1.0 PROJECT PROPOSAL SUMMARY SHEET

PROJECT TITLE: Livestock Environmental 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 Education NPS CATEGORY: Agriculture

WATERBODY TYPES: Lakes/Reservoirs, Rivers, Streams, Groundwater

CONTINUATION PROJECT: Yes. A summary of past accomplishments is provided in Appendix A.

SUMMARIZATION OF MAJOR GOALS:
Support livestock and crop producers by providing them with the information and education needed to implement livestock nutrient management practices to reduce surface and ground water contamination, more efficiently use 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 livestock nutrient management components.

PROJECT DESCRIPTION:
Due to the expanse of need and geographical production variation across North Dakota, one livestock environmental management Extension specialist will be responsible for leadership of the program, providing educational support on livestock manure management, the use of livestock manures in crop production, guidance for custom manure applicators and technical support for producers, NDSU Extension, NDSU researchers and agency personnel. This specialist will be based out of the NDSU Carrington Research Extension Center.

FY 319 funds requested: $683,850 Match: $455,900

Other Federal Funds: $ Total project cost: $1,139,750

319 Funded Full-Time Personnel: 1

2.0 STATEMENT OF NEED

This proposed project is a continuation of a multi-year project that works in conjunction with the NDSU Extension. The program has continued to focus on educating producers and agency personnel dealing with water quality issues arising from livestock enterprises. The Livestock Environmental Nutrient Management Educational Support Program has filled critical knowledge gaps and provided education to these groups through presentations, on-site visits, demonstrations, fact sheets, written publications and media outreach. A summary of past accomplishments from August 2023 through August 2025 is included in Appendix A.

2.1 Consistency with Water Quality Priorities

Livestock production is a major industry in North Dakota, with about 1.68 million cattle and calves, 150,000 hogs, and 62,000 sheep raised annually on 24,800 farms. According to the *North Dakota 2020-2022 Integrated Water Quality Assessment Report*, manure from animal feeding operations and riparian grazing are among the leading sources of surface water contamination for approximately 3,755 miles of rivers and streams. Additionally, nutrient loading from animal feeding operations was listed as a major source of nutrient loading to the state's lakes and reservoirs.

North Dakota's geography creates two distinct livestock production regions. The east has rolling terrain, higher rainfall, potholes, and year-round streams—conditions that increase the risk of runoff. Operations here often concentrate cows and calves for winter feeding. In the west, rainfall is lower but more intense during storms, creating episodic runoff. Winter feeding also differs: cows are typically fed in open pastures or cropland, while calves are fed in confined areas. These differences call for region-specific management strategies.

Alongside traditional beef, dairy, and swine operations, smaller-scale livestock farms are becoming more common, especially near urban areas. These farms often rely on supplemental income and face challenges such as limited land, equipment, and space for manure management—leading to stockpiling risks.

Equine operations are also concentrated in certain areas. As of 2017, 10 counties accounted for 45% of the state's horse inventory (Burleigh, Dunn, McKenzie, Morton, Emmons, Stark, Mountrail, McHenry, Williams, and Ward). In 2022, there were 3,332 farms with a total of 24,398 horses in North Dakota.

This project will primarily target Animal Feeding Operations (AFOs) but will also provide education and technical assistance to smaller livestock owners and crop producers with limited experience in manure management. This approach supports Goal 3 of the North Dakota State NPS Management Program, aligning with statewide efforts to improve water quality while addressing the needs of the broader agricultural community.

2.2 Justification for Target Audience

The North Dakota Department of Environmental Quality (NDDEQ) regulates animal feeding operations, requiring nutrient management plans and review of manure storage and runoff systems. For more than 25 years, the NDSU Livestock Environmental Nutrient Management Educational Support Program—funded by NPS 319 grants—has promoted sound nutrient management practices and provided educational support to producers and other NPS projects across the state. While many projects have focused on facility design and best management practices (BMPs), there has been less emphasis on nutrient management education, benchmarks, and alternative livestock manure management strategies.

Under the leadership of the current Livestock Environmental Management Specialist, the program has expanded beyond compliance to address alternative feeding options, manure handling and application, and integration with crop systems. While nutrient management planning remains a priority, the program also emphasizes mortality and offal disposal, as well as small-scale manure management. Outreach includes annual demonstrations and workshops at the NDSU Carrington Research Extension Center and cooperating farms, reaching producers, watershed coordinators, NRCS, and Extension staff. Educational resources produced include *Resource Guide for Livestock Manure Management; Naturally Occurring Anthrax in the Environment; Foot-and-Mouth Disease; Johne's Disease in Cattle and Small Ruminants; 4 Pasos sencillos para compostar ganado muerto; Personal Protective Equipment (PPE) Donning and Doffing Guidelines for On-Site Animal Disease Outbreaks;* and *Containment Pond Management*. These publications are available at www.ndsu.edu/agriculture.

Producers recognize the importance of managing on-farm nutrient sources, especially livestock manure, amid volatile markets. Containing runoff, applying manure consistently, protecting water quality, and improving crop yields all require careful management. Yet the divide between crop and livestock operations often leaves gaps: crop producers may lack understanding of manure’s fertilizer value, while livestock owners may overlook the need for consistency in manure products. Education helps bridge this gap, showing producers how to maximize manure’s economic and agronomic value while reducing environmental risks.

With increasing scrutiny of livestock practices, the Extension specialist role is critical to preventing compliance issues that threaten livelihoods and water resources. Through applied research, demonstrations, technical support, and educational programming, North Dakota State University, through NDSU Extension, provides statewide leadership in livestock nutrient management. Given the number of facilities, the scope of NPS projects, and the diverse nature of North Dakota agriculture (east

vs. west, urban vs. rural, small-scale vs. traditional), continued investment in this program is essential.

3.0 PROJECT DESCRIPTION

3.1 Goal

This project aims to help crop producers and livestock owners adopt nutrient management practices that reduce water quality impacts from manure. Programs will provide education and technical support to producers, 319 project coordinators, agency personnel, and NDSU Extension staff. Core topics include livestock facility management, manure handling, and land application. Because most North Dakota livestock operations are small to medium-sized, these systems will be the primary focus, with support for larger operations available as needed.

Since 1998, the North Dakota NPS Pollution Management Program has supported an Extension specialist in livestock waste and nutrient management. This work began with facility design education and expanded to deliver statewide programming in manure management education. The proposed project builds on that foundation with continued emphasis on small-scale livestock systems, innovative manure management strategies, including the nuances of liquid manure, suited to North Dakota soils and weather patterns, and stronger collaboration with custom manure applicators. It will continue individualized work on nutrient management planning and offal disposal options for butcher facilities.

Activities include producer workshops, on-farm demonstrations, one-on-one consultations, and applied research partnerships. To ensure consistent recommendations, the program will collaborate closely with watershed coordinators, NDDEQ, NRCS, soil conservation districts, and other service providers. Key focus areas include:

1. Developing and implementing nutrient management plans and offal disposal strategies for butcher shops.
2. Integrating livestock manure into soil fertility programs.
3. Improving the custom manure applicator's knowledge of manure nutrients and uses.
4. Strengthening manure management on small-scale farms.

This project will serve producers statewide while supporting existing NPS 319 initiatives that address livestock manure. Program impact will be evaluated through ongoing participant feedback and measurement of nutrient management practice adoption.

