



**THE OHIO STATE UNIVERSITY**

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COLLEGE OF FOOD, AGRICULTURAL,  
AND ENVIRONMENTAL SCIENCES

***On-Field Ohio !***

**Using the  
Revised Ohio P-Index**

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# Revised Conservation Practice Standard Nutrient Management, Code 590 USDA-NRCS-Ohio

Increased Emphasis on

Ohio P Risk Index

which includes

Tri-State Fertilizer Recommendations  
4Rs Nutrient Stewardship



Gulf of Mexico



Western Lake Erie



## Phosphorous Index Risk Assessment Procedure Worksheet

Site Characteristic	Phosphorous Vulnerability Values					Sub - Value
1. Soil Erosion	Soil Loss (Tons/Acre/Year) X 1.0					
2. Connectivity to Water.  Does concentrated flow (via a defined waterway, tile inlet, or surface drain) leave the site?	NO, and the site is not adjacent to an intermittent or perennial stream.  <b>Value = 0</b>	NO, but the site is adjacent to an intermittent or perennial stream.  <b>Value = 4.0</b>	Yes, but the site is not adjacent to an intermittent or perennial stream.  <b>Value = 8.0</b>	Yes, and the site is adjacent to and/or the concentrated flow outlets into an intermittent stream or through a tile inlet.  <b>Value = 12.0</b>	Yes, and the site is adjacent to and/or the concentrated flow outlets into a perennial stream or through a tile inlet; OR Outlets to a pond or lake within 1 mile.  <b>Value = 16.0</b>	
Runoff Class	See Runoff Class Matrix					
4. Soil Test Bray-Kurtz P1 PPM	Bray – Kurtz P1 (PPM) X ( 0.07)					
5. Fertilizer P2O5 Application Rate	Fertilizer P2O5 Applied (Lbs/Acre) X (0.05)					
6. Fertilizer P2O5 Application Method	0 Applied  <b>Value = 0</b>	Immediate Incorporation  Or Applied on 80% Cover  <b>Value = 0.75</b>	Incorporation < 1 Week  Or Applied on 50-80% Cover  <b>Value = 1.5</b>	Incorporation > 1 Week & < 3 Months  Or Applied on 30-49% Cover  <b>Value = 3.0</b>	No Incorporation Or Incorporation > 3 Months  Or Applied on < 30% Cover  <b>Value = 6.0</b>	
7. Organic P2O5 Application Rate	Available - Manure / Biosolids P2O5 Applied (Lbs/Ac) X (0.06)					
8. Organic P2O5 Application Method	0 Applied  <b>Value = 0</b>	Immediate Incorporation  Or, Applied on 80% Cover  <b>Value = 0.5</b>	Incorporation < 1 Week  Or, Applied on 50-80% Cover  <b>Value = 1.0</b>	Incorporation > 1 Week & < 3 Months  Or, Applied on 30-49% Cover  <b>Value = 2.0</b>	No Incorporation Or Incorporation > 3 Months  Or, Applied on < 30% Cover  <b>Value = 4.0</b>	
Filter Strip Factor (Deduct 2 points if field runoff flows through a designed filter strip - minimum 33 feet wide)						
Total Site Index Value						



# ***P transport into continues to be a water quality concern for Ohio***

Develop an index that:

