



Livestock Environmental Management News

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3 months, ~4600 miles...Queens of the Road?

Greetings and Happy (almost) Spring!

"Queens of the Road" may be a bit dramatic, but we have definitely been busy since our last issue of LEM News. We would like to extend a huge thank you to all of the Extension Agents, SCD personnel, and producers who have invited us share our program this winter. We really appreciate it. As winter meetings come to an end in the middle of this month, we are hopeful that the sunshine here at the Carrington Research Extension Center will stick around. We are eager to turn our over-wintering compost pile, start new compost piles with fresh livestock manure, and start some new mortality compost piles.

Of course, we are also excited to continue our black-top adventures. As soon as it thaws, we will be back to sampling livestock manure for nutrients. If you plan to spread your livestock manure this spring and would like to know the nutrient content, please contact us. We will come to your operation, sample the manure, send it off for analysis (we will pay for it) and give you the results. We need a two-week notice in order to get your results before you spread. Funding for this program is available through the fall of 2013 so please take advantage soon! We will also assist with manure spreader

Cows bale-grazing during a producer visit in Kidder County.



calibration, starting your own livestock manure or animal mortality compost pile or anything else dealing with livestock manure. Check out our website (www.ag.ndsu.edu/lem); follow us on Twitter @ndsulem, #poopprincesses; and "Like" us on Facebook (www.facebook.com/ndsulem).

Cheers!

Mary & Emily

Local Buzz...from Foster County

Hello! My name is Katie Gussiaas and I am the new 319 Watershed Coordinator for the Foster County Soil Conservation District. This fall, the district was awarded a grant from the EPA and the North Dakota Department of Health to start a

new watershed project. The district decided that the focus of their first watershed project would be the Kelly Creek. Kelly Creek is a small body of water that runs through approximately 120,000 acres and 187 miles of mostly Foster County with

smaller portions in Wells and Eddy counties. The project is aimed at decreasing non-point source pollution, which causes water quality issues, in the Kelly Creek watershed. My job as watershed coordinator is to help landowners and producers find ways to

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Special points of interest:

- FREE Manure Sampling still available, contact us for more information.
- If you live near Kelly Creek, check out the Local Buzz.
- "Engaged employees are more productive..."
- How many coyotes is your operation sustaining?
- Soil salinity and sodicity are not the same thing.

Out-of-State Perspective...How Engaged Are Your Employees?

Engaged employees are more productive, safer, and less likely to leave for another job.

Gallup, a research based management consulting firm, defines an engaged employee as "someone who works with passion and has profound connection to the company, driving results and moving the organization forward." In other words, engaged employees are those who show passion about their job and the business they work for, making them highly productive and efficient at work.

Gallup's statistics say that highly engaged employees can improve overall performance by 78 percent! Furthermore, engaged employees can improve:

- ⇒ Employee retention by 44 percent
- ⇒ Labor safety by 50 percent
- ⇒ Productivity by 50 percent
- ⇒ Profitability by 33 percent

So, are your employees highly engaged or not?

If they are, good for you! If they are not, I suggest starting by looking at your leadership and communication skills. We all recognize that good communication is critical for effective teamwork on the farm or in any business. Not only do we recognize that, but we often say that it is a priority for us. And yet, it is still a problem area for many.

As manager or business owner, you tend to assume that others understand what you want. You think that they give the same urgency to tasks as you will. You believe that they will have the same standards for how the job gets done that you have. But, unfortunately many times this is not the case.

You probably aren't the only one with questions and misconceptions. Many employees don't know much of the business outside their duties, what your goals are as an owner, or how they are doing compared to your expectations. The primary reason they don't know it is because many owners don't do a good job sharing that information.

That's where many owners get stuck. They recognize the importance of good communication and engaged employees, but aren't sure what to do differently. Meanwhile, many employees seem adrift. They may not contribute much beyond doing the minimum and aren't active participants in advancing the operation to a new level.

