

OFF THE HOOF

KENTUCKY BEEF CATTLE NEWSLETTER JANUARY 6, 2022



University of Kentucky
College of Agriculture,
Food and Environment
Cooperative Extension Service

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University of Kentucky

Beef IRM Team

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Timely Tips

Dr. Les Anderson, Beef Extension Professor, University of Kentucky

Spring-Calving Cow Herd

- Study the performance of last year's calf crop and plan for improvement. Plan your breeding program and consider a better herd sire(s). Select herd sires which will allow you to meet your goals and be willing to pay for superior animals.
- Consider vaccinating the cows to help prevent calf scours.
- Keep replacement heifer calves gaining to increase the probability of puberty occurring before the start of the spring breeding season.
- Start cows on the high magnesium mineral supplement soon. Consider protein supplementation if hay is less than 10% crude protein. If cows are thin, begin energy (grain) supplementation now. Cows must reach a body condition score of 5 before calving to maximize their opportunity for reproductive success. Supplementation now allows adequate time for cows to calving in adequate body condition score.
- Get ready for calving season! See that all equipment and materials are ready, including obstetrical equipment, record forms or booklets, ear tags, scales for obtaining birthweights, etc. Prepare a calving area where assistance can be provided easily if needed. Purchase ear tags for calves and number them ahead of time if possible. Plan for enough labor to watch/assist during the calving period.
- Move early-calving heifers and cows to pastures that are relatively small and easily accessible to facilities in case calving assistance is needed. Keep them in good condition but don't overfeed them at this time. Increase their nutrient intake after they calve.

Fall Calving Cow Herd

- Provide clean windbreaks and shelter for young calves.
- Breeding season continues. Keep fall calving cows on accumulated pasture as long as possible, then start feeding hay/grain. Don't let these cows lose body condition!
- Catch up on castrating, dehorning and implanting.

General

- Feed hay in areas where mud is less of a problem. Consider preparing a feeding area with gravel over geotextile fabric or maybe a concrete feeding pad.
- Increase feed as the temperature drops, especially when the weather is extremely cold and damp. When temperature drops to 15°F, cattle need access to windbreaks.
- Provide water at all times. Cattle need 5 to 11 gallons per head daily even in the coldest weather. Be aware of frozen pond hazards. Keep ice "broken" so that cattle won't walk out on the pond trying to get water. Automatic waterers, even the "frost-free" or "energy-free" waterers can freeze up in extremely cold weather. Watch closely.

Consider renovating and improving pastures with legumes, especially if they have poor stands of grass or if they contain high levels of the fescue endophyte. Purchase seed and get equipment ready this month.

Recent and Upcoming On-line Beef Education Opportunities *Beef IRM Team, University of Kentucky*

ROWLI

Disaster Relief Information – Beef Extension Crew

BeefBits Podcast

Texas Winters – Lehmkuhler and Dr. Jason Smith TAMU

To access this and other excellent beef educational content, visit our Facebook Page (facebook.com/KyBeefIRM) and/or on the Department of Animal & Food Science YouTube page (https://www.youtube.com/channel/UCu4t18Zo2E_4_DBBELPjPMg). Subscribe to the AFS YouTube page and click the notifications bell to receive a notification whenever we publish new beef education content. Beef Bits can also be accessed on the podcast website (https://www.podbean.com/media/share/pb-meqic-e6f8f1?utm_campaign=u_share_ep&utm_medium=dlink&utm_source=u_share).

UK Beef Management Webinar Series

Dr. Darrh Bullock, Extension Professor, University of Kentucky

Please join us for our Beef Management Webinar Series that meets via Zoom in the evening of the second Tuesday of each month. Registration is necessary, however, if you previously signed up for the ROWLI webinar series we conducted over the past 18 months or have already signed up for this webinar series then you do not need to re-register, you will automatically receive the invitation the morning of each presentation. If you need to register, please send an email to dbullock@uky.edu with Beef Webinar in the subject line and your name and county in the message. You will receive the direct link with a

password the morning of each meeting. This invitation will directly link you to the site and you will be asked for the password which can be found just below the link. Each session will be recorded and posted for later viewing. All meeting times are 8:00pm ET/7:00pm CT. The following is the planned agenda to date:

January 11, 2022

Milk: Benefit or Burden – Dr. Darrh Bullock and Dr. Jeff Lehmkuhler

February 8, 2022

AFS Beef Research Update

Titles and speakers to be announced.

