1.0 PROJECT PROPOSAL SUMMARY SHEET

PROJECT NAME: Nutrient Management Educational Support Program

LEAD PROJECT SPONSOR: North Dakota State University

CONTACT PERSONS:

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STATE: North Dakota WATERSHED: Statewide

HYDROLOGIC UNIT CODE: Statewide
HIGH PRIORITY WATERSHED (yes/no): N/A
PROJECT TYPE: Information and Educational Project
WATERBODY TYPES: Lakes/Reservoirs, Rivers, Streams, Groundwater
NPS CATEGORY: Agricultural

SUMMARIZATION OF MAJOR GOALS:
Support livestock producers by providing them with the information and education needed to implement nutrient management practices to reduce surface and ground water contamination, more efficiently utilize manure nutrients and successfully operate and maintain livestock manure management systems. Provide educational and informational support to ongoing NPS 319 projects in the state with nutrient management components.

PROJECT DESCRIPTION:
Due to the vastness of need and geographical production variation across ND, one livestock environmental management Extension specialist will be responsible for leadership for the program, providing educational support on livestock manure management, the utilization of livestock manures in crop production, proper composting practices, and guidance in developing nutrient management benchmarks. This specialist will be based out of the Carrington Research Extension Center.

FY14 319 funds requested: $295,500 Match: $197,000
Other Federal Funds: $ Total project cost: $492,500
319 Funded Full Time Personnel: 1

2.0 STATEMENT OF NEED

This proposed project is a continuation of a multi-year project working in conjunction with the NDSU Extension Service. The program has continued to focus on education of producers and agency personnel (SCD, NRCS, NDDH) dealing with water quality issues arising from livestock operations. The Nutrient Management Educational Support Program has worked to provide information and education to these groups through a website, presentations, posters, on-site visits and written publications. A summary of past accomplishments from July 2011 to the present is included in Appendix A.

2.1 Livestock production is a major industry in North Dakota with approximately 1,690,000 cattle, 151,000 hogs, and 73,000 sheep being inventoried annually on over 31,900 farms. The manure produced by these livestock is identified as a major source of surface water contamination in many watersheds across the state. According to the North Dakota 2012 Integrated Water Quality Assessment Report animal feeding and handling operations are the impairment source for 3,909 miles of rivers and streams and 13,881 acres of lakes and reservoirs. Nearly 24,000 acres of lakes and reservoirs are impaired by nutrients of which improper manure application contributes to. Geographically, North Dakota has two distinct livestock production areas. The eastern portion of the state has a more rolling topography and receives higher rainfall giving rise to potholes and more year-round flowing streams with an increased risk of frequent water runoff events in the watersheds. The western portion of the state has a steeper topography and receives significantly less rainfall but is prone to higher intensity of runoff during the less frequent events. The precipitation and topography split also dictates two different cultures of livestock production. This project will target primarily the small to medium livestock producers across the state since they constitute the majority in North Dakota.

Many existing feed yards and confinement operations have the potential to decrease water contamination through structural or managerial changes. As the size of operations change to larger and more intensive units, the potential for contamination of ground and surface water increases unless proper facilities are constructed and nutrient management procedures are utilized. Most of the existing parameters for facility design, nutrient management and water quality protection come from other states or geographic regions which may not be applicable to North Dakota. Therefore, nutrient management benchmarks are needed to support North Dakota producers with basic parameters of facility design and management, manure utilization and management, and water quality protection. The recent addition of researchers to the NDSU team in nutrient management is allowing research to be conducted within the state. This research may allow us to provide more appropriate recommendations or benchmarks to producers. Examples of these research findings included: proper manure application timing, alternative composting methods, bedding types in regards to composting analysis, nitrogen mineralization rates and uptake by plants. This program will work with producers to implement managerial changes to meet these recommendations.

The North Dakota Department of Health has regulations pertaining to animal feeding operations that require nutrient management planning and review and approval of plans for manure storage and runoff containment. Over the past 15 years, the NDSU Nutrient Management Educational Support Program, sponsored by NPS 319 grants, has made a concerted effort to promote sound nutrient management practices and provide educational support to producers and other NPS 319 projects in North Dakota. Previous and ongoing NPS projects focus primarily on facility design and BMPs for manure handling/storage with limited emphasis on nutrient management educational support, development of nutrient management benchmarks, or investigation of alternative livestock manure containment or treatment systems.

The NDSU Nutrient Management Educational Support Program under the direction of the current Livestock Environmental Management Specialist has evolved since its inception 15 years ago. The focus

has shifted from regulatory compliance issues and proper manure application to alternative livestock feeding options and the characteristics of handling livestock manure once it is contained in North Dakota's climate. Along with numerous invited talks, the team (current specialist along with nutrient management researchers at the CREC and on NDSU's campus) coordinates annual events such as the Manure Applicator and CAFO Operator School and a Composting Demonstration Day. These events target not only producers, but also watershed coordinators, NRCS and NDSU Extension personnel. The team works closely with the Nutrient Management Research Specialist at the Carrington REC and the Waste Management Engineer at NDSU to provide outreach to the public on the most current manure management studies being conducted. Extension publications written or updated recently include Resource Guide for Livestock Management, North Dakota Manure Fertilizer Use Recommendations, Containment Pond Management and Beef Feeding Operation Siting and Design Basics. The team also continually updates the website at www.ag.ndsu.edu/lem to keep their audience up-to-date on current information.