So what can you do to have highly engaged employees? Here are five things that you must have:

1. Strong leadership and communication
2. Well defined job roles and organizational structure

3. Effective performance management system
4. A well-defined recruitment and orientation process for new employees
5. A good training and development program

Over the winter months, when things are less hectic is the time to start thinking about how you can create a more engaged team.

If you are interested in learning more about this, contact Phil Durst at 989-387-5346 or via email at durstp@msu.edu.

Improvement is possible but it begins with considering employees as valuable teammates working with you to reach shared goals.

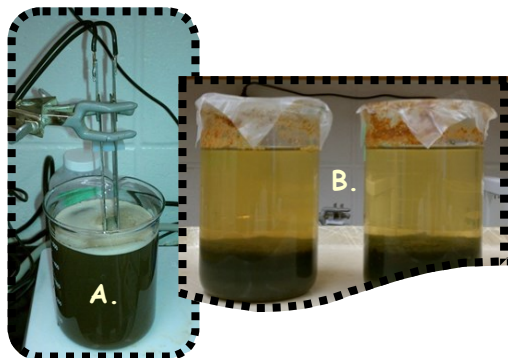
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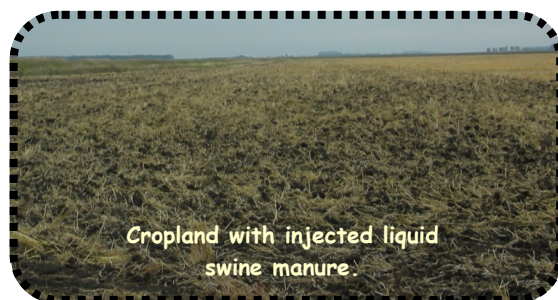
News From the Laboratory...Ongoing Research Activities



Electrolysis of swine manure: (a) before and (b) after electrolysis.

Dr. Shafiqur Rahman is an Assistant Professor in the Department of Agricultural and Biosystems Engineering at NDSU. Dr. Rahman's research program focuses on air and water quality resulting from livestock facilities and land application of manure. Currently he is conducting research on different treatment technologies such as ozonation, nanotechnology, electrolysis, etc. in mitigating ammonia, hydrogen sulfide

and greenhouse gas emissions from manure. He is also applying the same technologies to decrease nutrient runoff in laboratory setting.



Cropland with injected liquid swine manure.



Commentary From the CAFO Corral...North Dakota's CFO's (Coyote Feeding Operations)

North Dakota's largest scavenger, the coyote, has been here, paleontologists say, since the glaciers receded. Lewis and Clark recounted how the "prairie wolves" would follow the buffalo. After hunters would drive scores of bison off a cliff and carry off what they could, the coyotes would descend and gorge themselves. For some coyotes, the lifestyle has not changed so much, though the herds no longer roam and now die by ones and twos, not by the dozen. But when a large animal dies the coyote is still there, as soon as the humans leave the scene, to eat its fill.

One facility we visited recently had about 50,000 pounds of animal mortalities a year. It appears that most of this material was going to feed coyotes. At an estimated 1.5 pounds of food per coyote per day, this facility would be sustaining about 90 coyotes!

In travelling the state inspecting CAFO and AFO nutrient management systems, I've been surprised at how many ranchers have heard, seemingly from an official source, that coyote-based mortality disposal is an acceptable, or even a preferred, method. But the law (NDCC Chapter 36-14-19) is very clear: If an animal dies, other than from specific diseases, it must be burned, buried, composted, or given to a licensed rendering plant within 36 hours (deaths from anthrax and certain swine diseases require special treatment.) Leaving dead animals for coyotes is not a legal option.

The purpose of the law is biosecurity - dead animals may be diseased, coyotes may carry disease organisms between herds, and coyotes are known to deposit disease organisms in their scat. Besides, coyotes are known predators of sheep and of newborns at calving time - and of dogs and cats.

