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***Beef IRM Team***

## KENTUCKY BEEF CATTLE NEWSLETTER FEBRUARY 2020

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## Contents

This month's newsletter includes:



## Timely Tips

***Les Anderson, Ph.D., Beef Extension Specialist, University of Kentucky***

**Spring-Calving Cows**

- Observe spring-calving cows closely. Check cows at least twice daily and first-calf heifers more frequently than that. Be ready to assist those not making progress after 1 to 2 hours of hard labor. Chilled calves should be dried and warmed as soon as possible.
- See that each calf gets colostrum within an hour of birth, or administer colostrum (or a commercial colostrum replacement) with an esophageal feeder, if needed.
- Identify calves with eartags and/or tattoos while calves are young and easy to handle and record birthdate and Dam ID. Commercial male calves should be castrated and implanted as soon as possible. Registered calves should be weighed in the first 24 hours.
- Separate cows that have calved and increase their feed. Energy supplementation to cows receiving hay is necessary to prepare them for rebreeding. For example, a 1250 lb cow giving 25 lb/day of milk would need about 25 lb of fescue hay and 5 lb of concentrate daily to maintain condition. If you need to go from a condition score of 4 to 5, you will need to add about 2 more lb of concentrate. Cows must be in good condition to conceive early in the upcoming breeding season.
- Watch for calf scours! If scours become a problem, move cows that have not calved to a clean pasture. Be prepared to give fluids to scouring calves that become dehydrated. Consult your veterinarian for advice and send fecal samples to diagnostic lab to determine which drug therapy will be most effective. Try to avoid feeding hay in excessively muddy areas to avoid contamination of the dams' udders.
- Continue grass tetany prevention. Be sure that the mineral mix contains high levels (~15%) of magnesium and that cows consume adequate amounts. You can feed the UK Beef IRM High Magnesium mineral.
- Plan to vaccinate calves for clostridial diseases (Blackleg, Malignant Edema) as soon as possible. You might choose to do this at the prebreeding working in late April or early May.

- Obtain yearling measurements on bulls and heifers this month (weight, height, pelvic area, scrotal circumference, ultrasound data, etc.) if needed for special sales. Heifers should be on target to be cycling by the start of the breeding season.
- Prepare bulls for the breeding season. Increase feed if necessary to have bulls in adequate condition for breeding. Obtain Breeding Soundness Evaluation (BSE) on bulls, even if they were checked last breeding season.
- Finalize plans for your spring breeding program. Purchase new bulls at least 30 days before the breeding. Order semen now, if using artificial insemination.

**Fall-Calving Cows**

- Bull(s) should be away from the cows now!
- Plan to pregnancy check cows soon. You can also blood test for pregnancy as early as 30 days after bull removal.
- Creep feed calves with grain, by-products or high quality forage. Calves will not make satisfactory gains on the dam's milk alone after about 4 mos. of age – since there isn't much pasture in March, fall calves need supplemental nutrition. Consider creep grazing on wheat pasture, if available. Calves can also be early-weaned. Be sure that feed bunks are low enough that calves can eat with the cows.
- Calves intended for feeders should be implanted.
- Consider adding weight and selling your fall calves as "heavy" feeder calves. Keep them gaining!

**General**

- Repair fences, equipment and handling facilities.
- If you have a dry, sunny day, use chain-link harrow to spread manure in areas where cattle have overwintered. This may be done in conjunction with renovation.
- Renovation and fertilization of pastures should be completed.
- Start thistle control. They can be a severe problem in Kentucky pastures. Chemical control must be done early to be effective.
- Watch for lice and treat if needed.

## Mid-South Stocker Conference Returns to Warren County

***Jeff Lehmkuhler, PhD, PAS, University of Kentucky***

The Mid-South Stocker Conference is coming back to Bowling Green, Kentucky this year. Bowling Green is a great location for those traveling with access to the conference location from I-65 and other main highways. Warren County Cooperative Extension will host this year's conference in their new meeting facilities. I am excited to have the conference return to this area. Central Kentucky is a major stocker cattle corridor and I hope you will join us on Wednesday, February 26$^{th}$, 2020.