2.2 Producers are aware of the need to properly utilize all on-farm sources of nutrients. With the flexibility inherent in agriculture production systems in North Dakota and the vastness of the state, livestock producers have never been pressed to intensely manage runoff from their livestock facilities, apply livestock manure consistently, uniformly or in a way that diminishes environmental risk to surface water. Once producers learn how to economically use livestock manure as a fertilizer and about the negative impacts of nutrient runoff, they will implement nutrient management plans that emphasize environmental protection and proper use of livestock manures. North Dakota State University, primarily through the NDSU Extension Service, works closely to support livestock producers and NPS projects around the state with applied research and educational support relating to livestock production. With the number of livestock facilities and NPS projects needing support, the vastness of the state, the need to make progress with nutrient management support and the different cultures of livestock production and runoff management in the east vs. the west, it is imperative that this project continues under the leadership of a livestock environmental management Extension specialist.

2.3 The basics of nutrient management not only apply to manure application, but also to commercial fertilizer application. Improper application of commercial fertilizer also holds the potential to pollute through surface runoff and subsurface drainage. It is important to remind producers about the basics of proper crop rotations, correctly applying commercial fertilizers, and other basics of nutrient management planning. Mismanagement with commercial fertilizers also impacts the water quality of ground and surface waters. Excess phosphorus and nitrogen again can lead to algal blooms and fish kills from low oxygen levels.

3.0 PROJECT DESCRIPTION

3.1 Goal

The goal of this project is to educate and assist livestock producers in adopting nutrient management practices and developing manure management facilities to reduce adverse impacts on water and air quality. A program will be delivered to provide education and information support to livestock producers, 319 project coordinators and NDSU Extension agents on livestock facilities management and livestock manure handling and utilization. The majority of livestock operations in ND are small- to medium-sized. Therefore, this program will primarily focus on livestock systems defined as small or medium animal feeding operations.

The North Dakota NPS Pollution Management Program has funded a Livestock Waste Management/ Engineering Extension Specialist since March, 1998. Through effective collaboration with NDSU faculty, Extension agents, NRCS, and other agencies and groups, this individual developed a livestock waste facility design educational program that was well received by ND Producers. The program continued to grow to support one and then two nutrient management extension specialists as the need for educational assistance grew within the state. The current proposed program builds on this earlier work and involves the development of educational resources, cooperative research projects to develop nutrient management benchmarks, utilization of existing materials and compiling of information learned from ongoing NPS projects. Developed resources will expand beyond the previous scope of the program to focus on alternative options for feeding of livestock, as well as the proper utilization of livestock manures and composting manure and mortalities in the North Dakota climate. The program also involves conducting workshops with producers, one-on-one consultations and cooperation with researchers. Close working relationships will be maintained with 319 project coordinators, the North Dakota Department of Health, NRCS, local soil conservation districts and other technical service providers. Emphasis will be given to coordination with all entities working with producers to assure the same criteria and recommendations are being used. Special emphasis will be given to program development in the areas of operation and maintenance of livestock facilities, livestock manure handling and storage, and the utilization of livestock manure nutrients in soil fertility management programs used by ND crop and/or livestock producers. A manure testing and nutrient management plan development program will be wrapped up and a ND based book-value for manure nutrients will be developed. On-farm demonstrations will be developed to showcase the best practices to preserve manure nutrients and future nutrient crediting when manure is land applied.

This proposed information and education project will work with a large audience of producers and will offer advice and alternatives for livestock manure handling, management and utilization. This project will also work with existing NPS 319 projects that have an identified livestock manure component. Impact of the program will be measured through ongoing evaluation of participants to determine their adoption of nutrient management practices and an annual survey of producers implementing agriculture manure management systems.

3.2 Objectives

Objective 1: Provide technical support and advice to individual livestock producers on options for livestock manure handling, storage and utilization to prevent adverse water and air quality impacts. Provide follow-up consultation, training and assistance to individual producers who modified or installed livestock manure management systems and adopted nutrient management plans as a result of this program.

Task 1:

- Consult 3-5 livestock and/or crop producers per month regarding manure and fertilizer management. These will primarily be requested directly by producers or through Extension agents, 319 coordinators, ND Dept. of Health inspectors, soil conservation districts and NRCS offices.
- Consultations will focus on options individual producers have to reduce/control surface water contamination from livestock manure, fertilizers, and how to better utilize livestock manure in crop fertility management programs.
- In order to better serve producers, a tablet (touch-screen handheld computer) will be used to provide convenient on-site assistance. Manure results, soil tests, resources, nutrient

calculators and so on can be easily accessed at any producers' home or field. Nutrient management plans can be readily created and fields accurately mapped.

Approximately 15% of the project will be devoted to this task.

Products: One-on-one producer education, program strengthening by a statewide network of producers working with the program, producers with a better understanding of how to successfully operate and maintain their livestock facility into the future and the proper use of fertilizer types in crop production.

