



# IN THE TRENCHES

## From the President's Desk

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Greetings LICO,

This will be my last newsletter to this fine association. It's been a great experience and I would recommend it to anyone thinking of getting involved. Not nearly as scary as you think.

The convention is fast approaching. Don't forget to sign up early. It makes John's life much easier.....and it keeps his hair on his head.

This year we will be offering WHIMIS training on Tuesday at the same time as Red Cross training. A valuable course for you and your employees.

The Great Lakes and St. Lawrence Cities Initiative is making great progress. It has received financial support from many associations and businesses, allowing it to move forward to produce best management practices and hopefully enforcement of these practices. This is a great opportunity for our industry to be proactive on the phosphorus loss issues. The more we do in advance, the more prepared we will be when it hits the fan....or in this case the Lake. From more erosion control, to filters on outlets, there is great potential for projects moving forward, and to keep a good reputation for our industry.

Wishing everyone a Merry Christmas

See you in London,  
Matt

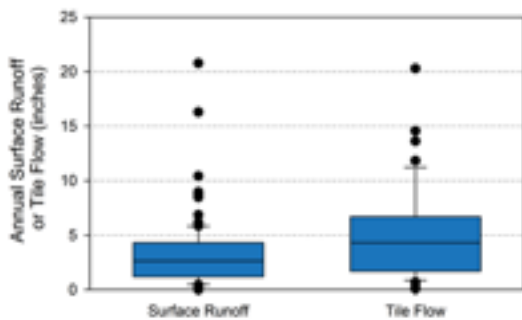


### Comparing Wisconsin and Minnesota Tile Flow - Tim Radatz and Eric Cooley, [etcooley@wisc.edu](mailto:etcooley@wisc.edu)

Wisconsin and Minnesota Discovery Farms have collected tile drainage data from a wide variety of farming systems. Combining these datasets provides an enhanced assessment that neither state could accomplish individually. This more comprehensive dataset can help draw more conclusions and recommendations about how tile systems influence water quality.

Tile water quality information has been collected from 10 different farms and 14 fields starting in 2005. In total, Discovery Farms has 47 site years of data. The fields are very diverse with slopes ranging from less than 1 to 5%. Soils range from fine sandy loams to clay loams and there are both random and pattern tile lines in the dataset. Monitored fields include corn, soybean, alfalfa, sugarbeet, wheat, and pasture. There are several clear lessons learned about soil and nutrient loss from tile systems but the first piece to understand is tile flow quantity and timing.

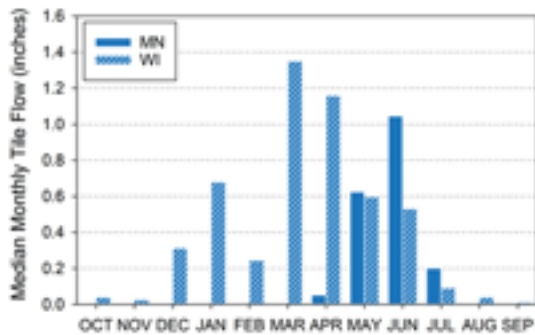
**There is typically more tile flow than surface runoff on an annual basis.**



Surface runoff and tile flow typically range from 1.3 to 4.2 and 1.8 to 6.5 inches, respectively. There are also differences between the timing and intensity of surface runoff and tile flow. Surface runoff is often inconsistent but generally occurs during snowmelt in the early spring and during the time from planting to crop canopy. On average, there are 10 days of surface runoff per year. On the other hand, tile drainage has many more days of flow and is much more consistent throughout the year.

**The amount and timing of tile flow differs between Wisconsin and Minnesota.**

While surface runoff characteristics in Minnesota and Wisconsin were similar, the amount of tile flow was higher in Wisconsin compared to Minnesota. 23% of precipitation moved through tile in Wisconsin compared to 9% in Minnesota. There were also many more days of flow per year in Wisconsin compared to Minnesota tile sites.

