
<https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1828-2020.pdf>

If you have unexplained livestock death loss in your operation, please contact your veterinarian and an ALIRT response may be triggered. For more information about ALIRT, please see: <https://extension.arizona.edu/alirt>



Burroweed (*Isocoma tenuisectus*)  
Photo Credit: LizMakings SEINet



Snakeweed (*Gutierrezia sarothrae*)  
Photo Credit: Patrick AlexanderSEINet

# University of Arizona

## Cooperative Extension Updates

*Ethan Orr, Associate Director of Agriculture and Natural Resources*

As the new Associate Director of Agriculture and Natural Resources for the Arizona Cooperative Extension I wanted to introduce myself and share some exciting updates about Extension.

I believe that Extension exists to serve you and my goal is to improve the quality and caliber of our service. I am a fourth generation Arizonian and I have served in the Arizona State Legislature on the Environment and Natural Resources Committee. I started working at the UA in 2014 and helped get the funding to start the College of Veterinary Sciences. I want to hear from you about ways that Extension and I can better serve you.

Based on feedback from producers around the state, we are adding two new specialist positions. First, we recently completed the hiring process for a new livestock specialist and we just started the search process for the new weed and plant specialist. Both of these positions will be statewide.

Also, several years ago we created the Natural Users law and Policy Center (NULPC) to help support you with legal issues. Currently the Arizona Legislature is running a bill which would add \$500,000 to the NULPC and would be used to hire attorneys to help support Arizona producers with legal issues regarding land and water use. Also, the Legislature is considering funding \$200,000 to create an agriculture-training program to help you fill your workforce and hiring needs. Please let me know if you would like any information about the legislation or the programs.

I look forward to getting to know you and working with you. Always feel free to contact me at [eorr@email.arizona.edu](mailto:eorr@email.arizona.edu)

Ethan Orr  
Associate Director, Agriculture and Natural Resources  
Arizona Cooperative Extension

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## During Tough Times – Return to the Basics

It's springtime in Arizona and producers have been having a tough time at just about every aspect of the business right now. Outside of some stimulus payments and possible drought payments, there hasn't been much good news within the industry. As we're coming up on warmer weather in the middle of an already dry year, there are a few things to consider when holistically looking at your ranching operation.

### Body Condition Score-

The body condition score (BCS) is a tool utilized to measure the condition of cattle. The BCS of the cattle in your operation can tell you a lot of how your cattle are doing and what they may be lacking. For example, if when looking and examining the cows in your herd, you notice that on average most of the cows in your operation score a 4 but there are a few cows that are at a 6...what might be the cause of that? One of the reasons could be that the animals scoring a 6 may not have a calf at their side and are thus able to better maintain better body condition. By paying attention to the BCS of your herd you can make wise management decisions based off the information your operation is giving you.

<b>1</b>	<b>Severely emaciated - no fat observed, backbone, tail head and ribs are prominently visible.</b>
<b>2</b>	<b>Emaciated - little visible muscle tissue, backbone, tail head and ribs less visible.</b>
<b>3</b>	<b>Very thin - no fat over ribs or brisket, backbone still easily visible (about 0.05 inches of fat cover).</b>
<b>4</b>	<b>Borderline - individual ribs noticeable, overall fat cover is lacking, there is increased musculature over shoulders and hindquarters, hips and backbone slightly rounded (about 0.10 inches fat cover).</b>
<b>5</b>	<b>Moderate - increased fat cover over ribs, only 12th and 13th ribs visible, tail head full or flat but not rounded (about 0.20 inches fat cover).</b>
<b>6</b>	<b>Good - back, ribs and tail head slightly rounded and spongy when palpated, fat deposition in brisket (about 0.30 inches fat cover).</b>
<b>7</b>	<b>Fat - cow appears fleshy and carries fat on back, tail head and brisket, ribs are not visible, some udder fat (about 0.40 inches fat cover).</b>
<b>8</b>	<b>Very fat - squared appearance due to excess fat over back, tail head and hindquarters, fat deposition in brisket and along ribs and in udder (about 0.55 inches of fat cover).</b>
<b>9</b>	<b>Obese - fatter than BCS 8 with more fat in udder (about 0.70 inches of fat cover).</b>

### Range Conditions + Projected Weather Patterns-

When looking at the condition of your ranch and operation, there are many variables to consider. As producers make management decisions, those decisions are based off of

current conditions. Even more important to consider is what conditions will be like 3-6 months in the future, or even farther out. Great producers look at current range conditions and weather patterns and make decisions to impact their operation down the road. These producers are pro-active in planning and implementing changes in their operation. The re-active producer fails to plan ahead and that slow decision making makes things harder to be successful. In an industry where profit margins are thin, the pro-active producer will find it easier to be successful in the beef industry. The University of Arizona Cooperative Extension Office has great specialists in range and climate/weather that can help you find valuable information to make wise management decisions when planning for the future.