Task 2:

- Provide individuals with printed information (i.e. presentation handouts and Extension publications) as well as individual science based management recommendations.
- Follow-up training and assistance to producers (12 per year) with newly installed systems (this information will be gained from the NDDH and 319 watershed coordinators) will be emphasized. This includes a continual education approach targeting producers who have modified or installed new livestock manure management systems.

Approximately 5% of the project will be devoted to this task.

Product: One-on-one producer education, program strengthening by a statewide network of producers working with the program, producers with a better understanding of how to successfully operate and maintain their livestock facility into the future and the proper use of fertilizer types in crop production. Create an extension publication on how to properly compost mortality's in North Dakota climate.

The estimated costs for this objective include the value of 20% of staff time/support plus the costs for supplies and contractual services.

Estimated cost $59,100 – 319 grant, $39,400 – Match

Objective 2: Provide educational support on livestock manure nutrient utilization to ND crop and/or livestock producers with or without new or existing livestock facilities.

Task 3:

- Educational materials and programming, focusing on the utilization of livestock manure, by giving credit for the fertilizer value in manure for crop production, will be delivered to producers and technical service providers.
- Educational materials include press releases (i.e. soil and manure testing), website material, newsletters (i.e. quarterly livestock environmental management news newsletter), and Extension bulletins. These bulletins are currently unavailable in North Dakota and bulletins that focus on nutrient crediting, organic soil amendments, nutrients in North Dakota manures, and how to determine the value of manure will be developed. Workbooks and web based materials will aid producers in developing nutrient management plans. Current curriculum applicable to the region will be utilized as well as curriculum focused on ND production practices will be developed.

Approximately 15% of the project will be devoted to this task.

Product: Manure nutrient crediting bulletin, nutrient management recommendations, nutrient management teaching curriculum, the value of manure, press releases, and educational materials available on the livestock environmental management website (www.ag.ndsu.edu/lem).

Task 4:

- Information on these topics will be presented at 4-5 livestock and/or crop educational demonstrations, workshops, and meetings organized by NDSU Extension staff on an annual basis. Research projects initiated by cooperating faculty at the ND Research Extension Centers will be used to validate the educational programs as well as develop and fine tune nutrient management benchmarks. The results of these projects will supply benchmarks on manure nutrient utilization by crops under ND conditions and will be incorporated into new bulletins. This task will also focus on manure and mortality composting and the effects of handling and storage methods on manure fertilizer value.

Approximately 20% of the project will be devoted to this task.

Product: Workshops (i.e. CAFO Operator/Manure Applicator's School, Animal Carcass Management) and demonstrations (i.e. Nutrient Management Day, cover crop/compost demonstration, manure spreader calibration demonstration, manure compost demonstration, mortality compost demonstration).

The estimated costs for this objective include the value of 35% of staff time/support plus the costs for supplies and contractual services.

Estimated cost $103,425 – 319 grant, $68,950 – Match

Objective 3: Develop educational materials and deliver technical support on current and innovative alternative facility design and livestock manure handling to ND livestock producers with new and existing livestock facilities.

Task 5:

- Meetings, workshops, demonstrations, and tours will be held to educate producers and those who advise and work with producers, about proper design and management of facilities. Five tours and/or workshops will be held each year. The tours/workshops will be spread throughout North Dakota. These workshops, tours and meetings will be organized by NDSU Extension Agents, NRCS, Soil Conservation Districts, 319 Coordinators, and producer organizations.
- Focus will be placed on lending support to new and innovative facility design, including systems that implement BMPs that result in cost effective changes to minimize water quality impacts from an operation while complying with current environmental regulations, also known as partial systems. Extension publications will be developed that cover "alternative CAFO facility designs and management".
- Mass media, websites, newsletters and Extension Impact Reports will be used to inform producers and the public about successful efforts to reduce impacts on air and water quality.

Approximately 30% of the project will be devoted to this task.

Product: Network of informational workshops throughout the state, annual reports, Extension publications, informational articles and news releases.

The estimated costs for this objective include the value of 30% of staff time/support plus the costs for supplies and contractual services.

Estimated cost $88,650 – 319 grant, $59,100 – Match

Objective 4: Create manure management awareness so that producers sample and test manures by assisting with manure sampling, soil sampling, manure spreader calibration, and manure application planning.

Task 6:

- Manure spreader calibration and determining manure application rates will be taught through one-on-one consultations (5 producers/year).
- A compilation of manure analyses gathered from 2011-2013 will be used to develop a publication of nutrients found in North Dakota manures.
- Upon completion of the nutrient publication, the manure sampling program will be continued, to a lesser degree (25 samples/year). It is imperative to continue to offer sampling for producers to ensure proper nutrient management planning occurs.
- A tablet (touch-screen handheld computer) will be used on site to organize manure and producer soil analysis into nutrient management plans. Accurate fertilizer amounts can be calculated and recorded.

Approximately 10% of the project will be devoted to this task.

Product: Increase producers' knowledge and use of manure sampling, manure nutrients, spreader calibration, and the agronomical use of manure and commercial fertilizers. Create an Extension publication of the nutrients found in livestock manure produced in North Dakota. Also, increase producers' knowledge of nutrient management plans and using the NMP for proper fertilizer application.