3.2 Objectives

Objective 1: Provide education and advice to individual livestock owners and butcher shop owners on proper disposal and use of livestock mortalities and offal. Emphasis will be placed on the composting process. Similar to regulations for animal feeding operations, the NDDEQ, Division of Waste Management, has regulations pertaining to butcher shops that compost their offal product. They are required to complete a nutrient management plan for storage and runoff containment, as well as spreading of the final product. Other disposal methods (i.e., above-ground composting, burial, landfilling, incineration) will be discussed individually, as needed, depending on environmental conditions. Additionally, time will be spent developing

a state emergency mass livestock mortality disposal plan specifically regarding foreign animal diseases (such as avian influenza or African swine fever) or natural disasters, in cooperation with other state agencies (i.e., North Dakota Department of Agriculture, NDDEQ, North Dakota Department of Emergency Services, NDSU Extension Disaster Coordinator). Because of the requirements for nutrient management plans that accompany composting as a disposal option, special emphasis will be given to using the final product (where it will be spread, rate, timing, crop rotation, etc.) created within this objective.

Task 1:

- Work individually with three livestock owners per year on changing their livestock mortality management practices.
- Host one demonstration per year pertaining to livestock mortality management either at the NDSU CREC or at a livestock owner's operation.
- Write two media pieces per year pertaining to livestock mortality management.
- Attend one online meeting with state agency personnel annually to modify and refine the North Dakota emergency mass livestock mortality disposal plan.

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

Products: One-on-one livestock owner education; group learning opportunities; two media releases; emergency mass mortality disposal plan.

Task 2:

- Work individually with two butcher shop owners per year, in cooperation with the NDDEQ, Division of Waste Management, on offal compost and nutrient management planning.
- Provide on-site training for approved offal compost and nutrient management plan holders.

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

Products: One-on-one offal disposal and use nutrient management planning; hands-on, on-site training for butcher shop owners or those composting or using butcher waste products.

The estimated costs for this objective include the value of 15% of personnel time plus the costs for travel, supplies, communication and contractual services.

Estimated cost $102,577 – 319 grant, $68,385 – Match

Objective 2: Continue developing educational opportunities and materials for custom manure applicators in North Dakota. These opportunities will include assistance with manure application rates, calibrating equipment, appropriate spreading patterns, education on nutrient management plans, environmental awareness, North Dakota rules and regulations, manure gas safety, communication with clientele, conflict management and stress mitigation during volatile agricultural cycles.

Task 3:

- Proper manure application rates will be taught in a classroom setting using indoor calibration kits during one field day during the project cycle. These rates will be determined by the type of manure, its nutrient content, the soil type, and the crop rotation.
- The basics and importance of nutrient management plans will be shown in a classroom setting and through one-on-one consultations in the field.
- Calibrations will be demonstrated one-on-one or in groups during one field day during the project cycle, organized by 319 watershed coordinators, NRCS or NDSU Extension personnel. This training will take place with field-scale equipment when permissible.

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

Product: Fifty North Dakota custom manure applicators will have increased confidence in their knowledge of the importance of NMPs, calibration techniques and proper application rates.

Task 4:

- Environmental awareness, North Dakota rules and regulations regarding manure management, vehicle and road rules and restrictions, and business management including communication techniques and conflict management strategies will be taught in a group effort along with NDSU Extension agents, manure industry representatives, soil scientists, North Dakota State Highway Patrol, farm business management specialists, and others when appropriate in various educational settings during one meeting per year in a general location.

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

Product: Develop a network specific to North Dakota custom manure applicators via classroom setting, social media and/or email, where questions can be asked, and information shared regarding manure application and nutrient management. One annual educational meeting will be held.

The estimated costs for this objective include the value of 15% of personnel time plus the costs for travel, supplies, communication and contractual services.

Estimated cost $102,577 – 319 grant, $68,385 – Match

Objective 3: Develop educational materials and create learning opportunities for traditionally smaller-scale livestock (e.g., equine, cattle, sheep, chickens, etc.) owners who need manure management assistance. When able, live demonstrations using appropriately-sized equipment will be conducted to show manure spreading, spreader calibration, evenness of spread, application rate differences and grazing management techniques to help manage manure distribution and consequently, parasite management. A social media campaign will be focused on reaching these smaller-scale livestock owners to disseminate information further.

Task 5:

- One workshop per year pertaining to small-scale livestock manure management will be offered to increase knowledge regarding nutrient management and water quality.

Whenever possible, these workshops will be held outdoors in an on-farm setting where lot management, paddock rotation, feedstuffs management, animal health and manure management can be demonstrated.

- Work with the NDSU Agriculture Communication team to revamp the small-scale livestock webpage, allowing for streamlined access to local information.
- Write one media piece per year pertaining to small-scale livestock manure management.
- Collaboration with NDSU Extension specialists and agents, agency personnel, and experienced producers will occur to share educational materials and programming.

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

Product: Workshops, demonstrations, informational webpage.

Task 6:

- Four educational webinars per year will be offered to equine owners via an online platform made live during a specific time and recorded for later viewing. These webinars will include collaboration from NDSU Extension range, soil and environmental specialists, NDSU Extension agents, NDSU Animal Sciences faculty, industry partners, equine owners and agency personnel when appropriate.
- One subject matter video (i.e., grazing management, manure spreader calibration, spreading manure, bedding management) will be recorded during seasonally appropriate times and made available during the webinars and on the small-scale webpage to showcase topics requested by participants.

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

Product: A network of North Dakota equine owners with the knowledge and skills to manage manure nutrients effectively while not negatively impacting their land or water resources. Four educational webinars per year. One subject matter video.

The estimated costs for this objective include the value of 25% of personnel time plus the costs for travel, supplies, communication and contractual services.

Estimated cost $170,963 – 319 grant, $113,975 – Match

Objective 4: Provide educational and technical support about general manure management questions and concerns to NDSU Extension, NRCS and other agency personnel, crop producers, livestock owners and urban and youth audiences. With continued livestock development in North Dakota, the focus on liquid manure education for crop producers will be renewed.

Task 7:

- Provide individuals with printed information (i.e., presentation handouts and Extension publications) and individual, science-based management recommendations.
- Educational materials and programming focusing on the use of livestock manure will be shared. Educational materials include press releases (i.e., manure spreader calibration, composting, manure nutrients), webpage material, blog posts, social media material and Extension bulletins. Mass media and NDSU Extension Impact

Reports will inform producers and the public about successful efforts to reduce impacts on water quality.

- Participation via presentation of technical information in meetings, workshops, demonstrations, roundtable talks, podcast interviews and tours that are held to share information with crop producers and livestock owners and those who advise and work with crop producers and livestock owners around the subjects of manure sampling, manure nutrient content, spreader calibration, spreader pattern, manure composting, crop and livestock integration and the agronomic use of manure and commercial fertilizers. Two demonstrations and/or workshops will be participated in each year. The demonstrations/workshops will be spread throughout North Dakota and organized by NDSU Extension agents, NRCS, Soil Conservation Districts, 319 watershed coordinators, or industry organizations.
- Focus will be placed on BMPs that result in cost-effective changes to minimize water quality impacts from manure nutrients while complying with current environmental regulations.

Approximately 45% of the project will be devoted to this task.

Product: Two workshops per year (i.e., NDSU Feedlot School, Liquid Manure Round Table, Stutsman County Soil Conservation District Winter Workshop) and two demonstrations per year (i.e., Nutrient Management Day, crop and livestock integration demonstration, manure spreader calibration demonstration, manure compost demonstration) as well as ten educational meetings per year (i.e., Kidder County Cow Day, Ward County Gardening Workshop, McIntosh County Crop Forum, Ransom County Winter Crop Day, Walsh County Livestock Day, North Dakota Pesticide Certification trainings, Lake Region Roundup, Central Dakota Ag Day, Hettinger County Coffee Talk, Logan County Livestock Day) organized by NDSU Extension agents/specialists or agency personnel in various North Dakota counties.

