

A Survey of the Awareness and Use of BMPs on North Dakota Beef Operations

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Abstract

A survey was sent to a sample of 1,000 North Dakota beef operations to determine the awareness and adoption of surface water best management practices (BMPs). Results demonstrated that the majority of beef producers were unaware of BMPs. North Dakota has three cost-share opportunities to finance BMPs (EQIP, LP3, ESP). The majority of the respondents who had adopted BMPs self-funded the project with the second largest group of adopters used EQIP. None of the respondents reported using the two state programs (LP3 and ESP). The results of the analysis indicate that additional focus needs to be put on educating producers about surface water BMPs and the cost-share opportunities available at the state level.

A Survey of the awareness and use of BMPs on North Dakota Beef Operations

Introduction

Environmental regulations for agricultural producers continue to become more stringent. Many states have defined a set of recommended best management practices (BMPs) to provide guidelines for environmental compliance. North Dakota, a state with 89% of its land classified as agricultural, does not provide information on BMPs for production agriculture.

BMPs are recommended farm practices that have been found to prevent and/or reduce potential agricultural pollution. BMPs for North Dakota beef operations are of particular importance due to the production practices associated with beef production and its interaction with surface water. In particular, many beef operations in North Dakota rely on pasture based feeding during the summer months. In these cases, livestock have access to local waterways and manure is distributed throughout the pasture rather than collected in a central location. Before BMPs can be suggested and implemented for North Dakota; there must be a better understanding of the current technologies used by livestock producers as well as their knowledge of available technologies and potential environmental compliance issues. Once there is a better understanding of the current practices, recommendations can be made on ways to improve practices to ensure environmental compliance.

Objectives

The data compiled through this project will provide information that can be used to increase the probability of adoption of BMPs by North Dakota beef cow operators. Six BMPs to manage surface water pollution were analyzed: filter strips, riparian buffers, streambank fencing, stream bridge crossing, rotational grazing, and nutrient management.

The central objective of this project is to improve our understanding of current beef production practices and their implications on environmental compliance. The specific objectives are:

1. Identify current production practices on North Dakota beef operations.
2. Identify North Dakota beef producers understanding of current environmental compliance and methods to ensure environmental compliance.
3. Assess the understanding of production practices and costs needed to adopt new production practices.

Methods

Surveys were sent to 1,000 North Dakota beef cow producers randomly selected from the National Agricultural Statistics Service (NASS) list of active beef producers in North Dakota. The survey was designed using the Dillman tailored design method and was mailed in December 2010 with a reminder postcard mailed in January 2011 to the same beef producers requesting they complete and return the survey if they had not yet done so. The postcard identified a website which directed the survey recipients to an online version of the survey (http://www.ext.nodak.edu/homepages/aeddept/staff/bio_hadrich_j.html).

Results

Survey response rate was 16.9% with 45 of 53 counties represented. Response rates from the 45 counties were fairly evenly distributed (Figure 1). Of the 169 returned surveys, 153 were actively farming (90.53%), 14 were no longer farming (8.28%), and 2 respondents returned blank surveys (1.18%). Operators were not required to answer all questions, thus individual question response rates may differ from the overall survey response rate.

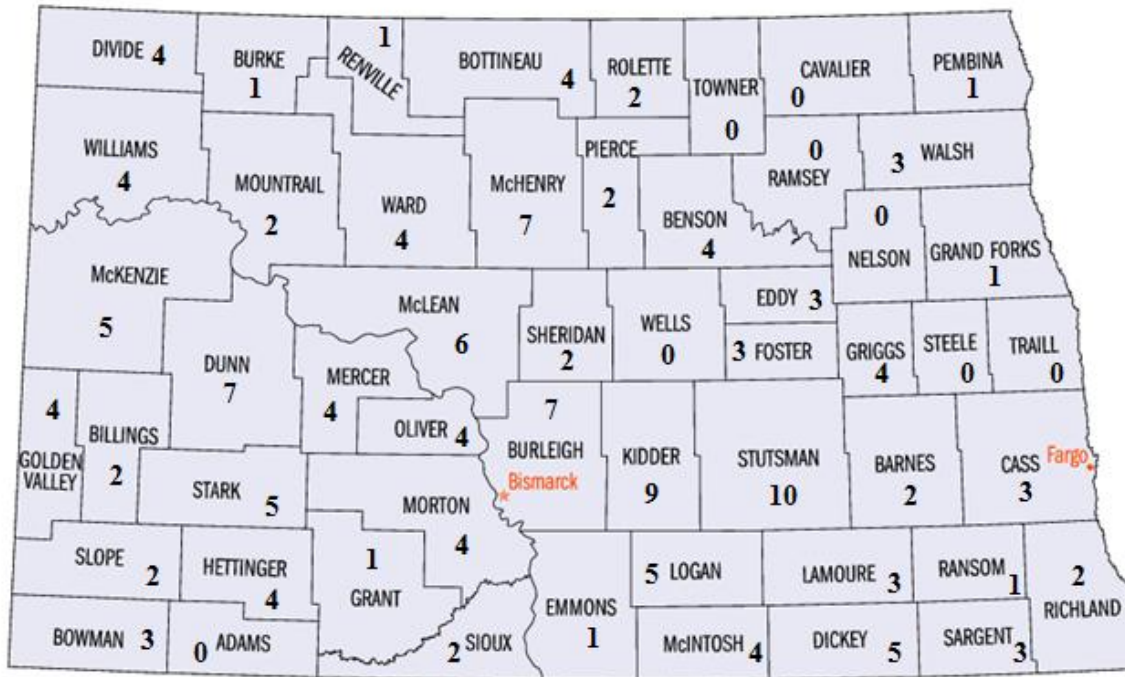


Figure 1. Survey Response by County, North Dakota

The information collected represented the current time and status for all on-going production and best management practices. Any time-specific information (e.g., herd size, pasture acres, crop acres) referred to a specific date (January 1, 2010). The appropriate date and year is indicated in the title of the table or figure as well as in the accompanying text for clarification purposes. Throughout the report, the summary statistics in tables are accompanied by the “number of respondents.” This value indicates the total usable responses to a given question. Farmers that responded to the survey had the option to answer or not answer individual questions at their discretion. This explains the variation in the number of farms reporting throughout the tables.

Farm Characteristics

Six herd size categories were used in this survey to determine the average herd size for North Dakota beef producers. Many of the statistics will be presented as a function of the different herd size categories to demonstrate how management and production characteristics change based on herd size. Of the 153 respondents who were actively farming, we had at least one response for each herd size category (Table 1). The largest percentage of farms reporting were in the 100-249 cow herd size (45.39%) with the next two most common herd sizes of 50-99 beef cows (30.9%) and 250-500 cows (19.08%).

Table 1. Distribution of beef cow herd size, ND beef operations, January 2010.

Cows	Number of Farms Reporting	% Total
1-49	5	3.29%
50-99	47	30.92%
100-249	69	45.39%
250-500	29	19.08%
501-750	1	0.66%
751+	1	0.66%
Total	152	100.00%

Many beef producers use a pasture based system or grow the feedstuffs for their livestock. The smallest herd size (1-49 beef cows) had 1,000 acres or less of pasture land (Table 2). Herds with more than 50 beef cows tended to use pastures between 200 and 2,000 acres. Two percent of the farms reported using 10,000 or more acres for pasture. The larger pasture size was associated with more beef cows on the farm.

Table 2. Pasture acres by herd size, ND beef operations, January 2010

Cows	Acres								Number of respondents
	1-199	200-499	500-999	1,000-1,999	2,000-3,999	4,000-5,999	6,000-9,999	10,000+	
1-49	2	1	2	0	0	0	0	0	5
50-99	3	20	15	7	1	0	0	0	46
100-249	0	2	24	28	14	1	0	0	69
250-500	0	0	0	6	12	6	2	2	28
501-750	0	0	0	0	1	0	0	0	1
751+	0	0	0	0	0	0	0	1	1
Total	5	23	41	41	28	7	2	3	150
Percent	3.33%	15.33%	27.33%	27.33%	18.67%	4.67%	1.33%	2.00%	100.00%

Pasture based grazing systems are typically used for beef cow production. The majority of North Dakota beef producers use a continuous pasture system (47.37%) or a rotational based pasture system (51.32%), (Table 3). A continuous pasture system was defined as using one or two main pastures, and a rotation system used multiple pastures to allow vegetative regrowth as livestock were rotated. Two of the respondents reported using a controlled system defined as strip grazing with a new pasture every 12 to 48 hours. Not surprisingly, the controlled system was used on smaller herd sizes (1-49 cows and 100-249 cows).

Table 3. Type of pasture system used by herd size, ND beef operations *

Cows	Continuous	Rotational	Controlled	Total
1-49	2	2	1	5
50-99	27	20	0	47
100-249	29	39	1	69
250-500	13	16	0	29
501-750	1	0	0	1
751+	0	1	0	1
Total	72	78	2	152
Percent	47.37%	51.32%	1.32%	100.00%

*Beef producers could use more than one system.

Most beef producers use farm diversification practices to manage potential production risks. Of the active survey respondents, 148 reported planting crops in addition to their livestock enterprise (Table 4). Two farms reported having between 6,000 and 9,999 acres of cropland, no farms reported having more than 10,000 acres in crops. Figure 2 demonstrates that alfalfa and hay were the two most common crops grown, which were more than likely raised for winter feeding. Spring wheat and corn were the third and fourth most common crops planted, respectively¹.