Rendering no longer exists and burning isn't practical for most operations, so that leaves burial and composting. From a nutrient management standpoint (since it recycles the nutrients), and from a cost standpoint for many operations, composting is the preferred option. NDSU has a good pamphlet that covers composting ([NM-1422 Animal Carcass Disposal Options](#)), and we can help you determine how composting fits with your NMP and your permit if you contact us at the ND Department of Health's Water Quality Division, 328-5210.

Above: Placing compost material over deceased calf at the CREC.

Below: Remains of deceased calf 45 days after start of compost pile.

*Ken Bickner
Environmental Engineer
ND Department of Health*

Local Buzz Continued...

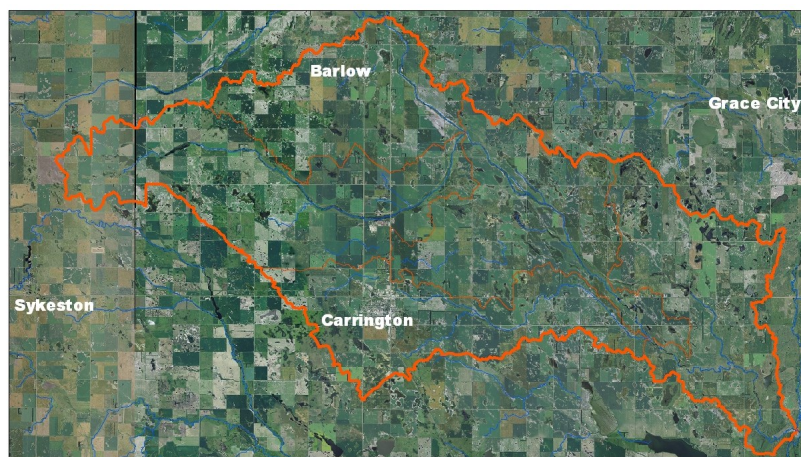
improve their operations while at the same time increasing the health of the watershed through the implementation of better management practices (BMP's). Some possible BMP's are: fencing, pipelines and tanks, full or partial manure management systems, nutrient management plans, cover crops, and many more are available for cost-share under the watershed project. Right now the district is actively looking for people to participate in the project. There is financial and technical assistance available for anyone that is interested in applying a single BMP or multiple practices, on their land. Start small by implementing just one practice and work your way into a larger project after you learn how the pro-

cess works!

If you know you live in the Kelly Creek watershed or are curious as to whether you do or not, please contact me at the office at 6720 Highway 200 in Carrington, give me a call at 701-652-2551 ext.3 or send me an email at

katie.gussiaas@nd.nacdn.net and I'll do my best to answer your questions! There is also information available on our website at www.fosterscd.org.

*Katie Gussiaas
Foster Co. Watershed Coordinator*



 Kelly Creek Watershed

From the Soil Health Team—Soil Salinity & Sodicity

Soil salinity and sodicity are major soil health related challenges facing North Dakota farmers. It is very important to understand the nature of these two different problems to manage them for healthy and productive soils.

We use many names, like saline-spots, alkali-ground, sour-ground or salt-land, but there are actually two different problems; soil salinity and soil sodicity.

Saline soils have excessive water soluble salts which don't allow the plant roots to absorb soil water even under wet conditions, resulting in drought-stressed plants. Soil salinity is determined by analyzing soil electrical conductivity (EC). Soil is considered saline if it has an EC value of 4.00 or more deciSiemens/meter.

Sodic soils have excess sodium adsorbed (or attached) to their cation exchange sites [the negatively charged particles in clay and humus that attach to positively charged plant nutrients like calcium (Ca^{++}), magnesium (Mg^{++}) and potassium (K^+)]. Sodium is difficult to leach. This excess sodium damages soil structure by disintegrating soil aggregates and forming a hard crust or sealing of soil layers, leading to poor soil drainage, soils which are difficult to till, poor seed germination, poor root growth and the potential for wind and water erosion. Soil sodicity is determined by analyzing either soil exchangeable sodium percentage (Ex. $\text{Na}^{\%}$) or sodium adsorption ratio (SAR). A soil is considered sodic if it has an exchangeable sodium percentage of 15 or more or sodium adsorption ratio of 13 or more.