The estimated costs for this objective include the value of 10% of staff time/support plus the costs for supplies, contractual services, and manure analysis.

Estimated cost $29,550 – 319 grant, $19,700 – Match

Objective 5: Develop educational opportunities and materials for manure applicators in North Dakota. These opportunities will include assistance with manure application rates, calibrating equipment, nutrient management plans, environmental awareness, and ND rules and regulations.

Task 7:

- Proper manure application rates will be taught in a classroom setting. These rates will be determined by soil type and crop rotations.
- The basics and the importance of nutrient management plans will be shown in a classroom setting and through one-on-one meetings.
- Environmental awareness and the ND rules and regulations will be taught in a group effort with the NDDH in various educational settings. (1 meeting/year in a general location or 2-3 meetings/year in localized areas depending on applicator response and program acceptance).
- Calibrations will be demonstrated one-on-one or in groups during field days organized by 319 watershed coordinators or Extension personnel.

Approximately 5% of the project will be devoted to this task.

Product: Develop a network with and for ND manure applicators. Increase manure applicators' confidence in calibration techniques and grow their knowledge of the importance of NMPs.

The estimated costs for this objective include the value of 5% of staff time/support plus the costs for supplies and contractual services.

Estimated cost $14,775 – 319 grant, $9,850 – Match

3.3 Milestone Table

See appendix B: Milestone Table

3.4 Lead Project Sponsor

The lead project sponsor is the NDSU Extension Service. With offices in every county in the state, the NDSU Extension Service provides a statewide educational system. The educational system draws upon the research base of North Dakota State University and other universities across the nation in the development of educational and informational materials and programs. The Extension Service also draws upon the knowledge base of other agencies and organizations including the Natural Resource Conservation Service, the North Dakota Department of Health and the North Dakota Department of Agriculture. Educational programs are delivered through local county extension offices as well as through area and statewide specialists. The NDSU Extension Service has a long history of working with these partners in the development and delivery of educational programming and has the ability to focus research and extension specialist knowledge from the departments of Animal Sciences, Plant Sciences, Agricultural and Biosystems Engineering, Natural Resource Sciences, and Research Extension Centers.

3.5 Operation and Maintenance of 319 Funded BMPs

This section is not applicable to this particular grant proposal.

4.0 COORDINATION PLAN

4.1 Cooperating Organizations

This program will be coordinated with other state agencies and organizations involved in water quality and livestock manure management. The NDSU Extension Service is the lead organization. The North Dakota Agricultural Experiment Station will collaborate with this program through applied research and demonstration projects. The Natural Resource Conservation Service will cooperate with technical resources and guidelines. The ND Department of Health will help provide contact with ongoing and proposed 319 water quality projects which have a livestock manure management component. The ND Department of Health will provide guidelines, rules and regulations for livestock enterprises. Livestock producer organizations provide another conduit to the producers and represent the producers' viewpoint. County Extension Agents and SCD personnel will provide contact with producers in counties not represented by a 319 watershed project.

A Nutrient Management Advisory committee will be used to provide overall program direction. Membership will include the NDSU Extension Service Ag Program Leader, Carrington REC Director, Executive Vice-President of the ND Stockmen's Association, NDSA's Environmental Services program leader, a representative of the ND dairy producers, a representative of the ND pork producers, ND Dairy

Coalition, 3 NDSU Soil Science Extension/researchers, NDSU Ag and Biosystems Engineering researcher, 319 Program Director & Coordinators, ND Department of Ag, ND Department of Health AFO team, 3 representatives from NRCS (i.e. state engineer staff and state agronomist), other state agricultural commodity groups, and NDSU extension district director (s). The advisory committee will meet semi-annually to give overall direction to the program. The NDSU Extension Service Ag Program leader and Director of the Carrington Research Extension Center will make up a two member steering committee charged with on-going supervision of the project and insure coordination with other livestock manure management efforts.

4.2 Local Support

The NRCS, ND Department of Health, and Soil Conservation District personnel have all indicated a need for this type of informational and educational program. Individuals working with local 319 funded water quality projects have also indicated a need.

Support letters have been solicited and are on file.

4.3 Coordination

This project will be coordinated with ongoing funded 319 projects and support them with technical information and educational assistance. There will also be coordination with other NDSU Extension and research extension center personnel as described below in section 6.0 budget detail.

4.4 Duplication of Efforts

This program is not duplicated by other organizations or agencies. The agencies represented at the most recent Nutrient Management Advisory meeting identified this project and the NDSU Extension Service as the lead on educational and research efforts in North Dakota. Other agencies such as NRCS provide site specific technical assistance on manure management projects but their limited resources require them to focus primarily on sites where cost share assistance is available. This project is not faced with such limitations and by nature provides exceptional assistance in coordination of resources.

5.0 EVALUATION PLAN

Individual workshop and meeting evaluations will be developed and utilized through the duration of this project to determine the needs of producers (Appendix C). These evaluations will measure the increase in knowledge of participants as well as their increased likelihood of adopting enhanced manure management practices. However, the impact of the project will be determined by follow-up monitoring of individuals who have sought assistance from the NDSU Extension Service or other agencies working in livestock manure management. Adoption of manure handling and nutrient management practices will be the focus of the program evaluations. Program evaluations will be based on Kirkpatrick's four levels of evaluation. Level 1 is what was thought about the training. Level 2 identifies the amount of knowledge gained during training. Level 3 measures the changes in behavior. Level 4 tracks the results from training. This is the evaluation system that is supported by NDSU Extension Service.