Table 4. Crop acres by herd size, ND beef operations, January 2010.

Cows	Acres								Number of Respondents
	1-199	200-499	500-999	1,000-1,999	2,000-3,999	4,000-5,999	6,000-9,999	10,000+	
1-49	0	3	0	2	0	0	0	0	5
50-99	14	9	7	8	7	1	0	0	46
100-249	10	12	18	15	9	1	2	0	67
250-500	4	4	7	9	3	1	0	0	28
501-750	0	0	0	1	0	0	0	0	1
751+	0	0	1	0	0	0	0	0	1
Total	28	28	33	35	19	3	2	0	148
Percent	18.92%	18.92%	22.30%	23.65%	12.84%	2.03%	1.35%	0.00%	100.00%

¹ Beef producers could plant more than one crop, hence total responses are larger than the total number of farms reporting.

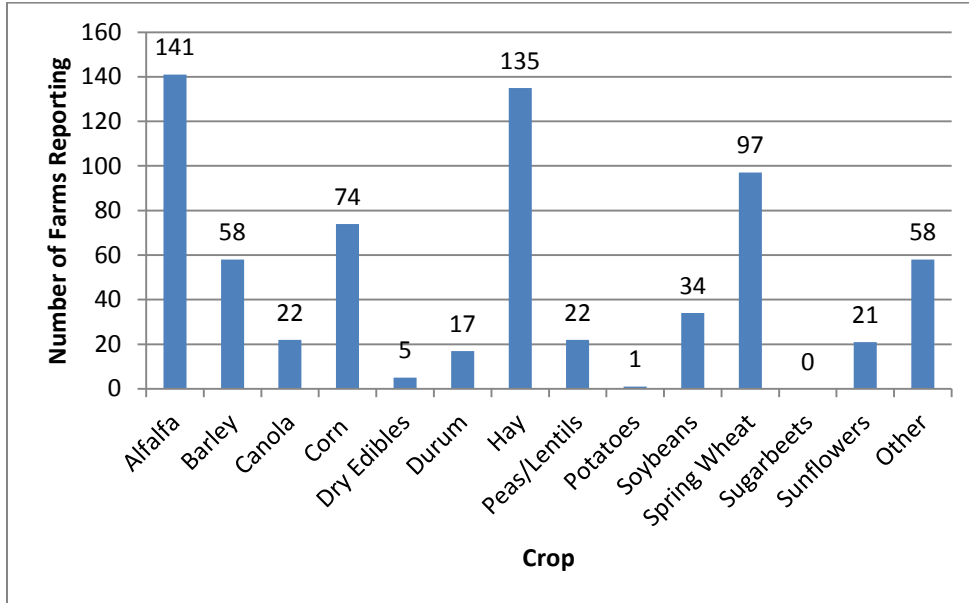


Figure 2. Crops planted, ND beef operations, January 2010

Land costs continue to be a major expense for beef producers. On average, the smallest herd size (1-49 beef cows) owned 1,197 acres and/or rented 2,174 acres from a private owner, and/or rented 480 acres from the government (Table 5). The smallest herd size did not rent out their land to other producers. The opposite held for herd sizes from 50-500 cows, who did rent out some of their land. The largest herd size (751+ cows) owned 2,800 acres and rented 160 acres from a private owner.

Table 5. Average acres owned versus rented, ND beef operations, January 2010*.

Cows	Acres			
	Owned	Rented Private	Rented Gov.	Rented out
1-49	1,197	2,174	480	--
50-99	1,632	1,385	917	529
100-249	1,608	901	1,558	370
250-500	1,502	1,122	336	250
501-750	20	2,790	--	--
751+	2,800	160	--	--

* Owned versus rented acreage includes both pasture and crop land. It is also important to note that these are averages, and it may be the case that one farm only had owned acreage, while another may rent all of their acreage.

Best Management Practices (BMPs)

Best management practices are recommended farm practices which have been found to be the most effective and practical methods to prevent and/or reduce potential agricultural pollution. For the purposes of this study, the BMPs studied focused on surface water quality. As stated earlier, the objectives of this survey were to identify producer awareness and adoption. North Dakota currently does not have any recommend BMPs or surface water environmental regulations. However, future regulation is possible since many states are adopting separate regulations for animal feeding operations (AFOs) and concentrated animal feeding operations (CAFOs). Of the 149 respondents, 40.94% were aware of AFO/CAFO regulations that may affect their operation (Table 6.). The question did not state whether these were state or federal regulations, rather the awareness of any future or current regulation was the objective of this question and associated response.

Table 6. Awareness of AFO/CAFO regulations by herd size, ND beef operations

Cows	Yes	No	Total
1-49	2	3	5
50-99	15	31	46
100-249	26	41	67
250-500	17	12	29
501-750	0	1	1
751+	1	0	1
Total	61	88	149
Percent	40.94%	59.06%	100.00%

While regulations and BMPs are separate issues, they are closely related. In particular, producers can be proactive and adopt BMPs regardless if regulations are imposed. Before asking questions regarding adopting BMPs, we wanted to know what type of surface water run-off control systems were currently in place on beef operations. There are two main sources of surface run-off manure (pasture and/or feedlot manure) and access to local waterways (streams, rivers, etc.). Manure is distributed throughout pasture systems and may or may not be collected. If it is not collected, producers can utilize different practices (e.g. Vegetative buffers) to control potential run-off. Feedlots typically collect manure and store it in a containment facility or holding pond, for example. The majority of beef producer respondents were not using surface water run-off systems for their manure in either a pasture or feedlot system (Table 7). Approximately 16% of the pasture based systems used a vegetative buffer, which indicated that a percentage of producers are being proactive regarding surface water run-off management.

Table 7. Surface water management of manure, ND beef operations

Manure Management	None	Vegetative buffer strips	Holding pond	Containment Pond	Clean water diversion	Other	Total Respondents
Pasture Manure	110	25	8	6	6	2	157
Feedlot Manure	110	26	3	2	3	7	151

* A beef producer can use multiple systems, which resulted in a higher number of respondents.

The second potential source of surface water pollution occurs when livestock have direct access to local waterways. Eighty-two percent of the respondents allowed their livestock to have direct access to local streams, rivers, or ponds (Table 8). Across herd sizes, again the majority of farms allowed direct access to local waterways. This is not surprising, since it is costly to haul water to remote pastures, therefore if a water source is in a pasture, livestock will have access to this source. If livestock did have access to surface water, the majority of farms did not restrict access (Figure 3). However, 22% of the responses did provide a water trough as a form of restricted access.

Table 8. Beef cow access to streams, rivers, or ponds by herd size, ND beef operations

Cows	Yes	No	Total	% with Access
1-49	3	2	5	60.00%
50-99	33	8	41	80.49%
100-249	54	14	68	79.41%
250-500	27	2	29	93.10%
501-750	1	0	1	100.00%
751+	1	0	1	100.00%
Total	119	26	145	
% of Total	82.07%	17.93%	100.00%	

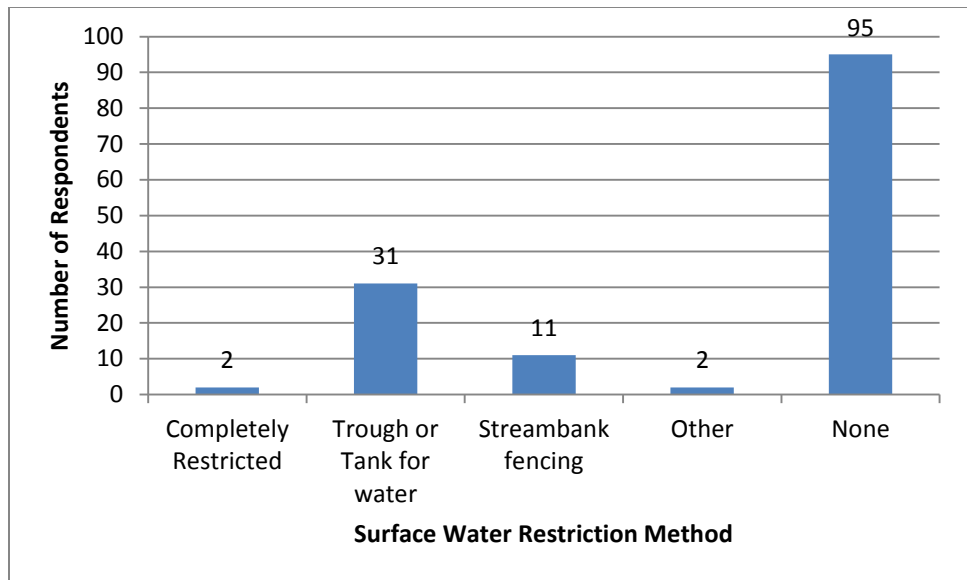


Figure 3. Type of surface water restriction, ND beef operations

Six BMPs were identified in this survey. They included filter strips, riparian buffers, streambank fencing, stream bridges, rotational grazing and nutrient management. Survey respondents had four options for each question regarding adoption of BMPs (1) yes, they were using that specific practice, (2) no, but they planned on implementing it in 12 months, (3) no, but had plans to implement in 5 years, and (4) no, with no plans to implement.

Filter strips were defined as vegetative areas used to trap sediment, organic material, nutrients, and chemicals before reaching sensitive environmental areas through surface runoff and waste water. Twenty-seven percent of the respondents had already implemented a filter strip on their farms for surface water control (Table 9). Close to 70% of the respondents have not implemented a filter strip system on their farms, and had no intention of doing it in the foreseeable future.

