Dear Ranch Hand Subscribers,

If you are a North Dakota beef producer, you have a one in four chance of having received a survey in your mailbox. The survey mentioned in the January Ranch Hand was sent in mid-February, and we’re awaiting your responses. Your input will help our beef industry stakeholder group understand your needs for future research and education, as well as gain insight into the future structure of the North Dakota beef industry.

Speaking of industry structure, I included an article from the U.S. Department of Agriculture’s National Agricultural Statistics Service that reviews the Jan. 1, 2012 overall U.S. and North Dakota beef cattle inventories. A record low number of cattle on inventory has contributed to record calf prices, and record calf prices have led to record bull prices.

As the bids keep going higher and higher at bull sales, producers need to keep operation goals in mind and not sacrifice bull quality. One way to have exceptional-quality genetics is to utilize artificial insemination (AI) in your herds. While bull prices have increased significantly, the cost of AI breeding has remained relatively stable. With this in mind, producers should pencil out the cost of AI breeding compared with natural-service breeding. An article talks about the process, and you may be surprised at the results.

While our winter has been fairly mild (to say the least), cold weather can occur at any time during winter in the northern Plains. An article reviews an experimental cold-weather tool from the National Weather Service that predicts the likelihood of climatic conditions being dangerous for newborn livestock.

Continuing with the calving theme, this month’s Research Corner article reviews a method of increasing vitamin status in newborn calves, and seven items on the Top 10 list deal with calving. As you proceed with or enter into your calving season, I wish you all the best!

Just for fun, I also wrote an article about how an elk hunt made me think about herd health concerns. Be sure to read to find out why.

For additional questions on the material covered in this newsletter or any other concerns on your operation, contact your county, area or state Extension personnel. We look forward to serving you.

Sincerely,

Carl Dahlen, Ph.D., Editor
NDSU Extension Beef Cattle Specialist
Maintaining a closed beef herd is a task that few beef producers care to undertake, yet it can have benefits from a herd health and biosecurity standpoint.

To be sure, most diseases enter herds through direct transmission from other cattle. With this possibility eliminated in closed-herd situations (via eliminating fence line contact with other herds, maintaining a sufficiently large genetic base to minimize negative effects of excessive inbreeding, or relying solely on artificial insemination as a means of getting breeding females pregnant), some producers go as far as to eliminate vaccinating cattle altogether.

However, even the best efforts to not bring any new animals into a herd can be negated by one neighbor’s bull jumping a fence. In these cases, having naïve, unvaccinated animals can set up a playground for disease-causing agents to flourish. Even if no cattle are present in the immediate area, other possible vectors of disease transmission may exist.

In 2009, I was fortunate enough to draw a once-in-a-lifetime elk tag for a free-ranging herd in northwestern Minnesota. The picture that entered my mind when I thought of elk hunting was a long-range passing shot either in a mountain valley or on one of the slopes. I grew up not very far from where this herd of elk called home, though, and this area certainly had no mountains in the immediate vicinity.

One benefit I did have in this adventure was good snow cover, and I soon found that following tracks in fresh snow through dense poplar stands and willow swamps was a productive method of hunting.

This herd of elk also happened to be in the area of Minnesota that had bovine tuberculosis in cattle and whitetail deer. As a result, all hunters were asked to call personnel from the Minnesota Department of Natural Resources upon a successful hunt so they could take a host of samples.