March 8, 2022

Shooting the Bull: Answering all your beef related questions! – Roundtable discussion with UK Beef Specialists

Mid-South Stocker Conference Online in 2022

Dr. Jeff Lehmkuhler, Extension Professor, University of Kentucky

Due to continued high infection rates of COVID, the 2022 Mid-South Stocker Conference will once again be offered free of charge as an online program. Last year the conference was held online with good attendance and the decision was made due to uncertainties in meeting restrictions to hold the program online again this year.

The conference will be held on February 23, 2022 beginning at 12:00 pm EST. Topics to be covered this year include baleage production, grazing management, new research on respiratory disease, and a 2022 market outlook. The Mid-South Stocker Conference is a joint effort between University of Tennessee, University of Kentucky, and industry to offer an educational program for the stocker and backgrounding sector of the industry.

To register for the conference, the following online link will be available during the week of January 11th. The link is <https://tiny.utk.edu/22MSSC> for registering. Once registered, an email will be sent to participants to join the Zoom program prior to the event. For additional information go to <https://midsouthstockerconference.utk.edu/> or contact your local county Extension office or email jeff.lehmkuhler@uky.edu . We hope you will join us on February 23 to from a great line-up of speakers.

Reflect, Rebuild, and Return

Jeff Lehmkuhler, Extension Professor, University of Kentucky

Happy New Year! What a year 2021 was with highs and lows. The weather certainly put a dampener on ending the year for many of our Western Kentucky families. The recovery will be a long process, much longer for those that lost loved ones. Yet, the strength of the state is the community support, whether that be locally or from those outside the area that have a connection to the communities in the Bluegrass.

The response from our state has been truly staggering. Locally, we had a beef producer who works at a local agricultural business coordinated a raffle that raised more than \$70,000 to help those impacted by the storm. University of Kentucky Athletics and a local television network held a telethon that reported raising more than \$5 million in donations that will go to the American Red Cross to support relief efforts in Western Kentucky. The agriculture community teamed up on coordination of relief efforts and setting up donation sites. Local Extension offices are aiding in this coordination. I am in awe of how many jumped to assist in the relief effort.

When we were at the Princeton research station rebuilding fences, a local heavy equipment operator brought his bulldozer over to clear trees from the fence lines. All forms of support make a difference. We will never know the full “value” of the donations, whether monetary, food, clothing, or the time individuals spend helping repair and clean up the debris. However, that number doesn’t really matter. The acts of kindness in helping a community rebound from such devastation is what matters. I hope the donations help those in need get back on their feet.

For those that are able, the new year is a great time to reflect on your beef operation. This year is offering a very different canvas to paint your beef image. Record inflation is driving up costs. Many of you have followed what fertilizer prices have done and their drastic increases compared to a year ago. The Bureau of Labor statistics report that the consumer price index (CPI) for energy was up 33% over the last 12 months. Food costs were up 6% and all goods were almost 7% higher. When looking closer at the CPI for food, the average reported for eggs, fish, meats, and poultry was 12.8%. However, beef saw a much larger increase of 20.8%. We all have seen this in the stores with steaks, roasts and ground beef being much more expensive. Will this have an impact on beef demand?

Do you know the money flow in your beef operation? What costs are much higher than a year ago? Can you reduce inputs without dramatic decreases in production? Where can you find efficiency? The ol’ saying goes you can’t manage what you don’t measure. For many, measurements are limited skewing decisions. Spend some time this year considering how you will collect the information you need to be able to decide if your management decisions are providing your operation a positive return on the investment. If you are interested in learning more about improving the efficiency of your beef cattle operation, join us at the Kentucky Beef Efficiency Conference in Lexington on January 13 as part of the KCA convention. Several nationally recognized speakers will present on a variety of topics centered on efficient beef cattle production. Hope to see you there!

