

Ohio Agricultural Nutrient Applicator Certification

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THE OHIO STATE UNIVERSITY

COLLEGE OF FOOD, AGRICULTURAL,
AND ENVIRONMENTAL SCIENCES

Discussion

- “Agriculture Nutrient Applicator Certification” Senate Bill 150 Training.
- Legislation description
- The focus on Agriculture
- BMP’s for Keeping Phosphorus on the field.

Overview

- Senate Bill 150 was signed by the Governor on May 22, 2014 and became law on August 2014.
- The rules for this law are still in writing and review and are projected to be completed by Jan. 1, 2015
- The law has 2 major components:
 - Agricultural Fertilizer Certification for fertilizer applied to agricultural production.
 - Affirmative defense for private civil claims against fertilizer applications

Who has to be certified?

- Anyone who applies commercial fertilizer to 50 acres or more for the purpose of agricultural production (sale of plants, or parts of plants). Note, that starter fertilizer applied through the planter is not included. Must be certified no later than Sept. 30, 2017 or be subject to fines etc. Steps in the process include:
 - Fill out application
 - Pay a fee 30.00 if **not** already a pesticide applicator
 - Attend a training session (ie Sept 12, Archbold, Ohio)
- Certification good for 3 years
- No certification required if hire all fertilizer applied (May buy fertilizer without certification)
- Direct supervision of fertilizer applicators similar pesticide law permitted



Record Keeping, Inspection, Affirmative Defense

- Records of date and place of fertilizer application, rate of fertilizer applied, analysis of fertilizer, and person applying fertilizer must be kept 3 years and be made available for inspection by ODA personnel.
- ODA will conduct random inspections
- Affirmative Defense (protection against civil claims) has 3 mandatory components:
 - Person applying is certified or under direct supervision.
 - Records are properly kept and maintained
 - Fertilizer applied has been applied in accordance and compliance with a voluntary nutrient management plan that has been submitted to supervisors of appropriate soil & water district or director.

Training components of certification

- The training program will: provide education on time, placement, form, rate and application of fertilizer that addresses all sources of nutrients and supports generally practical and economically feasible BMP's as a component of a comprehensive state nutrient reduction strategy.
- Training programs will be 3 hours in length or if a component of Pesticide Applicator Recertification program 2 hours in length (must be certified pesticide applicator).
- CCA's will be exempted from training but must make application and pay any applicable fees.
- Finally, be aware that rulemaking is not complete and additional changes may occur.

September 2014- Start of training



September 2014- Start of training

- September 12, 370 farmers and industry, Archbold, OH
 - Q5. Farm field P loss is a significant problem to our water resources (stream, rivers, lakes)- 81 % agreed or strongly agreed
 - Q11. I will change my nutrient management practices as a result of this meeting.
 - 51% agreed or strongly agreed
 - 38 % were neutral (I interpret this that they are willing to continue to listen to our message)
- September 25, 235 preregistered, Findlay
- September 26, 140 preregistered, Paulding



What is the goal?

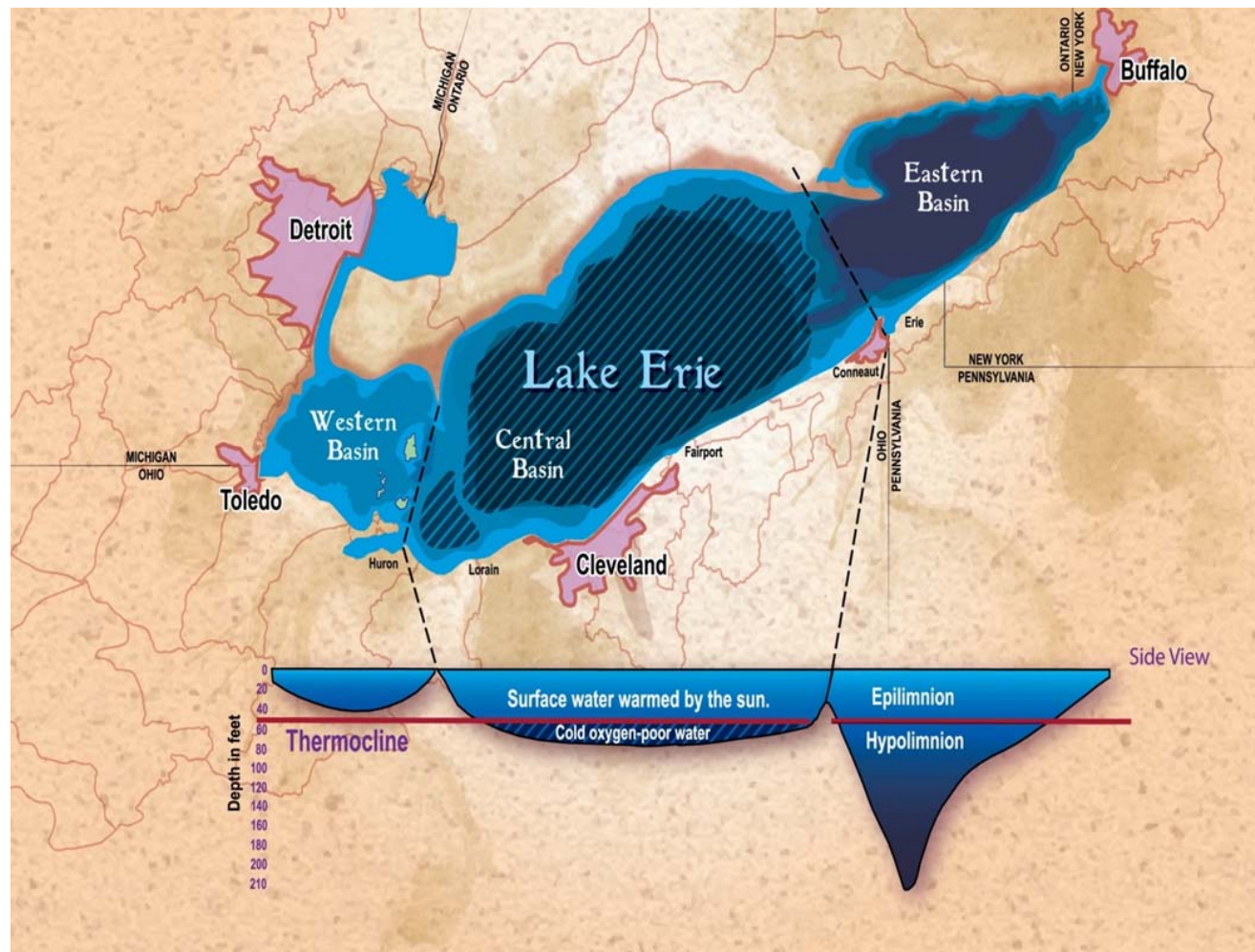
- Phosphorus Task Force 2 report indicates to improve HAB we need to reduce the average phosphorus loading to Lake Erie by 1,100 US Tons of P from the Western Lake Erie Basin
- “Adaptive management” is a process of treatment effect monitoring.
- Once we start to reach these goals they may need to be adjusted on the Lake is mentioned.
- We will be talking about “Adaptive management” from an agricultural perspective as well.

