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# Implementing Best Management Practices on Western Lake Erie Basin Farms

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## A comprehensive research/outreach framework:

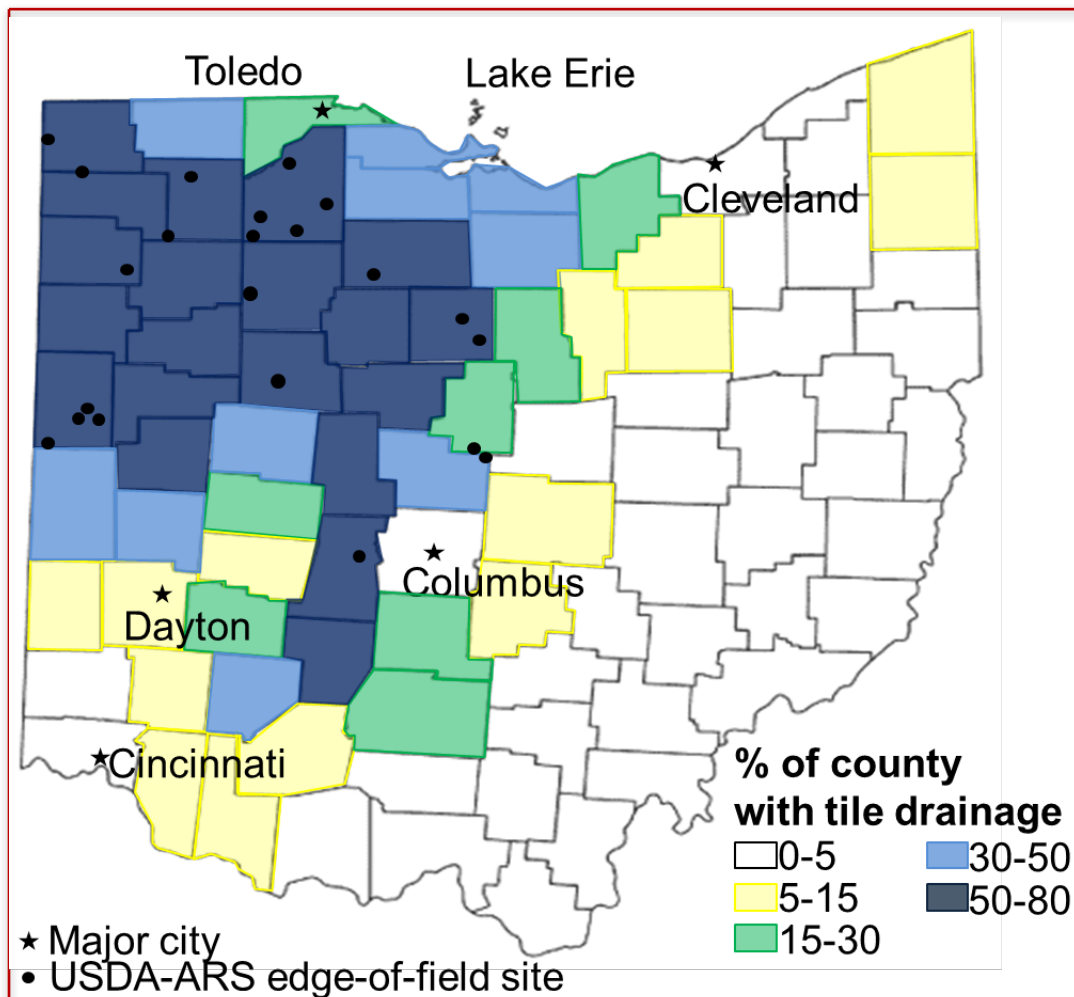
1. Research on water quality and crop production
2. Outreach
3. Regulation