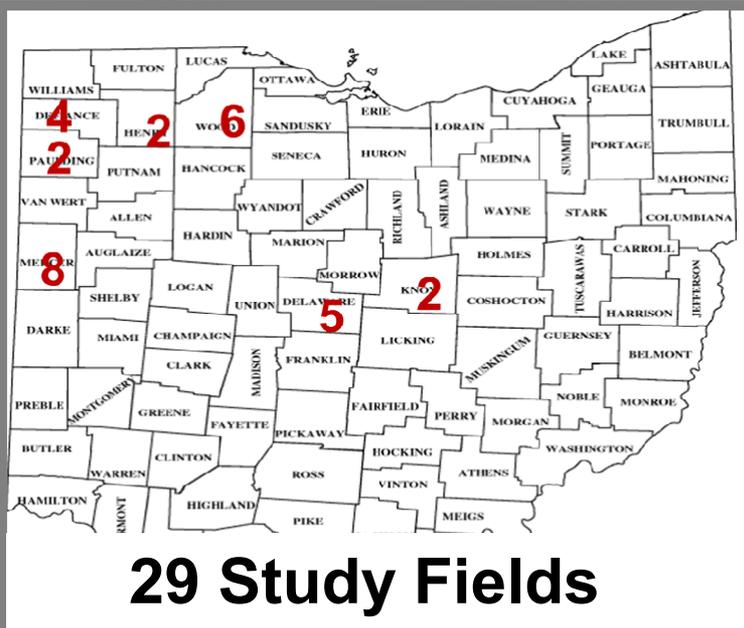
- Identifies where P is lost
- Quantifies how much P is lost
- Uses properties of all soils
- Calculates soil loss (RUSLE2)
- Soil Test P
- Fertilizer/Manure Inputs
- Incorporates 4Rs

# On-Field Ohio! OSU / USDA-NRCS

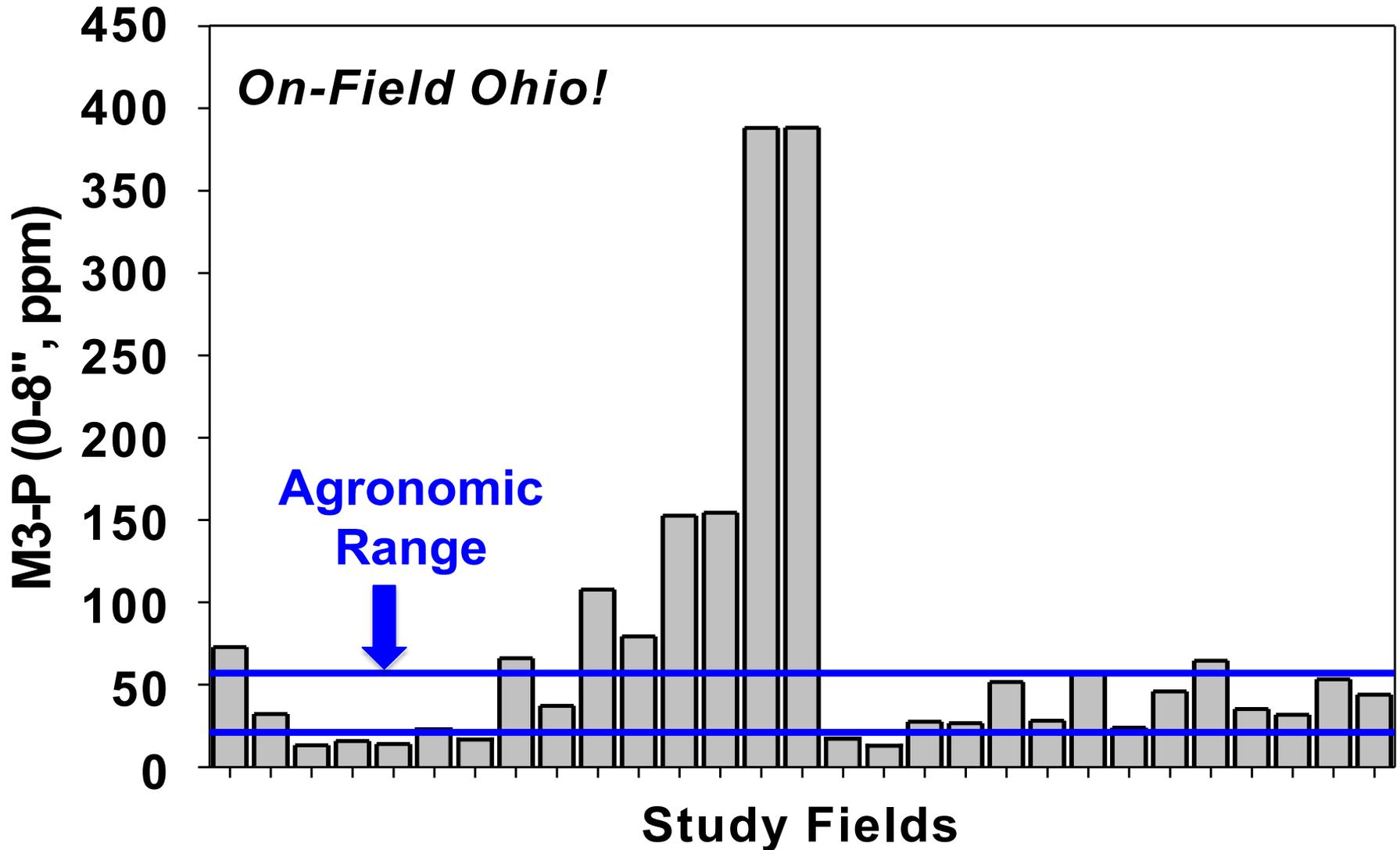
Long-term, Field-Scale Average Estimate  
Erosion Potential  
P Loss