Table 9. Filter strip adoption by herd size, ND beef operations

Cows	Yes*	No, 12 mo.**	No, 5 yrs***	No****	Total
1-49	1	0	0	3	4
50-99	11	1	0	28	40
100-249	16	1	1	47	65
250-500	9	1	2	17	29
501-750	1	0	0	0	1
751+	0	0	0	1	1
Total	38	3	3	96	140
% of Total	27.14%	2.14%	2.14%	68.57%	100.00%

*Yes = they were using that specific practices
 **No, 12 mo = Farm did not adopt that specific practice, but planned on adopting in next 12 months
 ***No, 5 yrs = Farm did not adopt that specific practice, but planned on adopting in next 5 years
 ****No = Farm did not adopt the specific practice and have no intentions to adopt it in the future

Riparian Buffers are vegetative areas adjacent to surface water to remove excess amounts of sediment, organic material, nutrients, chemicals, and other pollutants. Approximately 22% of the respondents have implemented riparian buffers on their farms (Table 10). Herd sizes with 100-249 cows were the most likely to adopt the riparian buffers. Similar to filter strips, a large majority of the respondent has not adopted riparian buffers and has no plans to do so.

Table 10. Riparian buffer adoption by herd size, ND beef operations.

Herd size	Yes*	No, 12 mo.**	No, 5 yrs***	No****	Total
1-49	1	0	0	3	4
50-99	9	1	0	30	40
100-249	12	1	3	49	65
250-500	7	1	2	18	28
501-750	1	0	0	0	1
751+	0	0	0	1	1
Total	30	3	5	101	139
Percent	21.58%	2.16%	3.60%	72.66%	100.00%

*Yes = they were using that specific practices

**No, 12 mo = Farm did not adopt that specific practice, but planned on adopting in next 12 months

***No, 5 yrs = Farm did not adopt that specific practice, but planned on adopting in next 5 years

****No = Farm did not adopt the specific practice and have no intentions to adopt it in the future

Streambank fencing is the practice of excluding livestock from surface water through the use of fencing. Of the 139 responses, 12 have implemented streambank fencing, of which 6 of those responses had 100-249 cows (Table 11). Only 6 of the respondents indicated they had plans to adopt streambank fencing within 12 months to 5 years.

Table 11. Streambank fencing adoption by herd size, ND beef operations.

Herd size	Yes*	No, 12 mo.**	No, 5 yrs***	No****	Total
1-49	1	0	0	3	4
50-99	2	1	0	37	40
100-249	6	1	1	57	65
250-500	3	1	2	23	29
501-750	0	0	0	0	0
751+	0	0	0	1	1
Total	12	3	3	121	139
Percent	8.63%	2.16%	2.16%	87.05%	100.00%

*Yes = they were using that specific practices

**No, 12 mo = Farm did not adopt that specific practice, but planned on adopting in next 12 months

***No, 5 yrs = Farm did not adopt that specific practice, but planned on adopting in next 5 years

****No = Farm did not adopt the specific practice and have no intentions to adopt it in the future

Stream Bridges are generally used in conjunction with streambank fencing to allow livestock to move across the stream/river with minimal contact to the water. Due to the low number of beef producers using streambank fencing, an even smaller number indicated stream bridges. Of the 12 producers with streambank fencing (Table 11), 7 of them have implemented stream bridge crossings (Table 12). These farms have between 50 and 249 beef cows.

Table 12. Stream bridge adoption by herd size, ND beef operations

Herd size	Yes*	No, 12 mo.**	No, 5 yrs***	No****	Total
1-49	0	0	0	4	4
50-99	3	1	0	36	40
100-249	4	1	1	56	62
250-500	0	1	0	27	28
501-750	0	0	0	0	0
751+	0	0	0	1	1
Total	7	3	1	124	135
Percent	5.19%	2.22%	0.74%	91.85%	100.00%

*Yes = they were using that specific practices

**No, 12 mo = Farm did not adopt that specific practice, but planned on adopting in next 12 months

***No, 5 yrs = Farm did not adopt that specific practice, but planned on adopting in next 5 years

****No = Farm did not adopt the specific practice and have no intentions to adopt it in the future

Rotational Grazing is the practice of dividing pastures into sections. Each section is grazed for a short period of time and then rested from grazing until vegetation in that section has recovered. Fifty-four percent of the respondents indicated they did not use rotational grazing and do not plan on implementing it (Table 13). We can assume that these respondents are using a feedlot based system for their beef operation. Thirty-seven percent of the respondents use rotational grazing, and the remaining 8% plan on adopting rotational grazing within 12 months to 5 years.

Table 13. Rotational grazing adoption by herd size, ND beef operations.

Herd size	Yes*	No, 12 mo.**	No, 5 yrs***	No****	Total
1-49	1	0	0	3	4
50-99	12	0	1	29	42
100-249	24	1	4	33	62
250-500	14	2	2	10	28
501-750	1	0	0	0	1
751+	0	0	1	0	1
Total	52	3	8	75	138
Percent	37.68%	2.17%	5.80%	54.35%	100.00%

*Yes = they were using that specific practices

**No, 12 mo = Farm did not adopt that specific practice, but planned on adopting in next 12 months

***No, 5 yrs = Farm did not adopt that specific practice, but planned on adopting in next 5 years

****No = Farm did not adopt the specific practice and have no intentions to adopt it in the future

Nutrient Management is the practice of using manure from agricultural/farm operations in an environmentally sound manner by following recommended application rates. Thirty-eight percent of the respondents are following recommended application rates when applying manure to cropland (Table 14). Eight percent of the respondents recognize they are not following recommended application methods, but plan to do so in the foreseeable future, while 54% of the respondents have no intention to adopt nutrient management BMPs.

Table 14. Nutrient management adoption by herd size, ND beef operations

Herd size	Yes*	No, 12 mo.**	No, 5 yrs***	No****	Total
1-49	1	0	0	3	4
50-99	12	0	1	29	42
100-249	24	1	4	33	62
250-500	14	2	2	10	28
501-750	1	0	0	0	1
751+	0	0	1	0	1
Total	52	3	8	75	138
Percent	37.68%	2.17%	5.80%	54.35%	100.00%

*Yes = they were using that specific practices

**No, 12 mo = Farm did not adopt that specific practice, but planned on adopting in next 12 months

***No, 5 yrs = Farm did not adopt that specific practice, but planned on adopting in next 5 years

****No = Farm did not adopt the specific practice and have no intentions to adopt it in the future

Within nutrient management, one of the major BMPs is proper manure application. Of the 139 respondents, 78% use manure as a supplement to commercial fertilizer (Table 15). About 4% of the respondents only use commercial fertilizer and 19% only use manure as a fertilizer source. When applying manure as a supplement fertilizer, manure application rates are very important. These rates are a function of manure nutrient content and soil type, therefore manure nutrient analysis is important. Of the 17 respondents, 15 producers have their manure tested for nutrient analysis prior to application (Table 16). Finally, the majority of producers only apply manure in the fall after harvest (Table 17).

Table 15. Manure and commercial fertilizer utilization, ND beef operations

Herd size	Manure and Commercial fertilizer	Manure only	Commercial fertilizer only	Total	Percent
1-49	2	2	0	4	2.88%
50-99	32	7	3	42	30.22%
100-249	52	12	1	65	46.76%
250-500	20	5	1	26	18.71%
501-750	1	0	0	1	0.72%
751+	1	0	0	1	0.72%
Total	108	26	5	139	100.00%
Percent	77.70%	18.71%	3.60%	100.00%	

Table 16. Manure nutrient testing, ND beef operations

Herd size	Yes	No	Total	Percent
1-49	1	0	1	5.88%
50-99	4	1	5	29.41%
100-249	6	1	7	41.18%
250-500	4	0	4	23.53%
501-750	0	0	0	0.00%
751+	0	0	0	0.00%
Total	15	2	17	100.00%
Percent	88.24%	11.76%	100.00%	

Table 17. Manure application time by herd size, ND beef operations

Herd size	Spring	Fall	Both
1-49	1	2	2
50-99	3	28	9
100-249	4	40	20
250-500	1	19	6
501-750	0	0	1
751+	0	0	0
Total	9	89	38
Percent	6.62%	65.44%	27.94%

Six BMPs were identified in this study. The following three tables identify reasons why BMPs were not adopted as well as the benefits producers expected to get if they chose to adopt the BMPs. Across the six BMPs, most respondents indicated all four items: initial material cost, initial labor cost, initial labor hours, and maintenance cost as reasons for not adopting BMPs. Initial material cost seemed to be the largest impediment for adoption of filter strips, riparian buffers, stream bank fencing, and stream bridges (Table 18). Initial labor hours were the largest reported issue for rotational grazing and nutrient management. Rotational grazing and nutrient management are both production processes which require day-to-day management while the previous four BMPs have minimal labor concerns once they are implemented.