Sections of lung, liver, blood samples, fecal samples and lymph nodes all were removed from the yearling female I harvested and shipped to researchers for evaluation. At the time, collecting the samples made sense, but the fact that they were taken soon slipped my mind. The immediate task at hand was to ensure the appropriate processing of the bounty of fresh elk I had before me.
Months after the elk was in the freezer and most of it was consumed, I received a letter in the mail with the sample results from the elk I shot, along with a summary report of all the elk harvested from the area. As I read through the results, I was very intrigued by the fact that many of the elk evaluated had been exposed to, among other things, viral and bacterial diseases that are commonly vaccinated against in our cattle herds. A brief summary of the findings included:

<table>
<thead>
<tr>
<th>Disease</th>
<th>Apparent prevalence, %</th>
</tr>
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<tbody>
<tr>
<td>Bovine Viral Diarrhea Virus (BVD) 1 and 2</td>
<td>12.5% (7 of 56)</td>
</tr>
<tr>
<td>Bovine Herpes Virus 1 (BHV)</td>
<td>7.1% (4 of 56)</td>
</tr>
<tr>
<td>Leptospira (hardjo, pomona or icterohaemorrhagicae)</td>
<td>13.8% (8 of 58)</td>
</tr>
<tr>
<td>Parainfluenza Virus 3 (PI3)</td>
<td>34% (18 of 53)</td>
</tr>
<tr>
<td>Lyme Disease</td>
<td>66.7% (30 of 45)</td>
</tr>
<tr>
<td>West Nile Virus</td>
<td>71.1% (32 of 45)</td>
</tr>
</tbody>
</table>

Adapted from Hildebrand et al., 2010

A survey summary released by the U.S. Department of Agriculture in 2009 (view NAHMS report) found that 94.4 percent of producers had seen wild deer within one mile of their beef herd and 62.5 percent of producers said they frequently (more than four times per month) saw deer within one mile of their herds.

You know what the deer situation is like on your individual operations. In some places, the deer wake up when the tractor starts and have a race with cattle to see who can get to the feed bunks first. Others prefer to sneak into the hay stacks and silage piles around dawn and dusk, or maybe just visit the salt blocks and waterers after the cattle walk away.

Deer know far fewer boundaries than our cattle and may alternate between your feed pile and the neighbors' feed piles. With this in mind, I asked myself the question: How “closed” is a closed herd?

Although disease transmission risk is lower with closed herds, it is not eliminated. Speak with your veterinarian about a vaccination program that is appropriate for your situation.

Another report summarized the potential for deer species to serve as a source of infection for livestock and humans. In addition to the diseases mentioned above, deer species in the U.S. have been found with tuberculosis, cryptosporidium, chronic wasting disease, salmonella, brucellosis and bluetongue virus (See Böhm et al., 2007, for full report).

Incidence of actual disease in deer varies and can be very regional. This list was meant to stimulate thought on what impacts a group of deer could have on your operation.
Seldom do cow-calf producers complain about the current record-high calf prices. We are, indeed, in unprecedented times in the beef industry.

However, increased calf prices also mean increased input costs for the cow herd. One of the input costs that producers are facing is the increased cost of buying good breeding bulls. Record-high calf prices equal record-high bull prices.

So what is a producer to do? Remembering what we paid for bulls last year and going to current sales with this number in mind is very easy. However, three things may happen if you take this approach: 1) You don’t go home with a bull, 2) You go home with a bull that is of much poorer quality than you had hoped to buy or 3) You get lucky and find a steal at the sale.

Option 1: This results in a fundamental problem on a cow-calf operation. A lack of bull power means a sacrifice in cow fertility (especially if you only run one bull). No bulls equal big problems for beef producers.

Option 2: If at all possible, do not sacrifice bull quality; bulls are a long-term investment in the future of your herd. This investment in a bull spans beyond next year’s calf crop and, if breeding females are kept for herd replacements, it easily could span into the middle of the next decade and beyond.

Option 3: This is much less likely to happen in 2012 because we’ve heard of many reports of sale averages being $1,500 to $2,000 over a year ago, and those year-ago prices were well above the previous year. We never can rule out the possibility of finding a steal (in fact, isn’t this half the fun of going to the sales?), but we can be very honest and admit we very likely will need to spend more.

But what other options are available? With current bull prices, producers may want to evaluate the cost comparisons among natural-service bulls and artificial insemination. To make a true financial comparison, producers must consider the entire cost of three factors: 1) cost of natural-service bulls, 2) cost of artificial insemination and 3) comparisons of costs among the systems.