Quantifies how voluntary changes  
in practices contribute to  
P runoff reduction goals

# Evaluate Relationship Between On-Field Properties & Practices & Edge-of-Field P Runoff



*Special Thanks to  
Participating Farmers*





## Erosion Potential

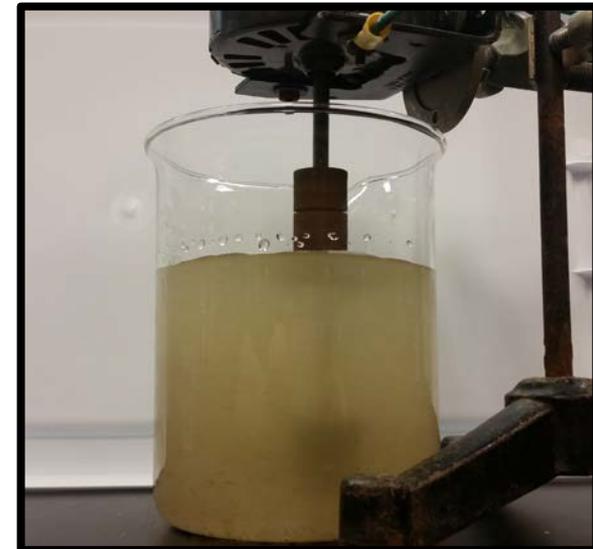
# Revised Universal Soil Loss Equation v2 (RUSLE2)

## Why Soil Loss (t/a/y)?

### Strong Binding of Phosphorus to Soil Particles

## Muddy Runoff Water

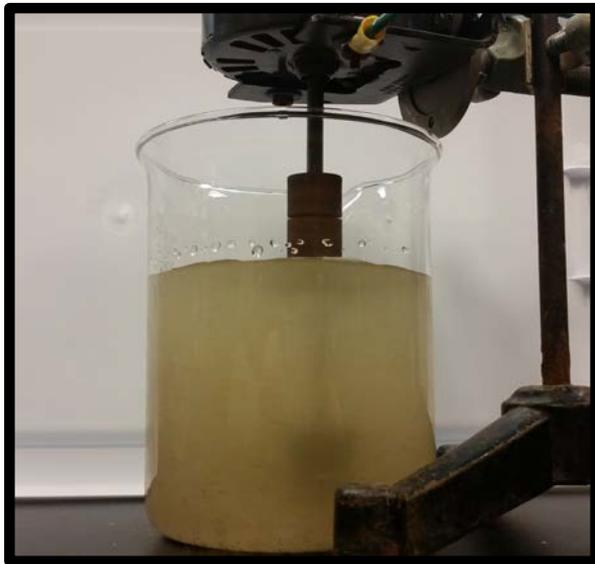
- How much sediment?
- How P rich is the sediment?





