

The BEEFLINE Initiative Projects A Comprehensive Report

Leif Anderson - Hettinger Research Extension Center
Vern Anderson - Carrington Research Extension Center
John Dhuyvetter - North Central Research Extension Center
Tim Faller - Hettinger Research Extension Center
George Flaskerud - NDSU Agribusiness and Applied Economics
Karl Hoppe - Carrington Research Extension Center
Greg Lardy - NDSU Animal and Range Sciences

Doug Landblom - Dickinson Research Extension Center
Lisa Lee - Dickinson Research Extension Center
Lee Manske - Dickinson Research Extension Center
Marty Marchello - NDSU Animal and Range Sciences
Paul Nyren - Central Grasslands Research Extension Center
Chip Poland - Dickinson Research Extension Center
Kris Ringwall - Dickinson Research Extension Center

The BeefLine Initiative was proposed in 2000. Research and extension leaders, along with private producers and agri-business leaders in the state, created a network of communication regarding the state of affairs of beef production. This discussion provided insights into the short term and long range needs and goals of everyone connected with beef production. The net result was the identification of an initiative that would provide options for producers from conception through harvest. The concept included research and extension education and assistance to provide beef producers with management strategies which would optimize resources available and maximize economic returns.

The beef industry directly impacts the economic well being of rural areas and the state. The total impacts of the 26 projects listed in this report will only be known over time but these projects show how an alliance between the North Dakota University System, private producers, government agencies and agri-business can work positively for all involved. In addition, this report details much about the dedication and service of agriculture professionals involved in research, extension and education within North Dakota.

12-Month Pasture-Forage Management Systems

Efficient 12-month pasture-forage management systems can increase beef production and significantly enhance the economy of North Dakota because they are more biologically effective than traditional practices such as 6.0-month and 4.5-month seasonlong treatments. This project is showing the effectiveness of 12-month pasture-forage management systems in improving efficiency of calf weight production and increasing profit margins.

On the twice-over management treatment, an efficient 12-month strategy, forage production required 11.7 acres, forage-feed cost \$171.00 per year, production of calf weaning weight cost \$0.28 per pound, and net returns after pasture-forage costs were \$251.53 per cow-calf pair and \$21.54 per acre.

On the 6.0-month season long treatment, forage production required 27.3 acres, forage-feed cost \$329.51 per year, production of calf weaning weight cost \$0.61 per pound, and net returns after pasture-forage costs were \$47.37 per cow-calf pair and \$1.74 per acre.

On the 4.5-month season long treatment, forage production required 23.9 acres, forage-feed cost \$246.15 per year, production of calf weaning weight cost \$0.46 per pound, and net returns after pasture-forage costs were \$130.88 per cow-calf pair and \$5.47 per acre.

Additionally, efficient 12-month pasture-forage management systems enhance the quality of natural resources by strengthening grassland ecosystem health, increasing grass plant growth, stimulating activity of beneficial soil organisms, facilitating nutrient cycling, and improving wildlife habitat.

Impact: Northern Plains beef producers who replace their traditional grazing and haying practices with efficient 12-month management strategies have the ability to double the cow herd size, reduce annual pastureforage costs per cow by 30 to 50 percent, and increase net income 3 to 10 times on their current land resources. Imagine 1.9 million cows producing 650 pound calves at 88¢ per pound with 30-50 per cent lower costs. The net economical effect could reach \$500 million for producers.

Project Coordinator: Lee Manske

Adopting Performance Records through CHAPS

Better cow herd genetic management decisions can be made by using benchmark data as the basis. The Cow Herd Appraisal Performance Software (CHAPS 2000), promoted by the North Dakota Beef Cattle Improvement Association, is a data collection program that analyzes herd performance. The collection of data is stymied by the lack of weighing equipment and time. Seven Griggs County producers weighed calves at weaning and are incorporating performance records into their herd management.

Impact: Through genetic tracking, producers can select superior bulls which can increase weaning weights without additional costs, plus creating opportunities for increased feedlot and carcass returns. Imagine increasing weaning weights 20 pounds per calf produced in North Dakota. The net impact would be over \$20 million to cow-calf producers.