Frost Seeding – It’s That Time of Year!

Chris Teutsch, Extension Professor, Forage Specialist, UKREC at Princeton

Since last month, nitrogen price has continued to increase. In the past 12 months nitrogen cost has more than doubled (Figure 1). Currently, urea is priced at \$750 /ton or \$0.82/lb N. Even so, nitrogen remains an important part of grassland ecosystems and is closely related to both dry matter yield and crude protein concentrations in grasses and non-leguminous forbs. Since nitrogen is highly mobile in the soil,

soil testing is not commonly used to make nitrogen fertilization recommendations. Recommendations are based on research trials conducted over multiple years and locations.

Nitrogen Cycling in Grassland Ecosystems.

So here is some good news...in well managed grasslands strong nitrogen cycles can be developed over time. Nitrogen enters these systems in the form atmospheric deposition (minor amounts), feed and supplements brought into the system, and nitrogen fixed by legumes. These cycles can reduce or in some cases even eliminate the need for nitrogen fertilizer. It is important to realize that these cycles take time to develop require good grazing and feed management. A key component of these cycles is the use of legumes such as red and white clover and alfalfa (Figure 2).

Legumes fix nitrogen in the air to a plant available form. The importance of legumes in grasslands has long been recognized. They bring nitrogen into grassland ecosystems via symbiotic nitrogen fixation, improve forage quality and animal performance, and dilute the toxic effects of the endophyte found in tall fescue. It is estimated that commonly used pasture legumes will fix between 50 and 250 lb of nitrogen per acre per year (Table 1). At current prices, the value of this nitrogen is between \$40 and \$200 per acre per year.

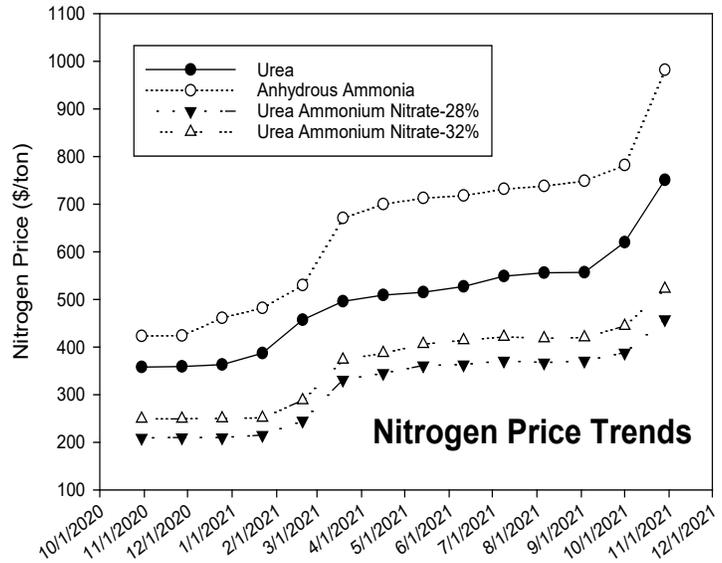


Figure 1. Nitrogen price trends over the last 12 months. Data are from DTN and available at <https://www.dtnpf.com/agriculture/web/ag/crops/article/2021/11/03/nitrogen-fertilizer-prices-close>.