This year's program will again have a mixture of topics. Health related topics will be a major focus this year. Dr. Michelle Arnold, University of Kentucky Extension Veterinarian, will share information on diagnostic tools for stockers. In addition, Dr. Lew Strickland, University of Tennessee Extension Veterinarian, will provide an update on the Asian longhorned tick as well as provide an update on antibiotic availability and utilization. To round out the health topics, Dr. Tom Yazwinski, University of Arkansas, will address internal parasite control in stocker cattle.

Financial risk management is essential in the stocker industry and Dr. Andrew Griffith, University of Tennessee Extension Economist, will lead a session on applying risk management strategies for stocker cattle. Virtual tours of local cattle operations will again be part of the program in the afternoon. David Trowbridge, Gregory Feedlots Inc., will also share views on what has changed with respect to procuring feeder cattle as we begin a new decade. The tradeshow will provide participants time to visit with industry partners to learn more about services and products available.

To register for the conference please visit UTIA Mid-South Stocker Conference website by searching for the Mid-South Stocker Conference with your web browser or you can visit https://mssc2020.eventbrite.com to pay online with a credit card. You can also contact Ben Crites at benjamin.crites@uky.edu or myself at jeff.lehmkuhler@uky.edu.

## Ol' Man Winter is a Thief!

***Jeff Lehmkuhler, PhD, PAS, Beef Extension Specialist, University of Kentucky***

Last winter we had a dramatic increase in the number of cattle deaths compared to previous winters. Excessive rain contributed to these losses and led to wet haircoats and mud conditions in the fields. In the midst of last year's muddy conditions, we did a series of meetings discussing the effects of rain and mud. I discussed the impacts of wet haircoats on lower critical temperatures and increases in energy for maintenance. When I looked back over a 110-day period that spanned November into February, the local Mesonet station had recorded precipitation 50 of those days. I think Ol' Man Winter has stolen our winter weather and your profits heading for warmer weather to relax.

How big of an impact is this weather on cattle? Not much research has been conducted under the exact conditions many of you may be dealing with on your farms. We have to interpret the research that is available and make educated guesses on how much the energy needs of cattle increases due to these conditions. This said, you should plan on greater energy needs of cattle outside and closely monitor cattle body condition and health.

I like to show the old foot in the box research in meetings. Ag engineers published work in the 1970's looking at the impact of mud depth and moisture on the energy needed to lift a leg. These researches obtained a cattle leg from an abattoir and fixed an eye screw to the top of the leg bone. The foot was placed into a box and surrounded by mud of varying depths and moistures. At 1" of mud depth, about five pounds of force was necessary to lift the leg. As depth increased, force required to lift the leg out of the mud increased. The force needed to lift a leg from 8" of mud ranged from approximately 25 pounds to over 105 pounds. That is a 5 to 20-fold increase in the energy needed to lift a leg to take a step. In another paper, researchers reported that during the winter when forages in pastures were limited, cattle activity from traveling or walking accounted for about 20% of the daily energy expended. Collectively this would mean that walking through mud could potentially increase energy needs 100-400%. I don't feel mud alone will increase energy needs 4-fold as cattle simply won't walk as much through mud reducing activity. However, this research illustrates why you find it so hard to pull that boot up out of the mud.

The equation 0.077 *(shrunk body weight, kg)$^{0.75}$ is assumed for cattle to determine the megacalories (mcal) of energy required for maintenance per kilogram of live body weight under thermoneutral conditons. A 1,200-pound animal would require approximately 8.4 mcal of maintenance energy daily. Feedlot researchers in Colorado followed cattle after severe weather conditions experienced during the winter of 2006-2007. The monitored live weights and feed intakes over this period of severe weather. Cattle performance was negatively impacted by extreme winter weather. They determined the net energy for maintenance equation that explained the observed cattle performance was 0.1919 mcal * (shrunk body

weight, kg)$^{0.75}$ or 21 mcal/d. These cattle had a 2.5-fold increase in maintenance energy needs for that period of extreme winter weather conditions in Colorado.

