

# LEM NEWS



## Greetings!

Benjamin Franklin is credited with saying, "If you fail to plan, you are planning to fail."

Yikes! I don't think any of us intentionally plan to fail, but I do think a lot of us fail to plan, and that, ultimately, leads to...failure. The free spirits reading this may have already checked out at the word "plan" but plans don't have to be rigid and scary! Your plan simply has to provide direction.

I've intentionally planned this year's manure management programming to be both effective and efficient.

Effective so that we learn, change and grow; and efficient so our time is used wisely.



As you head into 2019, I urge you to make a plan. Write down what you'd like to achieve. Maybe you'll accomplish everything on the list or maybe not, but at least every morning when your feet hit the ground you'll know which way to go. -Mary



The North American Manure Expo was held in Brookings, SD, August 15-16, 2018. Article and more photos on pages 2-4. Photo courtesy Ag Annex.

## In This Issue

Manure Expo .....	1-4
On-farm Compost Demo.....	5
Building Soil Organic Matter .....	6
Winter Manure Application .....	7
ND Nutrient Reduction Strategy.....	8-9
Mortality Disposal Plans .....	10
5 Easy Steps for Composting Dead Livestock.....	11

August 15 was Tour Day, with three options for tours: "Mooving Manure on Dairies," "Beefing Up the System," and "A Look Inside Swine Systems." Everyone came together in the afternoon for a manure agitation demonstration.



*Photo courtesy Robb Meinen*



*Photo courtesy Leslie Johnson*



*Photo courtesy Mary Berg*



*Photo courtesy Robb Meinen*

## What's in a NAME?

North Dakota State University Extension had the honor of co-hosting the 2018 North American Manure Expo (NAME) on August 15-16 in Brookings, South Dakota. NDSU Extension co-hosted NAME with South Dakota State University, University of Minnesota, University of Nebraska – Lincoln and Iowa State University.

NAME was launched in 2001 in Wisconsin by (what eventually became) the Professional Nutrient Applicators Association of Wisconsin and the University of Wisconsin Extension Nutrient Management Team. The event was put together at the request of custom manure applicators who wanted to see similar equipment go head-to-head with their competitors. The event has evolved to include three main attractions: an industry trade show, manure technology demonstrations and educational seminars and demonstrations.

NAME is an annual, international event that is hosted in a new location each year. It has been hosted in Wisconsin, Michigan, Minnesota, Missouri, Ohio, Iowa, Nebraska, and Pennsylvania and now South Dakota in the US and Guelph, Ontario, Canada. There were 1,300 people in attendance this year over the two-day event with demographics spanning 8 countries including the United States, Canada, England, Belgium, China, the Netherlands, Australia, and New Zealand.

Day one includes tours and agitation demonstrations while day two focuses on educational seminars, the trade show and spreader demonstrations. NDSU Extension had the opportunity to chair the educational seminar committee. Two hundred ninety-two people attended the educational seminars. The educational seminars provide a chance to share the latest information regarding technology and equipment, manure-related research, as well as treatment options and management practices that continue to evolve. Preliminary results from a follow-up survey of NAME attendees shows that 87% of 141 respondents either agreed or strongly agreed that attending the 2018 NAME made them more aware of how manure impacts soil health. The educa-

tional seminar committee considers this a success as several of the topics presented pertained to the use of manure as a fertilizer and its effects on soil health and the environment. Furthermore, 86% of 136 respondents have used what they learned during NAME to do their job better and 88% of 137 respondents said they have shared knowledge they gained with others after NAME, meaning the education and resources are reaching far more than just on-site attendees.

Professional manure applicators are not the only ones who attend NAME. The list also includes: dairy, livestock and poultry producers; handlers of both liquid and solid manures; crop consultants and nutrient management specialists; compost managers; custom operators; agricultural support industry; Extension and Government agency personnel.