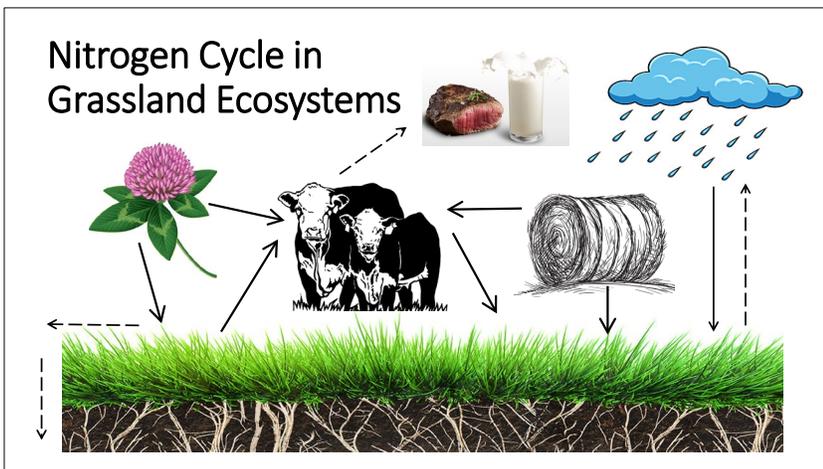


Figure 2. Strong nitrogen cycles can develop in well managed grassland ecosystems. Nitrogen enters the system via imported hay and supplements, nitrogen fixation in legumes and atmospheric deposition (minor amounts). Nitrogen leaves the system via volatilization, denitrification, leaching, runoff, and animal products removed. A cow-calf pair will consume approximately 280 lb N/year of which 200 lb is retained in the grassland

Legumes share nitrogen with grass indirectly. Nitrogen is transferred to grass grown in association with legumes through the ingestion of legumes and subsequent deposition of dung and urine by grazing animals (Figure 2), death and decomposition of above and below ground plant parts including roots, shoots, and nodules, and to a lesser extent direct legume to grass transfer.

Overseeding legumes is not the same as applying commercial nitrogen fertilizer. Mixed stands of grasses and legumes may yield as

much or more than grass monocultures fertilized with moderate rates of nitrogen, but a significant proportion of that yield will be made up of the legumes. In other words, legumes not only increase grass growth by supplying nitrogen, but also compensate for lower grass production in mixed swards.

Applying nitrogen fertilizer to mixed stands sifts botanical composition. The addition of nitrogen fertilizer to grass-legumes mixtures tends to sift the composition of the mixture toward grasses. Nitrogen fertilizer also reduces nitrogen fixation in the legumes since energetics favor uptake of nitrogen in the soil rather than biological fixation.

Improved legumes require good soil fertility to be productive and persistent. Improved legumes such as red and white clover and alfalfa require relatively high soil fertility and pH's above 6.0 to be productive. This means that an initial investment in potash, phosphorus, and lime must be made. These applications need to be based on a recent soil test.

Legumes are most productive when rotationally stocked. Like other forages legumes respond well to improved grazing management. Resting pastures allows leaf area to regrow and carbohydrate reserves to be stored up. In general, tall growing legumes like alfalfa and red clover are more dependent on stored energy for regrowth. This means that they need time to rest and replenish their stored carbohydrates between grazing events. That is the reason that alfalfa does not persist well in continuous grazing systems. Even white clover that tolerates close grazing very well benefits from rest.

Rotational stocking is a tool to manage botanical composition. How we graze our pastures has a profound impact on botanical composition. In grasses, energy for regrowth is dependent on leaf area remaining after grazing. The remaining leaf area is like a solar panel that captures sunlight and converts it into energy (sugars and carbohydrates) that the plant can use to fuel regrowth. The more leaf area we leave, the larger the solar panel, the faster pastures will regrow, and the more competitive the grass will be the tall growing legumes. If we graze closely with a rest period between grazings, we will tend to favor tall growing legumes in the sward since they are more dependent on stored carbohydrates for regrowth.

Mixed stands can be stockpiled for winter grazing. Grass-legumes mixtures can be stockpiled for winter grazing, but they need to be used first since legumes tend to deteriorate before grasses. Save pure stands of grass that were fertilized with nitrogen for late winter grazing.

Overseed when needed to introduce and maintain improved legumes.

Approximately 25 to 30% of the pasture on a dry matter basis should be made up of clover or other legumes. Even improved red clover varieties only last two to three years. Annual lespedeza will sometimes reseed itself,

Table 1. The amount and value of nitrogen fixed by commonly used pasture legumes.