# Measurements

## Surface & Tile P Runoff Concentration



**Particulate  
(RPP)**

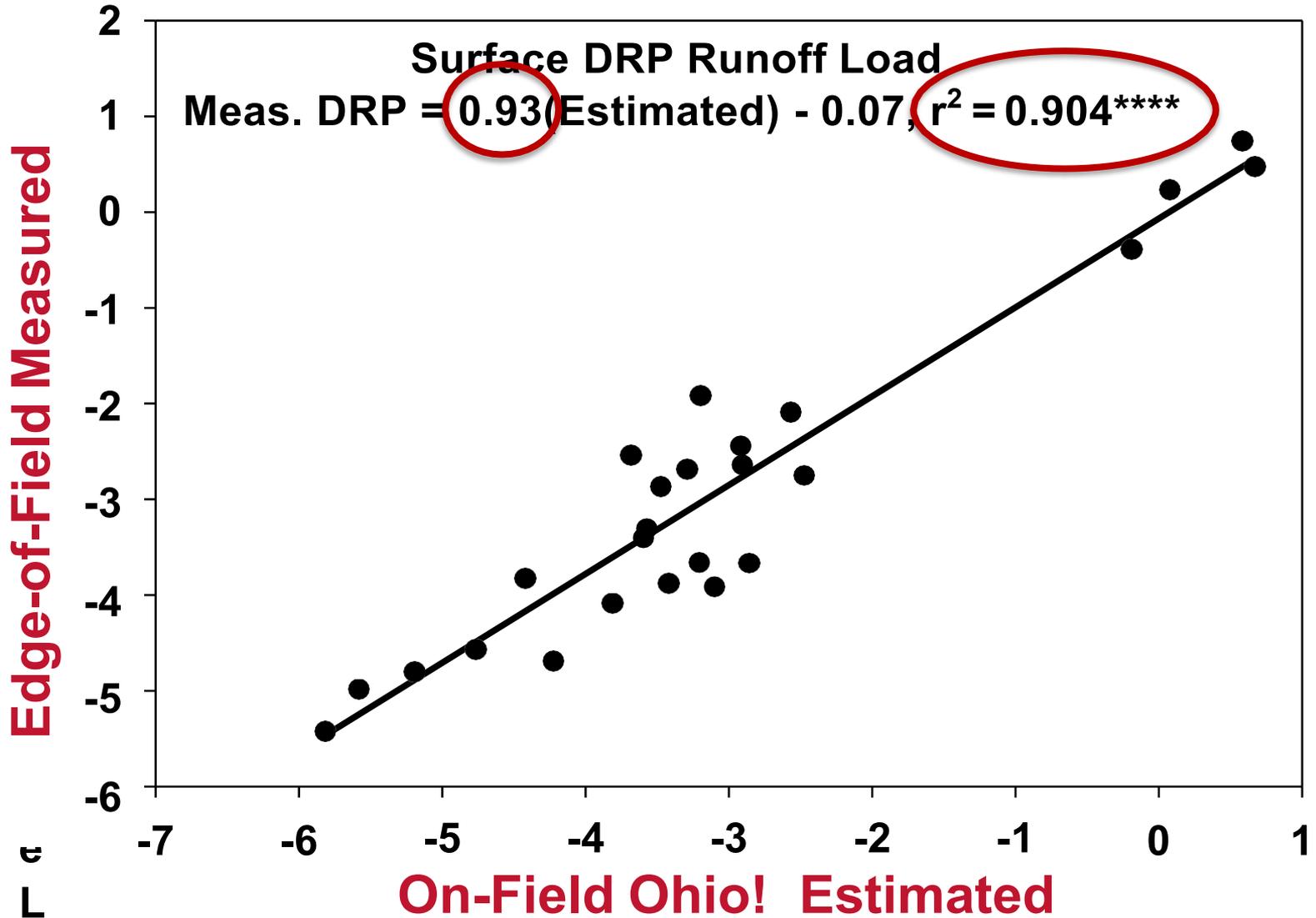
**Total (RTP)  
unfiltered/digested**

**Dissolved (DRP)  
filtered**

**Runoff Flow Volume**



## Measured vs Estimated Surface Runoff DRP (lb/A)





# *On-Field Ohio!* On-line Calculator

## Outputs

- Erosion (t/a/y)
- **Particulate P (lb/A)**
  - **Surface + Tile**
- **Dissolved P**
  - **Surface + Tile**
- **Dissolved P**  
**Fertilizer/Manure (lb/A)**
- Save, Print Report





# On-Line Tool Functions



Welcome to On-Field Ohio!