## **Market Trends**

There are multiple sale avenues for beef producers to market their animals. No matter whether you market your calves at the sale barn or sell via an online auction, or have a direct market, it is always important to adjust to dry conditions. There may be a need to adjust your marketing strategy to match conditions on the ranch. During a time of severe drought, things aren't able to be predictable when trying to market animals. Keep in mind that if the above mentioned things (BCS/Range Conditions/Weather Patterns) aren't optimum, there may be a need to have a contingency plan to be as profitable as possible. Another variable to consider when marketing animals is the quality product. In times of drought, quality cattle become even more valuable. Calves with great genetics, are healthy and stay healthy, and are feed efficient will be in high demand. They will continue to perform when things get tough.

One additional item you may find of interest is the 50/14 Senate Bill being introduced by Iowa Sen. Chuck Grassley. There are many opinions around the bill with most organizations supporting the proposal. More information can be found here, <https://www.agriculture.com/news/livestock/senate-bill-calls-for-half-of-slaughter-cattle-to-be-sold-on-cash-market>

At time of printing there are some uplifting predictions for the 2021 summer monsoon. Also, this week stockers and feeder prices are both trending up with August feeders hitting \$1.60 for the first time in some time. As has been said, "it will rain....hope it isn't all on the neighbors"

# Nutrition Considerations for Livestock During Drought

*Ashley Wright, Livestock Area Agent, University of Arizona Cooperative Extension*

Arizona is no stranger to drought, and those grazing livestock on public lands are well aware of the impacts to the landscapes they steward, as well as their operations. Drought has two main effects on the forage in the landscape: It decreases forage quantity, but also has a big impact on forage quality. Providing nutritional support to grazing livestock during drought can help producers offset or prevent losses, as well as preserve forage resources on the landscape for wildlife and replenishment when the rains return.

Supplemental feeding for cattle can be split into two main categories: Protein supplements and Energy supplements. Protein supplements are, as their name suggests, high in protein, usually at least 22%. Energy supplements, on the other hand, just provide calories (or “groceries”), usually this takes the form of purchasing and feeding hay. The choice between the two is determined by the situation your operation finds itself in when drought hits. Do you have forage resources to spare, they’re just low-quality forages such as ungrazed forages from previous years in rested pastures? Or do you have very few forage resources and scarcity of feed is the main problem?

If you are in the first category and are fortunate enough to have some forage resources to fall back on, protein supplementation can help your cattle better utilize those resources. Protein supplements are generally provided as a tub, block, or lick for convenience in providing them to grazing animals. These types of supplements are not meant to replace forage consumption, but enhance the cow’s ability to use it. As protein levels in forages drop below 6.25% (as they typically do during the winter months even in non-drought years), the microbiome of bacteria in the rumen reduce in number and become less active. This decreases the cow’s ability to consume and process forages. Cattle fed a protein supplement of at least 22% see significant increases in rumen activity and are able to consume higher quantities of low quality forage (up to a 49% increase in consumption has been reported in cattle fed a 33% protein supplement). The benefit to this type of supplement is they don’t need to be fed daily (although the blocks, licks, or tubs can be left out for cattle to consume at will), they can be fed as infrequently as once per week at 7x the daily rate. This significantly reduces labor associated with protein supplementation.

If lack of forage resources are the major problem, energy supplementation in the form of hay or perhaps hay and some grain concentrate could be the answer. Generally this type of feed can be cheaper than protein supplementation (although in drought years

the price often increases), but unlike supplementing with protein, energy supplements must be provided daily. Also unlike protein supplementation, cattle will consume less forages (not more) when energy supplements are provided, although this could be a positive factor if preserving landscape forage is the goal. Note that some land management agencies don't allow feeding hay, and cattle may need to be moved to another land type. Energy supplementation can also be used in conjunction with protein supplement, this is especially helpful if poor quality hay is what you have available.