How much Phosphorus does it take to grow plants?

Solution phosphorus concentration to support plants in different media.

Situation	Note	Concentration of P
Crops optimal soil solution	Maximizing crop production	~ 0.20 mg/L (or ppm)
Flowing Water	Algae grow stimulated	~ 0.01 – 0.10 mg/L (or ppm)
Lake	Higher resident or contact time results in lower concentration	~0.01 – 0.04 mg/L (or ppm)

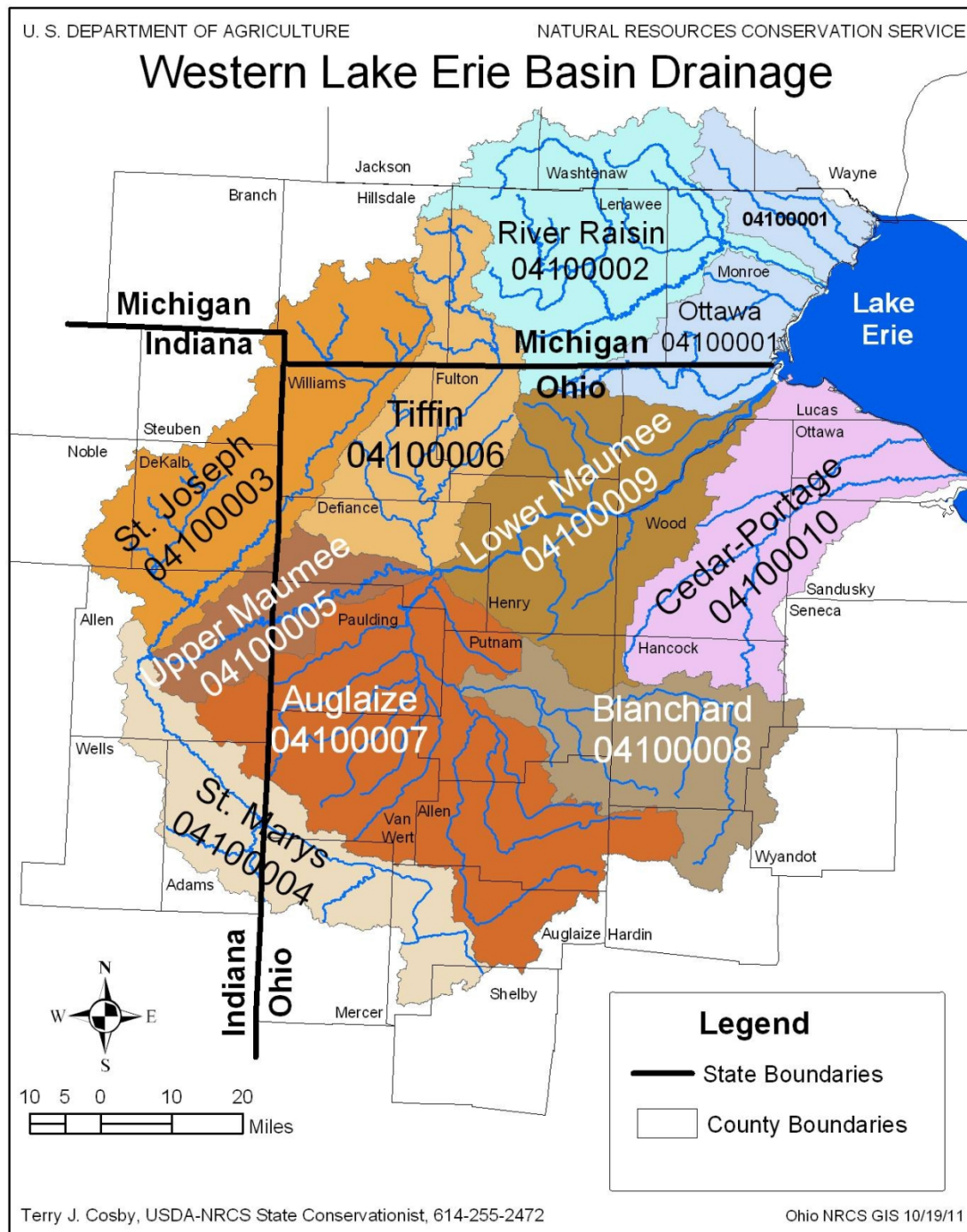
Lake Erie



Why the Agricultural Focus?

Annual US Tons P					
External P Sources	Connecting Channel	Western Basin	Central Eastern	Total	Percentage of Total
NonPoint	575	4,395	1,206	6,176	61%
Point	1,159	428	517	2,103	21%
Upper Lakes	1,190	-	-	1,190	12%
Atmospheric	-	88	604	692	7%
Total	2,924	4,911	2,327	10,162	100%
Percentage of Total	29%	48%	23%	100%	

Source: P Task Force 1 report, 2010



Why the Agricultural Focus?