When considering the costs of natural-service bulls, the actual purchase price is just the beginning. Every year, producers have certain costs to maintain bulls and keep them healthy: feed, yardage, vaccinations, breeding soundness exams. These costs will accrue every day the bull is alive, so another important cost determinant is what the useful life of the bull will be in your herd.
I like to use a default useful life value of three years for bulls in most commercial operations. This number is chosen because many producers have bulls that breed their heifers and a different battery of bulls for their cow herd.

The year a bull is purchased and turned in with the cow herd, he get cows pregnant, the next year his daughters are born, and the following year the daughters are bred by the heifer bulls. If the bull is still around on year four, he will be covering his daughters on pasture, hence the three years.

After that, the bull will be sold and a salvage value obtained. This value is credited back to the positive side of the balance sheet. Add risk of death/injury and interest on bull and feed purchases, and you have the costs associated with maintaining breeding bulls (minus fence repair and that dent in your pickup).

The next pertinent question to ask is what the stocking rate for pastures will be. The nationwide average stocking rate is 25 cows per mature bull and 15 cows per yearling bull. This number is highly variable among producers. Divide the total bull cost per year of his useful life by the number of cows he is expected to cover each year, and you will have the cost of natural service per cow.

The cost of AI is a much simpler calculation. Estrous synchronization is a powerful tool for cattlemen. By running cattle through working facilities three times and giving appropriate pharmaceuticals, all cows can be bred via AI and have the opportunity to become pregnant on the first day of the breeding season. Costs include all pharmaceuticals, semen, supplies and labor.

The next step is to compare the systems, but with applicability in mind. After a single round of fixed-time AI, a conservative pregnancy rate for the herd would be 50 percent (if body condition, nutritional status and days postpartum were all sufficient). This means that you still would need to use herd bulls to cover open cows, but only half as many as you would if you relied solely on bull breeding.

To calculate the cost of the AI breeding system, we need to add the cost of AI in all the cows to the cost of running half the number of herd bulls (or an alternative way to think of this is to double the number of cows per bull). This calculation is also on a per-cow basis and can be compared with the cost of running only natural-service bulls.

If this exercise is followed, given today’s market prices, producers may be surprised that at a certain bull purchase price point, incorporating AI into a herd is less expensive than buying enough breeding bulls to get their cows pregnant. When considering this economic question, producers must use their actual costs for feed, yardage, veterinary care, labor, semen and pharmaceuticals. Once these costs are known, producers can evaluate different scenarios on their operations to determine which is truly the best in their given situation.

A simple spreadsheet was developed to help producers work through comparing the cost of breeding systems using values from their operation. Call your county Extension agent or me for more details.

Another very important note: We have not even begun to talk about any additional value that AI-bred calves may have in the marketplace or other benefits to calving distribution and cow herd fertility. This was only a comparison of the substitution price for using AI in place of bull breeding, and you can draw a simple conclusion: You may be money ahead to incorporate AI before a calf ever hits the ground!
In most normal years, producers who are calving would be racing against time to pull calves out of snowbanks and save precious ears before frostbite sets in.

Although the winter of 2011-12 has been abnormally mild, the potential for cold weather always exists during winter in our northern climates. While adult cattle are very tolerant of cold temperatures as long as they are dry and have shelter from the wind, newborn calves are not as fortunate. Cold temperatures and newborn calves can be a dangerous combination if producers do not take steps to protect newborns from the elements.

Anticipating changing weather patterns, identifying climatic conditions that are dangerous for newborns and taking appropriate preventative measures are ways producers can mitigate weather-related calf losses.

A new tool called the Cold Advisory for Newborn Livestock (CANL) is available from the National Weather Service for the western two-thirds of North Dakota, all of Montana and parts of South Dakota. The CANL system uses specific colors on regional maps to indicate the degree to which conditions dangerous to newborn livestock are present. The maps show conditions ranging from “none” to “extreme.”