*Project Coordinator: Karl Hoppe
Assisted by Extension Agent John Swenson*

Bedding and the Environment

Ammonia volatilized from animal manure is a major pollutant in the earth's atmosphere. Adding carbon from straw has the potential to sequester more nitrogen from manure and urine through microbial action, reducing ammonia pollution. The raw manure/straw pack from bedded calves contained up to 54% more nitrogen than manure without bedding. Composted manure with straw contained 300% more nitrogen than manure from non-bedded pens indicating tremendous losses if a carbon source (straw) is not added to pens.

Impact: Nitrogen released as ammonia from animal waste can be significantly reduced if bedding is provided. Substantial sequestering occurs if manure is composted. This added nitrogen is useful as fertilizer, lowering off farm input costs significantly. Net total value of nitrogen sequestered from feedlot and beef cow manure is estimated at \$3.4 million.

Project Coordinator: Vern Anderson

Beef Quality Assurance Programming

Because of consumer dissatisfaction with consistency and quality, beef demand has consistently declined over the past two decades. North Dakota ranks tenth in the nation in the production of feeder cattle and sales of feeder and backgrounded calves account for about 10 percent of annual agricultural cash receipts. The North Dakota Beef Quality Assurance Program is part of a national educational program to improve the consistency and quality of beef, focusing on production at the cow-calf level and continuing to the consumer. Developed in 1999, the BQA program is an alliance between the North Dakota Stockmen's Association, North Dakota Beef Commission, the North Dakota Department of Agriculture, the North Dakota Veterinary Medical Association, the North Dakota Livestock Marketing Association and industry representatives. Certification requirements were developed and producer-friendly educational material was produced. North Dakota's Beef Quality Assurance program is considered by many national beef leaders to be one of the premier quality assurance programs for cow-calf producers.

Impact: Over 1,500 beef cattle operations have been certified, affecting .25 million cattle annually. This is about 25 percent of the annual production. Re-certification is available via the internet. The economic impact is profound because some certified producers report getting their calves sold for a premium, and/or into certain alliance or branded beef programs. Image just a 5¢ premium on 900,000 calves sold at an average weight of 500 pounds. The outcome would mean an additional \$22.5 million for producers. Additionally, the BQA program could provide additional incentives for quality, consistency and source verification in the final finished product which consumers today demand.

Project Coordinator: Lisa Lee

Calves to Carcass Project

Change in the marketing of beef can impact cow calf producers and create income opportunities by adding value. Value based buying of finished cattle through formula and grid pricing to incentive and source specification cattle for branded products rewards sellers of higher value animals and discounts non conformance. The Northwest Beef Task Force conducted an educational project to demonstrate cattle value differences, and further producer understanding of contributing genetic, feeding and management factors, and marketing alternatives to help them realize greater returns from their cattle. The project included feeding producer consigned steers to finish and following them through slaughter and grading at a concluding workshop.

Impact: The 40 participating producers may continue to track and document the feeding and carcass characteristics of their cattle, using this information as the benchmark for continued improvement in feeder calves. A shift to more retained ownership through finishing and marketing may allow producers to capture value from high feedlot performance and premium carcass characteristics. Image producers retaining ownership on 10% of the 900,000 calves produced annually and earning a 5¢ premium on the rail. That would translate to \$3.6 million.

*Project Coordinator: John Dhuyvetter
Assisted by Extension Agent Warren Froelich*

Capturing Value of Flax and Barley Diets in Animal Performance and Health Aspects of Beef

There is increasing interest in enhancing omega 3 polyunsaturated fatty acids in the human diet for heart health and potential chemo-protective characteristics. Flax and fish meal are excellent sources of omega 3 with linolenic acid the major source in flax. Flax has been reported to escape bio-hydrogenation in the rumen making it a more reliable source of omega 3 than fish meal. Barley diets supplemented with flax should enhance animal performance over corn or barley rations and may modify the fatty acid profile of the meat.