Table 18. Reasons for not adopting BMPs, ND beef operations

BMP	Initial material Cost	Initial Labor Cost	Initial Labor Hours	Maintenance Cost
Filter Strips	25	22	24	16
Riparian Buffers	25	25	24	17
Stream bank fencing	30	25	26	24
Stream Bridge	24	20	19	18
Rotational Grazing	12	13	19	10
Nutrient Management	16	15	20	13
Total	132	120	132	98

Many times BMPs are considered non-revenue stream generating capital investments. BMPs can be self funded through a traditional loan or paid in cash, but some cost-share programs are available to help defray BMP costs. Three specific options exist for North Dakota beef producers. The Environmental Quality Incentive Program (EQIP) is a national program that provides up to 75% cost share for certain water conservation practices to producers (NRCS-USDA, 2005). An application process is required for EQIP and funding levels are a function of the number of applicants. Livestock Pollution Prevention (LP3) is a North Dakota specific cost-share program that provides funds through the North Dakota Department of Agriculture and EPA 319 funds. LP3 can cost-share up to 60% of approved expenses (North Dakota Department of Agriculture, 2011). The Environmental Services Program (ESP) is a program provided directly through the North Dakota Stockmen’s Association.

Of the survey respondents, 92 reported using some sort of self-funding to finance the BMPs adopted on their beef operation (Table 19). The second most common type of funding was EQIP funding, most commonly used on rotational grazing. It is important to note that 64 of the respondents indicated “NA” for the financing used for adopting BMPs. This option was included if they used an alternative source, and due to the high response rate, it may be the case that this classification was unclear to the respondents and should be used with caution. The most surprising result was the fact that none of the respondents indicated they used either the LP3 or ESP program, even though these two programs are highly encouraged in the state. This may indicate additional focus on promoting these two programs for additional opportunities for financing BMP adoption.

Many times costs share programs require an application process and additional paperwork. Some producers may find it more efficient to use self-funding, but as researchers we were interested in the level of cost-share needed for a producer to adopt specific BMPs. In Table 20, the majority of respondents needed a cost share of 76% or higher to consider adopting a BMP. This is not surprising since everyone wants to get more for less. What was more surprising was the fact that 78 people were satisfied with a cost share of 45-75% and 51 respondents would consider adopting a BMP with a cost share less than 44% across the 6 BMPs potentially indicating these producers put a high value on being proactive regarding surface water.

Table 19. Financing used for BMPs, ND beef operations

BMP	Self-funded	EQIP	LP3	ESP	NA
Filter Strips	19	3	0	0	9
Riparian Buffers	12	1	0	0	12
Stream bank fencing	7	6	0	0	13
Stream Bridge	7	0	0	0	13
Rotational Grazing	29	26	0	0	8
Nutrient Management	18	13	0	0	9
Total	92	49	0	0	64

Table 20. Minimum cost-share needed to adopt BMPs, ND beef operations

BMP	0-14%	15-29%	30-44%	45-75%	76+%
Filter Strips	3	0	2	14	28
Riparian Buffers	3	0	2	13	28
Stream bank fencing	3	1	1	10	32
Stream Bridge	3	3	1	12	27
Rotational Grazing	7	3	6	15	17
Nutrient Management	5	2	6	14	20
Total	24	9	18	78	152

Labor is a major input in beef production. Two components play a factor with labor: labor cost and labor hours. Table 21 highlights the importance of reducing labor cost to adopt a BMP by herd size. Please note this is for any BMP, it is not specified by type. Across all herd sizes, 35.34% of the respondents indicated reducing labor cost was very important when adopting a BMP. Ten percent of the respondents indicated that reducing labor cost was not important at all. Similar results were found for reducing labor hours (Table 22).

Table 21. Importance of reducing labor cost to adopt BMP, ND beef operations

Herd size	Very Important (1)	(2)	Neutral (3)	(4)	Not important (5)	Total	Percent
1-49	1	1	2	0	0	4	3.64%
50-99	14	7	12	0	4	37	33.64%
100-249	14	8	16	1	6	45	40.91%
250-500	10	4	6	1	1	22	20.00%
501-750	0	0	1	0	0	1	0.91%
751+	0	0	1	0	0	1	0.91%
Total	39	20	38	2	11	110	100.00%
Percent	35.45%	18.18%	34.55%	1.82%	10.00%	100.00%	

* A likert scale was used to evaluate the importance with (1) representing very important and (5) not important.

Table 22. Importance of reducing labor hours to adopt BMPs, ND beef operations

Herd size	Very Important (1)	(2)	Neutral (3)	(4)	Not important (5)	Total	Percent
1-49	2	1	1	0	0	4	3.57%
50-99	15	6	13	0	4	38	33.93%
100-249	15	7	17	1	6	46	41.07%
250-500	10	4	6	1	1	22	19.64%
501-750	0	0	1	0	0	1	0.89%
751+	0	0	1	0	0	1	0.89%
Total	42	18	39	2	11	112	100.00%
Percent	37.50%	16.07	34.82%	1.79%	9.82%	100.00%	

* A likert scale was used to evaluate the importance with (1) representing very important and (5) not important.

Farm Management Characteristics

Farm management characteristics play a role in farm profitability. Recordkeeping is one of the major foundations of good management skills. Respondents were asked to check the type of recordkeeping they used the majority of the time. Of the 151 respondents, 36% used paper as their predominant recordkeeping system (Table 23). This was most commonly seen in herds with 50-99 and 100-249 cows. Larger beef operations tended to use computer based systems like EasyFarm, FarmLogic, Farm Notes, and Farm Works. Only 11 farms reported using spreadsheets which were in the 50-99 and 100-249 herd size categories. Recordkeeping is only useful if it is updated on a regular basis. Respondents indicated that they updated their records most commonly (39%) on a monthly basis (Table 24). The second most common frequency was quarterly updating of records at 30%.

Table 23. Type of recordkeeping system used by herd size, ND beef operations

Recordkeeping	Herd size (cows)						Total
	1-49	50-99	100-249	250-500	501-750	751+	
EasyFarm	0	3	6	17	0	0	26
FarmLogic	0	0	0	4	0	0	4
FarmNotes	0	5	2	7	0	1	15
Farm Works	0	1	3	9	1	0	14
Paper	4	25	23	3	0	0	55
Quicken	0	4	12	1	0	0	17
Quickbooks	1	1	5	0	0	0	7
Redwing	0	0	1	0	0	0	1
Spreadsheet	0	3	8	0	0	0	11
None	0	0	1	0	0	0	1
Total	5	42	61	41	1	1	151

Table 24. Frequency of recordkeeping, ND beef operations

Herd size	Daily	Weekly	Monthly	Quarterl y	Other	Total	Percent
1-49	0	0	2	0	2	4	2.76%
50-99	2	7	18	12	5	44	30.34%
100-249	2	8	22	20	14	66	45.52%
250-500	2	0	15	10	2	29	20.00%
501-750	0	0	0	1	0	1	0.69%
751+	0	0	0	1	0	1	0.69%
Total	6	15	57	44	23	145	100.00%
Percent	4.14%	10.34%	39.31%	30.34%	15.86%	100.00%	

Written business plans are used to determine where the farm is going and how it will get there. Short term plans identify the day-to-day operations (Table 25) to reach the long term goals (Table 26). Of the 143 respondents, 119 (83.22%) did not have a written short-term business plan. The smallest and largest herds responding did not have a written plan, while the herd sizes ranging from 50-500 cows had at least 20% of the farms with short-term plans. Only 11% of the producers had long-term business plans (Table 26). These two tables identify one area in North Dakota beef operations that needs attention. Past research has indicated that while producers think it is important to have a business plan, many fail to take the time to write one (Wittman, 2004). Business plans also become increasingly important with farm transfers and succession planning, indicating that additional focus may be needed on this particular management area for beef production.

Table 25. Written short-term business plan, ND beef operations

Herd size	Yes	No	Total	Percent
1-49	0	4	4	2.80%
50-99	8	37	45	31.47%
100-249	10	53	63	44.06%
250-500	6	23	29	20.28%
501-750	0	1	1	0.70%
751+	0	1	1	0.70%
Total	24	119	143	100.00%
Percent	16.78%	83.22%	100.00%	

Table 26. Written long-term business plan, ND beef operations

Herd size	Yes	No	Total	Percent
1-49	0	4	4	2.80%
50-99	3	42	45	31.47%
100-249	9	55	64	44.76%
250-500	4	24	28	19.58%
501-750	0	1	1	0.70%
751+	0	1	1	0.70%
Total	16	127	143	100.00%
Percent	11.19%	88.81%	100.00%	

The average age of principal operators on U.S farms continues to increase, and this is no different for North Dakota beef producers. Table 27 demonstrates that 48.28% of the respondents plan on retiring in the next 10 years with the largest group in the herd size of 50-99 cows.

Table 27. Principal operator plans on retiring in the next 10 years, ND beef operations

Herd size	Yes	No	Total	Percent
1-49	2	2	4	2.76%
50-99	30	17	47	32.41%
100-249	28	36	64	44.14%
250-500	9	19	28	19.31%
501-750	0	1	1	0.69%
751+	1	0	1	0.69%
Total	70	75	145	100.00%
Percent	48.28%	51.72%	100.00%	

The most common type of farm ownership structure was sole proprietorships (Table 28). Of the survey respondents, the second most common type of ownership structure was general partnerships followed by limited partnerships. Two respondents reported an “other” type of ownership structure which could be a written or oral agreement that has not been registered with the state.

Beef production is a labor intensive agricultural system. However, 63.09% of the respondents indicated they did not hire seasonal help (Table 29). Approximately 31% of the respondents did indicate that they used part-time help while only 6% used full-time help. Surprisingly it was the mid-sized beef operations that used full-time labor.