The estimated costs for this objective include the value of 45% of personnel time plus the costs for travel, supplies, communication and contractual services.

Estimated cost $307,733 – 319 grant, $205,155 – Match

3.3 Milestone Table

See Appendix B: Milestone Table

3.4 Lead Project Sponsor

The lead project sponsor is NDSU Extension. With offices in every county in the state, along with seven Research Extension Centers and NDSU main campus, NDSU Extension provides a statewide educational system. The educational system draws upon the research base of NDSU and a network of other universities nationwide to develop educational and informational materials and programs. NDSU Extension also draws upon the knowledge base of other agencies and organizations, including the Natural Resources Conservation Service (NRCS), the North Dakota Department of Environmental Quality, Division of Water Quality (NDDEQ), and the North Dakota Department of Agriculture (NDDA). Educational programs are delivered through local county Extension agents and on- and off-campus specialists. NDSU Extension has a long history of working with these partners to develop and deliver educational programming. It can access 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 does not apply to this 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. NDSU Extension is the lead organization. The North Dakota Agricultural Experiment Station will collaborate with this program through applied research and demonstration projects. The NRCS will cooperate with technical resources and guidelines. The NDDEQ will help provide contacts with ongoing and proposed 319 water quality projects that have a livestock manure management component. The NDDEQ will provide guidelines, rules and regulations for livestock enterprises. Livestock owner organizations provide another conduit to the producers and represent the producers' viewpoint. NDSU Extension agents and Soil Conservation District (SCD) personnel will provide contact with producers in counties not represented by a 319 watershed project.

A Livestock Environmental Nutrient Management Advisory Committee will be used to provide overall program direction. Membership will include NDSU Extension Agriculture Program Leader, Carrington Research Extension Center Director, North Dakota Stockmen's Association's Environmental Services program leader, a representative for North Dakota dairy producers, a representative of North Dakota pork producers, NDSU Soil Science Extension/researcher, NDSU Agriculture and Biosystems Engineering researcher, 319 Program Coordinator, NDDA, NDDEQ AFO team, representatives from NRCS (i.e. state engineer staff and/or state agronomist), other state agricultural commodity groups, a custom manure applicator, NDSU Extension agent(s) and NDSU Extension district director(s). The advisory committee will meet annually to give overall direction to the program.

The NDSU Extension Assistant Director of Agriculture and Natural Resources Program and the Carrington Research Extension Center Director will comprise a two-member steering committee charged with ongoing project supervision and ensuring coordination with other livestock manure management efforts.

4.2 Local Support

North Dakota NRCS, NDDEQ, SCD personnel, and NDSU county-based Extension agents have all indicated a need for this informational and educational program. Individuals working with local 319-funded water quality projects have also indicated a need.

Letters of support have been solicited from a North Dakota horse owner who has participated in the NDSU Extension Horse Management Webinar Series (Objective 3), a North Dakota custom manure applicator who has participated in the North Dakota Custom Manure Hauler Meetings (Objective 2) and the North Dakota State Board of Animal Health (Objective 1). Copies of these letters can be found in Appendix C and will be kept on file at the CREC.

4.3 Coordination

This project will be coordinated with ongoing, funded 319 projects and will support them with technical information and educational assistance. Coordination with NDSU Extension and Agricultural Experiment Station personnel will also occur.

4.4 Duplication of Efforts

This program is not duplicated by other organizations or agencies. The agencies at the most recent Livestock Environmental Nutrient Management Advisory Committee meeting identified this project and NDSU Extension as the lead on educational and research efforts on nutrient/manure management and water quality in North Dakota. Other agencies, such as NRCS, provide site-specific technical assistance on manure management projects. Still, their limited resources require them to focus primarily on sites where cost-share assistance is available. This project does not face such limitations and provides exceptional assistance in coordinating resources.

5.0 EVALUATION AND MONITORING PLAN

5.1 Plan for Evaluation

Workshop and meeting evaluations will be designed and implemented throughout the project to assess participants' knowledge, needs, and readiness to adopt improved manure management practices (Appendix D). These evaluations will measure learning gains and the likelihood of applying new practices.

The project's overall impact will be assessed through follow-up with individuals who seek assistance from NDSU Extension or partner agencies involved in livestock manure management. Evaluations will focus on the adoption of manure management practices and follow Kirkpatrick's four levels of evaluation:

- Level 1: Participant reaction to the training.
- Level 2: Knowledge gained and intended behavior change.
- Level 3: Actual behavior change following training.
- Level 4: Long-term outcomes resulting from the education provided.

An evaluation specialist will develop survey tools and analyze data, with a particular focus on Levels 3 and 4, to quantify the ongoing and long-term impacts of the Livestock Environmental Nutrient Management Educational Support Program. The specialist will deliver question design, evaluation timing, and data summaries. Results will inform future programming and materials, strengthening their impact, reaching broader audiences, and supporting regional compliance to improve water quality.

5.2 Monitoring for Demonstration Projects

This section does not apply to this grant proposal.

5.3 Collected Data

This section does not apply to this grant proposal.

5.4 Monitoring Strategy

This section does not apply to this grant proposal.

5.5 Data Storage, Management and Use

This section does not apply to this grant proposal.

5.6 Models

This section does not apply to this grant proposal.

5.7 O&M of Restoration Activities

This section does not apply to this grant proposal.

6.0 BUDGET

The budget is detailed in the two budget tables (Appendix E and F). Appendix E details funding sources by year. Appendix F is a detailed budget of section 319/non-federal budget. The following narrative will explain Appendix F. The salary and fringe benefits 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 used to continue employment of one Extension specialist, a full-time position at the Carrington Research Extension Center. The salary is annualized per year plus fringe benefits, increased by 3% per year. Salary is also included at 10% for a research technician, plus associated fringe benefits, for the technician to manage and prepare the compost area and demonstrate procedures at workshops. 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) NDSU Extension Specialists who provide program development and delivery in livestock environmental stewardship, livestock production, forage crops production, and farm and ranch safety.

2) A North Dakota Agricultural Experiment Station Scientist who works with animal and agronomy outreach programs at the Carrington Research Extension Center. Education and outreach using nutrient management benchmarks and demonstration projects will be the focus of this collaboration.

3) NDSU Extension agents who will organize local outreach efforts and deliver programs tailored to the specific needs of producers in their region. Specific contributions will include coordinating and facilitating regional events such as workshops, tours, and demonstrations. These Extension agents will receive additional training on small-scale manure management and traditional manure management, using manure, including liquid manure, as a fertilizer, and mortality management, with the expectation of them incorporating this information into their livestock and crop programming.

The remainder of the budget is supported by 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 the production of educational materials, including the development of Extension publications and fact sheets, and the development of field records and other printed material to be used by producers. Supplies include a computer in year three of the project; demonstration and sampling supplies including fuel, tarps and fees for shipping samples; calibration kits in year two; meals for educational meetings and the advisory board (meals at educational events are calculated at $14/person for 20 people per event at two events per year; the educational events are typically day-long events outside an urban area); and instructional supplies used in educational events such as PPE and flags to support the program. Communications costs are for long-distance telephone, internet access and mobile service costs for the specialist. Fees are included for manure and soil analyses, rental costs for workshops, video production, and online advertising for the horse webinars and workshops. Administrative costs are calculated at 10%.