A feeding trial with yearling steers conducted at the Carrington Research Extension Center compared feed intake, average daily gain, feed efficiency, and carcass traits on five barley diets containing 0% to 10% flax fed for 28 or 56 days. A corn control diet was also used. Samples from each carcass were obtained from the loin, brisket and round. These samples are pending fatty acid profile evaluations. A trained taste panel has evaluated the steaks and the data is currently being analyzed.

Impact: The addition of flax (omega 3) to the diet can potentially enhance the amount of healthy fatty acids in beef and give beef a better image in the eyes of the American consumer.

Project Coordinator: Marty Marchello

Conservation Reserve Hay Laboratory Analysis Project

The drought of 2002 caused many North Dakota cow calf producers to rely on Conservation Reserve Program (CRP) hay for winter feed supplies. Over 150 samples of CRP hay were analyzed for crude protein, neutral detergent fiber, and acid detergent fiber. The crude protein ranged from 3.99 to 16.30% with an average of 8.39%. Similar variation was noted for other nutrients. Two major factors influenced the quality: the date cut and the amount of alfalfa in the stand.

Impact: This project assisted producers establish a supplementation regimen based on the hay analysis. Without this laboratory analysis, a cost effective supplementation program would not have been implemented.

Project Coordinator: Greg Lardy

Co-products as an Alternative Creep Feed

Providing supplemental feeds to grazing calves remains a management choice producers use to increase calf weaning weights, which may lead to heavier sale weights and/or earlier sale dates. This study compared wheat midds to a commercial creep feed for increasing weights before weaning. Data showed actual average calf weights, not adjusted for age of cow, age of calf and pasture location, were 41 pounds less for the co-product feed. The co-product cost was 28.5% less with a total creep feed cost saving of \$11.16 per head.

Impact: Using co-products as creep feeds can reduce supplemental feed costs, however, reduced weaning weights, and reduced profit, may result from not feeding nutritionally balanced, higher cost creep feeds.

*Project Coordinator: Karl Hoppe
Assisted by Extension Agent Randy Grueneich*

Feedlot Usage of Straw Bedding

Providing straw for bedding during the winter is one method of mitigating effects of severe weather. Bedding is commonly done by farmers and ranchers but not by larger feedyards where logistics are more challenging. Data suggests steer calves bedded during the winter gained .46 lbs more per day, were cleaner, and produced 32% more choice carcasses yielding a financial advantage of \$50.91 per head after bedding costs.

Impact: If all calves currently being fed to finish in the state were bedded, an additional \$5 million dollars would be generated. Growing calves backgrounded in ND can also benefit potentially yielding additional returns.

Project Coordinator: Vern Anderson

Field Peas in Receiving Diets for Beef Calves

Field peas are a nutrient dense annual legume grain with high palatability for beef cattle. Calves consumed more feed if peas, protein rich, high energy, yet safe feed, were included in the 60% concentrate receiving diets. Improved gains were observed and all health was equal for all treatments.

Impact: Field peas in receiving diets increase feed intake, gain, and profit potential. Additionally, this home grown feed grain will reduce off farm purchases of protein and increase value capture of ranch raised feed and calves. If feeding adds \$1 per bushel to the value of peas, increased revenues of \$4 million will be realized for producers who grow their own protein.

Project Coordinator: Vern Anderson

Fly Ash for Stabilizing Feedlot Surfaces

Mud and spring break-up cause serious environmental challenges to profitable cattle feeding in North Dakota. Concrete and asphalt are expensive alternatives to dirt lots. Fly ash integrated into the surface of feeding pens may stabilize soils and prevent muddy conditions. Growing ruminants fed the same diets were contained in fly ash impregnated pens and control pens. The fly ash pens dried faster during spring thaw and rainfall than the control pens. Animals gained .25 lbs more per day during a six month feeding period that included late winter through early summer.

Impact: If all calves fed in North Dakota were fed in pens impregnated with fly ash, the net improvement in value of marketable gain is estimated at \$10.5 million.