Table 28. Farm ownership structure by herd size, ND beef operations

Herd Size	Sole Proprietorship	General Partners hip	Limited Partners hip	LLC	C-Corp	S-Corp	Other	Total
1-49	3	1	0	0	0	0	0	4
50-99	42	4	0	0	0	0	0	46
100-249	56	6	2	0	0	1	2	67
250-500	18	9	1	0	0	0	0	28
501-750	1	0	0	0	0	0	0	1
751+	0	1	0	0	0	0	0	1
Total	120	21	3	0	0	1	2	147
% total	81.63%	14.29%	2.04%	0.00%	0.00%	0.68%	1.36%	100.00%

Table 29. Type of seasonal help used by herd size, ND beef operations

Herd size	Full time	Part Time	None	Total	% Total
1-49	0	1	3	4	2.68%
50-99	1	8	36	45	30.20%
100-249	3	23	43	69	46.31%
250-500	5	13	11	29	19.46%
501-750	0	1	0	1	0.67%
751+	0	0	1	1	0.67%
Total	9	46	94	149	100.00%
% total	6.04%	30.87%	63.09%	100.00%	

Farm Finances

Financial resources on beef operations can be provided through farm and non-farm revenue sources. It is important to note that in this survey, the question asked about farm revenue. It failed to distinguish between net and gross, which was an error noticed after the survey was distributed. The author recommends using caution when interpreting and citing Table 30 which demonstrates that 56% of the producers reporting had farm revenue greater than \$80,000.

Many times non-farm revenue is used as a risk management option in the form of portfolio diversification. Of the 144 respondent, all reported some amount of non-farm revenue earned (Table 31). Forty-six of the respondents reported more than \$80,000 of non-farm revenue earned, demonstrating that about 32% of the farms earn a significant amount of income off the farm. This occurred in herd sizes with more than 100 beef cows. Table 32 presents revenue generated from beef operations.

Table 30. Farm revenue by herd size, 2009, ND beef operations

Herd size	< \$5,000	\$5,000-9,999	\$10,000-14,999	\$15,000-19,999	\$20,000-39,999	\$40,000-59,999	\$60,000-79,999	\$80,000+	Total
1-49	0	0	0	0	1	2	0	1	4
50-99	0	1	2	0	8	8	7	0	26
100-249	1	0	1	1	1	4	11	47	66
250-500	0	0	0	1	1	4	1	20	27
501-750	0	0	0	0	0	0	0	1	1
751+	0	0	0	0	0	0	0	1	1
Total	1	1	3	2	11	18	19	70	125
% total	0.80%	0.80%	2.40%	1.60%	8.80%	14.40%	15.20%	56.00%	100.0

*Please refer above regarding definition of “farm revenue”

Table 31. Non-farm revenue by herd size, 2009, ND beef operations

	None	< \$5,000	\$5,000-9,999	\$10,000-14,999	\$15,000-19,999	\$20,000-39,999	\$40,000-59,999	\$60,000-79,999	\$80,000+
1-49	0	0	0	0	1	3	0	0	0
50-99	0	0	1	5	4	16	15	4	0
100-249	0	1	0	3	0	9	16	10	27
250-500	0	0	0	3	2	1	3	1	17
501-750	0	0	0	0	0	0	0	0	1
751+	0	0	0	0	0	0	0	0	1
Total	0	1	1	11	7	29	34	15	46
% total	0.00%	0.69%	0.69%	7.64%	4.86%	20.14%	23.61%	10.42%	31.94%

Table 32. Beef farm revenue by herd size, 2009, ND beef operations

Herd size	None	< \$5,000	\$5,000 -9,999	\$10,000 -14,999	\$15,000 -19,999	\$20,000 -39,999	\$40,000 -59,999	\$60,000 -79,999	\$80,000 +
1-49	0	0	0	0	1	3	0	0	0
50-99	0	0	1	5	4	16	15	4	0
100-249	0	1	0	3	0	9	16	10	27
250-500	0	0	0	3	2	1	3	1	17
501-750	0	0	0	0	0	0	0	0	1
751+	0	0	0	0	0	0	0	0	1
Total	0	1	1	11	7	29	34	15	46
% total	0.00%	0.69%	0.69%	7.64%	4.86%	20.14%	23.61%	10.42%	31.94%

Farm debt plays a role with farm financing. As a farm becomes more leveraged, they decrease their ability to obtain additional financing. Twenty-five percent of the beef farms had 0% debt on their farms, indicating they were financially sound (Table 33). This was found in herd sizes less than 500 cows with the majority occurring with 100-249 cows. One farm indicated they had a 100% debt level. It is assumed that this was an error on their part, but it was recorded as they presented it. The majority of producers had less than 40% debt on their farm, which is the generally recommended level. The two largest herd size categories had mixed debt levels. The 751+ beef operation had 1-10% debt level while the second largest herd size (501-749) had a debt level of 41-50%, overall the largest farms seemed to be financed relatively well between debt and equity.

Table 33. Farm debt level, 2009, ND beef operations

Herd size	Percent debt											
	0%	1-10%	11-20%	21-30%	31-40%	41-50%	51-60%	61-70%	71-80%	81-90%	91-100%	100
1-49	1	1	2	0	0	0	0	0	0	0	0	0
50-99	14	6	5	7	3	1	1	2	1	3	0	0
100-249	16	10	12	14	7	3	0	1	1	0	0	1
250-500	5	5	4	4	0	6	2	2	0	0	1	0
501-750	0	0	0	0	0	1	0	0	0	0	0	0
751+	0	1	0	0	0	0	0	0	0	0	0	0
Total	36	23	23	25	10	11	3	5	2	3	1	1
% total	25.17%	16.08%	16.08%	17.48%	6.99%	7.69%	2.10%	3.50%	1.40%	2.10%	0.70%	0.70%

Operator Characteristics

Operator characteristics define those characteristics that are specific to the principal operator, and in some cases 2nd and 3rd operators. Of the farms reporting the largest two age groups were 30-54 years (48.67%) and 55-70 years old (37.33%), Table 34. The smallest age group of 18-20 years only had two respondents in herd sizes 100-249 and 250-500 cows. Many times farm operations have a second operator, which may be a spouse, child, or sibling who works with the principal operator. Of the 150 farms that reported a principal operator age, 105 of those reported the age of the second operator (Table 35). Very few second operators were over the age of 71 (3.81%), however we observed an increased amount of second operators in the lowest age category (7.62%). Only 21 of the 105 respondents reported a third operator (Table 36). Not surprisingly, the largest age group of third operators is 18-29 years, which more than likely suggests children returning to the farm and working under either both parents or a parent and grandparent.

Table 34. Age of principal operator by herd size, ND beef operations

Herd size	Age (years)				Total
	18-29	30-54	55-70	71+	
1-49	0	3	1	0	4
50-99	0	16	23	7	46
100-249	1	33	26	9	68
250-500	1	20	6	2	28
501-750	0	1	0	0	1
751+	0	0	0	1	1
Total	2	73	56	19	150
% total	1.33%	48.67%	37.33%	12.67%	100.00%

Table 35. Age of second operator by herd size, ND beef operations

Herd size	Age (years)				Total
	18-29	30-54	55-70	71+	
1-49	0	2	0	0	2
50-99	0	9	13	0	22
100-249	5	30	14	2	51
250-500	3	17	6	2	28
501-750	0	1	0	0	1
751+	0	1	0	0	1
Total	8	60	33	4	105
% total	7.62%	57.14%	31.43%	3.81%	100.00%

Table 36. Age of 3rd operator, North Dakota beef producer

Herd size	Age (years)				Total
	18-29	30-54	55-70	71+	
1-49	0	0	0	0	0
50-99	1	1	2	0	4
100-249	6	3	0	0	9
250-500	3	3	1	0	7
501-750	0	0	0	0	0
751+	1	0	0	0	1
Total	11	7	3	0	21
% total	52.38%	33.33%	14.29%	0.00%	100.00%

Years of experience captured the experience earned on the current farm, but any previous work on farms as well. The majority of principal operators had more than 35 years of experience on the farm (Table 37). The years of experience for second operators was pretty evenly distributed (Table 38) and 50% of the 3rd operators had 5-14 years of experience (Table 39).

Table 37. Years of experience, principal operator by herd size, ND beef operations

Herd size	Years					Total
	0-4	5-14	15-24	25-34	35+	
1-49	0	0	0	2	2	4
50-99	0	0	8	6	31	45
100-249	0	2	8	17	42	69
250-500	0	3	3	11	11	28
501-750	0	0	0	1	0	1
751+	0	0	0	0	1	1
Total	0	5	19	37	87	148
% total	0.00%	3.38%	12.84%	25.00%	58.78%	100.00%

Table 38. Years of experience, 2nd operator by herd size, ND beef operations

Herd size	Years					Total
	0-4	5-14	15-24	25-34	35+	
1-49	0	0	1	1	0	2
50-99	1	2	5	3	8	19
100-249	2	10	16	11	9	48
250-500	1	5	7	7	6	26
501-750	0	0	1	0	0	1
751+	0	0	1	0	0	1
Total	4	17	31	22	23	97
% total	4.12%	17.53%	31.96%	22.68%	23.71%	100.00%

Table 39. Years of experience, 3rd operator by herd size, ND beef operations

Herd size	Years					Total
	0-4	5-14	15-24	25-34	35+	
1-49	0	0	0	0	0	0
50-99	0	2	0	0	2	4
100-249	1	6	2	1	0	10
250-500	4	2	0	1	0	6
501-750	0	0	0	0	0	0
751+	0	1	0	0	0	1
Total	5	11	2	2	2	22
% total	22.73%	50.00%	9.09%	9.09%	9.09%	100.00%

Ninety-six percent of the principal operators were male (Table 40). Across all operator levels, 67.93% were males while females were the majority of 2nd operators indicating the likely possibility of husband and wife management teams. Very few operators received a Bachelors degree, however, over 49% of the operators were technical or college graduates (Table 41). It may be the case that “college” graduates was too similar to “Bachelors degree” which resulted in lower response rates in that category. Principal operators reported the college degree they received—no distinction was made between a technical or trade degree compared to a four year institution. The majority of principal operators received a degree in a non-ag related field (Table 42). Twenty percent of the principal operators received a degree in Animal Science while 16% received a degree in Agricultural Economics or Agribusiness.