Back of the envelope calculations

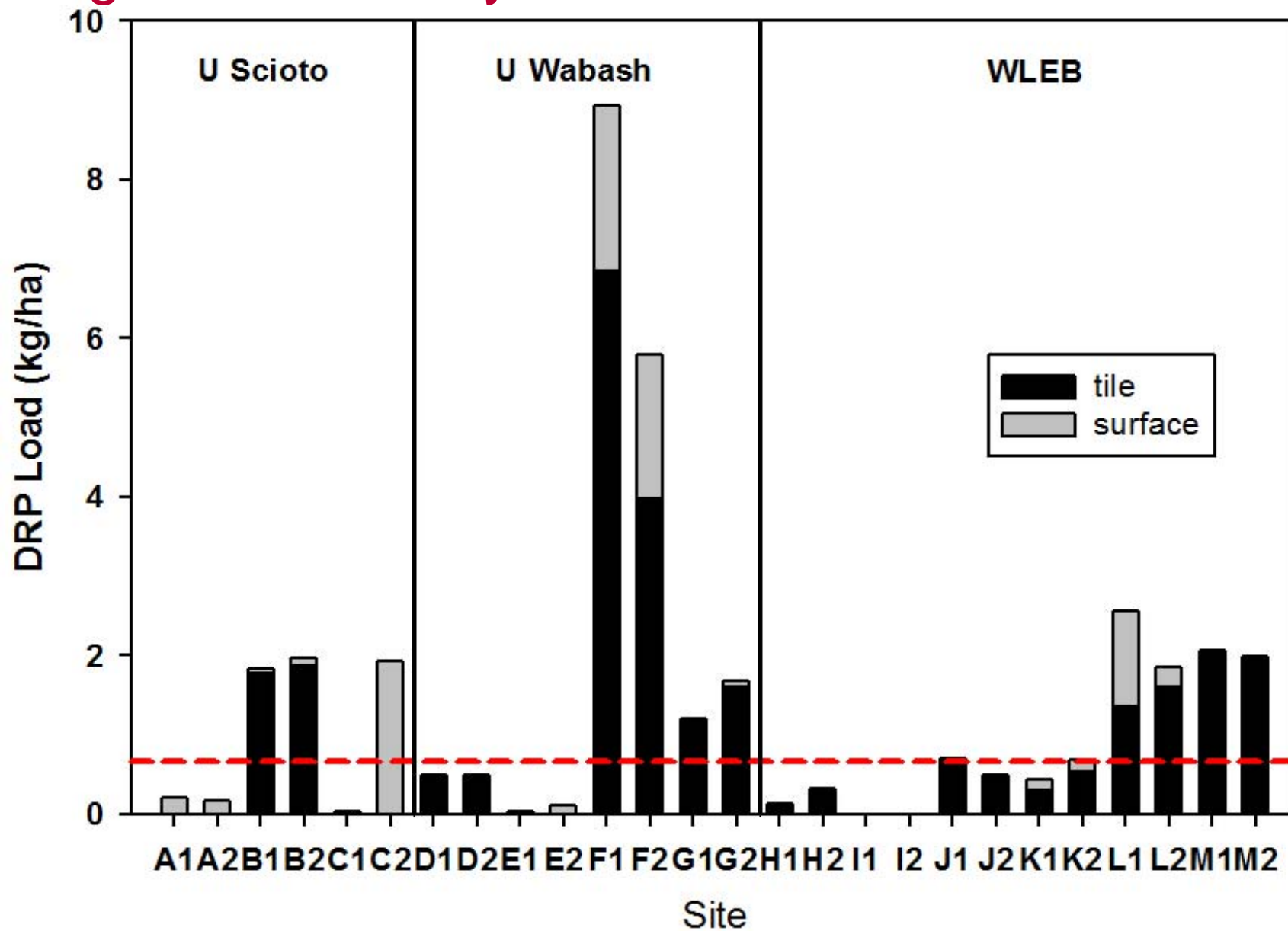
State	Acres
Ohio	3,806,780
Indiana	821,540
Michigan	1,313,420
Total	5,941,740
Percentage Ag	72%
Ag Acres	4,278,052

Edge of Field Studies

- Monitoring 32 field (16 paired sites) with surface and tile drainage
- Soil silt loam, silty clay loam and clay loam
- Soil test range 9-380 ppm M3
- Manure 12 sites (6 pairs)
- Tillage (No-till, strip till, conservation)
- Base line period