Draw

Map new field



Import Field Data

Restore a previously saved field from my PC

## Find New Field or Import a Stored Field



Choose Field

Crop Rotation

Field Info

Nutrients

Results

## Field: Example

Start a New Field

Run date: 7/11/2018

Rotation description: CY1: Fall Chisel, Spring Disk/Cultivate, Corn CY2: NT Beans

Nutrient description: CY1: Spring manure 100 lb P2O5

Save Field Info

Total acres: 73.42

Average slope: 1.03%

Map Unit	Location	Dominant Soil Type
1	Putnam County (29.02 A, 0.5% slope)	Toledo silty clay loam
2	Putnam County (25.02 A, 1% slope)	Fulton silty clay loam, 0 to 2 percent slopes
3	Putnam County (9.52 A, 1% slope)	Del Rey silt loam, 0 to 2 percent slopes
4	Putnam County (3.31 A, 4% slope)	Lucas silty clay loam, 2 to 6 percent slopes
5	Putnam County (3.04 A, 1% slope)	Digby loam, 0 to 2 percent slopes
6	Putnam County (1.41 A, 1% slope)	Haskins loam, 0 to 2 percent slopes
7	Putnam County (0.85 A, 9% slope)	Lucas silty clay loam, 6 to 12 percent slopes, moderately eroded
8	Putnam County (0.78 A, 1% slope)	Kibbie silt loam, 0 to 2 percent slopes
9	Putnam County (0.46 A, 0.5% slope)	Lenawee silty clay loam, 0 to 1 percent slopes

## Results Shows

- Field Name and Rotation & Nutrient Descriptions
- Acreage and Weighted Avg. % Slope Steepness
- Map Units with % Acreage

Parameter	Results for Each Crop Year (CY) and Average for Rotation		
	CY 1	CY 2	Rotation Average
Erosion (t/a/yr)	0.937	0.332	0.634
Soil Tillage Intensity Rating (STIR)	106.6	2.6	54.6
Mehlich 3 P (ppm)	1.0	1.0	1.0
<b>Runoff P (lb/A)</b>			
Surface Particulate P	0.545	0.251	0.398
Surface Dissolved P	0.003	0.004	0.004
Surface Dissolved P due to Fert. App.	0.000	0.000	0.000
Surface Dissolved P due to Man. App.	2.338	0.000	1.169
Total P Loss	2.887	0.255	1.571

[Download CSV Report](#)

[Download PDF Report](#)

## Results

- Each Parameter
- Each CY & Rotation Avg.,
- Download Report in pdf or CSV

# *On-Field Ohio!*

## **Results Example**

**Demonstrate How  
Voluntary Practices  
Achieve Target Reduction**



## Power of Comparison

**Example: Soils with 2 – 4% Slope**  
**Compare rotation average On-Field Ohio!**  
**Results for corn/soybean rotation**