Project Coordinator: Vern Anderson

Forage Quality and Supplementation

Cow calf production efficiency is greatest when the cows nutritional needs are met resulting in high reproduction. Opportunities to save feed cost exist by matching cow type and schedule to the forage resource of the ranch and limiting purchased supplements. A ranch monitoring project was established to clip and analyze pasture forage through the grazing season and harvested hay for wintering for nutrient content. Results were compared to estimated cow requirements for determination of nutrient deficiencies and appropriate supplementation.

Impact: For this late calving herd of moderate size cows rotationally grazed on native pasture and wintered on native meadow hay a fairly good match of needs to production was found. However, a fairly continual deficiency for several trace minerals was identified along with some seasonal needs for phosphorous and protein.

Project Coordinator: John Dhuyvetter

Hay Feeding Methods and Wintering Costs

North Dakota beef cattle producers feed over 2 million ton of hay to cows annually. These wintering costs make up a large portion of the production costs. Since the majority of hay within the state is put into round bales, a hay feeding methods study was established to document animal performance, waste, and economics. This study investigated three ways to feed round bales: rolled out, shredded and in a bale feeder. Weight gain, fat depth change, body condition score changes, hay intake and hay efficiency were measured.

Impact: Previous research indicated losses can range from three to 45 percent, depending on how hay is delivered to beef cattle. In this study, there was no significant difference in animal performance, so economic considerations were limited to differences associated with hay consumption and ownership and operating costs of machinery and equipment. Use of a round bale feeder offered substantial cost savings because of lower feed consumption by cows and less equipment operating time for feeding hay. Imagine a decrease in hay waste by 10 percent, or about 225,000 ton of hay annually. At \$40 per ton, that means a savings of \$10 million for producers.

Project Coordinator: Doug Landblom

High Quality Forage

Cow-calf producers can increase returns by feeding calves or cull cows past traditional weaning/shipping dates. This project evaluates the economics of producing high quality annual forage harvested as hay and self fed as big round bales in waste conserving feeding rings. Cull cows are being used in this trial, however, feeding performance and conversion data will provide insight on the alternative of growing feeder calves or replacement heifers on a low input simple system.

Impact: If high quality annual forage produces moderate gains and conversions with little labor and equipment cost, producers will likely have an option to grow and recondition feeders and culls at an economical cost of gain. Returns can be enhanced by marketing heavier animals at periods of higher seasonal prices. Imagine if the cull cows sold annually (15% of 950,000 cows with an average weight of 1,100 pounds) could net an additional 7.5¢ per pound, producers could earn nearly \$12 million dollars.

Project Coordinator: John Dhuyvetter

Implant Effectiveness in Beef Calves

Research data supports the use of implants in beef calves due to their ability to increase weight gain. It has been suggested that a potential of 500 to 1000 percent return on investment is available when implants are used. However, producers are beginning to question the effectiveness of implants compared to leaving male animals intact until weaning. In this study, weight gain was not affected by either castration or implantation.

Impact: Results from this study do not support the practice of delaying castration in beef calves to take advantage of “natural” growth promotants. The lack of a response from implantation of early castrated calves suggest more work is needed in this area.

*Project Coordinator: Chip Poland
Assisted by Extension Agent Bridget Johnson*

Livestock Marketing Clubs

Startup funds were provided to establish six clubs dedicated to livestock producers. Funds of \$750 per club were given out after requirements were met. Clubs needed to have a facilitator, leader and instructor, and conduct 24 hours of educational programming per year.

Livestock clubs were established in the counties of Stark, Kidder, Logan, Dunn, Ward and McHenry. They are facilitated by Extension Agents and Farm Business Management Instructors. Club leaders are members and members secured instructors who provide the required education.

Impact: The following comment from a facilitator sums it up well. “The group knows that owning the cattle with no protection is speculating. One producer wanted to retain ownership of his calves with very limited risk. After we looked at his break-even and looked at protecting the price, it wasn’t in the market, so he decided to just sell the calves. This is the kind of decision that this group of producers is able to make.”