List of Appendices:

- Appendix A: Past Accomplishments
- Appendix B: Milestone Table
- Appendix C: Letters of Support
- Appendix D: Examples of Evaluation Questions and Impact Statements
- Appendix E: Budget Table Part 1
- Appendix F: Budget Table Part 2
- Appendix G: Value of Time and Services Provided by Extension Personnel as non-Federal Match

Appendix A: Past Accomplishments (August 2023-August 2025)

Presentations

Presentations at producer meetings, professional meetings, and in-service/train-the-trainer workshops may involve organization, speaking on specific topics, and/or conducting demonstrations or tours that are appropriate for the topic.

Date	Title of Presentation	Location	Role	Participants
2025 [13 presentations, 345 participants, 497 views online]				
07/24/2025	Composting Basics	Urban Conservation Workshop	Prepared and presented material	25
07/22/2025	Using Compost in an Organic Cropping System	CREC Field Day	Prepared and presented material	38
07/2/2025	Using Compost in Your Garden	CREC Field Day	Prepared and presented material	35
06/24/2025	LENM Program Overview – CREC Advisory Board	CREC	Prepared and presented material	27
04/09/2025	Animal Disease Training – What we learned	Waste to Worth National Conference	Co-hosted conference and presented material	20
03/26/2025	Horse Grazing Management Webinar – Small Acreage Mgnt	Online	Co-hosted webinar and presented material	33 + 141 views online
03/19/2025	Horse Grazing Management Webinar – Foaling Management	Online	Co-hosted webinar and presented material	33 + 109 views online
03/12/2025	Horse Grazing Management Webinar – Breeding Management	Online	Co-hosted webinar and presented material	38 + 247 views online
02/27/2025	Manure Spreader Pattern and Application Rate	Custom Manure Hauler Meeting	Hosted training and prepared and presented material	20
02/26/2025	Animal Disease Training Follow-up Discussion	Online	Participated in answering round robin questions from attendees	25
02/05/2025	Manure Management	McKenzie County Ag Expo	Prepared and presented material	13
01/22-23/2025	Feedlot Manure Management	CREC	Co-hosted NDSU Extension Feedlot School; prepared and presented material	23
01/15/2025	Manure Management	Foster County Beef Producers Café Talk	Participated in answering round robin questions from attendees	15

2024 [20 presentations, 714 participants, 1,081 views online]				
11/26/2024	LENM Advisory Board Meeting	CREC	Hosted, prepared, and presented material	14
09/10-11/2024	Animal Disease Preparedness Training	Online	Co-hosted training and presented material	38
07/09/2024	NDSU Extension Contributions to One-Health	One-Health Conference	Prepared and presented material	10
06/18/2024	LENM Program Overview – CREC Advisory Board	CREC	Prepared and presented material	30
06/11-12/2024	Animal Disease Preparedness Training	CREC	Co-hosted training and presented material	29
05/01/2024	Overview of Quarter Horse Genetics	Online	Co-hosted webinar	38 + 338 views online
03/27/2024	Emergency First Aid Webinar	Online	Co-hosted webinar and presented material	92 + 213 views online
03/22/2024	Importance of Water Quality – Winter Feeding	Stutsman County 319 Winter Meeting	Prepared and presented material	25
03/20/2024	Horse Grazing Management Webinar – Communicable Diseases	Online	Co-hosted webinar and presented material	80 + 223 views online
03/13/2024	Horse Manure Management Webinar – Weed and Manure Management	Online	Co-hosted webinar and presented material	99 + 307 views online
03/04/2024	ANR Livestock Agent Monthly meeting – animal disease response	Online	Prepared and presented material	14
03/01/2024	Weed Seed Management via Manure Management	Stutsman County Pesticide Training	Prepared and presented material	49
02/22/2024	Manure Spreader Pattern and Application Rate	Custom Manure Hauler Meeting	Hosted training and prepared and presented material	6
02/20/2024	Weed Seed Management via Manure Management	Stutsman County Pesticide Training	Prepared and presented material	48
02/13/2024	Manure Management	Logan County Beef Production Meeting	Prepared and presented material	8
01/27/2024	Small Farm Composting	Farmers Market Symposium	Participated in answering round robin questions from attendees	17
01/19/2024	Mortality Composting Site Selection	NDVMA Annual Winter Meeting	Co-hosted training and prepared and presented material	25

01/17-18/2024	Feedlot Manure Management	NDSU Feedlot School	Hosted training and prepared and presented material	28
01/09/2024	Manure Management via Composting	Sheridan County Ag Forum	Prepared and presented material	19
01/03/2024	Composting Manure and Livestock Mortality	Lake Region Roundup	Prepared and presented material	19
2023 [3 presentations, 63 participants]				
11/28/2023	LENM Advisory Board Meeting	CREC	Hosted, prepared, and presented material	13
10/02/2023	Model Zoning Planning Meeting	Model Ordinance Task Force	Prepared and presented material via Zoom	20
08/15/2023	Manure Tools in the Box – Program Overview	Soil Conservation Leadership Academy	Prepared and presented material via Zoom	30

Demonstrations and Tours

Demonstrations are an extension of the publications and fact sheets and encourage learning by participation, either in large groups or one-on-one.

Date	Title of Demonstration	Location	Role	Participants
2025				
07/22/2025	Mortality Composting Demonstration	CREC Field Day	Demonstrated proper livestock mortality composting techniques, site selection and showcased various carbon types	50
07/02/2025	Mortality Composting Demonstration	Morton County	Demonstrated proper livestock mortality composting techniques, site selection and showcased various carbon types	12
2024				
09/10/2024	Mortality Composting Demonstration	CREC	Demonstrated proper livestock mortality composting techniques, site selection and showcased various carbon types	38
06/11/2024	Mortality Composting Demonstration	CREC	Demonstrated proper livestock mortality composting techniques, site selection and showcased various carbon types	29
2023				
08/02/2023	Manure and Compost Tour – Farm Credit Services – Value of Manure	CREC	Co-organized tour; prepared and presented material; Demonstrated how a compost turner operates	35

Extension Curriculum Development

M. A. Keena, N. Johnson, A. E. Harstad, S. Clemens, R. Gress, M. Seykora, A. Stuckle, D. Haasser. 2023. *Kids, Compost, Crops and Consumption.*

Co-led the content creation of a curriculum that can be used to teach 3rd and 4th-grade students about the food cycle. This curriculum provides lesson plans, hands-on activities, evaluations and physical exercises to implement into youth programming.

Lessons include:

- Livestock – teaching students about different kinds of livestock, what they eat and what they are used for.
- Compost and manure – discussing that each contains useful nutrients for plant growth.
- Soils – teaches about soil particle size and the importance of soils for plant growth.
- Roots and growing plants – teaching the basics of plant growth
- Food nutrients – discussing what students get from fruits and vegetables and why those nutrients are important for growth.

Publications

Publications and fact sheets facilitate the dissemination of research and provide step-by-step instructions for tasks such as manure spreader calibration, sampling manure for nutrient analysis, and composting animal manures.

- **Mary Keena**. Resource Guide for Livestock Manure Management. 2025. NM1320, revised.
- **Mary Keena**. Containment Pond Management. 2025. NM1626, revised.
- Heidi Pecoraro, Kelli Maddock, **Mary Keena**, Miranda Meehan. 2025. Naturally Occurring Anthrax in the Environment. V561, reviewed.
- Carrie Hammer, Taw Scaff, Miranda Meehan, **Mary Keena**. 2025. Foot-and-Mouth Disease (FMD). AS2258, new.
- Brianna L.S. Stenger, Quynn Steichen, **Mary Keena**, Lisa Pederson, Beth Carlson. 2025. Johne's Disease in Cattle and Small Ruminants. V1209, revised.
- **Mary A. Keena**, Paige Brummund, Alicia E. Harstad, Penny L. Nester. 2024. 4 Pasos sencillos para compostar ganado muerto. AS1781-1, translated.
- **Mary Keena**, Margo Kunz, Kelli Maddock. 2024. Personal Protective Equipment (PPE) Donning and Doffing Guidelines for On-Site Animal Disease Outbreaks. V2242, new.
- Breana Kiser, **Mary Keena**, Miranda Meehan. 2024. Highly Pathogenic Avian Influenza (HPAI). AS2239, new.