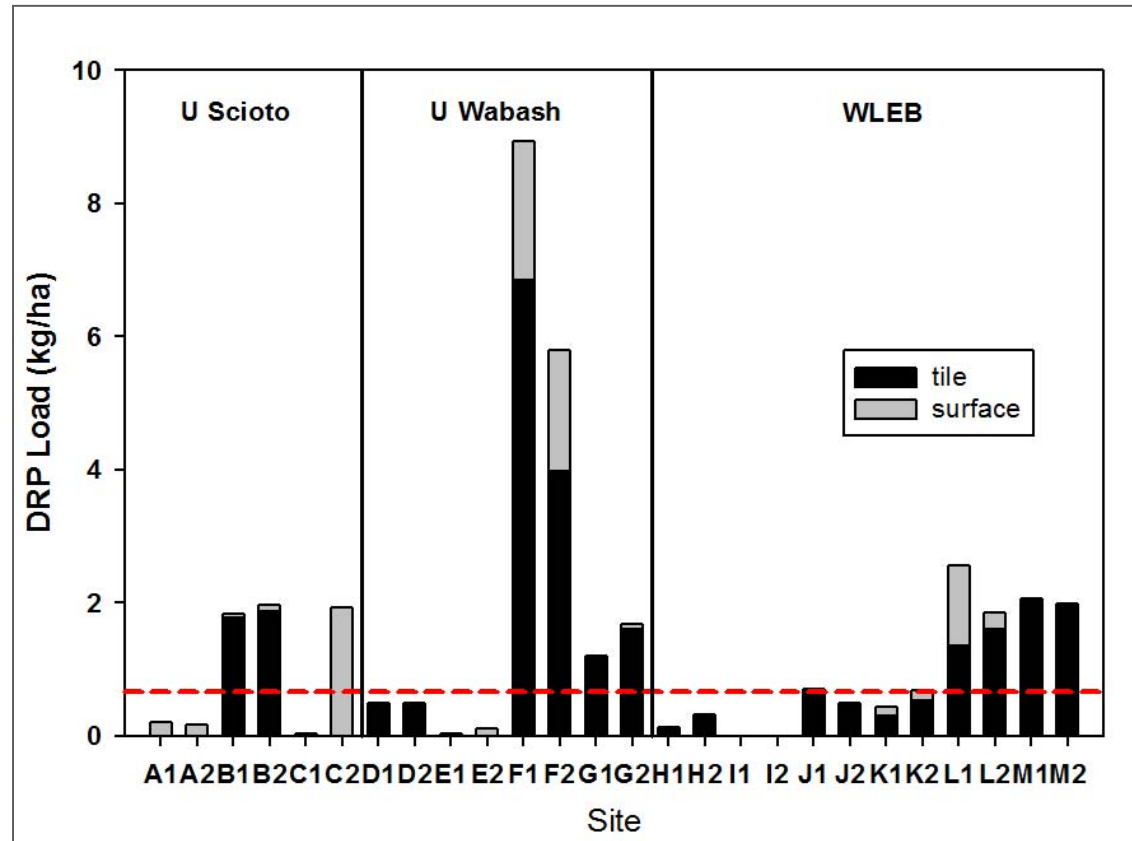


Edge of field study-Year 1 Results

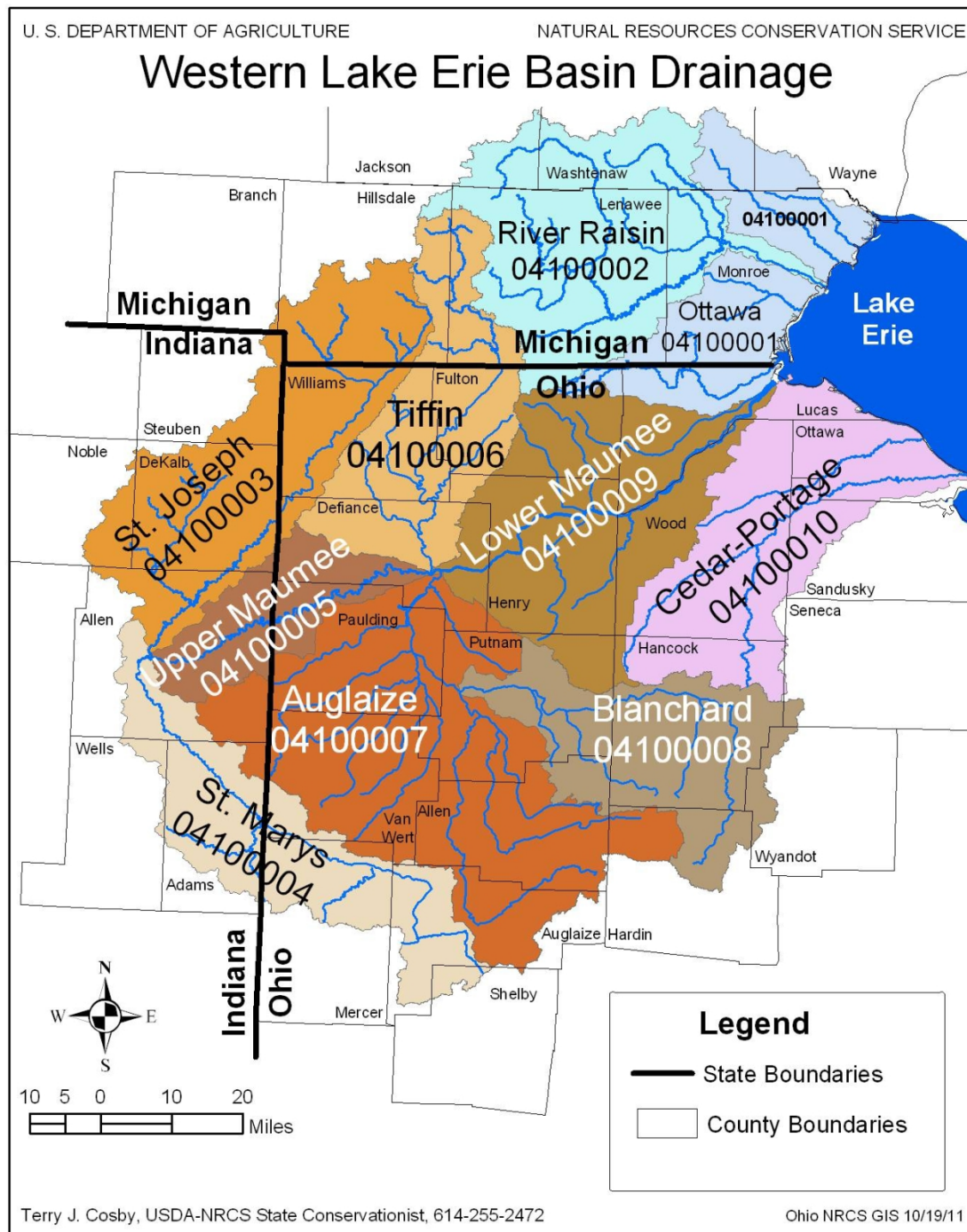


Edge of field study-Year 1

Back of the envelope
calculations



Source	Concentration (ppm)	DRP Loading Kg P/ha (1 year-24 sites)	DRP Loading lbs P/A (1 year-24 sites)
Surface	0.39	.5	.445
Subsurface	0.05	1.4	1.246
Total	----	1.9	1.7



Why the Agricultural Focus?