Project Coordinator: George Flaskerud

Mineral supplementation

Beef cow feed inputs become cost effective when needed for better production or health. Within North Dakota, the soil types and mineral content of grasses vary immensely. Cows selectively graze to consume a nutrient dense diet. This study used a new clipping technique to monthly sample grasses for protein, fiber, and mineral availability to assist beef producers develop trace mineral supplementation.

Impact: Cost effectiveness of the current mineral program can be determined after trace mineral analysis of grazed forages. Imagine if mineral supplementation costs can be reduced by 2 cents per cow per day by matching supplementation needs, that is a potential impact of \$8 million per year to North Dakota beef producers.

*Project Coordinator: Karl Hoppe
Assisted by Extension Agent Andy Gross*

Nutritional Value of Locally Grown Forage Oats and Barley

Acreage seeded to annual forages constitute a significant portion of the total acres planted in North Dakota. Small grains are the typical choice for annual forage to be fed to beef cattle. Determining factors that

influence economic output (e.g. quality, total yield) is essential if the economics of annual forage production are to be optimized.

Data is being used to demonstrate to producers differences among oat and barley and forage and grain type genotypes for forage production.

Impact: This information will be available to crop and livestock producers alike to aid in their attempts to optimize the balance between yield and quality in annual forages.

*Project Coordinator: Chip Poland
Assisted by: Extension Agent Harvey Peterson
Area Extension Agronomist Roger Ashley*

Ration Formation Helped by Feed Testing

Variable forage quality was more pronounced in 2003 due to drought and haying CRP fields. A wide range of hays, including CRP, grass, alfalfa and annuals, were harvested and tested for protein, fiber, calcium and phosphorous. Nineteen producers representing 5,500 cows were shown forage sampling and ration balancing methods. Forages ranged from 4.8 - 20.6% crude protein and 37.6- 49.5% acid detergent fiber.

Impact: Balancing rations and matching feed resources to cow nutritional needs can improve overall cow body condition. Although feed costs may not have been reduced, improved nutritional status will lead to better cow reproduction, and improved calf weight and health status. Imagine a 2% increase in conception and an additional 20 pounds of weaning weight on the state's cow herd. It could mean over \$20 million to producers.

*Project Coordinator: Karl Hoppe
Assisted by Extension Agent Tom Olson*

Resource-based Cow/Calf Production Systems

This program seeks to develop a range land computer model. Rangeland managers face pressure from many groups that may frequently take segments of data to come to conclusions about the impact of management practice on an ecosystem. Livestock grazing, in recent years, has been such a management practice.

Data from our 14 year study is beginning to show the negative impact of excluding all livestock grazing from the Coteau range lands. Our goal is to have a model that can assist beef producers and range planners develop programs and establish policies on public lands that will be productive for land use for livestock, wildlife and society. Developing a model of this type takes time. Only a small portion of the resources of the CGREC budget go into these types of studies, but in time the payoff can be enormous.

Impact: This model may, in time, be able to assist livestock producers and others interested in determining

the outcome of a particular management practice on the productivity and stability of the range land.

Project Coordinator: Paul Nyren

SmartCows™ Offers Systems Management Strategy

SmartCows™ was developed by the North Dakota Beef Cattle Improvement Association to provide a systems management strategy for cow-calf producers. The program provides assistance in the areas of forage resource management, animal data collection, equipment and labor needed from conception through weaning. Additionally, SmartCows™ offers a seamless link, if producers desire, to retained ownership to any and all stops along the beef protein harvest chain.

SmartCows™ realizes two problems with performance record keeping for calves is labor and facilities. The SmartCows™ team takes the equipment and labor force directly to the pastures to weigh, vaccinate, and record data on their preweaned calves. This portable equipment and team makes it possible to efficiently and safely handle calves and prepare them for weaning.

Impact: SmartCows™ offers producers full herd and individual animal data reports and assists in establishing 12-month forage resource programs which can optimize land use. The data is the power that helps producers make information management decisions. Researchers have already identified that proper forage management can double stocking rates on most land bases and increase weaning weights. Imagine if the North Dakota Cow herd could be doubled, which would double the number of calves produced--with more weight. An extra calf means \$500 per calf to the producer. This extra sales can boost the economy of North Dakota.