Information gained from the evaluations described above will be used to enhance the educational thrusts of the program. Results of the program evaluations will be shared in a confidential manner with the advisory committee, program supervisors and through the NDSU Extension reporting system.

6.0 BUDGET

The budget is detailed in the two budget tables (Appendix D and E). Appendix D details funding sources by year. Appendix E is a detailed budget of the section 319/non-federal budget. The following narrative will explain Appendix E. The salary and fringe lines include 319 and non-federal NDSU cash match monies (i.e. a salaried faculty member spending a portion of his/her time, for which s/he is paid, on a project). The 319 funds will be utilized to continue employment of one extension specialist, one full-time position at the Carrington Research Extension Center. The salary is annualized per year plus fringes, increased by 3% per year. The NDSU non-federal match in this line is the time devoted to the project by other NDSU faculty and staff who will be supporting the program (Appendix F).
This includes project support that will be tracked as match from the following:
1) North Dakota Agricultural Experiment Station Scientists who work with animal and agronomy outreach programs at the Carrington Research Extension Center. Education and outreach utilizing nutrient management benchmarks and demonstration projects will be the main focus of this collaboration.

3) County Extension Agents who will organize local educational efforts and help provide educational program delivery that is focused on the specific needs of producers in their region. Specific contributions to the project will include organizing and facilitating regional educational events such as workshops, tours and demonstration projects. These Extension agents will also receive additional training on alternative winter feeding options, manure utilization and mortality management and incorporate this information into their livestock/crops educational programs along with providing leadership to this program effort within their multicounty program unit.

The remainder of the budget would be supported from 319 funds. This includes travel and operating support for the specialist. Regular travel includes travel to producer, regional, and national meetings. Printing costs are for production of educational materials including development of extension bulletins and circulars, the purchase of national educational curriculum and the development of field records and other printed material to be used by producers. Supplies include computers and printers (including a computer and a tablet computer in year one of the project), sampling supplies, and instructional supplies to support the program. Communications costs are for long-distance telephone, internet access and mobile service costs for the specialist. Administrative costs are calculated at 10%.

List of Appendices:

Appendix A: Past Accomplishments

Appendix B: Milestone Table

Appendix C: Examples of Evaluation Forms and Surveys

Appendix D: Budget Table Part 1

Appendix E: Budget Table Part 2

Appendix F: Value of Time and Services Provided by Extension Personnel
as non-Federal Match

Appendix A: Past Accomplishments (January 2011-August 2013)

Meeting	**Location**	**Date**
The Effects of Manure on Salinity	Lamoure County NRCS Winter Meeting	Jan 12, 2011
Sound Nutrient Management Practices	Feedlot School CREC Carrington, ND	Jan 28, 2011
Carcass Composting Management	McHenry County Carcass Management Clinic	Feb 15, 2011
Manure Spreader Calibration & Manure Sampling for Nutrient Management	Morton County Manure Workshop	Feb 22, 2011
NDSU Nutrient Management Plan Training	NDSU Campus Fargo, ND	Feb 24, 2011
Containment Pond Management	ND Winter Show	Mar 1, 2011
Manure Nutrient Sampling Program	319 Watershed Coordinator's Annual Meeting	Mar 16, 2011
Manure Nutrient Sampling Program	CREC Field Day	2011
Manure Nutrient Sampling Program	Livestock In-service Washburn, ND	Sept 7, 2011
Solid Formation and Management	Ft. Ransom Eco Ed Day	Sept 15, 2011
Manure Management and Manure Nutrient Sampling Program	Livestock Q&A Granville	Sept 29, 2011
Manure Management and Manure Nutrient Sampling Program	Mercer County Workshop	Nov 29, 2011
Sound Nutrient Management Practices	Feedlot School CREC Carrington, ND	Jan 28, 2012
Super Pooper School	DREC	Feb 29, 2012
Super Pooper School	Edgeley	Mar 1, 2012
Super Pooper School	Rugby	Mar 2, 2012
Manure Management & Soil Salinity Management	Granville	Mar 14, 2012
Non – AFO Winter Feeding Systems	319 Watershed Coordinator's Meeting	Mar 22, 2012
Cover Crop Summit		Mar 28, 2012
Manure Compost Management and Its Benefits	CCSP	July 12, 2012
Nutrient Management Record Keeping	Morton County 319 Workshop	Nov 29, 2012
Horse Manure Management	Equine Producer Meeting Bismarck, ND	Dec 19, 2012
Conservation Community Fair Booth	Valley City, ND	Jan 16, 2013
Feedlot Nutrient Management	NDSU Feedlot School Carrington, ND	Jan 23, 2013
Nutrient Sampling and Manure Spreader Calibration	Walsh County Livestock Meeting Park River, ND	Jan 24, 2013