Table 40. Gender of operators, ND beef operations

Gender	Principal Operator	2nd Operator	3rd Operator	4th Operator	Total	% Total
Male	145	34	13	5	197	67.93%
Female	5	71	10	7	93	32.07%
Total	150	105	23	12	290	100.00%
% female	3.33%	67.62%	43.48%	58.33%	32.07%	

Table 41. Education level of operators, ND beef operations

Education level*	Principal Operator	2nd Operator	3rd Operator	4th Operator	Total	% Total
High School	45	24	8	3	80	28.07%
Some College	26	18	3	4	51	17.89%
Technical/Community	32	26	4	2	64	22.46%
College Graduate	41	28	8	1	78	27.37%
Bachelors Degree	2	9	0	1	12	4.21%
Total	146	105	23	11	285	100.00%

* Masters degree or higher was an option, but of the 285 respondents, no one checked that education level, hence it was removed from the table.

Table 42. College degree of principal operators, ND beef operations

Major	Principal Operator	2nd Operator	3rd Operator	4th Operator	Total	% Total
Ag Econ/AgBusiness	9	5	2	0	16	16.16%
Animal Science	9	8	3	0	20	20.20%
Business	8	4	2	0	14	14.14%
Crop and Weed Sciences	3	1	0	0	4	4.04%
Soil Science	1	0	0	1	2	2.02%
Other	17	21	4	1	43	43.43%
Total	47	39	11	2	99	100.00%

Extension and Membership Participation

Higher education is one way to stay up-to-date with new technology and practices, but continual learning occurs with participation in extension programming and membership participation. Approximately 20% of the principal operators reported not attending any meetings throughout the year (Table 43). Across all operators, about 27% did not attend extension meetings, however, close 51% attended more than two meetings a year.

Table 43. Number of extension visits made to farm per year, ND beef operations

Number of visits	Principal Operator	2nd Operator	3rd Operator	4th Operator	Total	% Total
0	29	30	5	6	70	26.52%
1	30	21	6	2	59	22.35%
2-3	46	22	5	0	73	27.65%
4+	41	13	5	3	62	23.48%
Total	146	86	21	11	264	100.00%

The type of extensions meetings varied across operators (Table 44). Group meetings, one-on-one consultations and workshop/tours were the most attended. Internet based meetings were the least popular only representing approximately 7% of the responses. Outside of extension, producers can participation in organization meetings. About 33% of the operators did not participation in membership of industry organizations while more than 47% participated in more than two organization meetings per year (Table 45).

Table 44. Number of extension programs attended on an annual basis, ND beef operations

Type	Principal Operator	2nd Operator	3rd Operator	4th Operator	Total	% Total
Group meetings	76	0	7	3	86	27.30%
Internet based	14	2	5	1	22	6.98%
One-on-one consultations	66	11	8	2	87	27.62%
Workshops/tours	60	16	6	1	83	26.35%
None	26	0	5	6	37	11.75%
Total	242	29	31	13	315	100.00%

Table 45. Number of member organizations operators participated in, ND beef operations

Number	Principal Operator	2nd Operator	3rd Operator	4th Operator	Total	% Total
0	36	29	8	5	78	33.05%
1	24	15	4	3	46	19.49%
2-3	34	14	1	1	50	21.19%
4+	42	14	5	1	62	26.27%
Total	136	72	18	10	236	100.00%

Conclusions

The objective of the survey was to evaluate the current production practices on beef operations as they relate to surface water BMPs and ND beef producers' knowledge of BMPs. Results indicated that about 60% of North Dakota producers were unaware of BMPs. Secondly, the results of the survey demonstrated that the majority of beef producer respondents were not using surface water run-off systems for their manure in either a pasture or feedlot system. This indicates that as educators we must first inform producers of different surface water BMPs and the role they may play in decreasing and preventing surface water pollution. Once producers are aware of different BMPs, we can then begin working through financing of the BMPs. Results of the survey indicated that while ND beef producers have three different sources of cost-share opportunities to help facilitate BMP adoption, the national program (EQIP) was the only cost-share program used. Very few states have multiple cost-share programs; therefore additional focus needs to be placed on these programs to capitalize on the opportunities available.

References

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APPENDIX

Appendix 1. Cover letter sent to sample of 1,000 beef operations

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December 3, 2010

Dear Valued North Dakota Beef Producer:

Enclosed with this letter you will find a survey designed to identify factors that influence North Dakota beef producer production practices and management decisions. This research is being conducted by Joleen C. Hadrich (NDSU Department of Agribusiness & Applied Economics) and Andrea VanWinkle (NDSU graduate student) in collaboration with Chris Augustin (NDSU Carrington Research Extension Station) and Scott Ressler (North Dakota Stockmen's Association). We place a high value on your input as it helps us conduct the best research and draw appropriate conclusions regarding ND beef producers. A summary of this project's research findings will be reported in an Ag Econ report and results will be released to agricultural media.

We want to emphasize that your participation in this survey is *entirely voluntary and highly encouraged*. It is estimated that the survey will take approximately 20 minutes of your time to complete. Your individual responses will be kept in strict confidence. Although we would like you to answer all of the questions (note there are questions on both sides of each page), you may choose to skip any question. You may choose not to participate or quit participating at any time without penalty or loss of benefits to which you are already entitled.

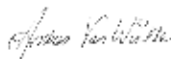
We appreciate your assistance with this research project and look forward to receiving your completed survey. After completion, please mail us your survey using the enclosed, postage-paid envelope. If you have any questions, comments, or concerns regarding this survey, please feel free to contact Dr. Joleen C. Hadrich via email at joleen.hadrich@ndsu.edu or phone 701-231-5721.

If you have questions regarding research subjects' rights or to file a complaint regarding the research please contact the NDSU Human Research Protection Office via email at ndsu.irb@ndsu.edu or phone at 701-231-8908.

Sincerely,



Joleen C. Hadrich
NDSU
Assistant Professor



Andrea VanWinkle
NDSU
Research Assistant



Chris Augustin
NDSU
Nutrient Management



Scott Ressler
ND Stockmen's Association
Environmental Services Dir.

NDSU is an equal opportunity institution.

Appendix 2. Survey sent to sample of 1,000 beef operations

SURVEY – NORTH DAKOTA BEEF COW PRODUCERS

Your participation in this survey is voluntary. You may choose to participate by completing and returning this survey. Your individual responses will be kept confidential. Please answer all questions to the best of your knowledge. Any information provided will be used to assess overall beef producer characteristics in North Dakota. The objective of this survey is to collect and analyze information in order to improve policies and programs that serve North Dakota beef cow producers. Information gathered will be used for educational and policy recommendation purposes.

Farm location: County _____

Are you currently involved in **beef cow** operations?

- Yes
- No. Please check all that apply
 - Still farming, but sold beef cow herd
 - Retired from farming, sold beef cow herd
 - Retired from farming, sold farm including beef cow herd
 - Other, please list _____

This survey is primarily interested in active beef cow producers. If 'NO' was answered in the above question, no additional information is needed, please return this survey and thank you for your cooperation. If 'YES' was answered in the above question, please continue answering the following questions. If the farm is not a sole proprietorship (individual owner), please answer all questions as they relate to the entire operation, not just your share.

A. CROP ENTERPRISES

- A1 How many **cropland** acres were farmed as of January 1, 2010?
- | | |
|--------------------------------------|--------------------------------------|
| <input type="checkbox"/> 1-199 | <input type="checkbox"/> 2,000-3,999 |
| <input type="checkbox"/> 200-499 | <input type="checkbox"/> 4,000-5,999 |
| <input type="checkbox"/> 500-999 | <input type="checkbox"/> 6,000-9,999 |
| <input type="checkbox"/> 1,000-1,999 | <input type="checkbox"/> 10,000 + |

- A2 Please check the crops typically grown on the farm.
- | | |
|--------------------------------------|---------------------------------------|
| <input type="checkbox"/> Alfalfa | <input type="checkbox"/> Peas/Lentils |
| <input type="checkbox"/> Barley | <input type="checkbox"/> Potatoes |
| <input type="checkbox"/> Canola | <input type="checkbox"/> Soybeans |
| <input type="checkbox"/> Corn | <input type="checkbox"/> Spring Wheat |
| <input type="checkbox"/> Dry Edibles | <input type="checkbox"/> Sugarbeets |
| <input type="checkbox"/> Durum | <input type="checkbox"/> Sunflowers |
| <input type="checkbox"/> Hay | <input type="checkbox"/> Other _____ |