Project Coordinator: Kris Ringwall

Southwest Feeders

BeefLine funds assisted with completion of a twenty-four pen backgrounding lot and hiring a Researcher/Educator/Coordinator to lead this new value added beef initiative. This is a rural economic development project using the quality beef/lamb and feed commodities that are in abundance to add value to all. The focus of this project is the "On Farm Feeder" with the intent to more fully utilize the resources of their units helping to optimize their bottom line profit. First year trials are in place and data will be available early in 2003.

Impact: A successful Southwest Feeders project will stimulate economic growth across the entire spectrum of rural communities within the region. The project involves livestock producers, feed producers, feed lot operators, financing organizations, veterinarians, service professionals, economic development specialists and NDSU personnel within the agriculture infrastructure. Additionally, producers will receive education about

feeding, marketing, risk management and value added economic opportunities.

Project Coordinator: Leif Anderson

Soyhulls vs. Corn: Energy Source in Lactating Beef Cows

This study compared soyhulls instead of corn as an energy source in lactating beef cow diets, with or without sunflower meal as a protein source. The project investigated whether soyhulls could help lower the overall cost of the ration if performance is unaffected. Results showed no effect on body condition score, body weight or milk production of cows. Calf body weight and weaning weight were not affected by supplement type or protein addition.

Impact: Soyhulls or corn are suitable as a supplement for the quality of forage (75% grass hay--11.5% crude protein; and 25% wheat straw--7.4% crude protein) utilized in this trial and widely found in North Dakota. Soyhulls are priced competitively to corn and may be used to lower the cost of the ration without affecting cattle performance.

Project Coordinator: Greg Lardy

Sunflower Screenings, Barley Malt, or Wheat Midds in Lactating Beef Cow Diets

Feed cost is a major issue, but consistency of nutrients is critical to a productive cow herd. Several co-product feeds are available for beef producers to feed cows between calving and breeding turn-out but are variable in nutrient content. Cows fed sunflower screenings after calving lost more weight and condition compared to cows fed barley malt or wheat midds. Conception rate was only 23% for cows fed sunflower screenings.

Impact: Alternative feeds need to be carefully scrutinized for nutrients when used in critical periods such as before and during breeding season. Lack of proper nutrition could cause serious reproductive problems amounting to millions of dollars, depending on the extent of use and diet formulations.

Project Coordinator: Vern Anderson

Water Quality for Cattle

Quality water is needed for better cow performance. Water containing less than 1000 PPM TDS, total dissolved solids, is generally recognized as good. As drought tends to concentrate dissolved solids in drinking water, fecal bacteria, another indicator of poor quality, may increase. Water samples were collected during summer drinking sources for five herds in Eddy County, North Dakota. Dugout ponds, springs, rivers and lake sources provided an average of 689 PPM TDS and 615 fecal coliforms per 100 ml of water

Impact: Water quality in eastern North Dakota pastures tends not to be limiting cattle growth. Developing alternative watering systems will provide cattle access to water with lower fecal counts. Managing water resources will improve the environment.

*Project Coordinator: Karl Hoppe
Assisted by Extension Agent Tim Becker*

Water Quality/Waste Management

Water quality and waste management are two issues beef cattle producers are forced to deal with. Animal waste is a non-point source pollutant. Assessing potential pollutants is simple and accomplished through various means. Control of pollutants with sound land management practices is important. The Southwest Feeders Project worked closely with the North Dakota Health Department to construct pens that are practical in nature and will serve as an excellent demonstration site for the area. Future work will monitor the movement of nitrates and phosphates in the soil profile and will be followed up with plot scale plant research looking at which plants best utilize them.

Impact: Proper management of animal waste is important for the future of air, soil and water quality. The addition of waste management engineers and the coalition with the North Dakota Health Department gives credence to the need to provide research and educational opportunities for producers and non-producers alike. The net impact of proper livestock waste on soil as a fertilizer aid could be huge.

Project Coordinator: Tim Faller