Winter Classic Booth	Mountrail County Livestock Meeting Stanley, ND	Feb 4, 2013
Compliance Considerations – Do I Need a Permit	Hettinger County Livestock Meeting Regent, ND	Feb 5, 2013
Manure Management and Nutrient Sampling Program	McKenzie County SCD Board Watford City, ND	Feb 20, 2013
Utilizing Livestock Manure	McIntosh County Crop and Livestock Meeting Wishek, ND	Feb 21, 2013
Manure Management Issues and Concerns	McHenry County Cattle Feeders Update Granville, ND	Mar 13, 2013
Livestock Environmental Management	Foster County Farm Bureau Lunch and Learn CREC	Mar 14, 2013
Manure Management and Nutrient Sampling Program	SCD/319 Watershed Coordinators Meeting Bismarck, ND	Mar 20-21, 2013
Managing and Utilizing Livestock Manure	NDSU Animal Science Beef Production Class Fargo, ND	Mar 25, 2013
Value of Swine Manure in ND	Swine Meeting CREC	Apr 12, 2013
CREC Booth	Foster County Fair Carrington, ND	June 25, 2013
Mortality Management	CGREC Field Day	July 8, 2013
Value of Manure as Fertilizer	HREC Field Day	July 9, 2013
Composting Basic/Value of Manure as Fertilizer	CCSP Farm Forman, ND	July 18, 2013
Offal composting	Bowdon Meat Processing	July 29, 2013
Farm Visits		
Manure Sampling	Lamoure County	May 16, 2011
Manure Sampling	Medina	May 24, 2011
Manure Sampling	Towner	July 8, 2011
Manure Sampling	Lamoure County	July 18, 2011
Manure Sampling	Norwich	July 26, 2011
Manure Sampling	Drake	Sept 20, 2011
Manure Sampling	Rolette	Sept 22, 2011
Discovery Farm	Johannes' Underwood	Aug 30, 2012
Van BeDaf Dairy	Carrington	Aug 31, 2012
Manure Sampling	Geneseo	Sept 27, 2012
Manure Sampling	Foster County	Oct 8, 2012
Manure Sampling	CREC	Oct 9, 2012
Manure Sampling	Medina	Oct 10, 2012
Manure Sampling	Foster County	Oct 11, 2012
Manure Sampling	Streeter	Oct 15, 2012

Manure Sampling	Center	Oct 16, 2012
Manure Sampling	Wells	Oct, 16, 2012
Manure Sampling	Ward	Oct 17, 2012
Manure Sampling	Mountrail	Oct 18, 2012
Manure Sampling	Beach & Bowman	Oct 23, 2012
Manure Sampling	Hettinger	Oct 24, 2012
Manure Sampling	Beulah	Oct 25, 2012
Manure Sampling	Logan County	Oct 31, 2012
Emmons County Extension Office	Emmons County	Dec 20, 2012
McHenry County Ext. Office	Towner	Dec 21, 2012
Bottineau County Ext. Office	Bottineau	Dec 21, 2012
Collaboration Visit	CGREC	Feb 25, 2013
Bale Grazing Visit	Tuttle	Feb 25, 2013
Manure Sample	Towner	Apr 12, 2013
Manure Sample	Spiritwood	Apr 22, 2013
Mortality Management Set Up	Bathgate	May 13, 2013
Manure Sampling	Park River	May 15, 2013
Manure Sampling	Carpio	May 22, 2013
Farm Visit	Wyndmere	July 19, 2013
Manure Composting Visit	Leeds	July 23, 2013
Manure Sampling	Kensal, Ellendale, Oakes	July 30, 2013
Manure Sampling	Foster County	August 1, 2013
Manure Sampling	Granville	August 14, 2013
Farm Visit/Producer Trip	Richland County	August 30, 2013
Demonstrations/Publications		
Hoopbarn tour	Southeast, ND	Mar 7, 2011
Manure Spreader Calibration Demo	Morton County Nutrient Management Workshop	Apr 26, 2011
Discovery Farms Tour	ND	July 13-14, 2011
Nutrient Management	SDSU Tour	July 19-20, 2011
Salinity	Stutsman Co. Salinity Tour	Aug 11, 2011
Compost Demo Day	DREC	Aug 17, 2011
Discover Farms EPA Tour	Bartholomay's Dazey, ND	Oct 7, 2011
Compost Demo Day	CREC	Aug 23, 2012
Manure Spreader Calibration Demo	Stanley	Sept 25, 2012
Conservation Fair Booth	Valley City	Jan 16, 2013
Compost Mortality Demo	CGREC	May 1, 2013
Mortality Composting	CGREC Field Day	July 8, 2013
Composting Basics/Value of Manure as Fertilizer	CREC Field Day	July 16, 2013
North Dakota Manure Fertilizer use Recommendations	Ron Wiederholt, Mary Berg, Emily Kline	Dec, 2012
ND Lamb Wool Expo Nutrient Management Booth	Jamestown, ND	August 2-3, 2013
Compost Day CREC 2013	Carrington	August 13, 2013
NDSU Intern/Short Mortality Demo	Carrington	August 16, 2013
Mortality Demo Work CGREC	Streeter	August 27, 2013

Interviews		
Manure Management	Mick Kjar KQLX 890	April 25, 2013
Flooding and Manure Management	Mick Kjar KQLX 890	April 29, 2013
Talking Dirt Radio Segment	KDAK 1600	May 1, 2013
Manure Management	Ken Morgan K-FYR 550	May 2, 2013

On average, 30 people are in attendance at all meetings the Nutrient Management Education program personnel present at. From January 2011 thru July 2013, approximately 1,170 people were reached via formal presentations. Farm visits are done one-on-one with producers and many of them have been accomplished in part by the manure sampling program. From May 2011 thru August 2013, approximately 75 ND crop and livestock producers were reached with on-farm visits. On average, 50 people will attend demonstrations or tours led by Nutrient Management Education personnel. From March 2011 thru August 2013, approximately 550 ND crop and livestock producers were reached via demonstrations/tours.