During the process of developing the CANL program, the National Weather Service gathered information from the ranching community specific to climatic factors that affect calf losses. Temperature, wind chill, humidity, precipitation and cloud cover were identified as key risk factors and, in turn, these items were combined to generate the CANL forecast maps. Forecast maps show danger potential for 6, 12, 18, 24, 30 and 36 hours into the future, and maps are updated every four hours.

The CANL program may be a good resource for producers looking for a single source of forecast information to determine the danger level for their newborn calves, which will allow them to take appropriate action to ensure the survival of calves being born during extreme conditions.

If you take a look at the maps now, they may be a pretty green, indicating a low risk of danger. However, keep this program in mind when the weather appears to be taking a turn for the worse, even if that is next year.

Links to CANL forecast for the following areas:

- **Bismarck, N.D.**: www.crh.noaa.gov/bis/?n=canl
- **Aberdeen, S.D.**: www.crh.noaa.gov/abr/canl/forecasts.php
- **Billings, Mont.**: www.wrh.noaa.gov/byz/canl/forecasts.php?wfo=byz
- **Glasgow, Mont.**: www.wrh.noaa.gov/ggw/canl/canl.html
- **Great Falls, Mont.**: www.wrh.noaa.gov/tfx/canl/canl.php
The Ranch Hand, February 2012

North Dakota Inventory:
All cattle and calves in North Dakota as of Jan. 1, 2012, totaled 1.69 million head, down 1 percent from 1.70 million head on Jan. 1, 2011, according to the USDA, National Agricultural Statistics Service, North Dakota Field Office. This is the fifth consecutive yearly decrease in herd size since Jan. 1, 2007, when total inventory was 1.85 million head. For the current inventory, the only categories to show an increase were bulls weighing 500 pounds or more and calves under 500 pounds. All other categories decreased from the previous year, except milk replacement heifers 500 pounds and over and steers weighing 500 pounds or more, both of which showed no change from a year ago.

All cows and heifers that calved as of Jan. 1, 2012, at 880,000 head, were down from 900,000 cows a year ago and 890,000 cows on Jan. 1, 2010. Beef cows, at 862,000 head, were down from 880,000 cows the previous year and below 869,000 cows on Jan. 1, 2010. Milk cows, at 18,000 head, were down from 20,000 cows a year ago and have declined in number for six consecutive years. All heifers 500 pounds and over, at 393,000 head, were down 2 percent from last year and slightly below 395,000 head on Jan. 1, 2010. Beef cow replacement heifers, at 183,000 head, were slightly down from last year’s 185,000 head but still above 165,000 head on Jan. 1, 2010. Milk cow replacement heifers, at 10,000 head, have remained steady since 2010. Other heifers, at 200,000 head, were down from 225,000 head a year ago and 220,000 head on Jan. 1, 2010.

Steers weighing 500 pounds and over, at 255,000 head, were equal to a year ago but down from 275,000 head on Jan. 1, 2010. Bulls weighing 500 pounds and over, at 57,000 head, were up from 55,000 head year ago but down from 2010. Calves under 500 pounds, at 105,000 head, were up from 70,000 head a year ago and 100,000 head on Jan. 1, 2010. Cattle and calves on feed for slaughter in all feedlots, at 60,000 head, remained steady from a year ago but were down from 90,000 head on Jan. 1, 2010.

The 2011 calf crop was estimated at 35.3 million head, down 1 percent from 2010. This is the smallest calf crop since the 34.9 million born during 1950. Calves born during the first half of 2011 are estimated at 25.7 million, down 1 percent from 2010.

US Beef Herd Inventory:
All cattle and calves in the U.S. as of Jan. 1, 2012, totaled 90.8 million head, 2 percent below the 92.7 million on Jan. 1, 2011. This is the lowest Jan. 1 inventory of all cattle and calves since the 88.1 million on hand in 1952.

All cows and heifers that have calved, at 39.1 million, were down 2 percent from the 40 million on Jan. 1, 2011.

