



ILLINOIS  
NREC

**Maximize Efficiency. Minimize  
Loss. Mitigate Potential Negative  
Impacts.**

# What is NREC?

- Created in 2012 through state statute
  - Pursue nutrient research & educational programs
  - Ensure adoption and implementation of practices that
    - Optimize nutrient use efficiency
    - Ensure soil fertility
    - Address Environmental concerns regarding fertilizer
- Funded by \$.75/ton assessment on fertilizer sold in Illinois
- Collaboration between ag, environmental groups, and state agencies

# NREC Council Members

- 13 Member Council (9 voting and 4 advisory)
- Voting Members
  - 3 Farmers (ILFB, ICGA, ISA)
  - 3 Members from Fertilizer Industry
  - CCA
  - Specialty Fertilizer
  - Illinois Department of Ag
- Advisory Members
  - 2 Environmental Organizations (Sierra Club & Environmental Law Policy Center)
  - State/Federal Ag Research Station Representative
  - Illinois EPA

# NREC Research Focus

- Solicit proposals that focus on
  - Improved nutrient efficiency
  - Enhanced crop production
  - Protect water quality
- Council, Research Committee, and Independent Peer Review Team review applications
- Projects are ranked on merit and availability of funds

# Funding and Progress to Date

- Since 2013
  - Approximately \$19.8M invested in research projects
  - Four NREC publications: Turf Guide, Cover Crop Guide 1.0, Guide to MRTN, and Cover Crop 2.0
  - Annual Reports, Investment Insights, Field Notes, and videos
  - More than a dozen papers published in Professional Journals written by NREC-funded researchers
  - Many opportunities for collaboration on research and outreach projects

# NREC 2019 Research Update

Dr. Shani Golovay



# COVER CROP HIGHLIGHTS

# What N form do cover crops scavenge?

- Where no fertilizer nitrogen was applied, we still saw a reduction in tile N – cover crops are reducing the mineralized N.
- Cereal rye reacts more with soil mineralized N compared to fertilizer N. Yield impact?
- $^{15}\text{N}$  studies revealed that only 7.3-10% of cereal rye biomass N is recovered by the subsequent corn and soybean.

# Do Cover Crops Work?

- Short answer? Yes.
- Field scale research at ISU shows 62% reduction in tile nitrates compared to no cover crops
- Watershed scale: Cover cropped watershed lost 30% less N than reference watershed with no cover.
- Cover cropping as little as 60% of a watershed could be effective without changing any other management practices.



# What's on the Horizon?

- Increased tile nitrates following soybeans? What role does mineralized N play?
- Insect control in cover crops
- Further investigation using the N15 isotope to better answer the when and how of nitrogen uptake and later release.





# Phosphorus Research

# Phosphorus Updates

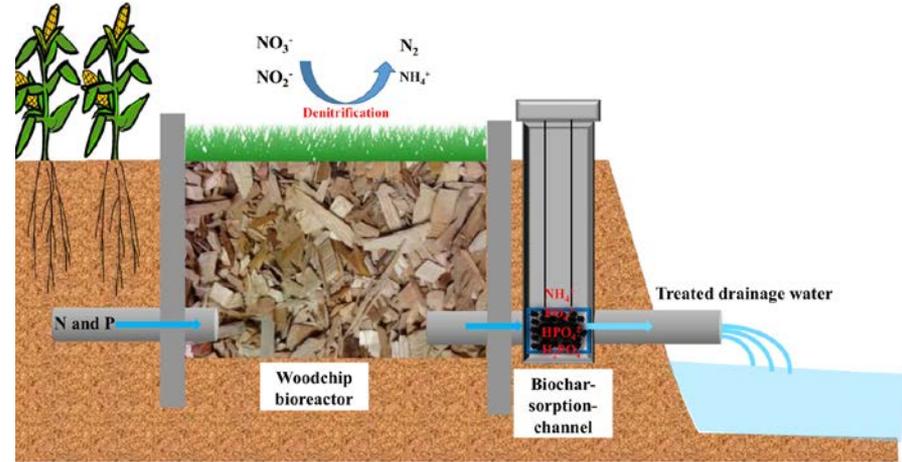
- Working with MRWD and the Ostara project to evaluate struvite as a recycled P fertilizer – with significant substitution of struvite – no yield penalty
- Looking at projects that address the role of DRP (dissolved reactive phosphorus) and potential losses



# Designer Biochar to Capture and Recycle Phosphorous from Tile Drainage System

Working to create designer biochars to effectively

- adsorb phosphorus
- recycle phosphorus-captured biochars as a slow-release fertilizer.
- construct refillable biochar-sorption-channels to capture phosphorus from subsurface tile drainage