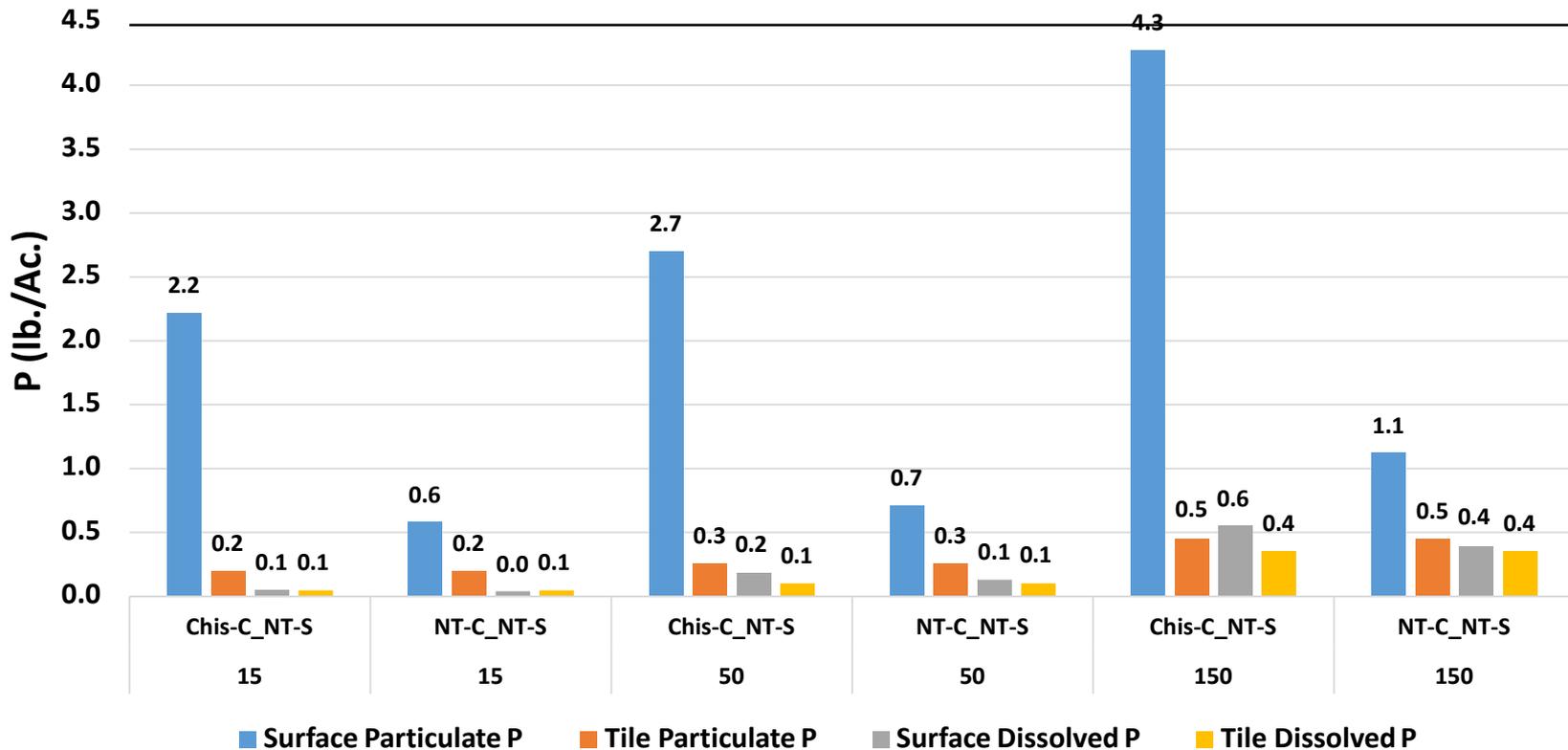
**CMS A: Fall chisel, spring disk & field cultivate corn, no-till soybean**

**CMS B: No-till corn, no-till soybean**

**Soil test P (15, 50, 150 mg/kg, Mehlich3-P)**



## Phosphorus Loss Partitioned by STP and CMS



**STP15, SPP: NT-C\_NT-S 72% Reduction**



## **Conclusions**

### **Major Shift for Ohio P Risk Index Qualitative to Quantitative**

- **Need to REDUCE P load to Ohio surface waters**
  - **Reduce Erosion**
  - **Reduce Soil P Levels**
- **CMS comparisons allow farmers to prioritize resources in effective management decisions to reduce P loss and soil erosion**
- **Production practices are receiving increased external review. Producers must improve Performance, we Have to Get it Right !**

# *On-Field Ohio!*



**Thank you**

## Quick Start Guide

- **Requirements To Begin a Session**

- Internet connection to <https://nutrientmanagement.osu.edu/>
- Input information
  - Field location
  - Planned crop rotation
  - Soil test phosphorus (STP) in Mehlich 3 or Bray-1
  - Soil organic matter (optional)
  - Historical crop yield or projected yield goal (optional)
  - Field drainage history
  - Planned fertilizer/manure application method, placement, time and amount

- **Choose Field**

- Locate field in map tool, directions are on the bottom of the screen
- Draw field the boundaries, follow directions below map
- Name the field:  
**Note: Run names consist of 1. field identifier, 2. date 3. rotation management description and 4. nutrient plan descriptions**
- Select the “next” button to load soil survey information
- Select the “next” button again after the soil survey map is drawn to move to the Crop Rotation screen