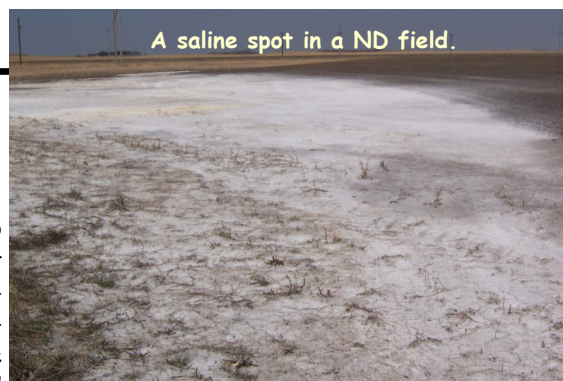
The main source for excessive salts and sodium in North Dakota is underlying sodium-rich shale. The main car-

rier of excessive salts or sodium to the soil surface is groundwater. Not to be confused with the term aquifers, in this article the term groundwater is used only in reference to the zone of soil or sediments saturated with water closest to the soil surface. Groundwater can move upward to the soil surface either as shallow water-table levels or as capillary rise, especially under drier weather conditions.

Management should involve a mix of mitigation practices combined with preventive measures to stop the future spread. Mitigation of saline soils starts by managing the shallow water-table level and improving soil drainage. First, intercept any surrounding water seeps (by planting crops like alfalfa) which may contribute to a high water-table. Moderately high water-table levels can be controlled through continuous cropping with deep-rooted and late-maturing crops, but the installation of surface or subsurface drainage systems might be useful in a high water-table situation. However before installing tile, soils should be analyzed for sodium content as excessive sodium may cause sealing or crusting of the soil layers around or above the tiles. Once proper soil drainage is achieved, salts will leach downward into the soils with rain water.

Sodic soils require the application of calcium supplements to displace the excessive sodium from the soil cation exchange sites and release it to the soil water. A common example is gypsum (CaSO_4) added to soils with high chloride levels, or calcium chloride added to soils high in sulfates. Once sodium is released into the soil water it can also be leached out with rain water.

A saline spot in a ND field.



Gypsum application rates range from 4 to 8 tons/acre; soils should be analyzed to obtain maximum benefit. At the beginning of the remedial process, one should also start with a salt-resistant crop like barley instead of sensitive crops like soybeans.

Preventive measures include monitoring groundwater movement towards the surface soil. Moderately high water-table levels require deep-rooted, late-maturing crops like alfalfa, sunflower, safflower or sugarbeets. Shallow water-table levels may benefit from tile drainage.

A second preventative technique is to keep the capillary rise (2-3 feet in sandy soil, up to 8-9 feet in clay soil) of the groundwater toward the soil surface under check by leaving plant residues or by not exposing the surface soil directly to the sunlight, by planting cover crops after fall-harvest, using minimum or no-till and by adding soil organic matter.

Once established these problems do take some time to remedy but they are manageable.

For more information please use the following link, <http://www.ag.ndsu.edu/langdonrec/soil-health>.

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Adapted by Linda Schuster

Below is a table showing different criteria for saline, sodic or saline-sodic soils.

Soil Type	pH	EC (deciSiemens/meter)	Sodium Adsorption Ratio	Exchangeable Sodium %
Saline Soils	No effect	4.00 or more	Less than 13	Less than 15
Sodic Soils	8.5 or more	Less than 4.00	13 or more	15 or more
Saline-Sodic Soils	8.5 or more	4.00 or more	13 or more	15 or more