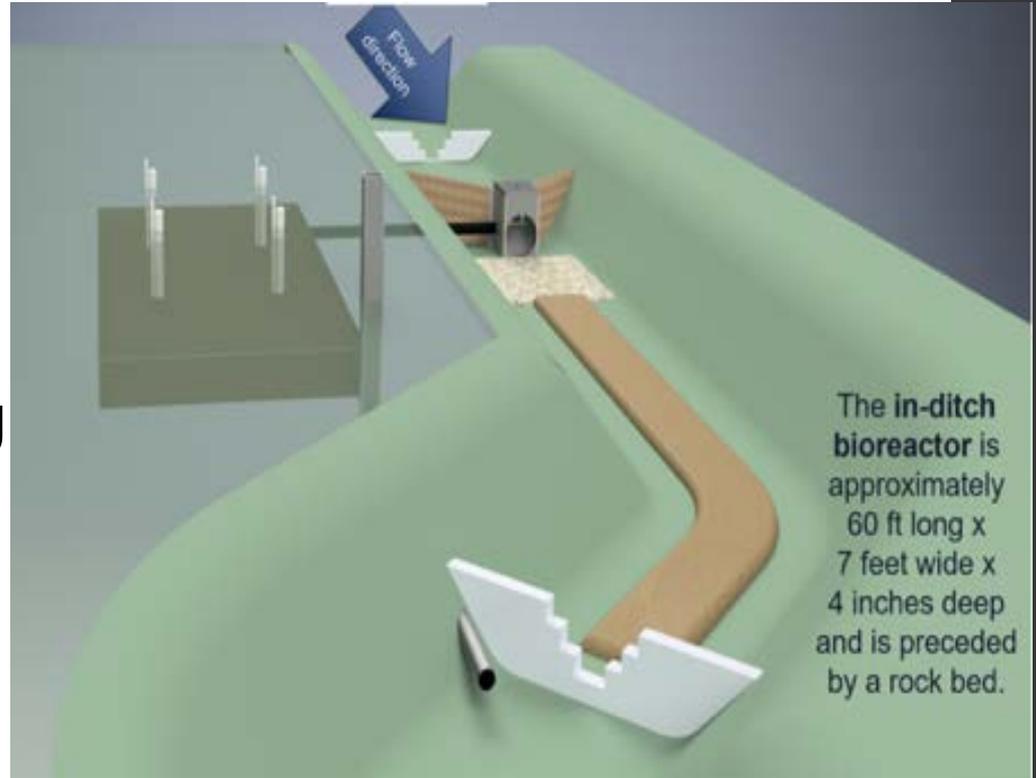




# Edge of Field Practices

# Bioreactors

An innovative idea is using ditches for bioreactor placement or “double duty ditches”;



# Drainage water management (DWM) and saturated buffers

The practice of drainage water management is working as expected to reduce nitrogen loss.

The practice is primarily reducing nitrate loss by reducing the volume of drainage water leaving through the tile outlet.

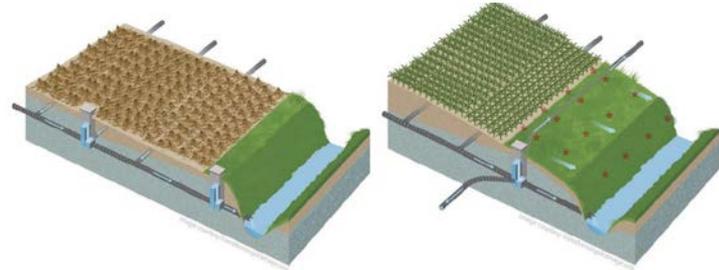


Figure 1. Illustration of drainage water management (left) and a saturated buffer (right) (credit: TransformingDrainage.org). Example proposed monitoring wells (four transects) shown with red stars.

# Drainage water management (DWM) and saturated buffers

The saturated buffer monitoring sites also continue to reduce nitrogen loss from the tile drainage outlets.