- A3 How many acres of **pasture** were in use as of January 1, 2010?
- | | |
|--------------------------------------|--------------------------------------|
| <input type="checkbox"/> 1-199 | <input type="checkbox"/> 2,000-3,999 |
| <input type="checkbox"/> 200-499 | <input type="checkbox"/> 4,000-5,999 |
| <input type="checkbox"/> 500-999 | <input type="checkbox"/> 6,000-9,999 |
| <input type="checkbox"/> 1,000-1,999 | <input type="checkbox"/> 10,000 + |
- A4 Of the total acres in operation, how many acres were:
- | | |
|--|-------|
| <input type="checkbox"/> Owned | _____ |
| <input type="checkbox"/> Rented from private entity | _____ |
| <input type="checkbox"/> Rented from government entity | _____ |
| <input type="checkbox"/> Rented Out | _____ |
- A5 What pasture systems are used by the farm? Please check all that apply.
- Continuous (one or two main pastures)
- Rotational (multiple pastures used to rotate livestock as necessary to allow vegetation re-growth)
- Controlled (strip grazing with new pasture area every 12 to 48 hours)
- Other, please list _____
- A6 If a pasture system is used on the farm, what time period(s) are cattle allowed to graze? Please check all that apply.
- Spring
- Summer
- Fall
- Winter (bale grazing/swath grazing)
- No pasture

B. LIVESTOCK ENTERPRISES

- B1 What was the average number of beef cows in the herd during the 2010 grazing season?
- | | |
|----------------------------------|----------------------------------|
| <input type="checkbox"/> 1-49 | <input type="checkbox"/> 250-500 |
| <input type="checkbox"/> 50-99 | <input type="checkbox"/> 501-750 |
| <input type="checkbox"/> 100-249 | <input type="checkbox"/> 751 + |
- B2 What breed of beef cows were in the farm herd as of January 1, 2010? Please check all that apply.
- | | |
|--------------------------------------|---|
| <input type="checkbox"/> Angus | <input type="checkbox"/> Shorthorn |
| <input type="checkbox"/> Charolais | <input type="checkbox"/> Simmental |
| <input type="checkbox"/> Gelbvieh | <input type="checkbox"/> Tarentaise |
| <input type="checkbox"/> Hereford | <input type="checkbox"/> Cross-bred |
| <input type="checkbox"/> Maine-Anjou | <input type="checkbox"/> Other, please list _____ |
| <input type="checkbox"/> Red Angus | |

- B3 What marketing element(s) does the farm utilize with regard to beef cows?
- Branded Beef Program
 - Farm direct to consumer
 - Grassfed
 - Organic
 - No hormones or antibiotics/Natural
 - Other, please list _____
- B4 How many head of other livestock were present on the farm as of January 1, 2010? Please check all that apply.
- | | <i>Number</i> |
|---|---------------|
| <input type="checkbox"/> Bison | _____ |
| <input type="checkbox"/> Goats | _____ |
| <input type="checkbox"/> Horses | _____ |
| <input type="checkbox"/> Pigs | _____ |
| <input type="checkbox"/> Sheep | _____ |
| <input type="checkbox"/> Other, please list _____ | _____ |
| <input type="checkbox"/> None | |

B. BEST MANAGEMENT PRACTICES (BMPs)

Best Management Practices (BMPs) are recommended farming practices which have been found to be the most effective and practical methods to prevent and/or reduce potential agricultural pollution.

- C1 Are you aware of any AFO/CAFO (Animal Feeding Operations/ Concentrated Animal Feeding Operations) regulations that may affect your farm operation?
- Yes
 - No
- C2 Are you aware of the *Environmental Quality Incentives Program (EQIP)* available through the United States Department of Agriculture? *EQIP* is a program that allows producers to apply for cost share payments and/or incentive payments to facilitate in implementing pollution abatement practices.
- Yes, aware of program but have not applied
 - Yes, applied but cost share/incentives not approved
 - Yes, applied and received cost shares/incentives
 - No

- C3 Are you aware of the *Livestock Pollution Prevention Program (LP3)* available through the North Dakota Department of Agriculture? *LP3* assists livestock producers meet environmental compliance regulations and increase productivity and profitability of livestock operations. This program reimburses producers up to 60 percent of the approved expenses.
- Yes, aware of program but have not applied
- Yes, applied but expenses not approved
- Yes, applied and received reimbursement
- No
- C4 Are you aware of the *Environmental Services Program (ESP)* available through the North Dakota Stockmen's Association's? *ESP* assists livestock producers make positive environmental contributions while increasing productivity and profitability of livestock operations. This program reimburses producers up to 60 percent of the approved expenses.
- Yes, aware of program but have not applied
- Yes, applied but expenses not approved
- Yes, applied and received reimbursement
- No
- C5 What type(s) of runoff control system(s) for *pasture manure* is currently used by the farm? Please check all that apply.
- None
- Vegetative buffer strips
- Holding pond
- Containment pond
- Clean water diversion
- Other, please list _____
- C6 What type(s) of runoff control system(s) for *manure application on cropland* is currently used by the farm? Please check all that apply.
- None
- Vegetative buffer strips
- Holding pond
- Containment pond
- Clean water diversion
- Other, please list _____
- C7 What type(s) of runoff control system(s) for *feedlot manure collection* is currently used by the farm? Please check all that apply.
- None
- Vegetative buffer strips
- Holding pond
- Containment pond
- Clean water diversion
- Other, please list _____

- C8 Do beef cows have access to streams, rivers, or ponds (surface water)? If "No", please skip to question C10.
- Yes
- No
- C9 If cattle have access to surface water, is there a method/system in place which restricts access to the surface water? If yes, please check all restriction methods that apply.
- Yes. Livestock are completely restricted from water.
- Yes. Beef cows use trough or tank for water.
- Yes. Fencing is used to allow only limited access.
- Other, please list _____
- No. Restricted water access methods not used.
- C10 **Filter Strips** are vegetative areas used to trap sediment, organic material, nutrients, and chemicals before reaching sensitive environmental areas through surface runoff and wastewater. Is this practice utilized on the farm?
- Yes
- No, implementation planned in the next 12 months
- No, implementation planned in the next 5 years
- No, implementation not being considered at this time
- C11 **Riparian Buffers** are vegetative areas adjacent to surface water to remove excess amounts of sediment, organic material, nutrients, chemicals, and other pollutants in surface water. Is this practice utilized on the farm?
- Yes
- No, implementation is planned in the next 12 months
- No, implementation planned in the next 5 years
- No, implementation not being considered at this time
- C12 **Streambank Fencing** is the practice of excluding livestock from surface waters through the use of fencing. Is this practice utilized on the farm?
- Yes
- No, implementation is planned in the next 12 months
- No, implementation planned in the next 5 years
- No, implementation not being considered at this time
- C13 **Stream Bridging/Crossing** is generally used in conjunction with streambank fencing so that livestock can move across the stream/river with minimal contact to the water. Is this practice utilized on the farm?
- Yes
- No, implementation is planned in the next 12 months
- No, implementation planned in the next 5 years
- No, implementation not being considered at this time

C14 **Rotational Grazing** is the practice of dividing pastures into sections. Each section is grazed for a short period of time and then rested from grazing until vegetation in that section has recovered. Is this practice utilized on the farm?

- Yes
- No, implementation is planned in the next 12 months
- No, implementation planned in the next 5 years
- No, implementation not being considered at this time

C15 **Nutrient Management** (manure utilization) is the practice of using organic wastes from agricultural/farm operations in an environmentally sound manner by following recommended application rates. Does the farm operation have a nutrient management plan?

- Yes, please list _____
- No, implementation is planned in the next 12 months
- No, implementation planned in the next 5 years
- No, implementation not being considered at this time

C16 Other than the above **Bolded** identified practices, what other practices does the farm utilize to abate possible contamination of surface water? Please list:

C17 If manure is collected, what collection system is used?

	Solid	Semi-solid
Scraper	<input type="checkbox"/>	<input type="checkbox"/>
Box scraper	<input type="checkbox"/>	<input type="checkbox"/>
Blades	<input type="checkbox"/>	<input type="checkbox"/>
Front end loader	<input type="checkbox"/>	<input type="checkbox"/>
Other please list _____	<input type="checkbox"/>	<input type="checkbox"/>

C18 How long do you store manure?

Solid	0-3 months	3-6 months	6-12 months	12+ months
Stock pile	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other please list _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Semi-solid	0-3 months	3-6 months	6-12 months	12+ months
Earthen basin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Concrete basin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other please list _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- C19 If manure is applied to crop land, when is applied?
 Spring
 Fall
 Spring & Fall
- C20 If manure is applied to crop land, what application method is used?
 Solid
 Broadcast spreaders
 Other, please list _____
 Semi-solid
 Broadcast spreaders
 Dragline/Draghose
 Other, please list _____
- C21 Is manure application on field/cropland supplemented with commercial fertilizer application?
 Yes
 No, field/crop land fertilized with farm manure only
 No, field/crop land fertilized with commercial fertilizer only
- C22 Of the field/crop land fertilized with manure, please check all that apply to describe field/crop land.
 Tiled crop land
 No-till (surface application)
 Traditional till (incorporated application)
 Other, please list _____
- C23 Is manure tested for nutrient analysis before applications?
 Yes
 No
- C24 If *Best Management Practices (BMPs)* are not currently used on the farm, what is the primary reason(s)? Please check all that apply.

	Initial Material Cost	Initial Labor Cost	Initial Labor Hours	Maintenance Cost
Filter Strips	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Riparian Buffers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Streambank Fencing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Streambank Bridging/Crossing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rotational Grazing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nutrient Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C25 If *BMPs* were implemented by the farm, how was the project financed? Please check all that apply.

