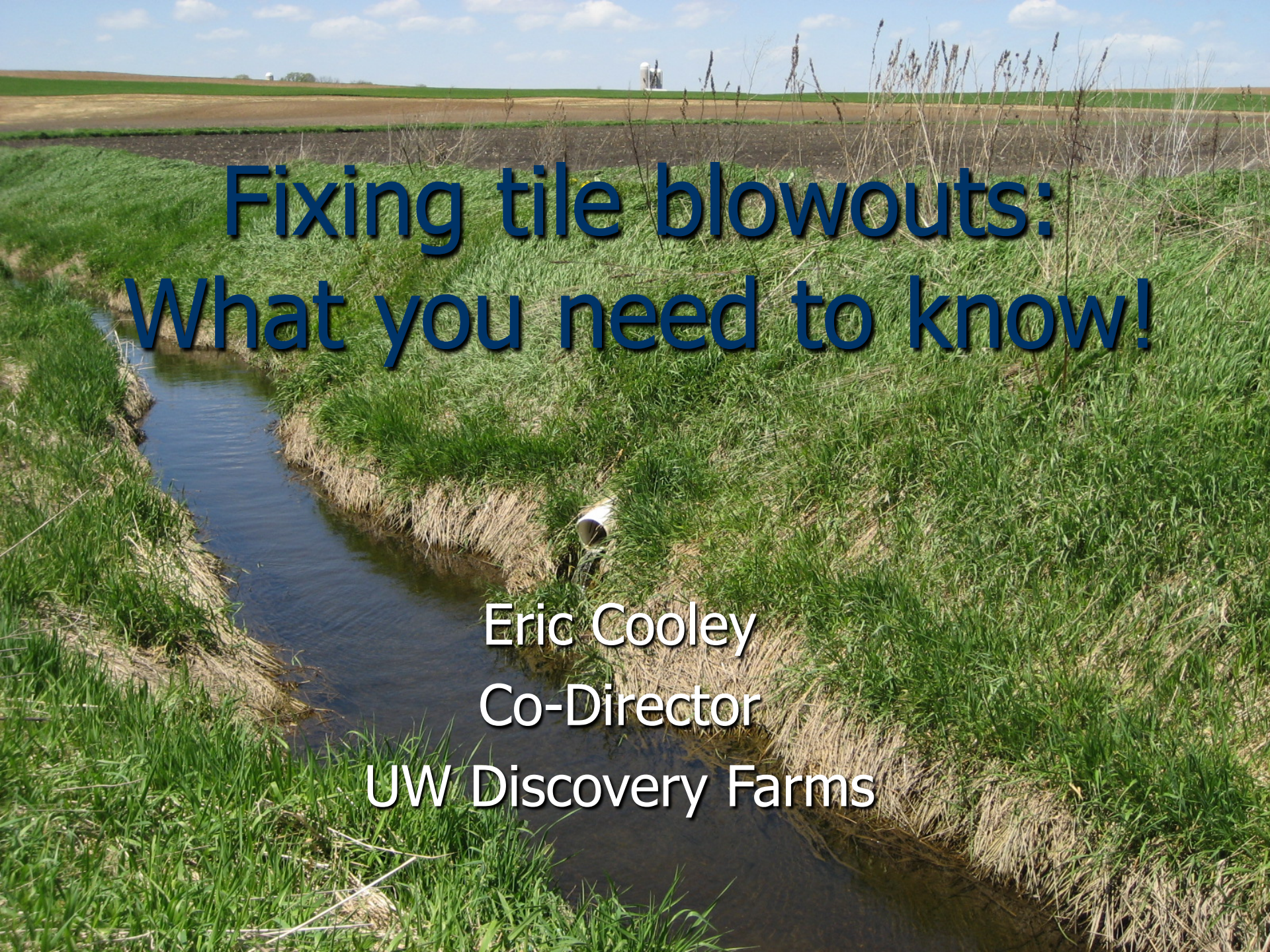
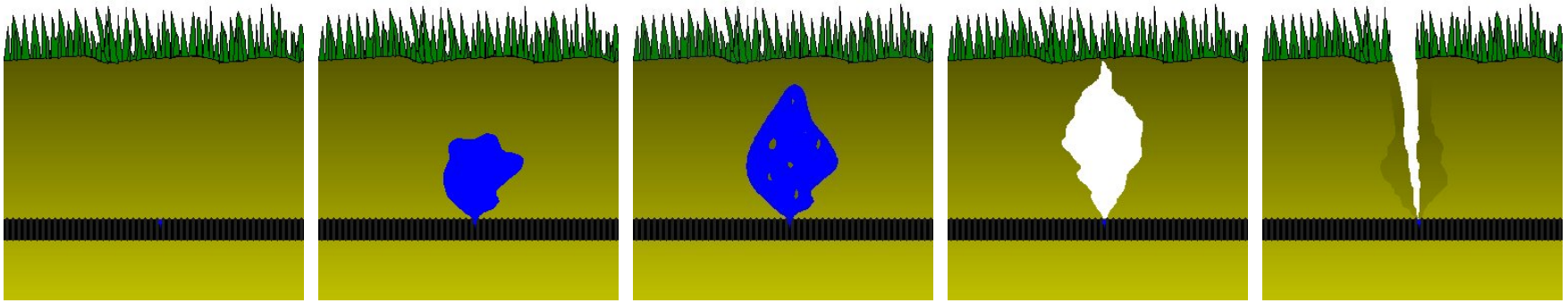