Legume	Nitrogen Fixed lb/A/yr.	Value of Fixed Nitrogen (\$/A/year)		
		N cost=\$0.25/lb.	N cost=\$0.50/lb.	N cost=\$0.75/lb.
Alfalfa	150-250	40-65	80-130	120-195
Red Clover	75-200	20-50	40-100	60-150
Ladino Clover	75-150	20-40	40-80	60-120
Annual Lespedeza	50-150	15-40	30-80	45-120

Adapted from *Southern Forages, Fourth Edition.*

but as a general rule this is not dependable. A good general mix for overseeding pastures in Kentucky is 6-8 lb medium red clover, 1-2 lb of ladino or grazing type white clover, and in some cases 10 lb of annual lespedeza per acre.

Always use improved clover varieties. Work done at the University of Kentucky shows that improved red clover varieties will last 1-2 years longer than common medium red clover. Using certified seed guarantees that you are getting the genetics that you are paying for. More information on the best adapted clover varieties can be found by going to the [UK Forages Website](#) and clicking on the “Variety Trial” icon.

Always inoculate or use pre-inoculated seed. Since legumes fix nitrogen from the air by forming a symbiotic relationship with *Rhizobium* bacteria, inoculating seed with the proper strain of nitrogen fixing bacteria prior to planting is the best way to ensure optimal fixation.



Figure 3. Nitrogen fixed by legumes is shared indirectly with grasses through grazing and subsequent deposition of dung and urine. In this photo dung beetle is hard at work breaking down a cow patty.

Sometimes we need to be reminded about the importance of legumes in grazing systems. I cannot think of a better reminder than \$0.75 nitrogen. Clover seed prices will likely be higher in the spring and availability may be limited. So, now is the time to make plans and gather supplies for frost seeding in February!

The Top Ten New Years' Resolutions for Cow/Calf Producers

Dr. Michelle Arnold, UK Veterinary Diagnostic Laboratory

“Insanity is doing the same thing over and over and expecting different results.” We have all heard this phrase, often attributed to Albert Einstein, and it certainly applies when it comes to the health and care of cattle. If you want to improve health and prevent as many problems as possible, think of adopting one or more of the following resolutions.

In 2022, I resolve to...

1. Improve the water the cattle drink: Water is the cheapest and most readily available nutrient but it is often the most overlooked. Consumption varies with age, breed, temperature and humidity, stage of pregnancy or lactation, and level of production but can reach as high as 25-30 gallons per day during hot weather. Generally, cattle health problems are seldom directly due to what is in the water but rather the decrease in water consumption because of the poor taste and odor. Decreased consumption is just as harmful as not having enough water available. When cattle do not drink enough, feed intake and milk production drop, heat stress worsens, and overall immunity suffers. If cattle are allowed to stand in water sources such as ponds, fecal and urine

contamination will decrease water quality and certain diseases (for example, leptospirosis) will spread through contaminated water.