Professional Reports

- **Keena, M. A.** and P. F. Brummund. August 2025. A five-year review of usefulness, change and benefit gained from NDSU Extension horse management webinars. 2025 *North Dakota Livestock Research Report*, 89-90.
- **Keena, M. A.** and M. A. Meehan. August 2025. NDSU Extension and Partners Enhance North Dakota's Foreign Animal Disease Response Capacity. *2025 North Dakota Livestock Research Report*, 86-88.
- **Keena, M. A.** and M. A. Meehan. December 2024. From Waste to Worth; Creating an Opportunity Out of a Disaster. *Carrington Research Extension Center Annual Report*. 47-48.

Media Outreach

Interviews may occur because of press releases or upcoming events, and connect the reader/listener to a person. Media outreach in various formats provides a means of information dissemination.

Date	Description	Intervention Channel	Affiliation	Reach
2025 [Reach = 54,017]				
07/28/2025	Home composting: turning waste into garden gold	Blog	Center Points	1,339
07/07/2025	NDSU Extension provides animal mortality resources after severe weather	Article	NDSU press release	5,000
06/23/2025	NDSU Extension to host livestock and poultry mortality composting workshop in Morton County	Article	NDSU press release	5,000
06/23/2025	The life of a cycle: from roars to lulls to hums	Blog	Center Points	1,339
04/24/2025	Manure Hauling	Radio	Ag News 890 – Erick Johnson	10,000
03/31/2025	HPAI biosecurity	Radio	RRFN – Jamie Dickerman	10,000
03/28/2025	Good biosecurity reduces risk of avian influenza in poultry and dairy	Article	NDSU press release	5,000
02/25/2025	Horse webinars	Radio	Ag News 890 – Erick Johnson	10,000
02/10/2025	Five Year Review of the NDSU Extension Horse Management Webinars	Blog	Center Points	1,339
02/03/2025	NDSU Extension to host horse management webinar series in March	Article	NDSU press release	5,000
2024 [Reach = 196,331]				
10/28/2024	Creating Direction from Disasters	Blog	Center Points	1,339
10/10/2024	Mortality Management	Radio	RRFN – Melissa Hammer	11,000
10/09/2024	Document livestock losses due to wildfire before disposal	Article	NDSU press release	5,000
10/02/2024	NDSU Ag Minute: The importance of getting your livestock manure spread right	Radio	NDSU Ag Minute – Kelli Anderson	80,000
09/10/2024	Hunters urged to practice biosecurity during fall season	Article	NDSU press release	5,000
08/30/2024	Biosecurity protocols for bird owners	Radio	Prairie Public – Todd McDonald	10,000
08/22/2024	Fall bird migration is time to reimplement biosecurity protocols	Article	NDSU press release	5,000
08/02/2024	If you build it...	Blog	Center Points	1,288
07/30/2024	Nutrient Management Podcast from University of Minnesota Extension	Article	NDSU press release	5,000
07/15/2024	Solid manure sampling	Article	Manure Manager Magazine	5,350

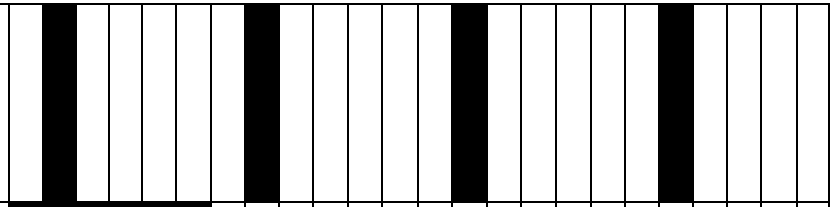
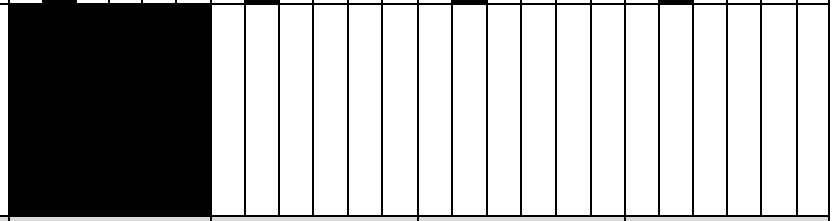
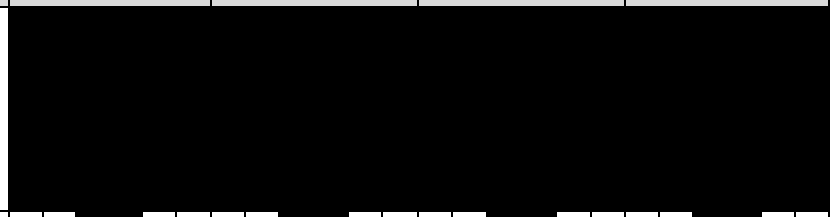
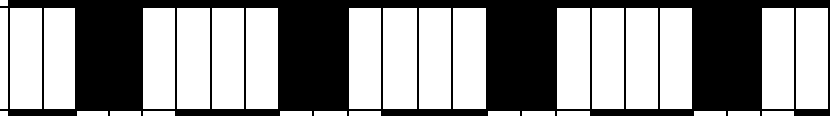
07/12/2024	Be aware of toxic cyanobacteria	Article	NDSU press release	5,000
05/21/2024	No Farm Too Small	Article	Manure Manager Magazine	11,452
05/13/2024	Training set for animal disease emergency response preparedness	Blog	Center Points	1,288
05/10/2024	Training set for animal disease emergency response preparedness	Article	NDSU press release	5,000
04/18/2024	Manure and Mortality Management	Radio	Ag News 890 – Erick Johnson	10,000
04/17/2024	Animal Disease Training	Radio	FarmTalk 890 – Jamie Dickerman	10,000
04/15/2024	The Rollercoaster of Emotions…Holding Two Things at Once	Blog	Center Points	1,288
03/06/2024	Poultry and bird owners encouraged to ramp up biosecurity plans now	Article	NDSU press release	5,000
02/12/2024	Horse Management Webinar Series	Blog	Center Points	1,288
02/06/2024	NDSU Extension to host horse management webinar series	Article	NDSU press release	5,000
01/24/2024	Manure Management in Practice with Soil Conservation Districts	Podcast	Agriculture Applied	38
01/17/2024	Small Farm Manure Management, Horse Manure Management	Radio	KFGO – Sarah Heinrich	12,000
2023 [Reach = 50,400]				
11/15/2023	Hunters urged to practice biosecurity this season	Article	NDSU press release	5,000
10/13/2023	Think Ahead for Fall Bale Grazing	Blog	Center Points	1,200
10/04/2023	Protect poultry flocks from HPAI this fall	Article	NDSU press release	5,000
09/14/2023	Livestock composting systems growing in use	Article	Iowa Farmer Today	33,000
08/21/2023	Horse Management Video Review	Blog	Center Points	1,200
08/02/2023	Now is the time to think ahead for fall bale grazing	Article	NDSU press release	5,000

Appendix B: Milestone Table

Group 1 – NDSU LEM Extension Specialist; **Group 2** – NDDEQ; **Group 3** – NDSU Extension agents/specialists; **Group 4** – 319, NRCS; **Group 5** – Other (manure industry reps, out-of-state speakers, producers, guest speakers, etc.)