Fixing tile blowouts: What you need to know!

Eric Cooley
Co-Director
UW Discovery Farms

Tile Blowouts



Tile blowout development in agricultural landscapes can occur from a variety of means:

- Collapse of clay or concrete tiles from degradation over time
- Inadequate venting
- Expansion of tile system without adequately resizing main or sub-mains
- Outlet blockages
- Improper joint connections or junctions between old/new tile lines
- Contact of deep tillage equipment with shallow tile lines
- Animal burrows

Identifying Tile Blowouts

- Most easily performed in the late stages of spring snowmelt when soils typically have reduced surface cover.
- When identified, immediately mark with a stake and take a GPS position or photo if possible

UW Extension
University of Wisconsin-Extension

DISCOVERY FARMS WISCONSIN

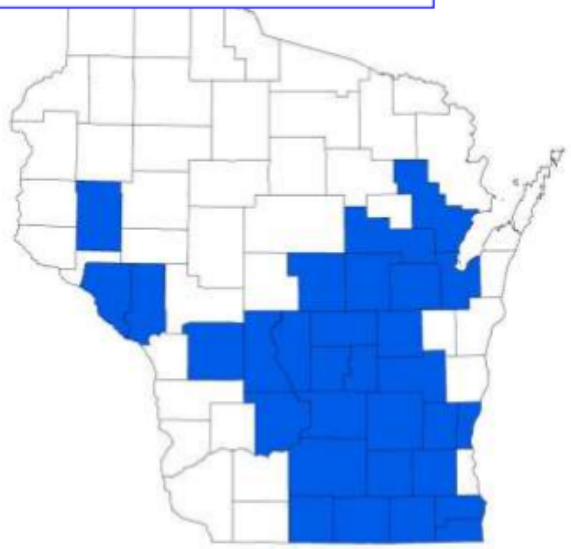
Farmers are allowed to fix their own tile blowouts, but there are several questions to consider:

1. **Is the tile system within a drainage district that is governed by county drainage boards?**

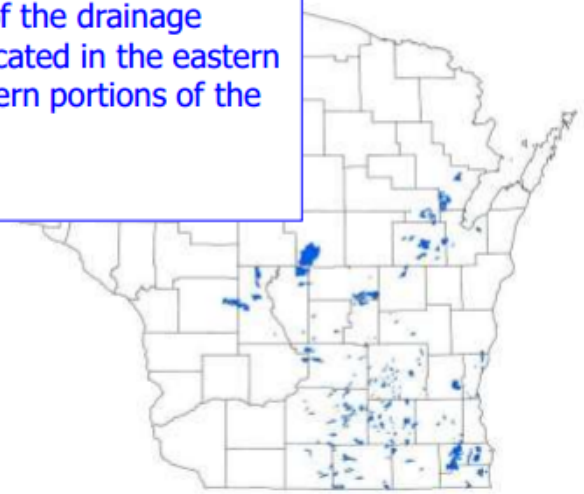
If so, the local drainage board needs to be contacted prior to tile system maintenance. Cost-sharing for the tile system repair might be available through the drainage board. To determine if your tile system resides in a drainage district, visit the Wisconsin Department of Agriculture, Trade and Consumer Protection Drainage District Program at: http://datcp.wi.gov/Environment/Drainage_Programs for a web map and additional information.