Comments from attendees included:

*“Keep up the great work. The show continues to be on the cutting edge of technology year after year. Thank you!” – NAME attendee*

*“Speakers were diverse. Good job keeping topics and schedule moving. There were six in my group, so we split up, to take almost all of them [educational seminars] in. I know my employees got a lot out of attending as well.” – NAME attendee*

The 2019 North American Manure Expo will be held in Fair Oaks, Indiana on July 31 and August 1. More information can be found at [www.manureexpo.org](http://www.manureexpo.org). — Mary Keena, Extension Specialist, Livestock Environmental Management

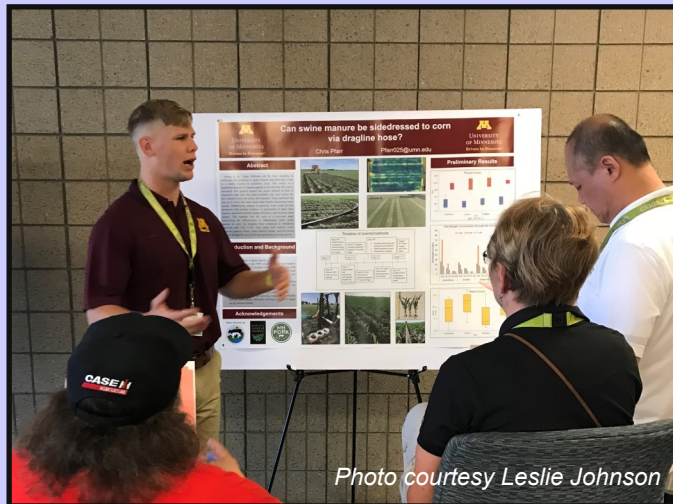


Photo courtesy Leslie Johnson



Photo courtesy Robb Meinen



Photo courtesy Ag Annex



Photo courtesy Ag Annex

August 16 was Education and Spreader Demonstration day. Four rooms of concurrent presentations occurred with 292 attendees. Field demos, a second day of exhibits, a student poster competition and the Expo also took place on the show grounds.

# TOP 10 MANURE EXPO SLOGANS

- ☑ Don't panic, it's organic.
- ☑ You just can't make this sh\*t up.
- ☑ The world's first fertilizer.
- ☑ If you're full of it, we can spread it.
- ☑ Manure, the movement you can get behind.
- ☑ Embrace your waste.
- ☑ Today's spread, tomorrow's bread.
- ☑ Manure — nature's gift to farming.
- ☑ How the waste was won.
- ☑ Your used feed distribution experts.

**NorthAmerican  
MANURE EXPO 2019**  
*Putting nutrients back to work*



**NorthAmerican  
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Linda, here, taking  
over again to say —

# Congratulations and best wishes

**Nick and Mary (Berg) Keena  
on their marriage,  
September 8, 2018.**

# On-farm Compost Demo Held in Carpio

On-farm demonstrations were a common program delivery tool in the early days of Cooperative Extension. If you want to show someone how something works, show them on their turf. The Livestock Environmental Management program used that “old” delivery tool this past summer.



This pre-1960 photo shows a NDAC (North Dakota Agriculture College, now NDSU) Professor showing producers John Deere's newest disk. NDSU photo.



Less formal (no ties required!) but similar methods bring transformational information to the producers, where they can use it.

The LEM program received several calls in the spring of 2018 about composting manure, most of which came from the northwest corner of the state. Local producer Monte Bloms agreed to be our cooperator and host for the summer.



Compost rows are turned approximately every 10-14 days to keep the internal temperature between 130 and 160 degrees F.

Bloms received a crash-course in composting manure and was responsible for turning and maintenance of the compost rows and hosting an on-farm demonstration day. We had 25 folks join us in Renville County on the morning of August 25, 2018.

LoAyne Voigt, Agriculture and Natural Resources Management Extension agent in Renville County, talked about using compost as a fertilizer on crop fields; Mary Keena talked about the composting process; and Monte Bloms of Bloms Land and Cattle LLC (our host) did a live turning demonstration

along with discussing what he found to be pros and cons of the process. The Renville County SCD and NRCS folks were also present with coffee and cookies and lead a discussion about manure management in the feedlot.