Finally, either of these feeding scenarios should be combined with other drought management tools such as early weaning some or all of the calves, and a strategic culling plan to remove nonproductive animals from the herd. If culling is accomplished earlier in drought rather than later, the overall impacts to the herd may be less. A high-quality mineral supplement can also help cattle make the best of the forages available to them during this time.

## Publication Highlights

<https://extension.arizona.edu/pubs/blister-beetle-toxicity-horses>

Blister beetles belong to a family of beetles called Meloidae. This family contains approximately 300 species distributed across the continental United States, including 150 in Arizona. Blister beetles have a peculiar life cycle. Females of some species lay eggs directly on plants and the emerged larvae interact with the host insect, while other blister beetles deposit clusters of eggs in small depressed areas of soil that form following rains and water runoff. The hatched larvae (called triungulin) feed on subterranean grasshopper egg pods or eggs of ground-nesting bees to complete development. The larvae pass through three growth stages (instars), with each becoming less active, and eventually they overwinter in the pupal stage. The adults emerge in the spring, and deposit eggs again in the summer to complete the cycle.

The Informed Arizona Equestrian  
HORSE HEALTH SERIES  
**Blister Beetle Toxicity in Horses**  
Elizabeth A. Gross, PhD, Ashley D. Wright MS, April Merseth, PhD, and S. John Cross, DVM

*No one wants their horse gradually changing their routine due to the rain, which has that you can't see until a few weeks later. One morning, you discover your favorite horse John is acting a little off. Most of the other horses seem fine, except for John. He has started eating and is showing signs of colic along with blood in his urine. You realize the day and it seems great to find out what's wrong with the horse and John's urine. It comes back positive for carbaryl.*

Blister beetles belong to a family of beetles called Meloidae. This family contains approximately 300 species distributed across the continental United States, including 150 in Arizona. Blister beetles have a peculiar life cycle. Females of some species lay eggs directly on plants and the emerged larvae interact with the host insect, while other blister beetles deposit clusters of eggs in small depressed areas of soil that form following rains and water runoff. The hatched larvae (called triungulin) feed on subterranean grasshopper egg pods or eggs of ground-nesting bees to complete development. The larvae pass through three growth stages (instars), with each becoming less active, and eventually they overwinter in the pupal stage. The adults emerge in the spring, and deposit eggs again in the summer to complete the cycle.

Blister beetles are hazardous to animals feeding on contaminated forage. The larvae produce an irritating compound called cantharidin. This compound is toxic to all livestock, including, and horses are particularly susceptible. Cantharidin is a component of the beetle's body fluid, and is released when the beetle is crushed or disturbed. Irritated animals will show symptoms of colic and frequent urination, which may cause colic death in 4-7 hours. One hallmark of blister beetle poisoning is a significant drop in the levels of calcium and magnesium present in the bloodstream of the affected animal.

Blister beetles are common in the desert southwest and vary considerably in size and shape. Some may be 1/4 inch long (Figure 1). Typically they are black, brown, or grey and may feature brightly colored spots or stripes of orange, yellow,

red, or brown (Figure 2). A few species are available to ingest in feed. Many of these species are not commonly found in hay bales, but they may show up in hay bales on an opportunistic basis. An example of these are exosomatids found around the edge of the bales. Meloidae can be distinguished from other families of beetles by their broad and expanded head and thorax neck (thorax). Their body and wings are generally soft and flexible, not as hard as other groups of beetles. When separated or pulled, the blister beetle will "bleed" from their big joints. This substance contains the homocyclic containing cantharidin.

*Figure 1. Blister beetle, a horse beetle commonly associated with carbaryl toxicity. It is black, brown, or grey and may feature brightly colored spots or stripes of orange, yellow,*

## The U.S. Drought Monitor

Andrew Bruchke, Michael Crimmins, Mitchell McClaran, Ashley Hall, and Joshua Grace

### Introduction

Drought is a complex and slow-moving natural disaster which can cause severe damage comparable to other natural disasters such as hurricanes, tornadoes, fires, and flooding. Drought can be detrimental to crop and livestock production, the water and energy cycles, and wildlife habitat (Vose et al. 2016). Warming temperatures and increased frequency of drought increases wildfire activity and severity throughout western states (Westering et al. 2006). Droughts can be difficult to discern in arid climates like Arizona where the climate is already relatively dry and warm. Nonetheless, droughts do occur and are infrequent climatic extremes eventually occurring in every location.