We may not know exactly the impact of the environmental conditions on cattle maintenance requirements, but it is safe to say that energy requirements are increased. Providing 3-4 pounds of a commodity feed would increase the energy intake of a beef cow by approximately 20%. This can help offset the increased maintenance needs during periods of time such as the past 3-4 days when it has rained constantly with daytime temperatures in the mid-30's to low 40's.

Providing cattle the nutrients they require to maintain body condition will provide benefits in the long run whether through enhanced cow immunity, calf vigor at birth, greater passive immunity to the calf or greater conception rates early during the breeding season. I would encourage you to test your hay and work with your local county extension office or nutritionist to develop a winter feeding program. Best of luck keeping your boots out of the mud and tell Ol' Man Winter to bring us some colder, drier weather.

## What's Next for Food Animal Antibiotics?

***Dr. Michelle Arnold, UK Veterinary Diagnostic Laboratory***

What is "antibiotic resistance"? When an antibiotic is no longer useful against an infection because the targeted bacteria changed in some way that protected it from the effects of the drug (antibiotic), this is referred to as "antibiotic resistance". The FDA Center for Veterinary Medicine is the government agency responsible for ensuring the safety and effectiveness of animal drugs for their approved uses. FDA has already restricted the use of antibiotics in feed and water through the Veterinary Feed Directive. Now they are gearing up to remove all over-the-counter "medically important" antibiotics approved for food-producing animals within the next two years and place them under veterinary oversight ("Over-the-counter" means available for purchase at any farm supply or internet retailer without the need for a prescription). FDA has established three goals to accomplish from 2019 to 2023:

1. Align antimicrobial drug product (antibiotic) use with the principles of antimicrobial stewardship;
2. Foster stewardship of antimicrobials in veterinary settings;
3. Enhance monitoring of antimicrobial resistance and antimicrobial drug use in animals.

This process will begin after the agency considers comments on the draft Guidance for Industry (GFI) #263 and issues the final guidance. In addition, the FDA plans to "engage with affected stakeholders and state partners at public events, such as meetings and conferences, to hear feedback and answer questions about the changes proposed in the draft guidance document". The list of drugs affected by the new draft GFI # 263 is available at the following link: https://www.fda.gov/animal-veterinary/judicious-use-antimicrobials/list-approved-new-animal-drug-applications-affected-draft-gfi-263

Although antibiotic resistance is a concern for the livestock industry, it is not the only reason to re-evaluate how and when antibiotics are used. There are simply no new antibiotics currently in development for future use. Given the need for antibiotics to continue to work for treatment of disease, it is important to review why disease develops, correct antibiotic usage and reasons why antibiotics fail. A good illustration is Bovine Respiratory Disease (BRD) in feeder calves. BRD relies on the combination of host susceptibility, pathogens (viral and bacterial), and the environment to overwhelm the immune system and cause disease. *Mannheimia hemolytica* (formerly known as *Pasteurella hemolytica*), the most commonly found bacterium in bovine bronchopneumonia, descends into the lungs when the calf's defenses are depressed due to concurrent respiratory virus infection and excessive stress. Weaning, co-mingling, transportation, castration and dehorning, bad weather, overcrowding, and poor-quality air are known stressors that compromise a

calf's ability to produce antibodies and fight disease. A deficiency in trace minerals, specifically selenium and copper, prevents proper function of immune mechanisms for protection so vaccines do not work as they should. If a high risk calf is placed in an environment where sick calves have been before, that pen is literally full of bacteria and viruses if not cleaned out between groups. Watering troughs, if not regularly drained and sanitized, are known risk factors for pneumonia as the organisms can live in the water and around the edges where calves stand and drink. A persistently-infected (BVD-PI) calf in a pen results in continuous exposure of the pen mates to the BVD virus and a constant suppression in their white blood cells needed to fight sickness. Recently weaned, lightweight calves that are placed on a ration of rapidly fermentable carbohydrates (such as ground corn) can develop acidosis, placing them at exceptionally high risk for respiratory disease and death. Many of these "risk factors" for disease are management problems that can be addressed and changed.