Back of the envelope calculations

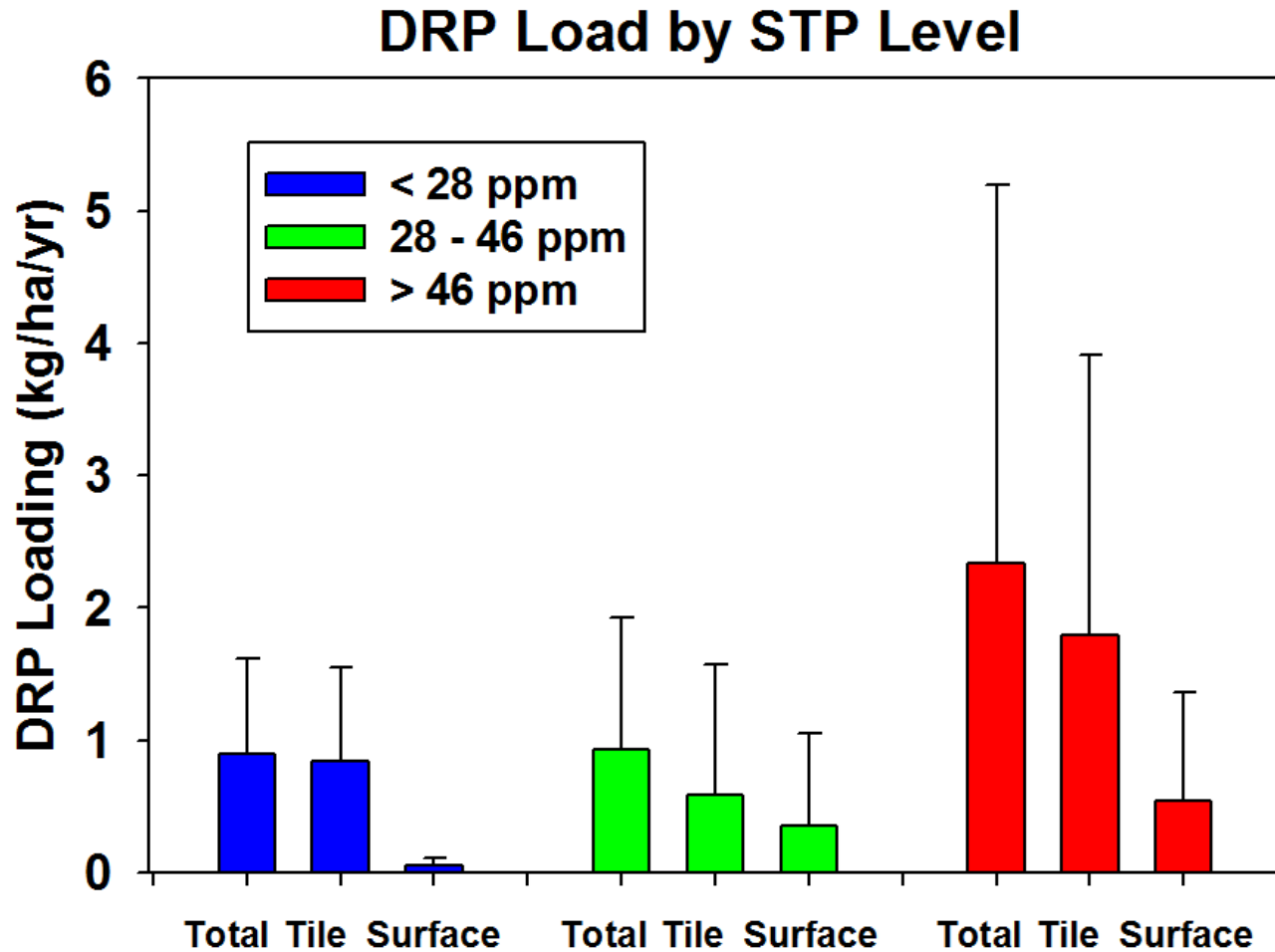
State	Acres
Ohio	3,806,780
Indiana	821,540
Michigan	1,313,420
Total	5,941,740
Percentage Ag	72%
Ag Acres	4,278,052
Lbs/A (EOF 1Year)	1.7
US Tons P (DRP)	3,636
P task Force non point US Tons	4,395

Avoid over loading soils-Rate

- Soil test and follow tri-state fertilizer recommendations.
Where soil test levels are above 40 ppm Bray P1 or 58 ppm Mehlich III-ICP, do not apply additional phosphorus in the corn-soybean rotation.
- These soil test levels require no additional fertilizer, according to the Tri-State Fertilizer recommendations.
- Fertilizing soils testing above these levels increases risk of P in runoff and tile drainage.

Soil Test and Water Quality

Ohio Edge of Field Study



Source: Kevin King

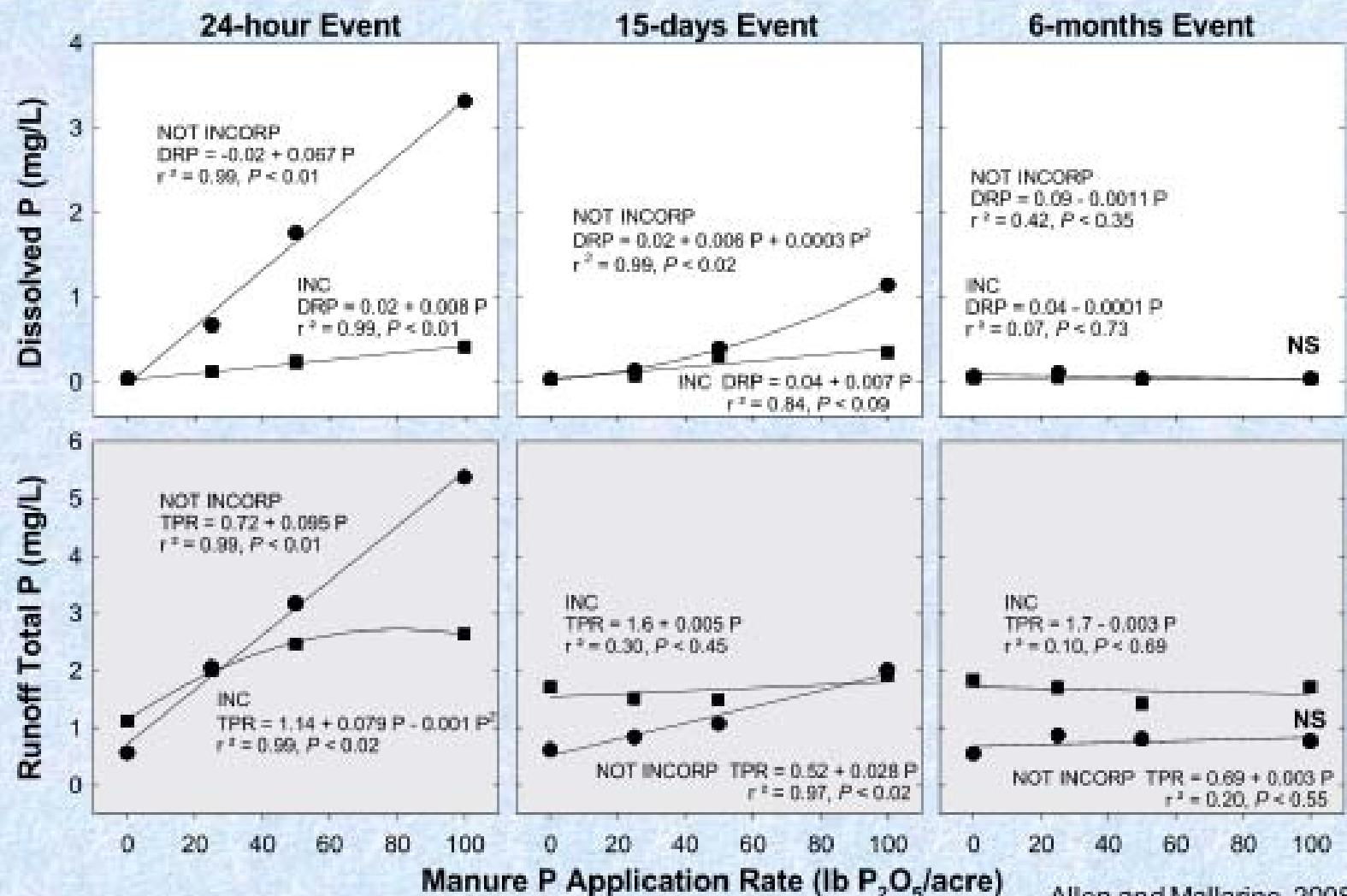
Avoid winter applications of fertilizer/manure