Participation in meetings may involve organizing the meeting, speaking on specified topics, and conducting demonstrations appropriate for the meeting topic. Participation may also involve logistics and behind-the-scenes coordination to ensure relevant speakers and a successful event. Producer and train-the-trainer education is accomplished through this event.

Participation in farm visits allows for one-on-one interaction between the specialist and the producer. This type of education allows for questions to be answered in a non-threatening environment while offering and teaching a technical service such as proper sampling technique.

Publications allow for dissemination of research and step-by-step instructions for accomplishing tasks such as manure spreader calibration or composting animal manures. Demonstrations are an extension of the publication and encourage learning by participation either in large groups or one-on-one.

Interviews may occur because of press releases and connect the reader/listener to a person. They also provide a means of information dissemination.

Appendix B: Milestone Table

OBJECTIVE/TASKS	OUTPUT	QTY/GRANT PERIOD	YEAR 1	YEAR 2	YEAR 3
			Jan 15 Dec 15	Jan 16 Dec 16	Jan 17 Dec 17
Objective 1					
Task 1 - Consult livestock/ crop producers regarding manure management (3-5/month).	One-one producer education	108			
Task 2 - Provide individuals with printed information as well as individual science based management recommendations. Follow-up training to producers with newly installed systems (12/year).	One-one producer education	36			
	ND climate mortality composting publication	1			
Objective 2					
Task 3 - Educational materials and programming, focusing on the utilization of livestock manure, by giving credit for the fertilizer value in manure for crop production, will be delivered to producers and technical service providers.	Manure nutrient crediting bulletin	1			
	Effects of soil resulting from organic amendments publication	1			
	Press releases	6			
	Livestock Environmental Management News newsletter	12			
	Website	1			
Task 4 - Livestock educational meetings, demonstrations, workshops organized by extension and cooperating agencies will be held to educate producers and technical service providers on manure fertility (4-5/year).	CAFO/Manure Applicator's/Operators Education	3			
	Seminars given at cooperating agency workshops	15			

Objective 3					
Task 5 - Meetings, workshops, demonstrations, tours, and educational materials will be held to educate producers, and those who advise and work with producers, about proper design and management of facilities.	Compost Demos/ workshop	3			
	Nutrient Management News newsletter	12			
	Seminars given at cooperating agency workshops	15			
	Website	1			
Objective 4					
Task 6 - Manure sampling, calibration, and determining application rates will be taught through one-on-one consultation (5/year). Collect manure samples, send to lab for analysis and educate producers how to calculate manure application rates based on agronomic needs (25/year). Create a publication (in year 2) on nutrients found in North Dakota manures from manure tests.	Manure application and calibration training	15			
	Manure sample collection and producer education	75			
	Manure nutrient publication	1			
	Website	1			
Objective 5					
Task 7 - Task 7- Proper manure application rates will be taught in a classroom setting. These rates will be determined by soil type and crop rotations. Calibrations will be demonstrated one-on-one or in groups during field days (3/year). Environmental awareness and the ND rules and regulations will be taught in a group effort with the NDDH in various educational settings (1/year).	Work with manure applicators one-on-one	9			
	Increase awareness of environmental impacts associated with manure applications	3			

Appendix C: Examples of Evaluation Forms and Surveys

A. Example of Level 3 assessment survey from Morton County SCD Record Keeping Training

Directions: Please rate your learning during this presentation on Nutrient Management Record Keeping. Your honest responses are valued. Your responses will be used to assist the instructor to make improvements in the design of this course.

Place an X in the box to indicate your response.

	Not Much		Some		A lot
1. Overall, how much did you learn from this presentation?	☐	☐	☐	☐	☐

Please rate your level of knowledge on each of the following:

Low ← -------Medium------ →High

2. My understanding of the importance of record keeping.

Before Participation	☐	☐	☐	☐	☐
Now, After Participation	☐	☐	☐	☐	☐

3. My understanding of the differences of AFO and CAFO records.

Before Participation	☐	☐	☐	☐	☐
Now, After Participation	☐	☐	☐	☐	☐

4. My knowledge of the economic value of my manure.

Before Participation	☐	☐	☐	☐	☐
Now, After Participation	☐	☐	☐	☐	☐

5. My confidence and comfort level in keeping my own manure records.

Before Participation	☐	☐	☐	☐	☐
Now, After Participation	☐	☐	☐	☐	☐

What was the most useful part of this presentation?

_____

What was the least useful part of this presentation?