2. Check the mineral feeder regularly and keep trace mineral in front of the cattle at all times: This resolution can be challenging, especially in those times when the cattle seem to eat it as fast as it is put out. The keys to using a free-choice trace mineral product are to ensure cattle have access to mineral 100% of the time, use a palatable, quality product and make sure they are consuming it at the expected level. Remember a 50-pound bag of mineral to be fed at 4 ounces per head per day will only last 4 days in a 50 cow herd. If the cows have calves that also eat mineral, a bag may only last 3 days. If cattle are consuming too much mineral, try moving the feeder farther from the water source or mixing in loose salt to slow the consumption rate. Mineral feeders should not be allowed to be empty for long or cattle will overeat salt or mineral when it is offered again. Provide adequate access for cows and calves, for example 1 mineral feeder per 15 cow/calf pairs. Do not offer additional loose salt, salt blocks, or sources of salt at the same time. Trace minerals, especially copper and selenium, are often far below acceptable levels in cattle without supplementation. The absence of these vital nutrients is a major factor in development of disease. Additionally, grass tetany/hypomagnesemia cases will occur in late winter and early spring if lactating beef cattle are not offered a free-choice, high magnesium trace mineral during that period of time.
3. Test my hay before winter and figure out if I need to buy supplemental feed: If hay quality is poor, for example if cut very ripe (late stage of maturity), rained on while curing, and/or baled with enough moisture to support mold growth, supplementing cattle with adequate energy and protein sources will likely be required to meet their basic nutritional needs until grass is available again. Many cows and calves presented for necropsy (an animal “autopsy”) in late winter reveal a total absence of fat and death is due to starvation. This indicates that the hay feeding program did not provide the necessary nutrition for winter weather survival. It is often difficult for producers to realize that cattle can actually starve to death while consuming all the hay they can eat – especially if crude protein levels are in the 3-4% range, and TDN (energy) is <40% – as is common in some late-cut, overmature, rained-on hay. Many producers purchase “protein tubs” varying from 16-30% protein to make up for any potential protein deficiencies but fail to address the severe lack of energy in the diet.
4. Keep my cows from losing weight, especially while pregnant: Learn to body condition score cows so you will know where on the cow to look for signs of early weight loss. Inadequate nutrition severely affects the developing fetus in a pregnant cow. “Fetal programming” of the immune system of the developing calf during pregnancy will not progress correctly without sufficient nutrients and trace minerals. A weak cow may experience dystocia (a slow, difficult birth) resulting in lack of oxygen to the calf during delivery, leading to a dead or weak calf. Calves born to deficient dams have less “brown fat” so they are less able to generate body heat and are slower to stand and nurse compared to calves whose dams received adequate nutrition during the last 100 days of pregnancy. Poor colostrum quality and quantity from protein and energy-deficient dams will not support calf survival and performance. Thin cows will be the last ones to rebreed.
5. Work with a veterinarian to examine my herd vaccination program: Cattle herds are unique entities with different risks for disease on every farm so working with a veterinarian is your best bet to finding the right vaccines for the herd. The question of whether to use modified live or killed vaccine in adult cows is not an easy one to answer. Modified live vaccines (MLVs) offer better and more effective pregnancy protection but can impact conception rates if given too close

to breeding season. In addition, MLV vaccines can cause abortions if given to pregnant cattle without strict adherence to label directions. Killed vaccines, on the other hand, are safer but are not nearly as effective at preventing infection. Another option is to administer two doses of MLV vaccine to open heifers (at weaning and a second dose 6 weeks prior to breeding) with annual revaccination using a killed vaccine. This combination stimulates excellent protection without the risk of MLVs although this protective response will diminish after several years.

6. **Improve biosecurity:** Purchasing bulls, cows, or calves, and bringing them home to the farm is likely the single most dangerous time for introduction of new diseases into a herd. Even show animals returning to the farm from events should be isolated to prevent introduction of disease when they re-enter the herd. Any newly purchased animals should be isolated either off the farm or in a well-segregated area for at least 2 weeks (3-4 weeks is better) and observed for any signs of illness. During the period of isolation, a veterinarian should be consulted to appropriately test and vaccinate new arrivals. The best practice is to purchase animals from herds of known health status that will provide a vaccination and health history. Introduction of an animal with a disease such as Johne's or a BVD persistently infected (PI) animal could have devastating, long-term effects on the health of the cow herd.
7. **Be better prepared to handle problems during labor and delivery:** Checking on cows and heifers close to calving allows early detection of difficulty and intervention if needed during calving. If a cow or heifer is in active labor for 1-1.5 hours and making no progress, calving intervention is indicated. Assist or call for assistance with calving as early as possible, especially with heifers. Make sure calves start nursing after calving, keeping in mind that calves should stand within 30 minutes of delivery and nurse within 30 minutes of standing. If in doubt that the calf will be able to stand and nurse within an hour, make sure the calf is warm and then feed a good quality colostrum replacer, at least 1-2 quarts, within an hour of birth and again before 6 hours old.
8. **Improve my forages:** It is often said that beef producers need to think of themselves as grass farmers because they sell pounds of calf produced by a cow that eats grass and makes milk. The UK Forages website: <http://forages.ca.uky.edu/> is full of easy-to-find, useful information to make pastures more productive. Check out their instructional videos at <https://www.youtube.com/c/KYForages>
9. **Keep better records:** It is hard to make well-informed decisions without information. At the very least, every animal should have a readable ID tag and calving dates should be recorded. Other parameters such as calf birth and weaning weights, sex, and dam information help differentiate the poor performing cows from the great ones. Vaccination records should include date administered, vaccine name, lot and serial numbers and expiration dates at a minimum.
10. **Listen to a trusted source for information and stop believing everything you read on Dr. Google:** This is true in much more than beef cattle production. There is a lot of misinformation available and discernment is becoming a lost art. Veterinarians, Extension agents, and University Extension specialists, among others, can help answer or point you in the right direction when it comes to questions about the health and care of cattle. Hope you have a prosperous 2022.