- Eliminate surface application of manure or fertilizer to frozen or snow-covered fields.
- Frozen ground is ground that is frozen to the degree that tillage is not possible.
- Surface applied manure or fertilizer is subject to runoff events that may occur before the ground thaws and allows nutrients to bind to soil.

Avoid surface applications of fertilizer/manure

- Surface applications of phosphorus are subject to higher loss if runoff producing rainfall events happen close to application.
- Placement of nutrient below the surface of the soil reduces loss. If tillage is planned in the crop rotation, P applications should be applied prior to the tillage and till before a rain event.
- Full width tillage has the potential to increased soil erosion and total phosphorus losses. New placement tools or strategies need to be implemented that place P below the surface with minimal soil disturbance.
- Until these tools become available, use banded application or the minimal amount of tillage to mix nutrient in the soil.

P Rate, Incorporation, Time and Runoff P



Allen and Mallarino, 2008

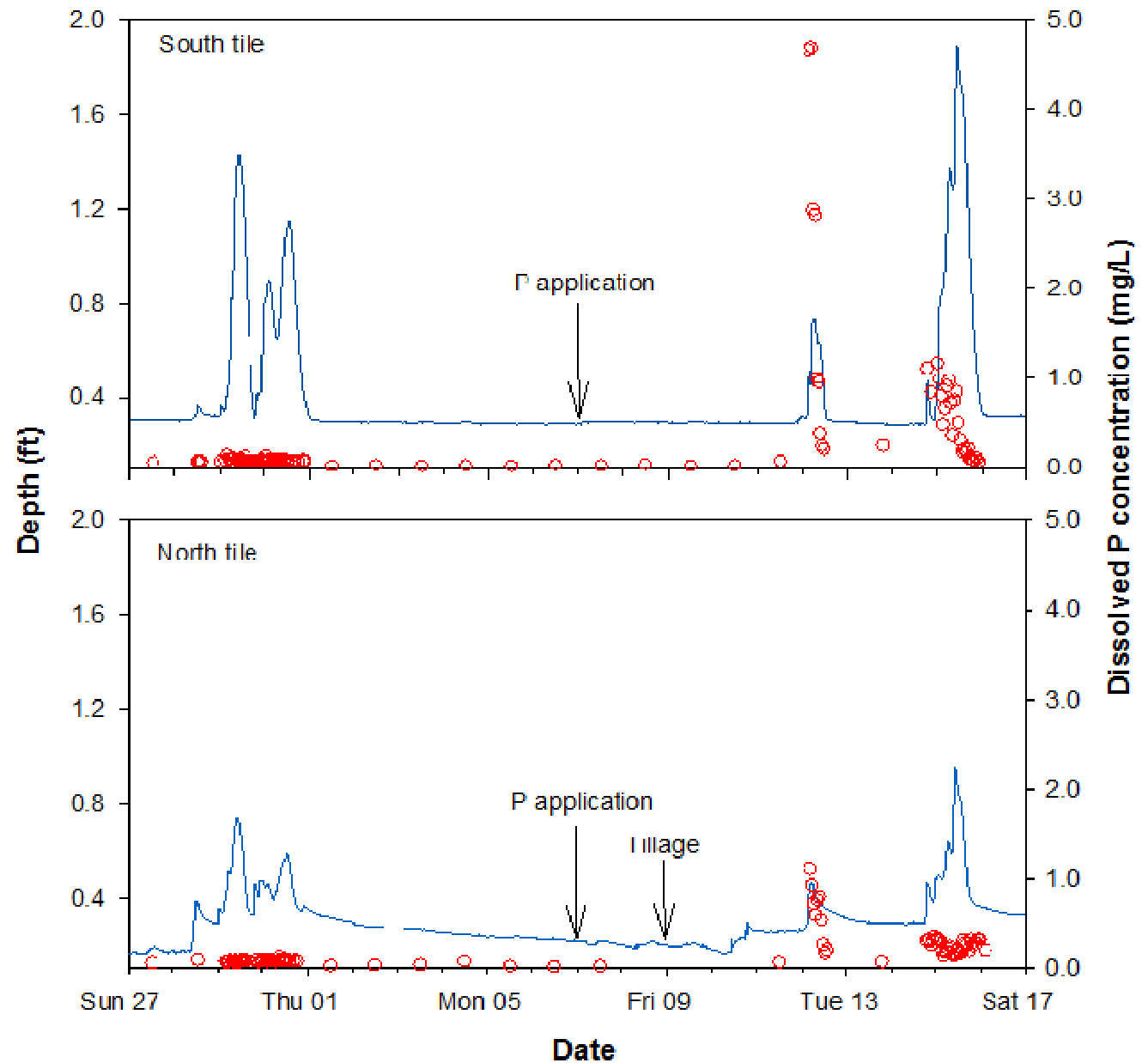
Soil Test and Water Quality

Ohio Edge of Field Study- 5/14



Source: Kevin King

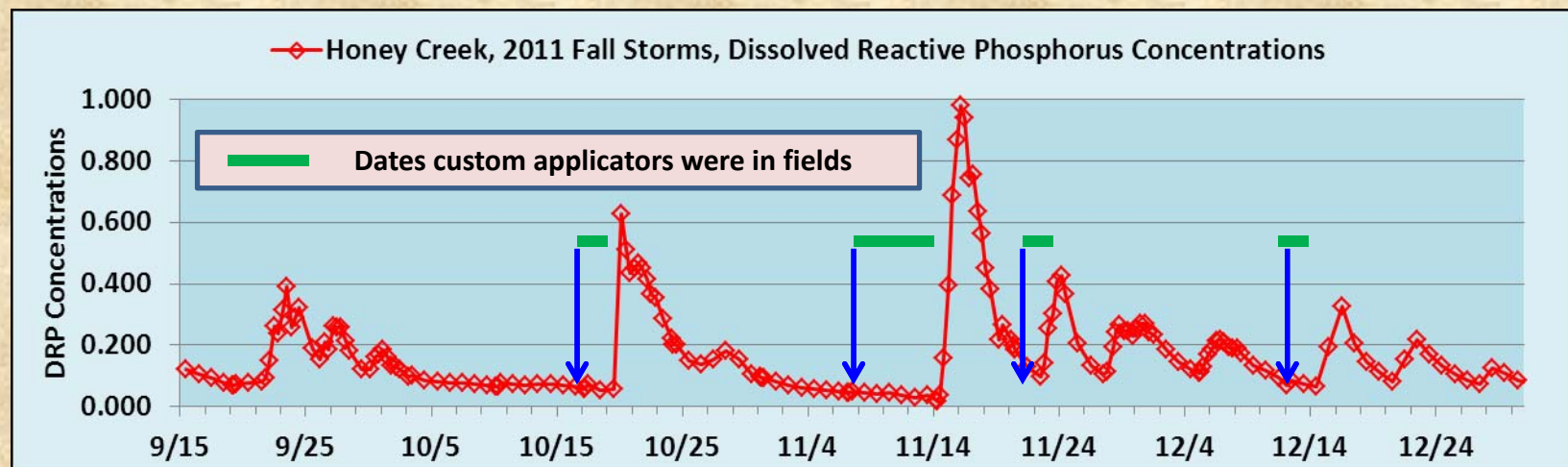
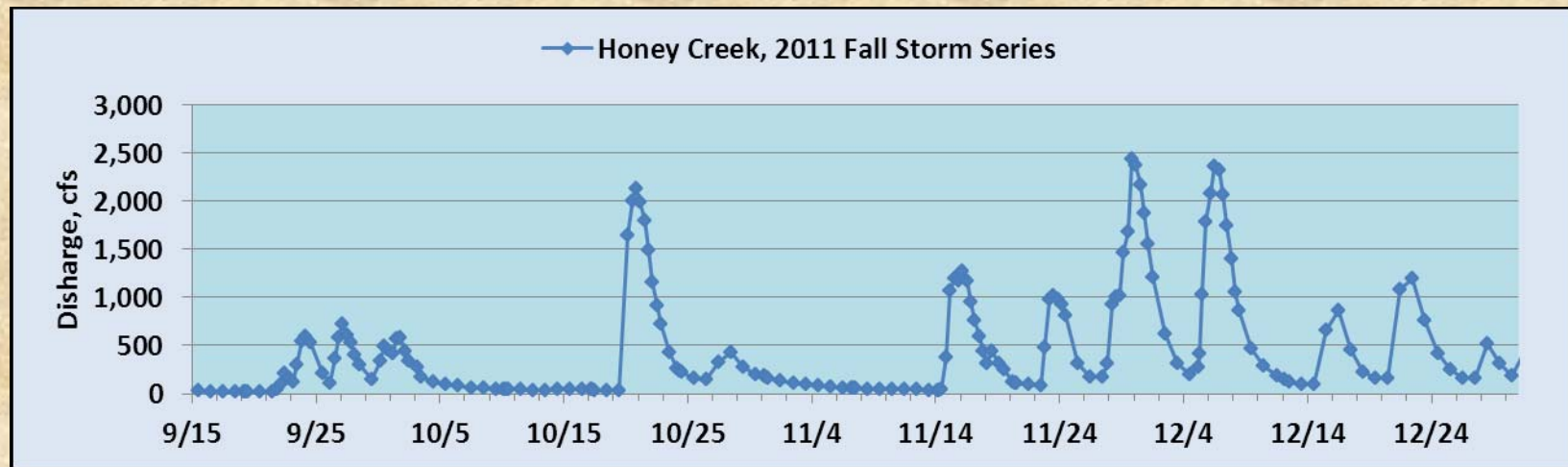
Placement and Water Quality Ohio Edge of Field Study- 5/2014



Source: Kevin King

Concentration of P along flow pathways

Incidental transfers of applied P



Source: Johnson, Heidelberg U.

Minimize erosion

Farm & Field Features

- Appropriate conservation practices should be implemented to minimize erosion.
- Maintain 30% cover as crop residue/cover crop.
- Filter strips, grassed waterways and water diversion structures are appropriate tools.

Slow the movement of Water

Farm & Field Features

- Surface water flows from fields directed to tile via standpipes should be converted to blind inlets.
- As risk loss potential increases for a field consideration should be given for edge of field treatments which control water movement or treat water as it is leaving the site.
- Drainage water management control structures, in ditch treatments such as two stage ditches and other stream practices can reduce loading.