Drainage Districts in Wisconsin

Counties Containing Active Drainage Districts



DATCP is aware of about 176 active drainage districts in Wisconsin. Of the 72 counties in Wisconsin, 31 of them contain one or more drainage districts. The majority of the drainage districts are located in the eastern and southeastern portions of the state.



Distribution of Active Drainage Districts

Source: Seth McClure, WDATCP (2012)

Farmers are allowed to fix their own tile blowouts, but there are several questions to consider:

2. Is the location of the blowout within a designated wetland?

Contact your local United States Department of Agriculture - Natural Resources Conservation Service (USDA-NRCS) field office for wetland determination. USDA benefits may be affected with non-compliance of rules: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_020717.pdf

Designated Wetlands (Swampbuster)

To maintain USDA benefit eligibility, producers must certify that they have not:

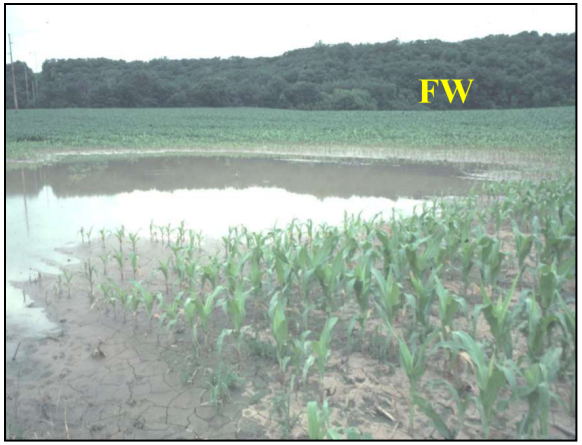
- planted an agricultural commodity on a converted wetland that was converted by drainage, dredging, leveling, or any other means (after December 23, 1985)
- converted a wetland for the purpose of or to make agricultural commodity production possible (after November 28, 1990).

Source: Wetlands and Conservation Compliance: What Every Wisconsin Farmer Needs to Know

Designated Wetlands

Farmed Wetland (FW) and Farmed Wetland Pasture - (FWP)

- Cropped or grazed prior to December 23, 1985, and are saturated for at least 14 consecutive days during the growing season.
- Drainage system may be maintained as originally constructed (prior to December 23, 1985). ***May not be improved beyond the scope & effect of the originally installed system***. (Except with abandonment)



Prior Converted Cropland (PC)

- Saturated for less than 14 days but may exhibit wetland characteristics
- ***No restrictions on drainage maintenance or improvements***, as long as adjacent wetlands are not adversely impacted.
- PC's retain this label as long as they remain in agricultural use.

Source: Robert Weihrouch, USDA NRCS (2011)