Drought is more complex topic than simple precipitation deficit. Factors affecting drought intensity include temporal and spatial variability of precipitation events, rainfall intensity, and temperature and cloud cover which influence evaporation. Similarly drought impacts

vary among different land uses. As a result, we often identify four categories of drought for use in determining impacts: meteorological (precipitation and temperature), agricultural (mainly short-term impacts to soil moisture and the ability to grow crops and range), hydrological (long-term impacts to streamflow and reservoir storage), and ecological (long-term impacts to vegetation die-back and increased likelihood of wildfire).

The U.S. Drought Monitor (USDM) attempts to represent this complexity of drought intensity, and impacts to natural resource utilization (land and water) each week using a single map to delineate drought conditions across the U.S. However, the complex nature of drought may be difficult to capture in a single map-based assessment meaning limitations may exist when interpreting the USDM within the scope of local drought conditions and impacts. Despite this limitation, the USDM serves

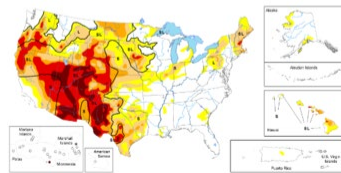


Figure 1. The U.S. Drought Monitor from November 19, 2020 illustrates the extent and intensity of drought. The U.S. Drought Monitor is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration. Map courtesy of NDMC-UNL.

<https://extension.arizona.edu/pubs/us-drought-monitor>

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<https://extension.arizona.edu/pubs/financial-options-livestock-producers-during-natural-disasters>

Natural disasters affecting the agricultural industry occur regularly throughout the United States and may receive a disaster designation from the United States Department of Agriculture (USDA). Disaster payments through various programs from 2014-2018 totaled over \$63.6 million in Arizona (EWG, 2020). Agricultural disasters often place economic hardships on producers. Producers in arid/semiarid regions like the southwest U.S. are particularly susceptible to the impacts of drought while other regions may be more susceptible to other disasters such as blizzards and extreme cold (e.g. Northern Great Plains).

## Financial Options for Livestock Producers During Natural Disasters

Andrew Bruchke, Michael Crimmins, Josh Grace, Ashley Hall, and Mitchell McClaran

### Introduction

Natural disasters affecting the agricultural industry occur regularly throughout the United States and may receive a disaster designation from the United States Department of Agriculture (USDA). Disaster payments through various programs from 2014-2018 totaled over \$63.6 million in Arizona (EWG, 2020). Agricultural disasters often place economic hardships on producers. Producers in arid/semiarid regions like the southwest U.S. are particularly susceptible to the impacts of drought while other regions may be more susceptible to other disasters such as blizzards and extreme cold (e.g. Northern Great Plains). To alleviate some of these economic hardships faced by producers, certain relief programs correspond directly with the U.S. Drought Monitor (USDM) map. The USDM is

a map authored each week to delineate drought conditions across the US (Figure 1).

Many designations are dependent on drought categories depicted on the USDM. One of the most immediate impacts of the USDM is the ability to trigger an emergency disaster designation. Producers may benefit from disaster relief programs including, but not limited to, the Livestock Forage Disaster Program, emergency loans, or tax deferrals.

For an overview of the USDM please see, The U.S. Drought Monitor, AZ 2018-0037. To review the types of data used to inform the USDM please see, Monitoring Drought in Arizona, AZ 2020-0709. To access the USDM, please visit: <https://droughtmonitor.unl.edu/>.

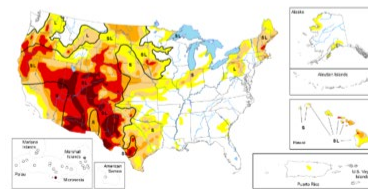


Figure 1. The U.S. Drought Monitor from November 19, 2020 illustrates the extent and intensity of drought. The U.S. Drought Monitor is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration. Map courtesy of NDMC-UNL.