

What is the water
quality/soil test
data showing us?

What are
worrisome
practices?

What practices
appear to be most
useful so far?

What practices
have the most
promise?

How are we
reaching farmers?

How do we get
farmers to use the
best practices for
their farm?

How open to
change are
farmers?

What is the water
quality/soil test
data showing us?

- Dissolved P is the form that's changed
- But we still lose plenty of particulate P
- Chronic or baseline losses with each storm
- Acute or spike losses from specific practices
- Tiles deliver lower concentrations but higher loads of dissolved P
- Many farms are at recommended STP and are in balance or negative P budget, but P stratification is prevalent
- Although STP decreases without application of fertilizer, it doesn't have a clear influence on yields (because of maintenance approach)
- Available P a small percent of total P in soil
- It's the bioavailable P that changed, but not necessarily TP

What are worrisome practices?

- Surface application of P, especially at before precipitation or on frozen ground
- Overapplication, especially in combination with manure

What practices appear to be most useful so far?

- Keeping STP at maintenance or below
- Measuring 0-2" STP
- Injection or banding of fertilizer P
- Incorporation of fertilizer P, too
- Water management (surface and tile)

What practices have the most promise?

- Moldboard plow to remove stratification
- Cover crops
- Saturated buffers
- 4Rs
- *see BMP toolbox for more

- Fertilizer training
- 4R certification for retailers
- Incentive programs
- Watershed group and SWCD educational programs
- Demonstration farms
- Targeting using ranking and/or SWAT to ID areas of need

How are we reaching farmers?

- Convince farmers that the BMP will work for them and that they can do it- consistent messaging (economics too)
- Share research results that link BMP to water quality
- Allow flexibility in choosing practices
- Have more on-farm research
- Target incentives to the hesitant farmers
- Focus cognitive to motivated farmers
- NTT and updated P Index

How do we get farmers to use the best practices for their farm?

- Most know about nutrient stewardship and are concerned about farm runoff
- Most plan to use better practices
- Don't worry about the ~15% that will never change

How open to change are farmers?

Research needs for... Water and Soil

What else do we need to measure?

- Manure vs commercial P (and/or other sources)
- Appropriateness of current soil extractions for P availability
- How old is the “legacy” P that runs off?
 - In-stream legacy P?
- P dynamics from EOF to lake
- Role of other possible causes- pH/S, glyphosate
- How to soil quality and biology influence nutrient availability
- Application of gypsum... one high STP, high stratification, moderate STP
 - Does the source of gypsum make a difference??

Research needs for... BMPs

What practices need to be investigated more?

- Will cover crops increase or decrease dissolved P? How much influence on water holding capacity?
 - How does managing for soil health influence factors such as inputs or applications to farms?
- Can we target even? Or do we need a cultural change?
- Stacking BMPs
- Overall water management, not just nutrient
- Stratification and tillage
 - Does stratification matter with sufficient SOM?
- Natural vs agricultural stratification
 - What level of stratification is detrimental?
- Need more study on how soil health and DRP loss interact
- If you reset for stratification, how long before it reforms, what if no management change? Will a “reset” actually help?
 - Make sure to not recreate past problems.
- How to manage when you need to till with the long-term no till approach

Research needs for...

Communicating with farmers

- First consider... how many farmers do we really need to reach?
- Consistent messaging
- How to implement practices?
 - Show the economics – may not work for losses, but would work for inputs (i.e., don't apply P fert for a year saves a lot)
- Need to approach issues as system rather than an individual BMP, better connections to producers to reach all goals
- Profit margins are shrinking, leading to a large perceived risk. Hence need to farm-to-farm communication to test BMPs etc.
- Adding economics to NTT may help meet these challenges.
- What are the day to day ways we reach these goals?
- SWCD and extension are the key people
- Disconnection between agencies and funding sources
- Evaluating and measuring what the people on the ground are doing with farmers... share those lessons!
- How to reach landowners of rented ground.
 - Can we suggest things to include or exclude from lease agreements?
 - Have the landowner consider the long-term rather than the short-term?
- Need to have farmer trust to have successful suggestions

Other research needs?

- Can we maintain crop yields and preserve water quality?
- How can we use the NTT more effectively on a wide scale?
- Can we address most needs with on-farm research?? That is, research done BY the farmers