Task/Responsible Organizations	Output	Qty.	Year 1	Year 2	Year 3	Year 4
Objective 1						
Task 1 • Individually assist livestock owners with changing mortality management plans. (3/yr.; Group 1, 3) • Host one demonstration per year pertaining to livestock mortality management either at the NDSU CREC or at a livestock owner's operation. (1/yr.; Group 1, 2, 3, 4) • Write two media pieces per year pertaining to livestock mortality management (2/yr.; Group 1).	One-on-one producer education.	12				
	One-on-one producer or group education.	4				
	Mass media piece.	8				
Task 2 • Individually assist butcher shop owners with offal disposal plans and NMPs. (2/yr.; Group 1, 2)	One-on-one education.	8				

Objective 2			
Task 3 • Demonstrate manure spreader calibration and teach the basics and importance of NMPs. (1/yr.; Group 1, 3, 4)	One-on-one or group applicator education.	4	
Task 4 • Aspects of the ND custom manure applicator industry, including environmental awareness, ND rule and regulations, vehicle and road rules and business management will be taught in a classroom setting. (1/yr.; Group 1, 3, 5)	A network of 50 or more manure applicators who can ask questions and receive information pertaining to manure application and nutrient management.	4	
Objective 3			
Task 5 • Hands-on workshop for small-scale livestock owners where lot management, paddock rotation, feed management, animal health and manure management will be discussed and demonstrated. (1/yr.; Group 1, 2, 3, 4, 5)	One-on-one producer or group education.	4	
• Small-scall webpage (1/project; Group 1, 3)	Streamlined access to local, small-scale information.	1	
• Write one media piece/year pertaining to small-scale manure management (1/yr.; Group 1).	Mass media piece.	4	

Task 6 • Four educational webinars per year will be offered to equine owners via an online platform. (4/yr.; Group 1, 2, 3, 4, 5)	Group education via an online platform.	16	
• One subject matter video will be recorded during seasonally appropriate times and made available during the webinars or on the small-scale webpage. (1/project; Group 1, 3, 4, 5)	Subject matter video.	1	
Objective 4			
Task 7 • Provide educational and technical support pertaining to general manure management issues to producers, NDSU Extension and agency personnel. (Group 1, 2, 3, 4, 5)	Provide Groups 2, 3, 4 & 5 with science-based manure management recommendations (5/mo.)	240	
	Workshops and demonstrations (2/ea./yr.)	16	
	Educational Producer Meetings (10/yr.)	40	
	Mass media pieces (5/yr.)	20	

Appendix C: Letters of Support

Emilee Novak
ND NPS Management Program Task Force
4201 Normandy Street
Bismarck, ND 58503-1324

November 4, 2025

To Whom It May Concern:

I am writing to express my support for the continuation of the 319 Watershed Coordinator Grant and associated programming. As a participant in the North Dakota State University (NDSU) Extension Horse Management Webinars and related outreach efforts, I have directly benefited from the educational opportunities and technical guidance provided under this program.

Through these programs, I have gained valuable knowledge about pasture management, manure handling, and grazing strategies that have helped improve both the efficiency and sustainability of my operation. The webinars provided practical, research-based information tailored to smaller-scale livestock owners like myself, addressing challenges that are often overlooked in larger agricultural programs.

I have found the Mary's leadership and expertise to be instrumental in delivering accessible, high-quality education to horse owners. Continued funding for this grant will ensure the positive impacts of these programs are maintained and expanded.

Thank you for your consideration of this important grant application.

Sincerely,

Mindy Sigvaldsen

Mindy Sigvaldsen
Program Participant
NDSU Extension Horse Management Webinars

Brian and Holly Kunkel
4351 County Rd 85
New Salem, ND 58563

October 29, 2025

Emilee Novak
ND NPS Management Program Task Force
4201 Normandy Street
Bismarck, ND 58503-1324

Emilee and Task Force,

We support funding for the Livestock Environmental Educational Support Program position.

As a farmer, rancher, and custom manure hauler in North Dakota, I have found that Mary and her background are a great resource to turn to when questions arise. As a manure hauler, her support for us has been unwavering. She has been getting us business owners together for several years now, presenting educational materials in manure management, regulations, business management subjects and several other topics that prove to be invaluable.

Through my enterprises, I have implemented many suggestions she proposed or presented in an educational format. Additionally, I am also able to help educate others on practices that better improve the results from the work we do.

I believe Mary's work is vital for our state, farmers, ranchers, and others involved in the agricultural industry.

Sincerely,

Brian and Holly Kunkel

STATE BOARD OF ANIMAL HEALTH
ND Department of Agriculture
600 E. Boulevard Ave. Dept. 602
Bismarck, ND 58505-0020

November 6, 2025

Emilee Novak
ND NPS Management Program Task Force
4201 Normandy Street
Bismarck, North Dakota 58503-1324

Dear Emilee and Task Force,

The State Board of Animal Health and State Veterinarian's office see significant value in the Livestock Environmental Management Educational Support Program and associated position at the Carrington Research Extension Center (CREC). We strongly encourage the continuation of this funding.

As growth of animal agriculture has been a primary directive by our North Dakota Legislature and Agriculture Commissioner, this position serves as an integral part of our state and federal response related to Highly Pathogenic Avian Influenza (HPAI) and potentially other high mortality disease and disaster events. Additionally, the development of programs for education of animal producers of multiple species, and slaughter facilities in the state is necessary.

Our producers utilize Mary Keena's expertise and remarkable communication skills to navigate the complicated processes outlined by USDA APHIS Veterinary Services, allowing them to bring their operations back into production. Since our first outbreaks of HPAI in 2022 that continue through this fall, Mary has stepped up and her service is unmeasurable. Her passion for her work and service to our producers in the state cannot be overstated.

This position has become the backbone of our mortality management plans for the Department of Environmental Quality (DEQ) and State Veterinarian's office. Even as additional resources may be developed within DEQ and the Department of Agriculture, we will continue to need her services to create depth of service for education, outreach and emergency response.

We ask that you continue funding this program and position.

Sincerely,

Ethan Andress, DVM
North Dakota State Veterinarian

EA:tc

Appendix D: Examples of Levels 1, 2 & 3 evaluations and NDSU Extension Impact Reports

2024 NDSU FEEDLOT SCHOOL EVALUATION **(Levels 1 and 2)**
CARRINGTON RESEARCH EXTENSION CENTER
January 17-18, 2024

Please complete the following evaluation in order to help us prepare for next year's NDSU Feedlot School.

1. Which best describes you? (Check all that apply)

____Feedlot Owner ____Backgrounder ____Feedlot Manager
____General Cattle Feeder ____Feedlot Employee ____Cow/Calf Operator
____Industry Rep ____Student Other:_____

2. How did you learn about the 2024 NDSU Feedlot School?

___Newspaper ___Magazine ___NDSU Extension ___Website
___Waitlist Notification ___Other: _____

3. Please rate the usefulness of the following topic areas/presentations.

Why Feed Cattle in North Dakota?	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Facility Design and Equipment	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Budgets for Different Cattle Feeding Scenarios	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Cattle Requirements and Feeding	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Beef Quality Assurance	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Implants	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Cattle Financing	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Feed Additives	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Ration Balancing	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Feed Sampling/Analysis	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Feedlot Diseases and Treatments	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Q & A Session Wednesday Night	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
CREC Feedlot Research Facilities Overview	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Low Stress Working Facilities	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Feed Mill	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Feed Bunk / Manure Reading	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Bunk Reading and Feed Delivery	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Manure and Nutrient Management	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Livestock Outlook	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Price Protection with Hedging and LRP	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Alternative Market Programs	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
Carcass Quality and Marketing	Not Useful	Somewhat Useful	Useful	Very Useful	Extremely Useful

Overall Facilities	Poor	Adequate	Good	Very Good	Excellent
Meals/Breaks	Poor	Adequate	Good	Very Good	Excellent
Registration Process	Poor	Adequate	Good	Very Good	Excellent

Directions: Please rate your learning from this program. Your honest responses are valued.