Successful treatment of diseases like pneumonia is not simply a matter of grabbing a bottle of antibiotic, drawing up a dart-full, shooting it in the sick calf and waiting for the drug to take effect. Instead, full recovery is a joint effort between the calf's immune system and the selected drug to stop the growth of bacteria and destruction of lung tissue. Antibiotics are designed to hold bacterial growth "in check" while the calf's immune system produces protective cells and mobilizes them to the site of infection. Treatment failure is often due to a delayed immune response because of overwhelming stress, infection with BVD, or nutrition-related factors including trace mineral deficiencies or subacute ruminal acidosis (SARA). Sound nutrition and management, especially around the time of weaning, will substantially improve the immune response to disease challenge and antibiotic therapy. A clean environment with plenty of space and air movement, clean water and ample bunk space reduces calf stress and their exposure to contagious organisms. Transition rations formulated to meet nutrient needs while gradually introducing grain in the diet help keep calves on feed and rumen microorganisms healthy. Identification and removal of BVD-PI calves is through a simple, inexpensive ear notch skin test. Trace mineral deficiencies can be addressed through an injectable trace mineral product while calves are transitioning to a trace mineral mix provided in the diet. Vaccines for the respiratory viruses (IBR, BVD, $PI_3$ and BRSV) are most effective when given during times of low stress; 2-3 weeks prior to weaning is best.

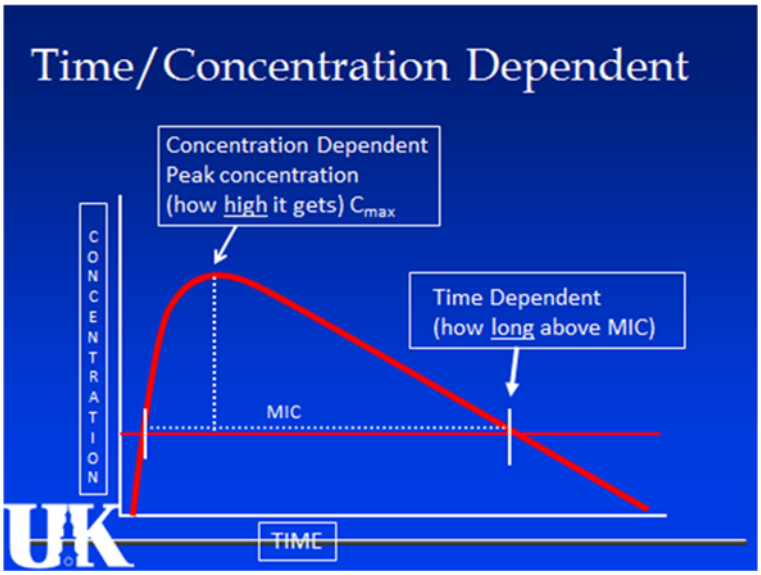



*Figure 1: The "MIC" is the "minimum inhibitory concentration" or the minimum level of the drug needed to fight bacteria.*

Treatment failure due to human errors include poor timing, use of the wrong drug, improper dose or route of administration, mishandling issues or failure to recognize treatment response. Timing is crucial; if calves are treated early in the course of disease, almost any antibiotic will work. Conversely, if calves are treated late in the course of the disease, nothing will work. In addition to timing, dosage is crucial because antibiotics work by different mechanisms. Figure 1 graphically displays the difference between antibiotics that are considered "time dependent" (effectiveness depends on exposure to the drug for a certain length of time) versus "concentration dependent" (bacteria must be exposed to a high concentration of the drug). If label directions are not followed and only a partial dose is administered or when a second dose is required but not given, the drug is unlikely to work effectively because it cannot reach the necessary minimum target concentration. Selection of the best