This on-farm format for a demonstration day was well accepted and the Livestock Environmental Management program plans to co-host more of these in 2019! —*Mary Keena*



After the compost was turned the attendees each did a field moisture test (wet rag test). Freshly turned rows of compost will begin the heating phase immediately. On average, North Dakota manure compost needs 4-6 turns and 3-6 months to complete.



# Building Soil Organic Matter Takes Time

[Soil Health Nexus blog: Nov. 1](#)

What is a realistic timeline goal for increasing soil organic matter content? Our “instant” culture gravitates to testimonials about how to rapidly increase soil organic matter by 1% within 1 to 3 years.

Conversations with lenders and landlords regarding rewards on manure applications and multi-species cover crops investments would likely be easier if financial rewards or measured soil physical properties came quickly. However, Dr. Sjoerd Willem Duiker, Penn State University Soil Scientist, says that a 1% increase in soil organic matter per year on a field scale is unrealistic.

To understand why a 1% soil organic matter build might be a better ‘decade goal’ than a yearly goal; consider the calculations. For example, one acre of land (6 inches thick) weighs about 2,000,000 pounds. Therefore, 1% of 2,000,000 pounds equals 20,000 pounds which includes both the stable (humus) and unstable organic components decomposing within the soil.

When manure, such as solid dairy manure, is applied to fields, soil microbes decompose 80% of the manure for their food sources. The remaining solid manure will only provide 90 pounds



Healthy soils support microbial life and worm colonies.



Increasing stable soil organic matter takes many management tools, including manure and cover crops.

of ‘stable carbon’ per ton of manure applied for building organic matter. Thus, to increase the total soil organic matter by just 1% through dairy manure applications, it will require a total application of 222 tons (or about 20 tons applied per year for 10 years).

Fred Magdoff and Harold van Es in their book, “Building Soils for Better Crops” (2<sup>nd</sup> Edition), outline that even applying 20 tons per acre per year of solid dairy manure will only increase organic matter 0.065% per year. So, if relatively high applications of manure are added to soils, it will likely only be possible to increase organic matter content 0.17% per year.

As a result, **a goal of raising soil organic matter 1% would be far more realistic over a decade than one year.** To attain this goal, it may be necessary to use other soil improving practices such as conservation tillage (limited till or No-till); cover crops; residue management; and nutrient saving manure application methods to enhance the soil building process.

Soil health building through manure applications can be further increased through grazing and incorporating cover crops into rotations. During the grazing process, part of the plant root system dies; then more soil carbon and nitrogen energy is available for microbes which in turn fix more stable soil aggregates and soil humus organic matter content.

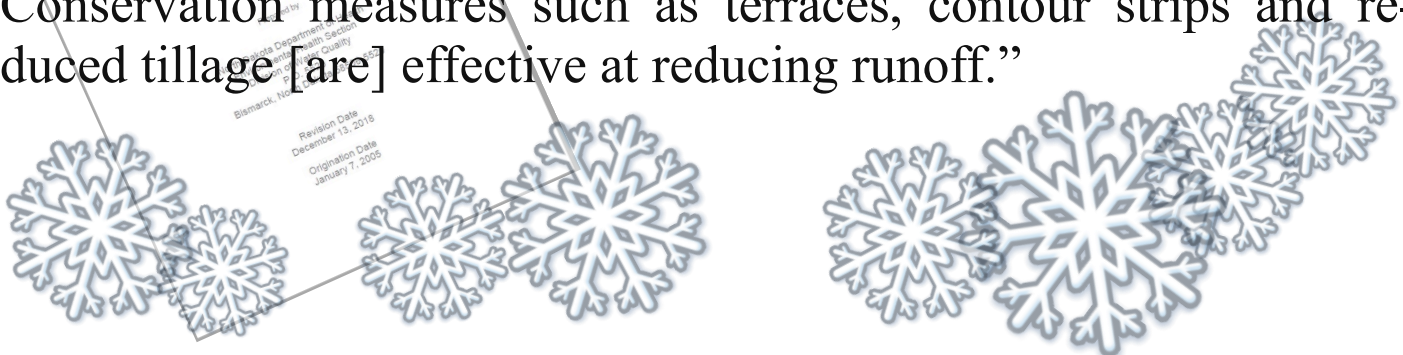
**Author:** Todd Whitney, University of Nebraska – Lincoln. **Reviewers:** Michael Sindelar, Rick Kolesch, and Leslie Johnson, University of Nebraska – Lincoln

“Manure shall not be applied to frozen, snow covered or saturated soils if there is a likelihood of runoff.