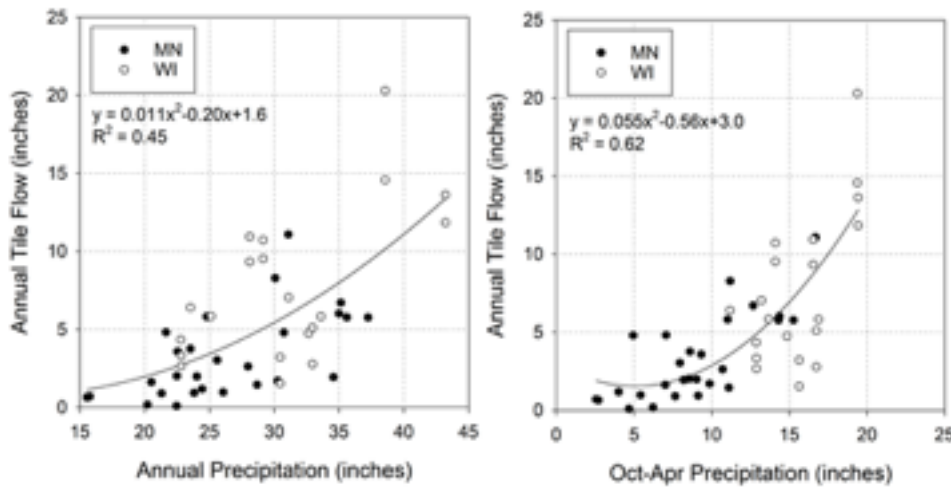


Continued Pg. 3

**Comparing Wisconsin and Minnesota Tile Flow - (Cont'd from Pg. 2)**

The flow time period in Wisconsin is typically from December through July, whereas in Minnesota it is typically from April through July. In Wisconsin, there was a significant portion of tile flow during the frozen ground period. The difference in the amount and timing of drainage is likely due to climate and landscape position. The Wisconsin sites usually have much more rainfall during the October through April time period. Three of the Wisconsin sites were located in low areas in the landscape that were influenced by shallow groundwater flow.

**Precipitation between Minnesota and Wisconsin likely explains some of the differences in the amount of tile flow observed between the two states.**



The amount of precipitation during the year has a large effect on the amount of tile flow. There is a strong correlation between annual precipitation and annual tile flow. There is even a stronger correlation between October through April precipitation and annual tile flow. Precipitation during this period has a significant impact on the amount of tile flow. Precipitation differences between Minnesota and Wisconsin likely explain the differences in the amount of flow observed between the two states. During the years monitored in Minnesota and Wisconsin, Wisconsin had more than 7 inches of additional precipitation during the October through April period. This is not unique to the years monitored. Looking at long term 30-year precipitation normal for the monitored sites, the Wisconsin sites have 3.8 inches more during the October through April time period.

**More tile information to come at Discovery Farms Conference and through new research.**

The 2016 Discovery Farms Annual Conference will feature a talk on tile by Tim Radatz, Minnesota Discovery Farms Research Coordinator. Tim will continue to dive into the comprehensive dataset from Minnesota and Wisconsin Discovery Farms. He will offer three practical ways to avoid losing soil, nitrogen, and phosphorus from tile drains.

The Minnesota and Wisconsin Discovery Farms Programs have recently received a Conservation Innovation Grant (CIG) from the United States Department of Agriculture - Natural Resources Conservation Service (USDA-NRCS) for "Developing Diagnostics to Improve Water Quality and Soil Health on Tile Drained Lands in Minnesota and Wisconsin." This grant will allow Discovery Farms Programs in both states to continue efforts to identify the timing and mechanisms of soil and nutrient loss to tile drainage systems. For more information about the project visit the Discovery Farms blog describing the project or visit the USDA-NRCS website to read more about the 45 innovative award winners.

## **2017 LICO Conference - Franklin Kains**

Here is the program for the LICO Convention, Lamplighter Inn, London

### **Tuesday, January 24, 2017**

8:30 am to 4:00 pm: **Canadian Red Cross First Aid Course and Recertification**

9:00 am to 4:00 pm: **Soil Erosion Control Certificate Holder Professional Development Event;**  
Jim Ritter, OMAFRA, Brighton

9:00 am to noon or 1:00 pm to 4:00 pm: **Workplace Hazardous Materials Information System (WHMIS) Training Session**

### **Wednesday, January 25, 2017**

9:00 am: **Drones and Drainage**, Stephen Davies, RME Geomatics

9:45 am: **Wetland Restoration**, Dave Richards, MNRF

11:00 am: **Managing Phosphorus Losses in Drainage Water from Croplands**, Tom Bruulsema,  
International Plant Nutrition Institute

11:40 am: **A Collaborative Drainage Strategy to Reduce Phosphorus Loss into the Thames River**,  
Nicola Crawhall, Great Lakes and St. Lawrence Cities Initiative

12:00 noon: **Agr Information Atlas Update: New Tools**; Bob Steiss, OMAFRA

1:30 pm: **Soil Health: Improve Your Drainage Power with Earthworms and Make Your Soil Smoke**;  
Frank Gibbs, Wetland and Consulting Services, Ohio

2:30 pm: **Annual meeting of LICO Contractors**

3:00 pm: **Maintenance of Self-Propelled Hydrostatic Ploughs**, Rob Hall, Bron, Woodstock

4:00 pm: **Suppliers Reception**

6:30 pm: **Banquet**

### **Thursday, January 26, 2017**

9:00 am: **The New Regs around Pipelines**, Amy Vanderdool, Enbridge

9:45 am: **The Social Economics of Farming in Ontario**, Al Mussel, Agri-Food Economic Systems

11:00 am **LICO Annual Meeting**

1:00 pm to 4:00 pm: **Tour to Sylfico**, Exeter



Unmanaged surface drainage can be devastating for topsoil and water quality.



# CROPLAND SURFACE DRAINAGE

## Outcomes and management

Everyone has a stake in how all surface water is managed. On cropland, surface drainage water must be managed with care because it can contribute to soil erosion, degraded water quality, increased peak flows and flooding.