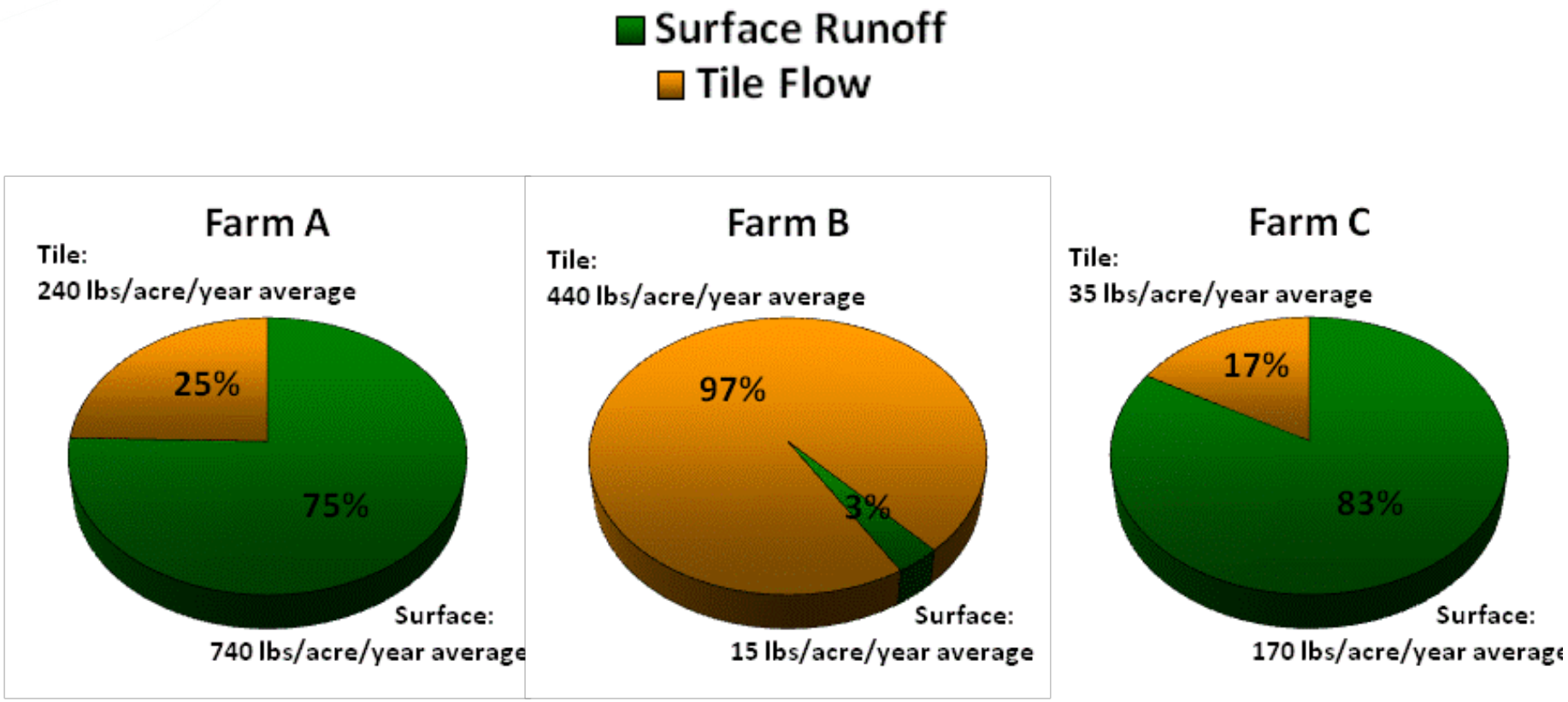
Farmers are allowed to fix their own tile blowouts, but there are several questions to consider:

3. What caused the blowouts to develop?

The cause of blowout formation is critical to prevent future formation of other blowouts. Tile age degradation, improper venting or undersized tile mains are common issues that will result in persistent development of blowouts. If tile system issues are not remedied in conjunction with the tile blowout, the problems will persist.