However, manure can be land applied during frozen conditions provided it is applied on land where runoff is contained and does not drain off during spring runoff.

The department [North Dakota Department of Health, Environmental Health Section, Division of Water Quality] recommends operators consider land with slopes of less than 6 percent, where there is stubble or vegetative cover and less than 8 inches of snow on the ground surface.

Conservation measures such as terraces, contour strips and reduced tillage [are] effective at reducing runoff.”



# April 22-26, 2019

Waste to Worth brings together the nation's best science on animal agriculture and the environment.

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# North Dakota's Nutrient Reduction Strategy

## What is Nutrient Pollution?

Nutrient pollution is caused by the overabundance of the nutrients phosphorus and nitrogen in streams, rivers and lakes.



**NORTH DAKOTA**  
DEPARTMENT of HEALTH

Excessive nitrogen and phosphorus in water can lead to serious problems including:

- ☑ Harmful Algal Blooms (HABs) which can be lethal to pets, livestock and wildlife, and lead to health problems in humans.
- ☑ Fish kills due to increased aquatic plant growth. After the plants die, the decomposition process uses up oxygen needed by fish.
- ☑ Increased costs to treat surface water drinking water supplies.

## Nutrient Sources

In North Dakota, we know that the major sources of nutrients are:

- ☑ Erosion and runoff from cropland
- ☑ Industrial and municipal point sources
- ☑ Runoff from animal feeding operations
- ☑ Storm water runoff, i.e., residential fertilizer
- ☑ Failing septic systems
- ☑ Hydrologic modification, including wetland drainage and stream channelization



## Why is a Nutrient Reduction Strategy Needed?



Many nutrients can be lost due to runoff following heavy rainfall.  
Photo from the ND Department of Health, Division of Water Quality.

Nutrient enrichment is consistently one of the nation's top causes of water resource impairment. Many of North Dakota's waterbodies are also affected by nutrient pollution. Forty-seven lakes and thousands of miles of streams are impacted due to excessive nutrients. Approximately 2,800 miles of streams are in poor condition due to nitrogen, and more than 3,500 miles are degraded due to phosphorus in North Dakota.

The United States Environmental Agency (EPA) has explicitly outlined that the management of nutrient pollution is best addressed at the state and local levels. However, EPA has intervened where states have not addressed nutrients.

Due to the serious effects of nutrient pollution, more action should be taken to reduce nutrients in our nation's waterways. In some states, nutrient pollution issues have resulted in controversy and lawsuits. To avoid these problems, the North Dakota Department of Health has worked with stakeholders to develop a statewide nutrient reduction strategy.

## What is a Nutrient Reduction Strategy?

The goal of a Nutrient Reduction Strategy is to develop and implement cost-effective approaches to reduce the delivery of nutrients via point source discharges and nonpoint source runoff. The strategy plan examines the available data to determine criteria and sets targets. Through stakeholder input, sources are prioritized, and tools are identified to reduce the nutrients being delivered to streams,



rivers and lakes from priority sources.

As we move closer to finalizing the Nutrient Reduction Strategy, we anticipate that agency officials, working closely with stakeholders, will develop a strategy that is technically and scientifically defensible, can be reasonably implemented within state and local laws, and includes measures to safeguard public health and reduce economic impacts.

## Solutions

To reduce nutrient pollution, the department will work with stakeholders to identify best available technology and expertise to recommend effective best management practices (BMPs) to reduce nutrient runoff.