Ideal surface drainage requires an integrated and properly sequenced water management system. The first step is to install sub-surface drainage wherever it can be effective in reducing the amount of surface drainage that is needed during wet seasons. Next, soil erodability must be reduced and water infiltration improved through soil management that improves soil aggregation. Then, to control the water runoff rate on complex topography during snow melt and storm events, a system of check dams or WASCoBs (Water and Sediment Control Basins) should be placed along concentrated flow paths. Behind the check dams, standpipe inlets with intake control orifices will slow the rate of water intake and will also allow time for sediment and other agricultural products to settle out before they enter sub-surface drain pipes. Water leaving a field from a well-planned surface drainage system will be cleaner and move at a slower rate thus providing real benefit to downstream waterways.

On most soil, surface drainage can be achieved without negative consequences. However, current surface drainage practices can lead to unacceptable consequences and need to be reconsidered. Key examples:

- Surface drains that are plowed through

fields increase the surface water runoff rate and increase sediment and nutrient delivery to receiving waterways. If surface drains feed into a standpipe inlet that is connected to a sub-surface drain, the flow rate to a waterway is further increased. It is always preferable to remove as much surface water as possible by improving water infiltration to sub-surface drains, and avoid use of open inlets.

### Ideal surface drainage requires an integrated and properly sequenced water management system.

- Land levelling to accommodate surface water runoff will increase sheet erosion, downstream sedimentation and downstream peak flow. Here the best option is to reduce the need for surface drainage by improving water infiltration through improved soil aggregation. Ensure that sub-surface drainage is adequate and functions properly.
- The installation of catch basins to intercept surface flow adds to downstream water quality degradation and increased peak flow. They should be positioned away from surface water flow where they can provide pressure relief and provide air access to allow water to flow freely in drain pipes.
- Grass waterways have been used to control erosion where there is

concentrated water flow. If the grass is cut short as it should be to avoid sediment buildup, then the waterway will do little to reduce downstream sedimentation and will not reduce peak flows or flooding. The use of check dams; e.g. WASCoBs is almost always a better option than a grass waterway. No-till and cross slope cropping dramatically reduces erosion and sediment build-up in WASCoBs.

On a relatively small amount of extremely dense clay very little water can percolate down into the soil. An example would be on Toledo Clay on the Essex clay plain. Here, surface drainage is the only option, so the cropland surface may be shaped to create regular, usually parallel, drainage swales or shallow ditches. It is important to use appropriate crop management and very minimal tillage to maintain soil organic matter and soil aggregates that minimize sedimentation of receiving waterways. Some soluble phosphorus (P) will be lost in the surface runoff, so in the interest of food production security, society must share in finding other ways to reduce the total phosphorus load.

A surface drainage system plan for cropland needs to consider all consequences so it will meet societal expectations in addition to providing effective drainage for agriculture.

Many LICO (Land Improvement Contractors of Ontario) contractors are trained and equipped to install those systems.

## CALENDAR OF EVENTS

Primary Drainage Course, January 16 - 20, 2017  
Advanced Drainage Course, February 6 - 16, 2017  
Ag Erosion Control Structures Courses, February 27 - March 3, 2017  
Marden Community Centre



January 24 - 26, 2017  
**LICO Conference**  
**Best Western Lamplighter Inn**  
591 Wellington Rd,  
London, Ontario N6C 4R3



### Passings

**IRWIN, Doreen Alice (née Webster)** Of Guelph, passed away peacefully at St. Joseph's Health Centre on Monday, November 7, 2016, in her 93rd year. She was a loving mother to her children John (Joan) of Ottawa and Carol Anne (the late Brian Pinkney) of Elora. Proud grandma of Trevor, Tim, Troy (Amber), Robbin and Christine. Predeceased by her husband Ross W. Irwin (2013) and her parents Roy Webster and Laura (Rich) of Oakwood. Doreen was born at Oakwood, Victoria County on April 1, 1924. She graduated from the Lindsay Collegiate Institute and was admitted to the Registered Nursing program at the Ross Memorial Hospital at Lindsay, graduating in June 1946. Doreen married Ross Irwin in 1949 while he was attending the Ontario Agricultural College at Guelph where they lived in the College Trailer Park. They later moved to Winona, Cedar Springs and Chatham before returning to Guelph in 1954. Doreen was an active member of Trinity United Church and the College Women's Club. Her hobbies were knitting, bowling, bridge and a spectator of all TV sports. In 1993 Doreen became a resident of St. Joseph's Health Care Centre. She never complained and always had a smile and throughout the years she has been blessed to have had the love and care of many, many staff members who became part of her extended family. Memorial contributions to Trinity United Church, 400 Stevenson Street N., Guelph, N1E 5C3 or St. Joseph's Health Care Foundation, 100 Westmount Rd., Guelph, N1H 5H8 would be appreciated. A tree will be planted in memory of Doreen A. Irwin of in the Wall-Custance Memorial Forest, University of Guelph Arboretum. Dedication service, Sunday, September 17, 2017 at 2:30 p.m.

**LICO would like to take this opportunity to wish you and your family all the best for the holiday season and the year to come.**