Please rate the usefulness of Feedlot School in your day-to-day operation.	Not useful	Somewhat useful	Useful	Very useful	Extremely useful
My knowledge of animal requirements, available feeds, feed additives, feed testing, etc. BEFORE Feedlot School.	Low	Moderately Low	Moderate	Moderately High	High
My knowledge of animal requirements, available feeds, feed additives, feed testing, etc. AFTER Feedlot School.	Low	Moderately Low	Moderate	Moderately High	High
My knowledge of feed nutrient analysis, feed processing, ration formulation, etc. BEFORE Feedlot School.	Low	Moderately Low	Moderate	Moderately High	High
My knowledge of feed nutrient analysis, feed processing, ration formulation, etc. AFTER Feedlot School.	Low	Moderately Low	Moderate	Moderately High	High
My awareness of feeding/feedlot facilities, low stress working facilities, etc. BEFORE Feedlot School.	Low	Moderately Low	Moderate	Moderately High	High
My awareness of feeding/feedlot facilities, low stress working facilities, etc. AFTER Feedlot School.	Low	Moderately Low	Moderate	Moderately High	High
My knowledge of feedlot diseases, treatments, and health programs BEFORE Feedlot School.	Low	Moderately Low	Moderate	Moderately High	High
My knowledge of feedlot diseases, treatments, and health programs AFTER Feedlot School.	Low	Moderately Low	Moderate	Moderately High	High
My understanding of carcass quality and marketing on the grid BEFORE Feedlot School.	Low	Moderately Low	Moderate	Moderately High	High
My understanding of carcass quality and marketing on the grid AFTER Feedlot School.	Low	Moderately Low	Moderate	Moderately High	High
My knowledge of using market information to manage risk with pricing opportunities BEFORE Feedlot School.	Low	Moderately Low	Moderate	Moderately High	High
My knowledge of using market information to manage risk with pricing opportunities AFTER Feedlot School.	Low	Moderately Low	Moderate	Moderately High	High
My knowledge of feedlot manure management BEFORE Feedlot School.	Low	Moderately Low	Moderate	Moderately High	High
My knowledge of feedlot manure management AFTER Feedlot School.	Low	Moderately Low	Moderate	Moderately High	High

What did you learn from the 2024 NDSU Feedlot School that you plan to take home and use?

The most important information I learned from the 2024 NDSU Feedlot School:

What additional topics should be included in next year's NDSU Feedlot School?

What suggestions do you have to improve next year's NDSU Feedlot School?

NDSU Extension Horse Management Webinar Series Follow-up Survey - December 2024 **(Level 3)**

1. In which state do you currently reside?
2. Are you a citizen of a Tribal Nation?
    a. Yes
    b. No
3. If yes, which Tribal Nation(s) are you a member of?
4. In what country do you reside?
5. As a result of attending the NDSU Extension Horse Management Webinar Series (2020-2024), have you made any changes to your operation or practices in the following areas based upon information obtained from the topics presented? Check all that apply:
    a. Arena and Facility Footing
    b. Bedding Management
    c. Biosecurity Practices
    d. Drought Management
    e. Communicable Disease Management
    f. Emergency Field Aid
    g. Equine Conditioning
    h. Facility Management
    i. Fencing
    j. Genetic Disease Management
    k. Geriatric Horse or Foal Care
    l. Grazing Management
    m. Haying Management
    n. Manure Management
    o. Mortality Management
    p. Parasite Management
    q. Weed Management
    r. Winter Horse Management

6. If applicable, please describe what specific changes you made based on the information obtained from the NDSU Extension Horse Management Webinar Series (2020-2024).

    _____

7. As a result of the changes made, what has been the benefit to you, your animal(s), your finances and/or the environment?

    _____

8. Please share future topics you would like to see us host on this webinar platform.

    _____

9. Which of the following best describes your affiliation?
    a. Horse Owner
    b. Stable Owner/Manager
    c. Industry
    d. University Extension/Research
    e. Government Agency
    f. Other, please describe

Horse Management Webinars 2020-2024

PUBLIC VALUE

Changing management practices leads to more efficient land use, which saves money and reduces pollution potential, improving water quality.

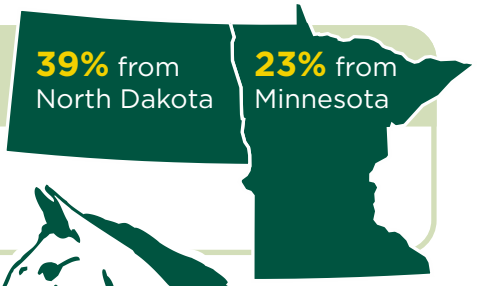
- **23 webinars**
- **972** live webinar **participants**
- **4,472** YouTube **views**

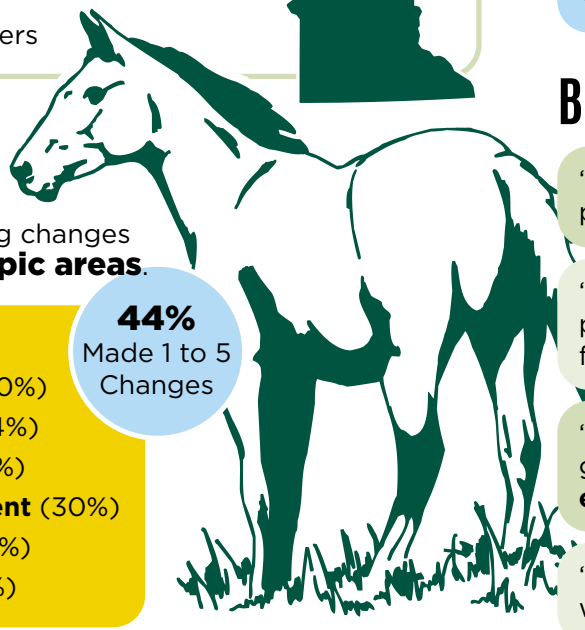
82% of 320 live webinar participant respondents **rated the webinar as very or extremely useful**.

Five-year Review of Webinar Participants: 96 Respondents

66% Horse Owners

12% Stable Owners/Managers





AREAS of CHANGE

Participants expressed making changes to their practices in **all 18 topic areas**.

44% Made 1 to 5 Changes

Top 6 Topic Areas

1. **Grazing Management** (40%)
2. **Manure Management** (34%)
3. **Haying Management** (31%)
4. **Winter Horse Management** (30%)
5. **Emergency First Aid** (25%)
6. **Weed Management** (25%)

CHANGES

"I have **changed my grazing rotation** and used electric fencing to make the horses graze a smaller area for a short period of time. I have also been more aware of length of grass I allow the horses to graze the pasture down too."

"Your webinar on weed management has **helped us identify and mitigate weeds** that we had in our pasture."

"We went from generic feed for everyone to individual needs based feed."

"Moving, piling, and composting manure."

"Working on **better manure management plan** (it's a work in progress)."

"I have been more selective about the quality of hay that I have been purchasing."

BENEFITS

"The benefit has been to our horses by providing **better pasture grass** to them."

"It's **more money saved** with more pasture producing forage and manure fertilizing it."