- **Crop Rotation Information**

- From dropdown menu choose number of years for crop rotation template
- Select a crop production template from the management dropdown menu that best describes the production system
- Amend operations as necessary using searchable dropdown menus
- Adjust dates of operations using edit button beside each line  
**Note: Crop years run Nov.1 to Oct. 31**
- Add operations by filling in the bottom blank line and then choosing the green “+” button. Delete an operation by selecting the red “x” button
- Adjust yield potential
- Provide rotation management description that is meaningful, it becomes part of the name of the “run” as described above
- Select the “next” button to move to the Field Info screen

- **Field information**

- Select the “yes” or “no” button to identify use of tile drainage
- Use the default soil organic matter or input a measured value if available
- Input the soil test P (STP) value an appropriate units from the dropdown menu

- **Nutrient Management Practices: This represents the 4Rs of nutrient stewardship**

- Press “ADD+” button for in the appropriate crop year (CY) to apply fertilizer, liquid or solid manure
- Select season (Right time) when fertilizer will be applied. If the fertilizer is split, press “ADD+” again to open a second input line
- Input the quantity (Right amount) of P fertilizer or manure (Right source) applied

- Choose the placement method (Right placement) from the dropdown menu
- Input the incorporation depth in inches
- Provide a meaningful nutrient plan description
- Select the “next” button to move to the Results screen

## • Results and Data Output

- Data download
  - Upon completing a field scenario, it is recommended the user chose “Save Field Info” so information from the most recent analysis is retained as a file with the identifier of OFO\_date\_GMT\_.json
  - Users may find it useful to rename the \*.json file for future reference
  - All data generated from On-Field Ohio **BELONGS TO THE USER**, the only copy of the output data resides where downloaded by the user
- Results are provided in three formats
  - Screen Display
  - CSV (excel) download. Press “Download CSV Report” CSV outputs can be used to compare what-if scenarios to evaluate management practices
  - PDF Format: To download a single field/scenario in a pdf format Press “Download PDF Report
- For each CY# and averaged across the rotation, the user will receive estimates of:
  - Erosion (t/a/yr)
  - Soil Tillage Intensity Rating (STIR)
  - Mehlich3 P (ppm)
  - Surface Particulate P (lb/A)
  - Tile Particulate P (lb/A)
  - Surface Dissolved P (lb/A)
  - Tile Dissolved P (lb/A)
  - Surface Dissolved P due to Fert. App. (lb/A)
  - Surface Dissolved P due to Man. App. (lb/A)
  - Total P Loss (lb/A)

## • Next Steps

- Congratulations, you have completed a scenario (run) in an OFO session. The value of OFO is to estimate P loss from a field then compare to alternative CMS and nutrient management practices that reduce P loss for the field
- The information from this scenario was saved in the “OFO\_date\_GMT\_.json” file. See the detailed instructions (pg. 6) for importing this information to compare succeeding runs.

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FSR-1 (9/12/2018)

Rotation: Chisel corn, NT-soybean

Nutrients: STP 15 ppm Spring DAP 255 lb/ac P205 Surface No Incorp County:  
Madison

Total Acres: 28.34

Map unit 1 (11.62 A, 41%): Crosby-Lewisburg silt loams, 2 to 6 % slope

Map unit 2 (8.91 A, 31%): Kokomo silty clay loam, 0 to 2 % slope

Map unit 3 (5.01 A, 18%): Crosby-Lewisburg silt loams, 0 to 2 % slope

Map unit 4 (2.8 A, 10%): Odell-Lewisburg complex, 0 to 2 % slope Weighted Avg.  
slope: 1.4

	CY1	CY2	Rotation Avg.
Erosion (t/a/yr)	1.345	0.633	0.989
Soil Tillage Intensity Rating (STIR)	24	3	13
Mehlich 3 P (ppm)	15	15	15
Surface Particulate P (lb/A)	1.746	0.992	1.369
Tile Particulate P (lb/A)	0.193	0.193	0.193
Surface Dissolved P (lb/A)	0.061	0.063	0.062
Tile Dissolved P (lb/A)	0.049	0.049	0.049
Surface Dissolved P due to Fert. App. (lb/A)	1.011	0	0.505
Surface Dissolved P due to Man. App. (lb/A)	0	0	0
Total P Loss (lb/A)	3.06	1.3	2.18