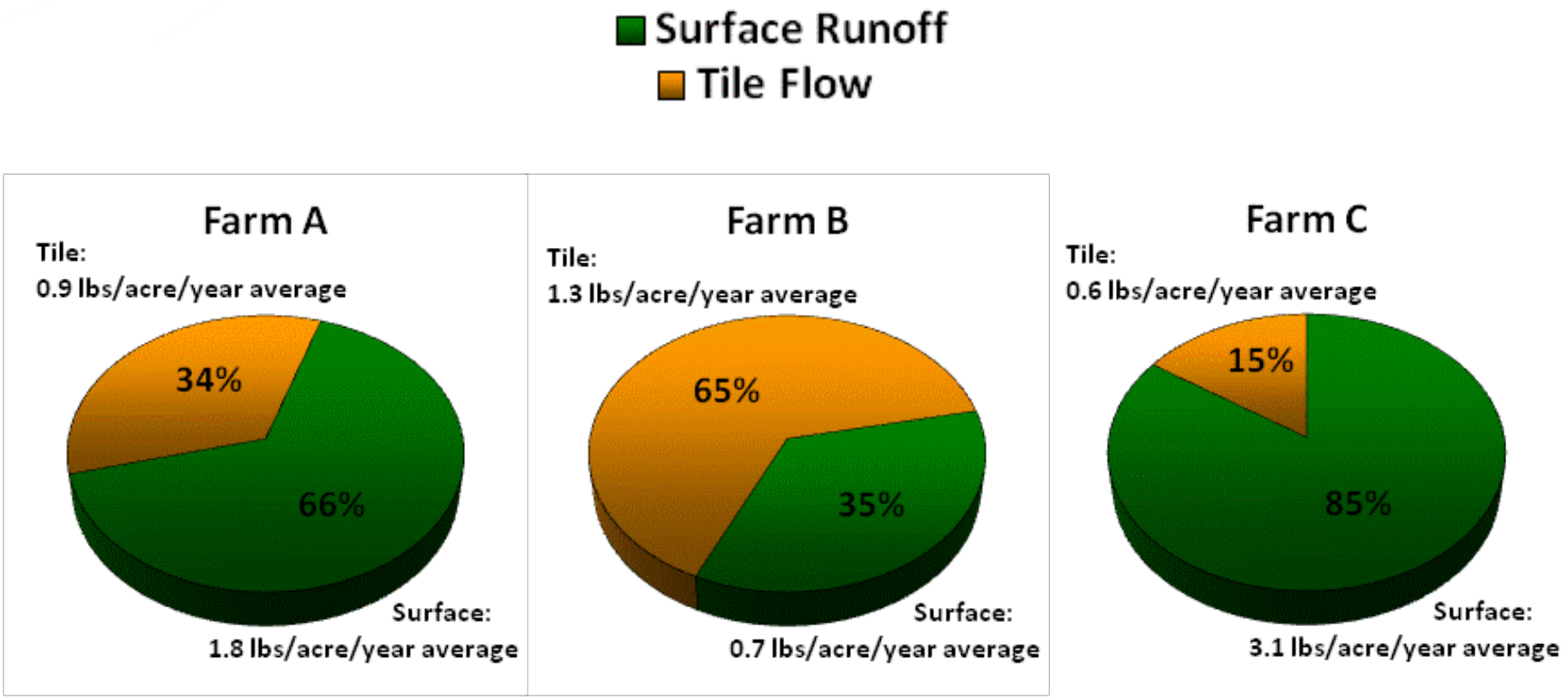
Always contact Digger's Hotline prior to excavation for tile repairs.