- Beef cows, at 29.9 million, were down 3 percent from Jan. 1, 2011.
- Milk cows, at 9.2 million, were up 1 percent from Jan. 1, 2011.

Other class estimates on Jan. 1, 2012, and the change from Jan. 1, 2011, are as follows:

- Cattle and calves on feed for slaughter in all feedlots, 14.1 million, up 1 percent
- The combined total of calves under 500 pounds, and other heifers and steers over 500 pounds outside of feedlots, was 25.7 million, down 4 percent

The 2011 calf crop was estimated at 35.3 million head, down 1 percent from 2010. This is the smallest calf crop since the 34.9 million born during 1950. Calves born during the first half of 2011 are estimated at 25.7 million, down 1 percent from 2010.

The 2011 calf crop is estimated at a record low of 860,000 head, down from 2010’s calf crop of 880,000 and 2009’s calf crop of 890,000 head.
Effects of Injectable Vitamin Products on Serum Vitamin and Selenium Concentrations and Growth Performance in Beef Calves

Research in Progress

Carl Dahlen, NDSU Extension Beef Cattle Specialist, and Bryan Neville, Central Grassland Research Extension Center Animal Scientist

Have you ever had a group of calves that was born very weak and prone to illness? Inadequate vitamin intake in gestating cows may result in calves that are born weak and with poor immunity. The immune system benefits of vitamins A, D and E, as well as the antioxidant properties of selenium, have the potential to improve overall animal health and productivity significantly.

The purpose of this study was to determine the effectiveness of vitamin A-D-E or Bo-Se injection on raising serum fat-soluble vitamin and selenium concentrations of newborn calves in the first 48 hours after treatment.

To conduct this research, we used 40 young beef calves (3 to 20 days of age) born to first-calf heifers at the Central Grasslands Research Extension Center near Streeter, N.D. Calves were blocked by age and sex, then randomly assigned to treatments in a 2×2 factorial design, with factors being 1) administration or not of 4 mL Bo-Se [Intervet; selenium (1 mg/mL) and vitamin E (50 mg/mL)], and 2) administration or not of 5 mL of VITAL EAD [Stuart Products; vitamin E (as d-alpha-tocopherol; 300 I.U.), vitamin A (as retinyl-palmitate; 100,000 I.U.) and vitamin D₃ (10,000 I.U.)].

Whole blood samples were obtained via jugular venipuncture from all calves just prior to administration of treatments. Calves were placed on a portable digital scale to determine body weight at the time of treatment administration. Forty-eight hours after treatment, a sample of whole blood was collected again.

Cow-calf pairs were maintained in a lot and fed once daily. The diet consisted of 20 percent alfalfa/grass hay, 70 percent corn silage, 6 percent barley and 4 percent liquid supplement. In addition, cows had access to free-choice loose mineral.

Twenty-three days after treatment administration, calves were weighed and cow-calf pairs were moved to pasture. Body weight gain was calculated by subtracting the weight at the start of the trial from the pasture turnout weight. Blood samples were shipped to the Iowa State University Diagnostic Laboratory for analysis of selenium, vitamin A and vitamin E.

Calves treated with BoSe had greater concentrations of selenium 48 hours after treatment, compared with calves not given BoSe (Table 1). In addition, calves treated with VITAL-EAD had greater concentrations of vitamin A and vitamin E on day two, compared with calves not given VITAL-EAD (Table 2). No interactions (P > 0.10) were present among BoSe and VITAL-EAD factors for serum concentrations of selenium, vitamin A or vitamin E.

Table 1. Serum profile 48 hours after BoSe administration.

<table>
<thead>
<tr>
<th>Item</th>
<th>No BoSe</th>
<th>BoSe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selenium, ng/ml</td>
<td>56.3*</td>
<td>72.5y</td>
</tr>
<tr>
<td>Vitamin A, µg/ml</td>
<td>0.18</td>
<td>0.19</td>
</tr>
<tr>
<td>Vitamin E, µg/ml</td>
<td>8.78</td>
<td>10.75</td>
</tr>
</tbody>
</table>

* Mean differs (P < 0.01)

Table 2. Serum profile 48 hours after Vital EAD administration.