_____

I would like to receive more information on

_____

As a result of participating in this presentation:	Yes	No
• I intend to start record keeping.	☐	☐
• I intend to improve my record keeping.	☐	☐

Please leave additional comments on the back.

B. Example of Level 2 assessment survey from County Agent Visits

Survey for County Agents

1. Agent Name:
2. County:
3. Current issues in your county:
4. Issues you foresee:
5. How can I help?
6. Description of past Nutrient Management programming that has been done in your county:
7. Plans for livestock related spring programming?
8. Research Opportunities?

C. Example of Level 1 assessment survey from Horse Nutrient Management Presentation

1. What was the most useful part of the presentation?
2. What was the least useful part of the presentation?
3. I would like to receive more information on
4. Additional comments?

D. Example of Level 3 assessment survey from 2013 CREC Nutrient Management Day

Directions: Please rate your learning during these presentations. Your honest responses are valued. Your responses will be used to assist the instructor to make improvements in the design of this course.
Place an X in the box to indicate your response**.**

	Not Much		Some		A lot
1. Overall, how much did you learn today?	☐	☐	☐	☐	☐

Please rate your level of knowledge on each of the following:

	Low ← -------Medium------ → High				
2. My understanding of the containment pond management.					
Before Participation	☐	☐	☐	☐	☐
Now, After Participation	☐	☐	☐	☐	☐
3. My understanding of managing mortality compost piles.					
Before Participation	☐	☐	☐	☐	☐
Now, After Participation	☐	☐	☐	☐	☐
4. My knowledge of the manure composting process.					
Before Participation	☐	☐	☐	☐	☐
Now, After Participation	☐	☐	☐	☐	☐
5. My knowledge of compost/manure benefits to soil.					
Before Participation	☐	☐	☐	☐	☐
Now, After Participation	☐	☐	☐	☐	☐
6. My understanding of the importance of microbiology of manure.					
Before Participation	☐	☐	☐	☐	☐
Now, After Participation	☐	☐	☐	☐	☐

7. What was the most useful part of today?

8. What was the least useful part of today?

9. As a result of participating in Nutrient Management Day I plan to:

10. Additional comments:

E. Example of Level 3 assessment survey from College Student Field Day and Center Field Day 2013 (Distributed through Survey Monkey)

1. What was one strong point about the presentation?
2. What was one weak point of the presentation?
3. What topics would you most like to learn about or learn more about?
4. Did you find the composting presentation useful?
    a. Not At All
    b. Somewhat
    c. Quite
    d. Very

5. Did you find the manure value presentation useful?
    a. Not At All
    b. Somewhat
    c. Quite
    d. Very

6. How would you rate the content of the presentations?
    a. Poor
    b. Fair
    c. Good
    d. Very Good

7. How would you rate the teaching of the presentations?
    a. Poor
    b. Fair
    c. Good
    d. Very Good

8. To what extent can you apply the information presented at the presentations?
    a. Never
    b. Rarely
    c. Sometimes
    d. Often
    e. Always

9. For my experience level, the work shop was
    a. Too basic
    b. About right
    c. Too advanced

Appendix D

Budget Table for Nutrient Management Educational Information and Assistance Program

Part 1: Funding Sources	2015	2016	2017	TOTAL
319 Funding	95,457	97,558	102,485	295,500
NDSU Non-federal Match**	63,638	65,039	68,324	197,000
Total	159,095	162,597	170,809	492,500

** The sources and value of cash match provided by NDSU staff is provided in more detail in Appendix F.

Appendix E

Nutrient Management Educational Information and Assistance Program

Part 2 Section 319/Non-Federal Budget

Fiscal Year	2015	2016	2017	Total 319 Funds	NDSU Non-federal Match FY15-17	Total
Personnel/Support						
1) Salary (1.0 FTEs)	48,204	50,616	53,148	151,968	131,333	283,301
2) Fringe	19,282	20,246	21,259	60,787	45,967	106,754
3) Travel	9,000	9,450	9,925	28,375		28,375
4) Printing	1,300	1,360	1,450	4,110		4,110
6) Supplies	4,000	1,800	1,900	7,700		7,700
8) Communication	2,000	2,100	2,210	6,310		6,310
9) Fees (manure analysis)	2,125	2,230	2,345	6,700		6,700
Subtotals	85,911	87,802	92,237	265,950	177,300	443,250
Administrative	9,546	9,756	10,249	29,550	19,700	49,250
Total 319/Non-Federal Budget	95,457	97,558	102,485	295,500	197,000	492,500

Appendix F

Nutrient Management Educational Information and Assistance Program

Value of Time and Services Provided by Extension Personnel as non-Federal match

Fiscal Year	FTE	2015	2016	2017	Total
Personnel/Support					
Research Scientists (1 staff)	0.02	1,819	1,910	2,006	5,735
Extension Agents (10 staff)	0.92	40,606	41,449	43,543	125,598
Fringe Benefits		14,849	15,176	15,942	45,967
Administrative		6,364	6,504	6,832	19,700
Total Non-Federal Match Budget* **		63,638	65,039	68,324	197,000

*** Matching funds are estimated at the beginning of the three-year period. Amounts are subject to change with changing staff and changing salaries. Total match will always meet agency requirements.