Surface & tile sediment loss



Farm A: Chisel plow, injected Farm B: grazed paddocks Farm C: no-till, surface

Surface & tile phosphorus loss



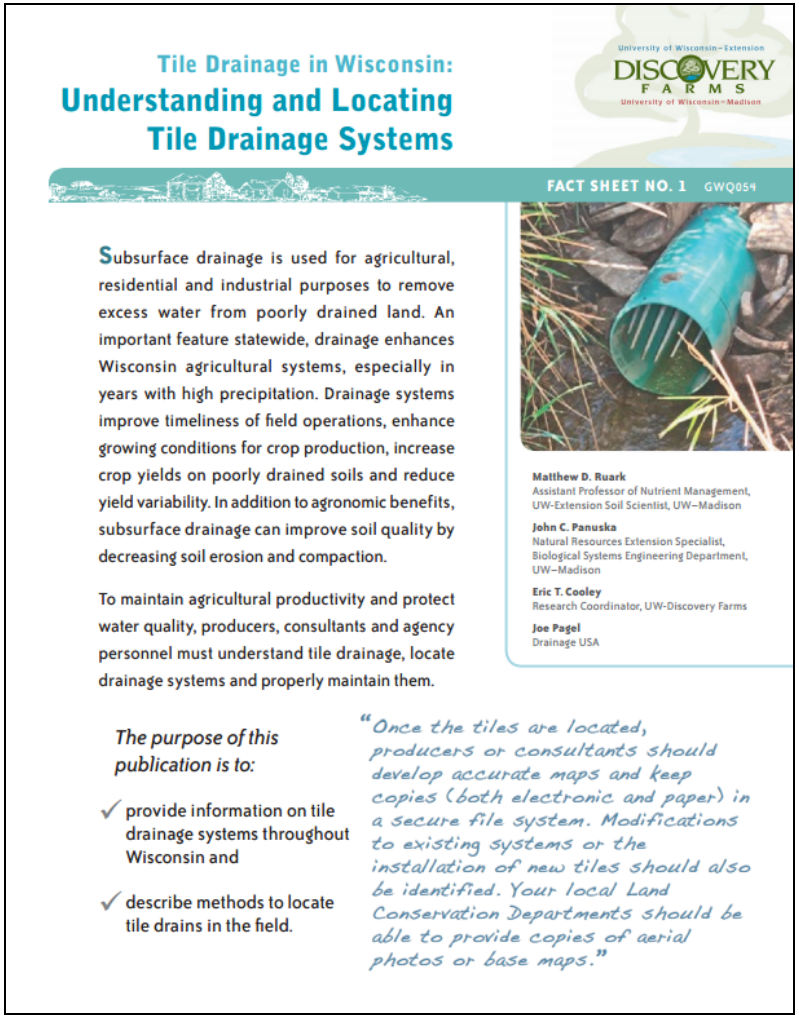
Farm A: Chisel plow, injected Farm B: grazed paddocks Farm C: no-till, surface

UW Extension
University of Wisconsin-Extension

DISCOVERY FARMS WISCONSIN

A new service for agronomists

- Develop maps of unknown tile system locations
- Identify tile blowouts to be fixed



Tile Drainage in Wisconsin:

Understanding and Locating Tile Drainage Systems

University of Wisconsin–Extension DISCOVERY FARMS University of Wisconsin–Madison

FACT SHEET NO. 1 GWQ054

Subsurface drainage is used for agricultural, residential and industrial purposes to remove excess water from poorly drained land. An important feature statewide, drainage enhances Wisconsin agricultural systems, especially in years with high precipitation. Drainage systems improve timeliness of field operations, enhance growing conditions for crop production, increase crop yields on poorly drained soils and reduce yield variability. In addition to agronomic benefits, subsurface drainage can improve soil quality by decreasing soil erosion and compaction.

To maintain agricultural productivity and protect water quality, producers, consultants and agency personnel must understand tile drainage, locate drainage systems and properly maintain them.

Matthew D. Ruark
Assistant Professor of Nutrient Management, UW-Extension Soil Scientist, UW–Madison

John C. Panuska
Natural Resources Extension Specialist, Biological Systems Engineering Department, UW–Madison

Eric T. Cooley
Research Coordinator, UW-Discovery Farms

Joe Pagel
Drainage USA

The purpose of this publication is to:

- ✓ provide information on tile drainage systems throughout Wisconsin and
- ✓ describe methods to locate tile drains in the field.

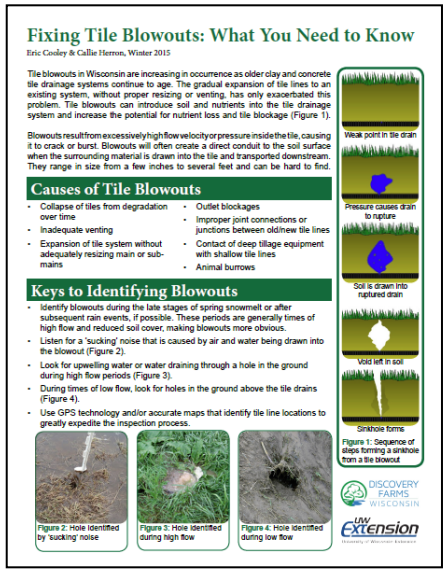
"Once the tiles are located, producers or consultants should develop accurate maps and keep copies (both electronic and paper) in a secure file system. Modifications to existing systems or the installation of new tiles should also be identified. Your local Land Conservation Departments should be able to provide copies of aerial photos or base maps."