Some examples of BMPs for each source include, but are not limited to:

- Improving soil health and reducing soil loss through the use of cover crops and reducing tillage.
- Encouraging the use of precision application techniques for fertilizer.
- Implementing manure management systems as required and utilizing manure as a soil amendment.
- Using software tools that aid in identifying land that requires more inputs than generates income. This allows producers to be more profitable and to rest marginal lands.
- Working with industrial and municipal point sources to monitor their discharges, to optimize treatment efficiencies for nutrients and upgrade wastewater treatment plants when necessary.
- Promoting urban soil testing and proper lawn fertilization rates and techniques.
- Educating homeowners about their septic systems and proper maintenance and care.
- Restoring wetland functions where possible and mitigating the effects of drainage and channelization.



Blue-green cyanobacterial blooms can be fatal to humans, livestock, and wildlife. Photo from the ND Department of Health, Division of Water Quality.

It is anticipated that the menu of BMPs will grow as the department and stakeholders work together.

## Tracking Progress

The state will implement water quality monitoring programs to track progress towards the nutrient reduction goals. Nutrient issues did not become a problem overnight, and they will not disappear quickly. It will take everyone working together to restore North Dakota's waters and protect our water resources for future generations.

## Developing Criteria/Standards

A critical piece to the state Nutrient Reduction Strategy is the establishment of nutrient criteria (i.e., standards). Without criteria it will be impossible to assess nutrient problems, set reduction targets or measure our successes and/or failures. The criteria designate the level of nutrient pollution acceptable for a waterbody, while allowing it to meet its beneficial use designations.

The development of nutrient criteria by North Dakota is driven by four fundamental considerations:

1. Protective of the state's water resources and designated beneficial uses.
2. Tailored to the unique physiographic characteristics, climate and water resources of our northern plains (prairie) state.
3. Technically and scientifically defensible.
4. Based on conceptual ecosystem models that reflect cause-and-effect relationships for resource impairment and the loss of beneficial uses.

For more information about the Nutrient Reduction Strategy and/or nutrient criteria development, please visit [www.tinyurl.com/NDNutrient](http://www.tinyurl.com/NDNutrient) or call the Division of Water Quality at 701.328.5210.

# Producers Need Disposal Plan for Dead Livestock

The death of animals is part of any livestock operation.

"With lambing underway and calving just around the corner, now is the time for producers to have a plan for disposing of the mortalities quickly," says Mary Keena, North Dakota State University Extension livestock environmental management specialist at the Carrington Research Extension Center. "Timely disposal of these mortalities is critical to preventing the spread of disease, as well as protecting water quality."

Rendering, incineration, burial and composting are approved methods of carcass disposal in North Dakota. "Carcass abandonment is not considered an acceptable disposal practice," Keena stresses.

Rendering is the process of converting animal carcasses into pathogen-free, useful byproducts such as feed protein. The process involves using high-temperature, pressurized steam. However, rendering no longer is a common disposal method in North Dakota because of the lack of facilities and the cost.

Incineration is the thermal destruction of carcasses using fuel such as propane, diesel or natural gas. It requires considerable energy. The cost of incineration may be a limiting factor for some producers. Also, large carcasses often exceed the incinerator's capacity. Open-pit burning of carcasses is an acceptable last-resort disposal option.

Burial is a common method of carcass disposal, but selecting the proper burial site and maintaining it are important. Areas with sandy or gravelly soil and a shallow groundwater table must not be used a burial site. Also, burial is difficult during the winter and isn't an option during flooding or in areas prone to flooding. The disposal site should be away from residences, drinking water wells or shallow aquifers.

Keena says **the best option might be composting**, which is a naturally occurring process that breaks the carcass into basic elements via microorganisms and heat generated during composting. Composting is a simple process that requires few materials and minimal maintenance.

Here are Keena's tips for composting:

- Build a pile if composting one animal.
- Build a windrow if composting several animals.
- Use material such as straw or old hay for the base, manure or spoiled silage for the bulking material, and straw, old hay or sawdust as cover material.

This is the process for composting:

- \* Start with 2 feet of base material in a windrow or pile, depending on how many carcasses will be composted.
- \* Lay the carcass on top of the base. Have at least 1 foot of base material between the perimeter of the carcass and the edge of the base.
- \* Cover the carcass with 8 to 10 inches of bulking material.
- \* Cover the entire pile or windrow with 2 feet of cover material. The cover material should be placed on the top and sides, with no part of the carcass showing. The pile needs a good cap to keep predators out and seal in heat.