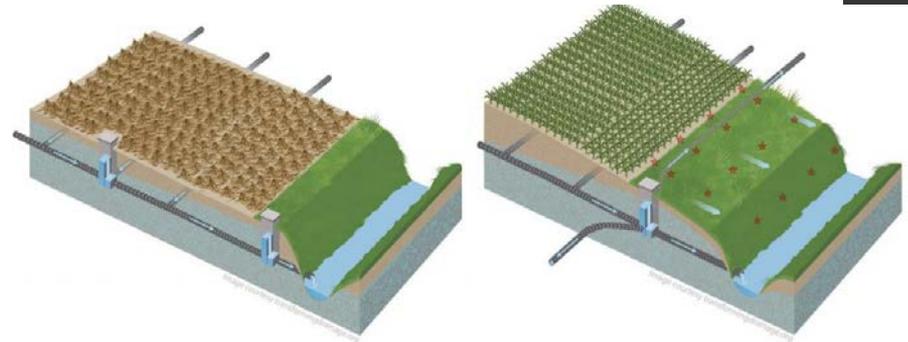


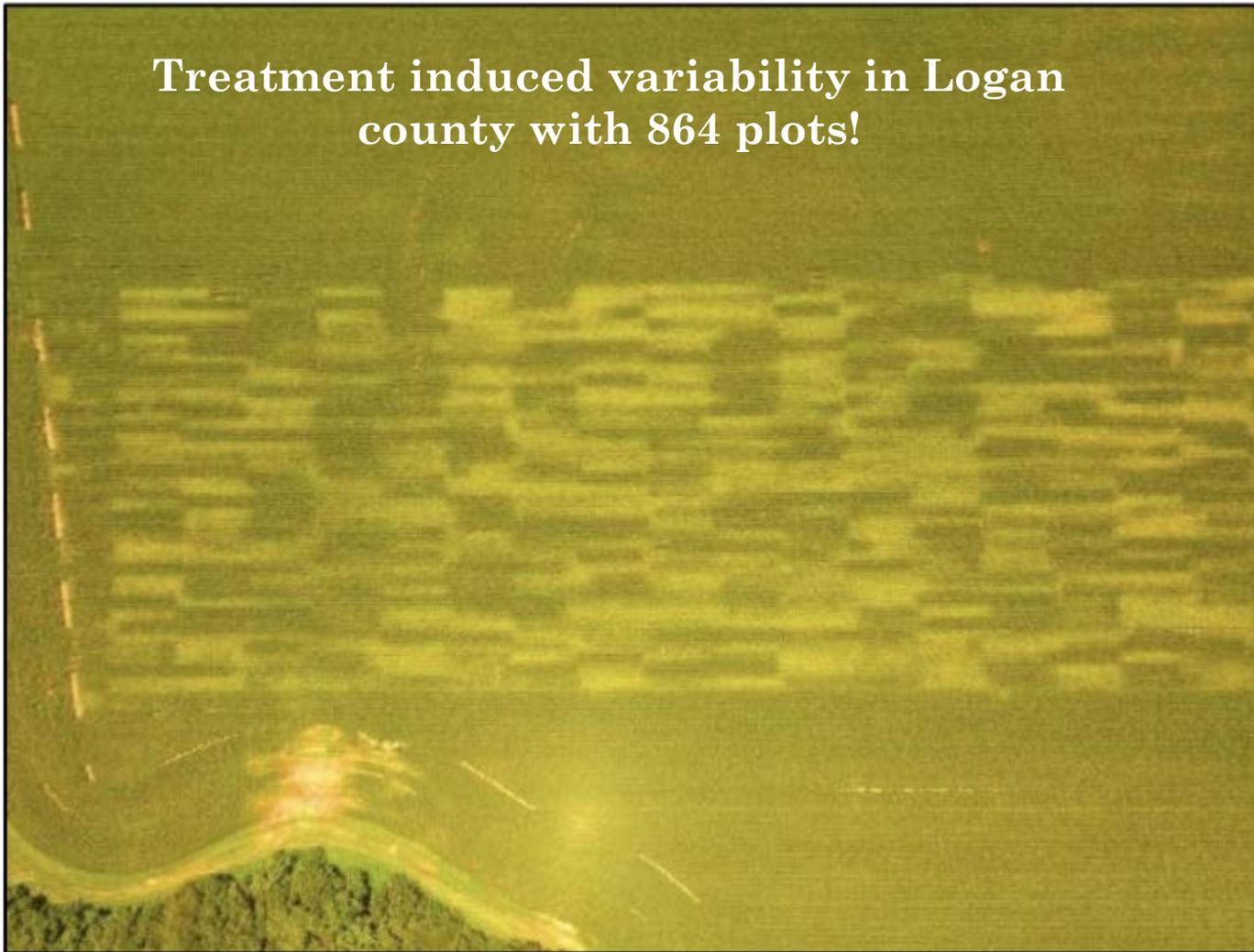
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# 4R Nutrient Management

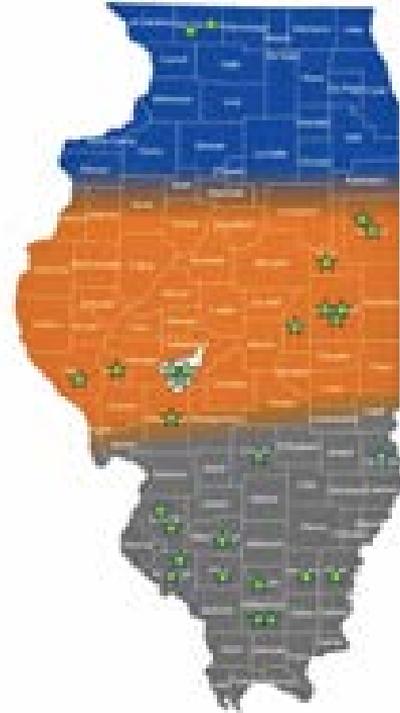


Treatment induced variability in Logan  
county with 864 plots!



# IFCA: Nitrogen Rate Research & NREC Project Partnership

- Long-term N rate trials to support MRTN calibration
- Publication of MRTN guide
- Support of field scale N rate trials throughout Illinois



# Where can I get more info?

- **Website:** [illinoisnrec.org](http://illinoisnrec.org)
- **Twitter:** @IllinoisNREC
- **Facebook:** @IllinoisNREC
- **Email:**  
[Julie.Armstrong@illinoisnrec.org](mailto:Julie.Armstrong@illinoisnrec.org)  
[Sgolovay@illinoisnrec.org](mailto:Sgolovay@illinoisnrec.org)