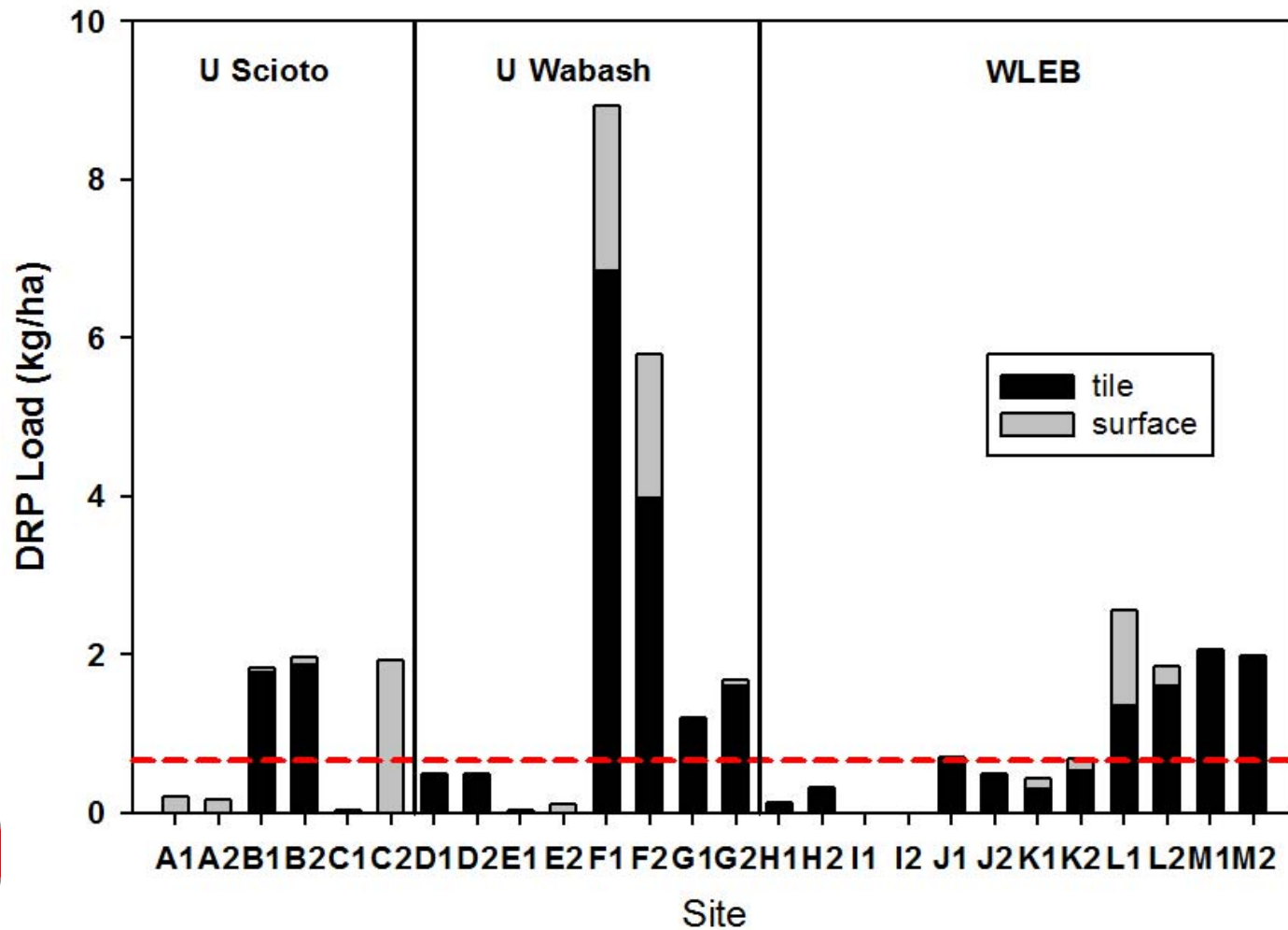
Know your fields risk factors

Farm & Field Features

- Soil test P, field proximity to water and soil hydrologic class impacts edge of field losses of phosphorus.
- The NRCS Ohio P Risk index provides a risk of loss index and should be used as part of the development of a Nutrient Management Plan to assess the individual field risk.

Know your fields risk factors

Farm & Field Features



Three Key Factors

Field Risk Factors

- Soil test P
 - greater than 40 ppm Bray P1 or 58 Mehlich III-ICP
- field proximity to water
 - Where do concentrated flows of water go
- soil hydrologic class

Nutrient Management Plan

- Crop Needs
- Field Risk
- Practices to reduce risk

- NRCS EQUIP NMP
- OSU Workbook
- To your fertility plan add P Index (RUSL2)?
- Tool to be developed?

Strive to Build Soil Quality

Farm & Field Features

- Soil condition is a mitigating factor.
- Increasing the water infiltration by reducing compaction and improving soil structure increase water retention, nutrient cycling, crop rooting capacity and crop yield.
- Drainage and soil pH provide a foundation for other practices such as cover crops, drainage, residue management, controlled traffic and other compaction management techniques.

BMP's to Keep Phosphorus on the field

Rate, Application & Timing

- Avoid overloading soils.
 - Check the soil test, is it 40 ppm Bray P1 or 58 ppm M3-ICP or greater do not apply fertilizer
- Avoid Winter Application
 - Frozen where tillage is not possible
- Avoid surface application of fertilizer/manure
 - Getting contact with more active sites in the soil

BMP's to Keep Phosphorus on the field

Farm & Field Features

- Minimize erosion
 - Phosphorus moves with sediment, keeping soil on the field keeps P there also
- Slow the movement of water
 - Retain on the field and treat water leaving
- Know your fields' risk factors
 - The risk is not the same for all fields
- Strive to Build Soil Quality
 - Soil condition is a mitigating factor. Increasing the water infiltration by reducing compaction and improving soil structure increase water retention, nutrient cycling, crop rooting capacity and crop yield

Questions?

For More Information

<http://agcrops.osu.edu/specialists/fertility>

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