<table>
<thead>
<tr>
<th>Item</th>
<th>No Vital EAD</th>
<th>Vital EAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selenium, ng/ml</td>
<td>64.2</td>
<td>64.5</td>
</tr>
<tr>
<td>Vitamin A, µg/ml</td>
<td>0.16*</td>
<td>0.22*</td>
</tr>
<tr>
<td>Vitamin E, µg/ml</td>
<td>4.73*</td>
<td>14.80y</td>
</tr>
</tbody>
</table>

* Mean differs (P < 0.01)
Research Corner (continued from page 8)

The average daily gain of calves from treatment until pasture turnout was affected by an interaction among BoSe and VITAL-EAD. Calves given either Bo-Se (1.66 lb/d) or VITAL-EAD (1.64 lb/d) had greater average daily gain compared with calves given both products (1.17 lb/d), while calves that did not receive either product (1.42 lb/d) were intermediate.

This research showed that administration of VITAL-EAD increased the serum concentration of vitamin A and vitamin E in young beef calves, whereas Bo-Se increased concentrations of selenium. Future research efforts need to explore the duration of the elevated serum vitamin status as well as potential health benefits this may bring to calves with inadequate vitamin status.

Upcoming Events: January-February 2012

<table>
<thead>
<tr>
<th>Event</th>
<th>Location</th>
<th>Date</th>
<th>Contact Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ND CornVention</td>
<td>Fargo</td>
<td>Feb. 22</td>
<td>(701) 364-2250</td>
</tr>
<tr>
<td>Sheridan County Ag Improvement Forum</td>
<td>McClusky</td>
<td>Feb. 24</td>
<td>(701) 363-2242</td>
</tr>
<tr>
<td>Barley Production and Utilization as Feed</td>
<td>Carrington</td>
<td>Feb. 28</td>
<td>(701) 652-2951</td>
</tr>
<tr>
<td>Super Pooper Scooper School</td>
<td>Dickinson</td>
<td>Feb. 29</td>
<td>(701) 652-2951</td>
</tr>
<tr>
<td>Super Pooper Scooper School</td>
<td>Edgeley</td>
<td>March 1</td>
<td>(701) 652-2951</td>
</tr>
<tr>
<td>Super Pooper Scooper School</td>
<td>Rugby</td>
<td>March 2</td>
<td>(701) 652-2951</td>
</tr>
<tr>
<td>North Dakota Winter Show</td>
<td>Valley City</td>
<td>March 6-11</td>
<td>(701) 845-1401</td>
</tr>
</tbody>
</table>

To get your events included on the Ranch Hand’s upcoming events list, email event name, location, date and contact number to Carl.Dahlen@ndsu.edu.
Management strategies to consider in the coming month:

1. Prepare for calving: facilities, supplies, mental focus
2. Feed cows at night to increase proportion of calves born during daylight hours
3. Be sure to have plenty of high-quality feed, vitamins and minerals available; nutrient requirement dramatically increase after calving
4. Ear tag calves and keep appropriate records, track any death loss; these records may be essential for receiving future disaster payments
5. Develop standard operating procedures for treating sick calves with your veterinarian and have all medications on hand
6. Catch and treat sick calves ASAP; they will respond better to treatment and perform better after recovery, compared with waiting until “later” to treat them
7. Maintain clean, dry, wind-free areas for cows to calve on; castrate (and dehorn) calves as soon as possible if they are not breeding stock
8. Attend bull sales with the bulls’ job description in hand; make all attempts to purchase bulls that will help you meet your herd goals and do not sacrifice quality
9. Secure seed and fertilizer for planting in spring of 2012
10. Complete tax preparation: deadlines are March 1 for most, April 15 if you made estimated tax payment by Jan. 15