antibiotic class or "family" is an equally important success factor. Figure 2 is an illustration of the mechanisms different antibiotic classes use against bacterial cells. Beta-lactams (penicillin, Excede®, Naxcel®, Excenel®) interfere with production of the bacterial cell wall that protects the cell from external threats. Aminoglycosides (gentamicin) and Tetracyclines (LA-300®, Biomycin®, and many others) interfere with protein synthesis within the bacterium by grabbing on to the machinery in the ribosome (the 30S subunit) needed to build proteins. Macrolides (Draxxin®, Micotil®, Zactran®, Zuprevo®, Tylan®) and Chloramphenicol derivatives (Nuflor®) also interfere with protein synthesis although at a different location on the ribosome, the 50S subunit. The Fluoroquinolones (Baytril®, Advocin®) block genetic replication by interfering with DNA and RNA synthesis. Why is this information important? If an animal requires retreatment, selection of an antibiotic from a different class will attack the bacteria through a different route and often improve treatment response. Another good example is treatment for *Mycoplasma bovis*, a bacterium frequently found in chronic pneumonia cases. It has no cell wall so treatment with a Beta-lactam (such as penicillin or Excede®) is useless. A veterinarian is trained in antibiotic selection and is the best source of information when choosing a therapy. Another issue that may affect success is mishandling the product; an antibiotic that gets too hot or is allowed to freeze will inactivate the drug in most cases. Lastly, treatment failure is not always a "failure" but rather an inability to recognize recovery. A calf that is eating, drinking and looks better after treatment but still has a slight fever often needs additional time to fully recover since fever is one of the last clinical signs to disappear.

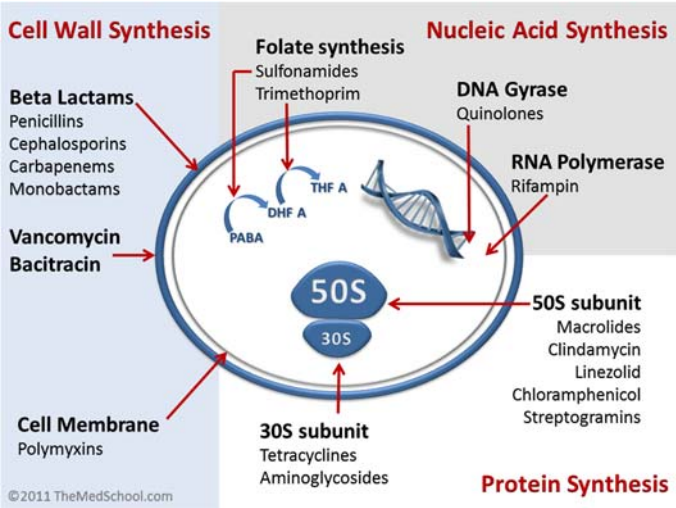



*Figure 2: Drawing of a bacterium illustrating the ways different "classes" of antibiotics fight against them. By Kendrick Johnson (Own work) [CC BY-SA 3.0 (http://creativecommons.org/licenses/by-sa/3.0)], via Wikimedia Commons*