After the Storm: Considerations for Managing Cattle in the Aftermath of Severe Weather

Dr. Katie VanValin, Assistant Extension Professor, University of Kentucky

December is one of the busiest times of the year for many of us. It's breeding season for fall calving herds, and many are starting winter feeding programs. In addition to everyday farm life, December also

brings the hustle and bustle of the holiday season. However, this year for many people throughout western Kentucky and beyond, December brought unimaginable destruction and devastation in the form of a devastating tornado outbreak on December 10th and 11th, 2021.

The University of Kentucky Research and Education Center in Princeton, KY, suffered catastrophic damages from an EF-4 tornado on the evening of December 10th. Although the destruction left behind is devastating, the University of Kentucky community is fortunate that there was no loss of life amongst our colleagues, and injuries were minor. Unfortunately, the beef herd at the UKREC lost cattle in the storm and in the days that followed. However, when standing in the rubble of our buildings or in our debris-ridden pastures, I often find myself thinking that it is truly a miracle that our people and our cattle were not more severely impacted by the storm.



Damage to one of the barns at the UKREC beef unit

There is no doubt that severe weather can cause significant disruptions to cattle operations. While some of the impacts are noticeable and will be felt immediately, others may not be so obvious and maybe felt in the weeks, months, and years to come.

Human Life. In the immediate aftermath of severe weather, priority should be placed on ensuring that everyone is accounted for and safe. Once family members, friends, and neighbors are accounted for, and severe weather is no longer a threat, it is time to focus on agricultural damages and losses.

Securing Animals. Every effort should be made to safely secure livestock in areas where fencing may have been impacted. Cattle getting out onto roadways can cause a secondary emergency. Securing cattle may involve:

- Moving them to a location where perimeter fencing has minimal damage.
- Combining multiple groups of cattle into one area, where fencing is in place.
- Installing temporary fencing.
- Making repairs to damaged fences.

Electricity may be out; solar-powered fence chargers are especially useful when installing temporary fences.

When securing animals on a storm-damaged operation, evaluating feed and water resources is also essential. It is possible that even if your operation only sustained minor damages, that impacts to surrounding areas could impact municipalities. It may be necessary to haul water to cattle. The storm may have affected feed resources, including hay, grain, and feeding equipment. People in the agricultural community are quick to jump in and help, so taking a few moments to determine your needs will allow others to assist you more efficiently. At the UKREC, we lost water and needed to have water trucked in for several days.



Damage to farm equipment, storage sheds, and one of the cattle handling facilities at the UKREC.

Thankfully, local farmers and the fire department were more than happy to help us haul water to our cattle in the days following the storm.

To account for cattle and determine if any may be missing, it is helpful to have an up-to-date list of animal numbers and pasture locations. As animals may be in larger groups and possibly confined to smaller areas, it can be difficult to accurately count cattle; especially calves. Have an individual animal I.D. system and an accurate list of tag numbers so numbers can be checked off as cattle are accounted for.