To maintain the compost site:

- \* Leave the pile or windrow undisturbed to keep heat sealed in during the very cold winter months.
- \* Aerate the pile every two months using a loader from early spring until late fall.
- \* Make sure the pile or windrow always has sufficient cover material.

For more information visit NDSU's livestock environmental management website at <https://www.ag.ndsu.edu/lem/resources>. See NDSU's "Animal Carcass Disposal Options" publication at <https://tinyurl.com/CarcassDisposal> or "5 Easy Steps for Composting Dead Livestock" at <https://tinyurl.com/StepstoCompostDeadLivestock>. — Mary Keena

# 5 Easy Steps for Composting Dead Livestock

AS1781

## Step 1

Place 2 feet of base material in pile or long row, depending on number of carcasses to be composted.



## Step 2

Lay carcass on top of base. Have at least 1 foot of base material between perimeter of carcass and edge of base.



## Step 3

If composting cattle, puncture the rumen to prevent it from exploding.



## Step 4

Cover carcass with 8 to 10 inches of bulking material.



## Step 5

Cover the entire pile or long row with 2 feet of cover material.



## Composting Material

- Base material: straw, old hay, coarse crop residues (corn stalks)
- Bulking material: manure or spoiled silage
- Cover material: straw, old hay, sawdust

## Things To Remember

- Make sure pile always has sufficient cover material.
- Turn pile every six months from early spring to late fall.
- To accelerate composting, turn pile every two months from early spring to late fall.
- Do not disturb pile or long row during winter months.
- Existing compost can be used to cover new piles or long row sections.

**Mary Berg**, Area Livestock Environmental Management Specialist, Carrington Research Extension Center

**Paige Brummund**, Ward County Extension agent

**Alicia E. Harstad**, Stutsman County Extension agent

**Penny L. Nester**, Kidder County Extension agent

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North Dakota State University, Fargo  
December 2015

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# Coming Events

Jan. 17-18	Winter Ag Expo, Jamestown Civic Center.
Jan. 30-Feb 1	KMOT Ag Expo, Minot.
Feb. 12-13	Advanced Crop Advisers Workshop, Fargo.
Feb. 12-13	KFYR Agri International, Bismarck Event Center.
Feb. 19	On-site Wastewater Education, Carrington REC.
Feb. 25-26	ND Reclamation Conference, Dickinson.
Feb. 26	Tile Drainage Design Workshop, Devils Lake.
Feb. 26-27	Eastern Crop & Pest Management School, Fargo.
Feb. 26-27	Farming & Ranching for the Bottom Line, Bismarck.
Mar. 4-5	Western Crop & Pest Management School, Minot.
Mar. 5-10	North Dakota Winter Show, Valley City.

## Center Points: Easy as 1-2-3...

The Carrington REC has a weekly blog with updates on what's happening now and information on coming events. Read online at [www.ag.ndsu.edu/CarringtonREC](http://www.ag.ndsu.edu/CarringtonREC) or subscribe to receive a weekly reminder and quick link.

**Subscribing is as easy as 1-2-3:**

1. Send an e-mail to [Listserv@listserv.nodak.edu](mailto:Listserv@listserv.nodak.edu)
2. Leave the subject line of the email blank
3. In the body (not the subject line) of the e-mail enter the following:  
**SUB NDSU-CARRINGTONREC-CENTERPOINTS yourfirstname yourlastname**

OR: Simply send a regular email to [Mary.Keena@ndsu.edu](mailto:Mary.Keena@ndsu.edu).



### Contact Us —

#### NDSU Carrington REC

663 Hwy 281 NE | PO Box 219 | Carrington, ND 58421

Phone 701-652-2951 | [Mary.Keena@ndsu.edu](mailto:Mary.Keena@ndsu.edu)

Visit us on the web at [www.ag.ndsu.edu/CarringtonREC](http://www.ag.ndsu.edu/CarringtonREC)



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