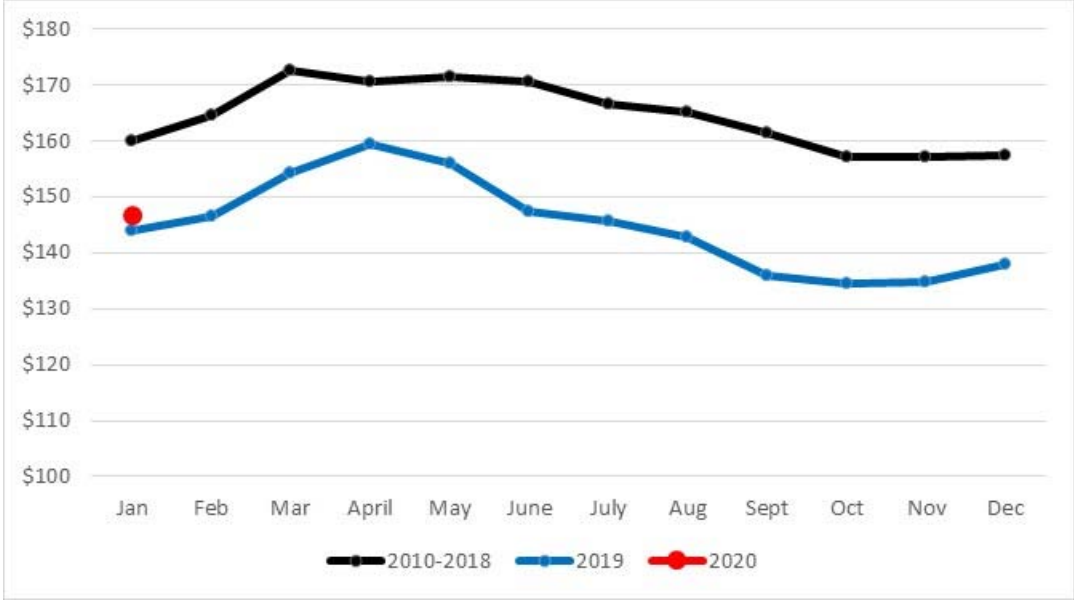
Strategic and correct use of antibiotics will continue to be of importance for the cattle industry from this point forward. Consumers are increasingly aware and demanding reduced antimicrobial use in the production of wholesome beef. FDA is responding by decreasing antibiotic availability to the public and will soon place this responsibility completely in the hands of veterinarians. Careful attention to timing of treatment, drug selection, dose, and handling of the product will reduce the human factors that contribute to antibiotic failure. However, by addressing the underlying management factors that contribute to disease in the first place, including reduction of stressors, prompt identification and removal of BVD-PI cattle, and correction of environmental or nutrition-related disorders will lead to better overall health and less reliance on all medications in cattle operations.

## Kentucky Beef Cattle Market Update

***Dr. Kenny Burdine, Livestock Marketing Specialist, University of Kentucky***

After a very frustrating fall, the calf market is showing some signs of life. To start the new year, 550 lb steers calves traded $12 per cwt higher in January than they did in November (see figure 1). This is by no means a great market, but enough to create some optimism for spring. Excessive rains continue to create challenges across the board and the market seems to consistently discount green calves that are likely perceived as high risk placements in this type of weather. Heavy feeder cattle prices have pulled back some from fall, but that is a typical seasonal pattern and I expect their prices to improve through the year.

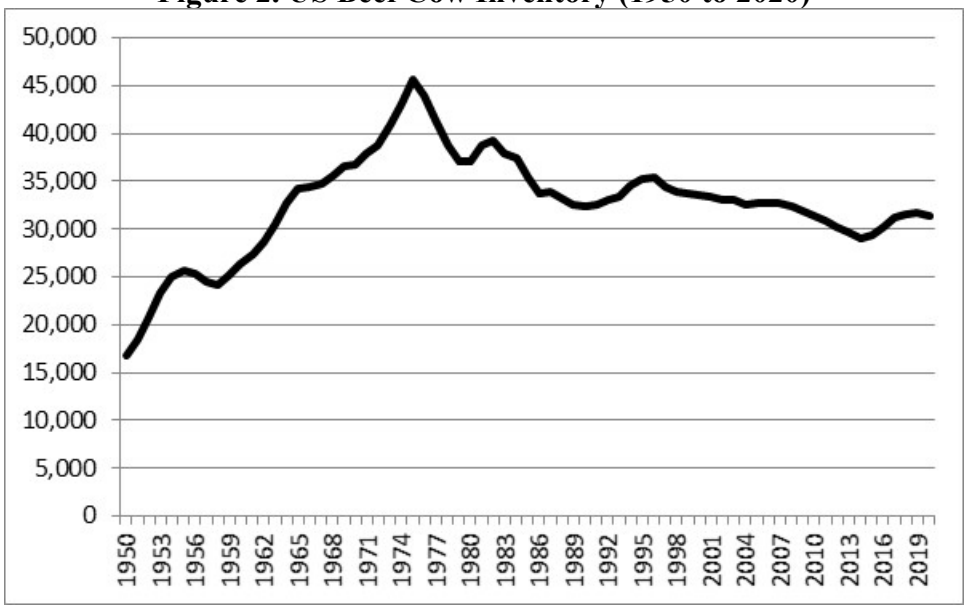
**Figure 1. 550 lb Medium / Large Farm #1-2 Steers**
**KY Auction Prices ($ per cwt)**