	Self-Funded	E QIP	LP3	E SP	NA
Filter Strips	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Riparian Buffers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Streambank Fencing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Streambank Bridging/Crossing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rotational Grazing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nutrient Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C26 If 100% subsidy is not available, what is the minimum percentage cost share needed by the farm to adopt *BMPs*?

	0-14	15-29	30-44	45-75	76+
Filter Strips	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Riparian Buffers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Streambank Fencing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Streambank Bridging/Crossing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rotational Grazing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nutrient Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

D. MANAGEMENT CHARACTERISTICS

D1 What record keeping system is utilized in farm operations?

- | | |
|--|--------------------------------------|
| <input type="checkbox"/> Easy-Farm | <input type="checkbox"/> Quicken |
| <input type="checkbox"/> FarmLogic | <input type="checkbox"/> Quickbooks |
| <input type="checkbox"/> Farm Notes | <input type="checkbox"/> Redwing |
| <input type="checkbox"/> Farm Works | <input type="checkbox"/> Spreadsheet |
| <input type="checkbox"/> Paper Record Book | <input type="checkbox"/> None |

D2 How often are receipt and expense information entered into the farm record system?

- Daily
- Weekly
- Monthly
- Quarterly
- Other, please list _____

- D3 How important are the following in the consideration to adopt a *BMP*?
- | | Very Important | | Neutral | | Not Important | |
|--------------------|----------------|---|---------|---|---------------|--|
| Reduce Labor Cost | 1 | 2 | 3 | 4 | 5 | |
| Reduce Labor Hours | 1 | 2 | 3 | 4 | 5 | |
- D4 How important is generating adequate farm income so that non-farm income is not necessary?
- | | Very Important | | Neutral | | Not Important | |
|----------------------------|----------------|---|---------|---|---------------|--|
| Generating non-farm income | 1 | 2 | 3 | 4 | 5 | |
- D5 Does the farm operation have a short term (less than 3 years) written business plan which clearly identifies current farm focus?
- Yes
- No
- D6 Does the farm have a long term (10 years or more) written business plan which clearly identifies future focus of the farm?
- Yes
- No
- D7 Does the Principal operator plan to retire in the next 10 years?
- Yes
- No
- D8 If yes, have plans been made for transfer of farm to the next generation?
- Yes, next generation will continue
- Yes, secondary operator will become primary operator
- No, next generation is not interested
- No, sell livestock
- No, sell complete farm operation
- No, have not discussed farm transfer

E. ECONOMIC/FINANCIAL CHARACTERISTICS

- E1 What is the ownership arrangement of the farm operation?
- Sole Proprietorship (Individual owner)
- General Partnership
- Limited Partnership
- Limited Liability Company (LLC)
- C-Corporation
- S-Corporation
- Other, please list _____

E2 What was the farm operation revenue in 2009?

- | | |
|--|--|
| <input type="checkbox"/> Less than \$5,000 | <input type="checkbox"/> \$20,000-\$39,999 |
| <input type="checkbox"/> \$5,000-\$9,999 | <input type="checkbox"/> \$40,000-\$59,999 |
| <input type="checkbox"/> \$10,000-\$14,999 | <input type="checkbox"/> \$60,000-\$79,999 |
| <input type="checkbox"/> \$15,000-\$19,999 | <input type="checkbox"/> \$80,000 or more |

E3 What was the amount of farm operation revenue (estimated) in 2009 that was generated by beef cow operations?

- | | |
|--|--|
| <input type="checkbox"/> None | <input type="checkbox"/> \$20,000-\$39,999 |
| <input type="checkbox"/> Less than \$5,000 | <input type="checkbox"/> \$40,000-\$59,999 |
| <input type="checkbox"/> \$5,000-\$9,999 | <input type="checkbox"/> \$60,000-\$79,999 |
| <input type="checkbox"/> \$10,000-\$14,999 | <input type="checkbox"/> \$80,000 or more |
| <input type="checkbox"/> \$15,000-\$19,999 | |

E4 If you sold the complete farm operation (including all land and assets) what percentage of the sale amount would you retain after all debts had been paid, ignoring taxes?

- | | |
|---|---------------------------------------|
| <input type="checkbox"/> 100% - currently debt free | <input type="checkbox"/> 40 - 49% |
| <input type="checkbox"/> 90 - 99% | <input type="checkbox"/> 30 - 39% |
| <input type="checkbox"/> 80 - 89% | <input type="checkbox"/> 20 - 29% |
| <input type="checkbox"/> 70 - 79% | <input type="checkbox"/> 10 - 19% |
| <input type="checkbox"/> 60 - 69% | <input type="checkbox"/> 0 - 9% |
| <input type="checkbox"/> 50 - 59% | <input type="checkbox"/> Less than 0% |

Operators are defined as any individual who has a financial interest and is involved with decision making situations for the farm operation. Operators can be a spouse, siblings, children, hired employees, etc.

E5 How much non-farm income (estimated) was earned in 2009?

	Principal Operator	2 nd Operator	3 rd Operator	4 th Operator
None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Less than \$5,000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
\$5,000-\$9,999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
\$10,000-\$14,999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
\$15,000-\$19,999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
\$20,000-\$39,999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
\$40,000-\$59,999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
\$60,000-\$79,999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
\$80,000 or more	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

F. PRODUCER CHARACTERISTICS

F1 What is the age of each farm operator?

	Principal Operator	2 nd Operator	3 rd Operator	4 th Operator
18-29	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30-54	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55-70	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
71+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

F2 How many years of farming experience does each operator have?

	Principal Operator	2 nd Operator	3 rd Operator	4 th Operator
0-4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5-14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15-24	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25-34	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

F3 How many years has the primary farm operator worked as a principal operator in beef cow operations?

- 0-4
- 5-14
- 15-24
- 25-34
- 35+

F4 What is the gender of each operator?

	Principal Operator	2 nd Operator	3 rd Operator	4 th Operator
Male	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Female	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

F5 What is the highest level of education earned by each operator?

	Principal Operator	2 nd Operator	3 rd Operator	4 th Operator
High School	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Some College	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Technical/Community College Graduate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bachelors Degree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Masters Degree or greater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

F6 If Bachelors, Masters or greater degree was earned, what was the major course of study?

	Principal Operator	2 nd Operator	3 rd Operator	4 th Operator
Ag Econ/Ag Business	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Animal Science	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Business	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crop and Weed Science	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soil Science	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other please list	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

F7 Does the farm hire seasonal help?

- Yes, full-time
 Yes, part-time
 No

F8 How many times per year do the operators have contact with the NDSU Extension Service?

	Principal Operator	2 nd Operator	3 rd Operator	4 th Operator
0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2-3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

F9 What is your interaction with Extension Service programming?

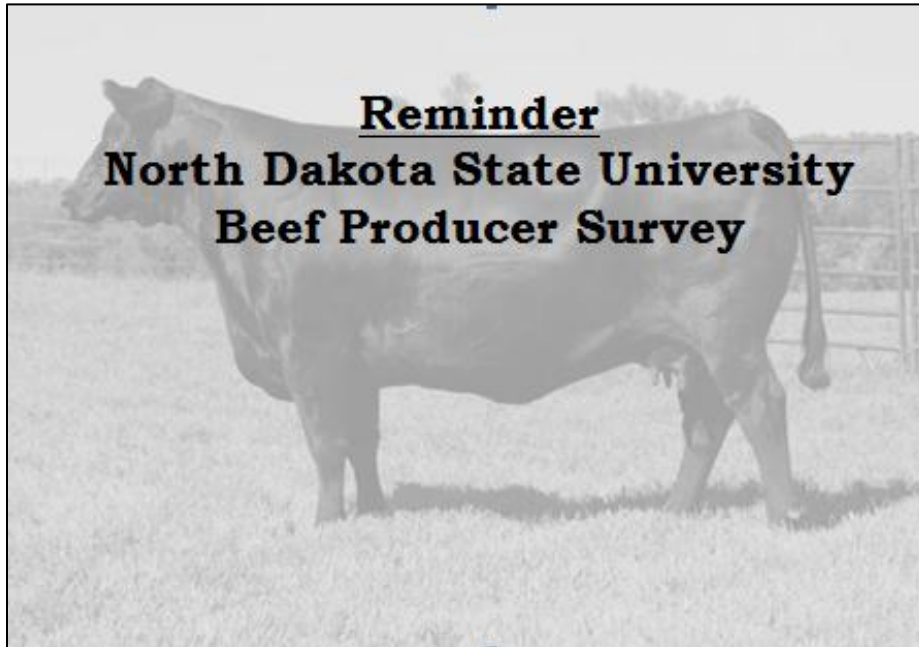
	Principal Operator	2 nd Operator	3 rd Operator	4 th Operator
Group meetings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internet based	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
One-on-one consultations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Workshops/tours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

F10 How many industry-related organizations are you a member of?

	Principal Operator	2 nd Operator	3 rd Operator	4 th Operator
0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

F11 Please list the industry-related organizations of which operators are a member of.

Appendix 3. Reminder survey sent to a sample of 1,000 beef operations



Dear North Dakota Beef Producer:

Thank you if you have already completed the ND Beef Producer survey you recently received. This is a reminder that surveys are requested back by Jan 1st, 2011.

If you need another survey, you may obtain one at:

http://www.ext.nodak.edu/homepages/aedept/staff/bio_hadrich_j.html

For more information, contact Dr. Joleen C. Hadrich by email: joleen.hadrich@ndsu.edu or phone: 701.231.5721

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