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# Edge of Field Study



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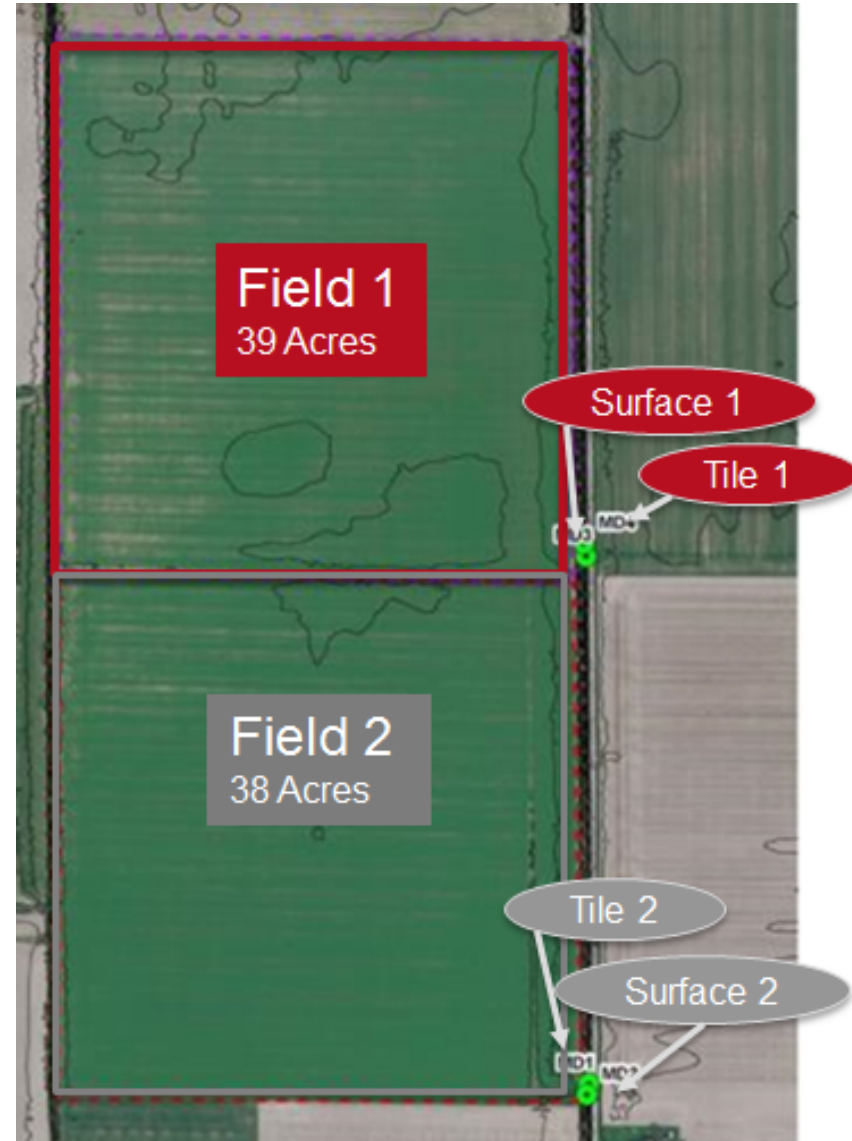
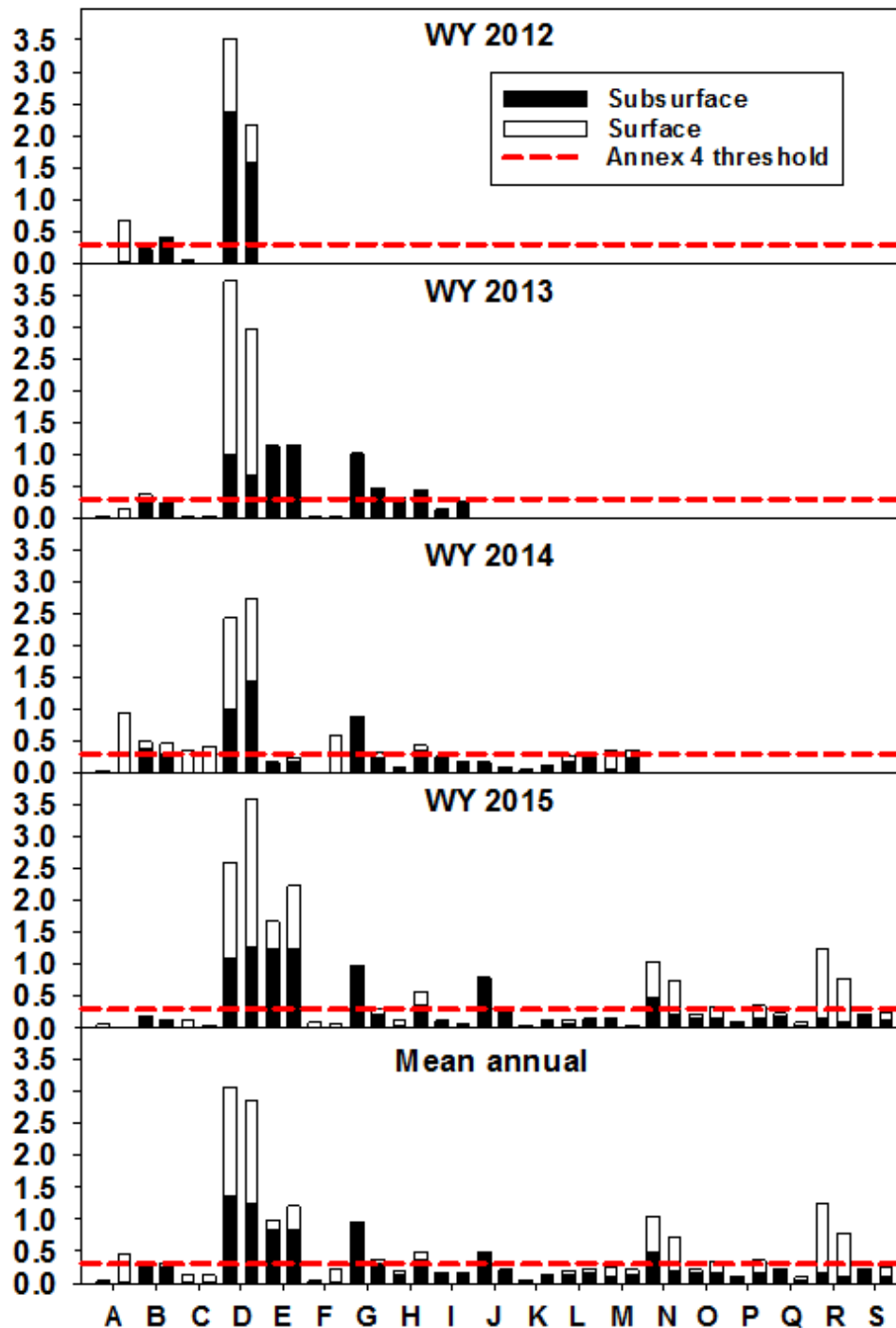
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# EoF Study Results-P