UW Extension University of Wisconsin-Extension

DISCOVERY FARMS WISCONSIN

For more information

www.uwdiscoveryfarms.org



Fixing Tile Blowouts: What You Need to Know

Eric Cooley & Callie Herron, Winter 2015

Tile blowouts in Wisconsin are increasing in occurrence as older clay and concrete tile drainage systems continue to age. The gradual expansion of tile lines to an existing system, without proper resizing or venting, has only exacerbated this problem. Tile blowouts can introduce soil and nutrients into the tile drainage system and increase the potential for nutrient loss and tile blockage (Figure 1).

Blowouts result from excessively high flow velocity or pressure inside the tile, causing it to crack or burst. Blowouts will often create a direct conduit to the soil surface when the surrounding material is drawn into the tile and transported downstream. They range in size from a few inches to several feet and can be hard to find.

Causes of Tile Blowouts

- Collapse of tiles from degradation over time
- Inadequate venting
- Expansion of tile system without adequately resizing main or sub-mains
- Outlet blockages
- Improper joint connections or junctions between old/new tile lines
- Contact of deep tillage equipment with shallow tile lines
- Animal burrows

Keys to Identifying Blowouts

- Identify blowouts during the late stages of spring snowmelt or after subsequent rain events, if possible. These periods are generally times of high flow and reduced soil cover, making blowouts more obvious.
- Listen for a 'sucking' noise that is caused by air and water being drawn into the blowout (Figure 2).
- Look for upwelling water or water draining through a hole in the ground during high flow periods (Figure 3).
- During times of low flow, look for holes in the ground above the tile drains (Figure 4).
- Use GPS technology and/or accurate maps that identify tile line locations to greatly expedite the inspection process.

Figure 1: Sequence of steps forming a sinkhole from a tile blowout

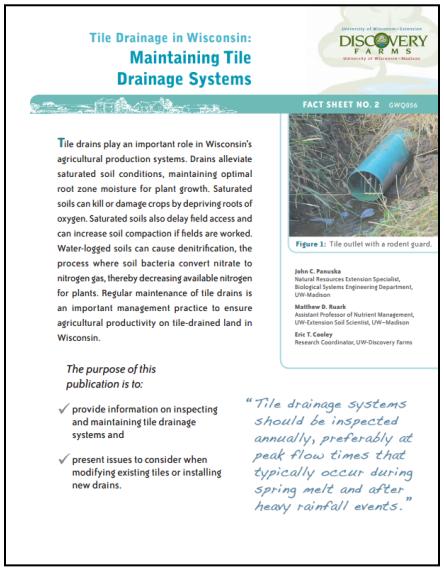
Figure 2: Hole identified by 'sucking' noise

Figure 3: Hole identified during high flow

Figure 4: Hole identified during low flow

DISCOVERY FARMS WISCONSIN

UW Extension



Tile Drainage in Wisconsin:

Maintaining Tile Drainage Systems

DISCOVERY FARMS

FACT SHEET NO. 2 GWQ056

Tile drains play an important role in Wisconsin's agricultural production systems. Drains alleviate saturated soil conditions, maintaining optimal root zone moisture for plant growth. Saturated soils can kill or damage crops by depriving roots of oxygen. Saturated soils also delay field access and can increase soil compaction if fields are worked. Water-logged soils can cause denitrification, the process where soil bacteria convert nitrate to nitrogen gas, thereby decreasing available nitrogen for plants. Regular maintenance of tile drains is an important management practice to ensure agricultural productivity on tile-drained land in Wisconsin.

Figure 1: Tile outlet with a rodent guard.

John C. Panuska
Natural Resources Extension Specialist, Biological Systems Engineering Department, UW-Madison

Matthew D. Ruark
Assistant Professor of Nutrient Management, UW-Extension Soil Scientist, UW–Madison

Eric T. Cooley
Research Coordinator, UW-Discovery Farms

The purpose of this publication is to:

- ✓ provide information on inspecting and maintaining tile drainage systems and
- ✓ present issues to consider when modifying existing tiles or installing new drains.

"Tile drainage systems should be inspected annually, preferably at peak flow times that typically occur during spring melt and after heavy rainfall events."

UW Extension
University of Wisconsin-Extension

DISCOVERY FARMS WISCONSIN