Animal injuries. Cattle will likely suffer injuries during violent storms, including lacerations and broken bones. When possible, work with a veterinarian to evaluate the injuries sustained during the storm and develop treatment protocols for those animals that can be treated or humanly euthanize severely injured animals. One thing that should be considered during this time is your ability to treat and care for injured animals. Cattle handling facilities and barns may have also been damaged in the storm, making the safe treatment of some injuries difficult or impossible. The goal here is to do no harm. There may be injuries that could otherwise be treated in a typical scenario that may require euthanasia in a disaster scenario. Again, when possible, work with a veterinarian to evaluate cattle on the operation.

Animal death. Unfortunately, some cattle may die from injuries sustained during weather events. While the hope is that this number is low, the herd mentality of cattle means they often congregate together, leading to the devastating loss of life during natural disasters. Be sure to keep an accurate count of animals that are lost during the storms. The United States Department of Agriculture's livestock indemnity program will help financially compensate producers that lose livestock. Other programs may also be available to help, so contact your local extension office, USDA-FSA office, and emergency

management office. Ensure you know the programs available to you and the documentation and deadlines associated with these programs.

Proper carcass disposal is also critical. Again, every effort must be made to not create secondary issues during the aftermath of a weather emergency. In Kentucky, acceptable methods of animal disposal include burial and composting. If you are unsure of how to or cannot properly dispose of animals on your operation, reach out to your local county extension office or emergency management offices for assistance.

Hardware disease. Hardware disease occurs when ruminants consume metal debris, including screws, nails, and metal wire. This debris becomes lodged in the reticulum, the first compartment in a ruminant animal's stomach. The metal can puncture the wall of the reticulum, diaphragm, or the pericardium (protective sac around the heart). Hardware disease can be challenging to diagnose because its symptoms, including depression, poor appetite, and reluctance to move, can often mimic other conditions. Placing a magnet in the reticulum can help attract metal debris away from the walls of the reticulum, which can treat or prevent hardware disease.

Every effort should be made to prevent the ingestion of metal objects by carefully clearing affected pastures of storm debris. The use of commercial-grade magnets can help clear pastures. Additionally, metal detectors can be used to identify metal debris. However, these tools will not detect or collect all potentially harmful debris in pastures. It is also important to ensure that feeds such as hay or grains were not contaminated with metal debris that cattle could ingest.

Reproductive complications. Stress has a negative impact on reproductive outcomes, and undoubtedly severe weather events cause stress on livestock. Stress can significantly decrease conception rates of cattle. Although, we would typically expect tornadic activity to impact the breeding season of spring calving herds, this outbreak happened to occur during the breeding season for fall calving herds. At the UKREC, we utilize A.I., and the entire herd happened to be bred the morning of December 10th. We expect conception rates to A.I. to be extremely low, especially in the animals most affected by the tornado.



This Farmall Cub tractor was one of the original tractors used at the UKREC. It had previously been restored by the farm staff and was on display in the lobby of the UKREC and Grain and Forage Center of Excellence.

Cattle may also abort due to the stress of weather events. Pregnancy is a luxury; it is not necessary for survival. When cows experience stress, such as extreme weather events, biological processes kick in to help them survive (think fight or flight response). These processes affect every part of the body with the end goal of helping the cow survive. Thus, luxury processes such as pregnancy or even lactation can be negatively affected by stress. Keep a close eye on nursing calves in the days and weeks following storms, especially those whose dam may have been injured or killed due to the storms.

These reproductive complications may not be observed immediately but can have devastating impacts on the herd's future. Work with your county extension agent and local veterinarians to help assess the potential reproductive impacts on the cow herd.

The impact of these tornadoes will be felt for many years to come in the impacted regions. If you or someone you know has been affected by the storms, continue to seek assistance as the recovery process is long and challenging. These storms were so powerful and brought so much destruction in just a matter of seconds. Still, the strength, resilience, kindness, and generosity of friends, neighbors, colleagues, and complete strangers from all over the United States has been stronger. The debris will be cleaned up in time, and the physical structures that make up the University of Kentucky Research and Education Center will be rebuilt. In the meantime, the people of the University of Kentucky Research and Education Center will strive to continue our work serving the agricultural community of Kentucky and beyond.