Source: USDA-AMS, Livestock Marketing Information Center, Author Calculations

Late January brought USDA's annual cattle inventory estimates, which confirmed that the size of the beef cow herd was smaller to start 2020. The size of the decrease actually exceeded trade expectations, with beef cow numbers down a little over 1%. I think the primary driver of the decrease was high beef cow slaughter in 2019, which was up 5% for the year and over 14%f or the 4th quarter. Also not surprisingly, heifer retention was also down (-2%), which is consistent with low margins at the cow-calf level. The key takeaway from the report is that the cowherd is finally decreasing in size and calf crops should continue to get smaller, which is exactly what our calf market needs. US beef cow inventory from 1950 to 2020 is shown in figure 2.

**Figure 2. US Beef Cow Inventory (1950 to 2020)**




Source: USDA-NASS and Livestock Marketing Information Center

Frankly, I was surprised by USDA's estimate of Kentucky beef cow numbers as they were estimated to be up very slightly from 2019. Given the number of cows that moved through auction markets in fall of 2019, I fully expected Kentucky beef cow numbers to be lower. There are eight states in the US with more than one million beef cows. Beef cow numbers were estimated to be lower in six of those states: Texas, Oklahoma, Montana, Nebraska, South Dakota, and Kansas. Only Kentucky and Missouri were estimated to have more cows to start 2020 than they did in 2019.

A smaller cowherd at the national level, combined with considerable optimism with respect to export markets, paints a much more optimistic picture for prices in 2020. As is always the case, I expect calf markets to improve considerably between now and spring. An additional price improvement of $15-$20 per cwt would not surprise me at all. As we start thinking about spring born calves, I do expect a better fall market than was seen last year. My initial guess would be that calves will sell for $10-$15 more per cwt than they did in fall of 2019.

The USDA report is summarized in table 1 and the full report can be accessed at:
https://downloads.usda.library.cornell.edu/usda-esmis/files/h702q636h/rb68xv24k/76537h73d/catl0120.pdf

**Table 1: USDA January 1, 2020 Cattle Inventory Estimates**

| | 2019 (1,000 hd) | 2020 (1,000 hd) | 2020 as % of 2019 |
|---|---|---|---|
| **All Cattle and Calves** | 94,804.7 | 94,413.3 | 100 |
| | | | |
| **Cows and Heifers That Have Calved** | 41,044.1 | 40,651.3 | 99 |
| **Beef Cows** | 31,690.7 | 31,316.7 | 99 |
| **Milk Cows** | 9,353.4 | 9,334.6 | 100 |
| | | | |
| **Heifers 500 Pounds and Over** | 20,210.0 | 20,114.4 | 100 |
| **For Beef Cow Replacement** | 5,884.9 | 5,771.9 | 98 |
| **For Milk Cow Replacement** | 4,701.5 | 4,637.0 | 99 |
| **Other Heifers** | 9,623.6 | 9,705.5 | 101 |
| | | | |
| **Steers 500 Pounds and Over** | 16,757.7 | 16,671.2 | 99 |
| **Bulls 500 Pounds and Over** | 2,253.0 | 2,237.4 | 99 |
| **Calves Under 500 Pounds** | 14,539.9 | 14,739.0 | 101 |
| | | | |
| **Cattle on Feed** | 14,367.9 | 14,667.7 | 102 |
| | | | |
| | **2018 (1,000 hd)** | **2019 (1,000 hd)** | **2019 as % of 2018** |
| **Calf Crop** | 36,312.7 | 36,059.6 | 99 |

Source: NASS, USDA