"The weedy areas of my pasture are going away and my pasture has **more even forage coverage**."

"**Hay is lasting longer** as it is fed more wisely in the winter **which saves money**."

"**Pasture is healthier** due to delayed spring grazing and early removal in the fall. Additional changes to manure management will yield **less flies**, more changes to be made."

"Animal [individual] based feed has helped keep weight on my old guys."

NDSU EXTENSION

Livestock Disaster Response – 2023

Public Value Statement
Because of the coordinated response efforts by NDSU Extension, livestock and poultry owners were able to receive technical and financial assistance for disasters and diseases, keeping their operations in business; enhancing the sustainability of their operations and rural communities.

The Situation

North Dakota livestock and poultry owners faced numerous disasters in 2023, including disease outbreaks, winter storms, flooding and drought. These disasters had far reaching impacts including but not limited to increased animal mortalities, market disruptions, and feed and forage shortages. NDSU Extension initiated a coordinated effort to assess impacts, gather information to determine additional resources required to meet stakeholder needs, develop resources and supported state and local response efforts.

Extension Response

NDSU Extension agents and specialists were an integral part of the disaster response team for livestock and poultry owners in North Dakota. The response efforts ranged from awareness and preparedness prior to natural disasters and disease outbreaks to information sharing and support following an event. NDSU Extension facilitated bi-weekly disaster meetings (23) with local, state and federal partners, enhancing communication and coordination during an event. NDSU Extension completed an assessment of winter impacts to livestock and submitted 487 reports assessing drought impacts. This information was shared with agencies and organizations in the state to direct response efforts. Regular updates were provided via email (45) and documents containing talking points were created (4). NDSU Extension specialists prepared publications (2), news releases (18), updated webpages (5), created social media content (195), a public service announcement and conducted media interviews (22) to disseminate information. NDSU Extension was on-site aiding in response efforts in counties with active HPAI cases in backyard and commercial poultry flocks.

Impacts

10 cases of **highly pathogenic avian influenza** (HPAI) in **7 counties**

- NDSU Extension agents aided with **contacting individuals in control zones**
- Extension Livestock Environmental Management Specialist provided **technical support for carcass disposal** at two commercial sites

25 cases of **Anthrax**

- NDSU Extension agents **served on county-level task forces** in affected counties

7 blizzards/winter storms

- NDSU Extension agents in 50 counties assessed county level impacts of the winter. This information was used to determine gaps in existing disaster programs to **provide aid to producers.**

195 **Social Media Posts** with a reach of **199,327** and **15,073** engagements

The NDSU Extension Disaster Preparedness team received a USDA Animal and Plant Health Inspection Service National Animal Disease Preparedness and Response Program **grant totaling $217,138 to develop educational resources and technical training** for Extension agents, emergency managers and veterinarians on responding to mass livestock mortalities and foreign animal diseases.

NDSU | EXTENSION **Making a difference**

NORTH DAKOTA STATE UNIVERSITY — EXTENDING KNOWLEDGE ›› CHANGING LIVES

NDSU Extension agents mentored producers on using state and federal assistance programs and served as a third-party verification. Because of the coordinated efforts by local, state and federal agencies, North Dakota livestock owners received the following 2023 USDA Farm Service Agency Disaster Program Payments as of February 8, 2024:

- Livestock Indemnity Program (LIP): 303 North Dakota producers have reported livestock loses to LIP for 2023. **45 applications have been paid totaling $218,000 in assistance.**
- Livestock Forage Program (LFP): 12 counties are eligible for LFP payment. **1,796 applications have been paid totaling $15 million in assistance.**
- Emergency Livestock Assistance Program (ELAP) approved funds for water, feed and livestock hauling for producers impacted by drought. **40 ELAP applications have been paid, totaling $2.56 million in assistance.**
- Pandemic Assistance Revenue Program: North Dakota producers who experienced revenue decreases due to the COVID-19 pandemic **received $7.78 million in assistance.**

Feedback

"Grant County has done an amazing job taking the initiative to form a task force for local response with Extension, Emergency Manager, County Commission, and Road & Bridge Crew" – Veterinarian, North Dakota Department of Agriculture

"Anthrax had a huge impact not only economically, but also mentally for some of our Grant County producers. The efforts of the State Specialists from our [NDSU Extension] Disaster Response team were much appreciated and did not go unnoticed. I was able to get contact information from them and resources that could then in turn be distributed to producers who contacted our office for help and guidance." – Tessa Osterbauer, NDSU Extension Agriculture and Natural Resources Agent, Grant County

"This has been an excellent communication source, getting agency updates and finding out what's happening across the state." – Wanda Braton, FSA Farm Programs Specialist, regarding bi-weekly disaster response team calls

"When HPAI hit my area, Miranda [Meehan] and Mary [Keena] quickly briefed me with all information I would need to know...from media interview pointers to in-depth information on human and animal safety. They were available in a variety of different ways to answer my questions and keep me informed." – Crystal Schaunaman, NDSU Extension Agriculture and Natural Resources Agent, McIntosh County

Primary Contact

Miranda Meehan
Livestock Environmental Stewardship Specialist
NDSU Dept. 7630, P.O. Box 6050
Fargo, ND 58108-6050
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Resource Links

NDSU Extension Disaster Website: https://www.ndsu.edu/agriculture/ag-hub/ag-topics/disasters

Appendix E: Budget Table Part 1

Budget Table for Livestock Environmental Nutrient Management Educational Support Program

Part 1: Funding Sources	**2027**	**2028**	**2029**	**2030**	**TOTAL**
319 Funding	164,162	168,875	172,918	177,895	683,850
NDSU Non-federal Match**	109,442	112,583	115,279	118,596	455,900
Total	273,604	281,458	288,197	296,491	1,139,750

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

Appendix F: Budget Table Part 2

Livestock Environmental Nutrient Management Educational Support Program

Part 2 Section 319/Non-Federal Budget

Fiscal Year	FY 2027	2028	2029	2030	Total 319 Funds	NDSU Non-federal Match FY15-17	Total
Personnel/Support							
1) Salary (1.0 FTEs)	78,773	81,137	83,571	86,078	329,559	303,933	633,492
Salary - technical support	5,835	6,010	6,190	6,376	24,411		
2) Fringe	45,767	47,141	48,554	50,011	191,473	106,377	297,850
3) Travel	10,915	10,545	6,195	10,575	38,230		38,230
4) Printing	750	773	796	820	3,139		3,139
6) Supplies	2,260	2,830	4,700	2,475	12,265		12,265
8) Communication	2,196	2,262	2,330	2,400	9,188		9,188
9) Fees (manure and soil sample analysis) (site rental) (video production) (online advertising)	1,250	1,290	3,290	1,370	7,200		7,200
Subtotals	147,746	151,988	155,626	160,105	615,465	410,310	1,025,775
Administrative	16,416	16,888	17,292	17,789	68,385	45,590	113,975
Total 319/Non-Federal Budget	164,162	168,875	172,918	177,895	683,850	455,900	1,139,750

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

Livestock Environmental Nutrient Management Educational Support Program

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

Fiscal Year	FTE	2027	2028	2029	2030	Total
Personnel/Support						
State and Regional Specialists (5 staff)	0.05	4,994	5,134	5,278	5,430	20,836
Research Scientists (1 staff)	0.01	822	845	869	894	3,431
Extension Agents (11 staff)	1.05	67,145	69,076	70,706	72,740	279,667
Fringe Benefits		25,536	26,269	26,898	27,672	106,377
Administrative		10,944	11,258	11,528	11,860	45,590
Total Non-Federal Match Budget* **		109,442	112,583	115,279	118,596	455,900

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