DRP loading (kg/ha/yr)



# Ohio P Index Revision

1. Erosion
2. Connectivity
3. Soil Hydrology
4. P Soil Test
5. Rate P
6. Application Method
7. Filter strip

Source: NRCS 590

Table 1. Ohio Phosphorus Risk Index (P Index) overview of parameters with associated weighting or scores (sub-values) and interpretation. Sub-values are added together to determine P Index score					
Site Characteristic	Phosphorus Vulnerability Values				
1. Soil Erosion	Soil Loss (tons/acre/yr) x 1 (Revised Universal Soil Loss Equation ver. 2, RUSLE2)  Includes: Map Unit, Crop Management Zone, Climate, Farmer Management, Slope Length, Slope Steepness,				
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	No, but the site IS adjacent to an intermittent or perennial stream.	Yes, but the site is Not adjacent to an intermittent or perennial stream	Yes, and the site IS adjacent to and/or the concentrated flow outlets into an intermittent stream or through a tile inlet.	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.
	Value = 0	Value = 4.0	Value = 8.0	Value = 12	Value = 16
3. Runoff Class	“Represents the effect of the Hydrologic Soil Group (A,B,C,D) combined with the effect of slope.  This factor represents the sites’s surface runoff vulnerability”  See Runoff Class Matrix (0 to 15 points)				
4. Soil Test Bray-Kurtz P1 PPM	Bray-Kurtz P1 (PPM) X (0.07)				
Application Rate 5. Fertilizer (P <sub>2</sub> O <sub>5</sub> ) 7. Organic (P <sub>2</sub> O <sub>5</sub> )	Fertilizer (P <sub>2</sub> O <sub>5</sub> ) Applied (Lbs/Acre X 0.05) Available – Manure / Biosolids (P <sub>2</sub> O <sub>5</sub> ) (lbs/Acre X 0.06)				
Fertilizer OR Manure (P <sub>2</sub> O <sub>5</sub> ) Application Method	0 Applied	Immediate Incorporation OR Applied on 80% Cover	Incorporation < 1 Week OR Applied on 50-80% Cover	Incorporation > 1 Week & < 3 Months OR Applied on 30 – 49% Cover	No Incorporation OR Incorporation > 3 months OR Applied on <30% Cover
6. Fert. App. Meth.	Value = 0	Value = 0.75	Value = 1.5	Value = 3.0	Value = 6.0
8. Man. App. Meth.	Value = 0	Value = 0.5	Value = 1.0	Value = 2.0	Value = 4.0
9. Filter Strip	Deduct 2 points if field runoff flows through a designed filter strip – minimum 33 ft. wide				

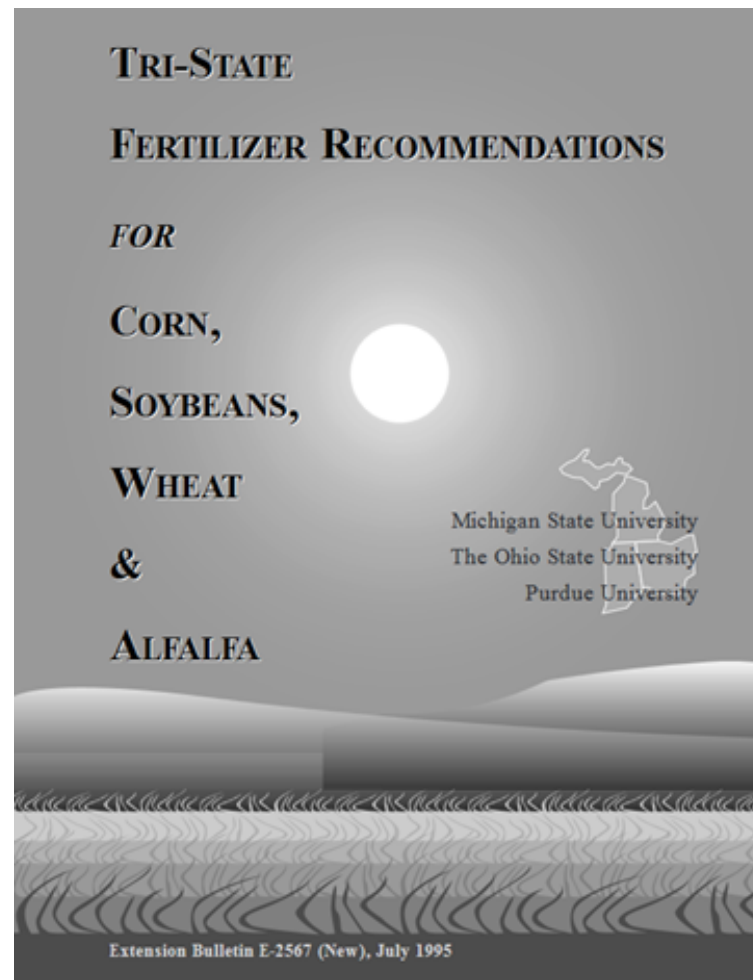


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# Tri State Fertilizer Recommendation Updates Phosphorus and Potassium

- Re-establish critical ranges for soil test P and K levels
- Re-establish leaf critical levels for P, K and all nutrients
- Re-establish typical P and K removal rates per bushel grain



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## Nutrient Utilization from Manure

In crop application which uses N content for current crop and provides two year P rotation crop removal rate



Topdressing wheat



Side dressing corn



# Survey Farmers in WLEB

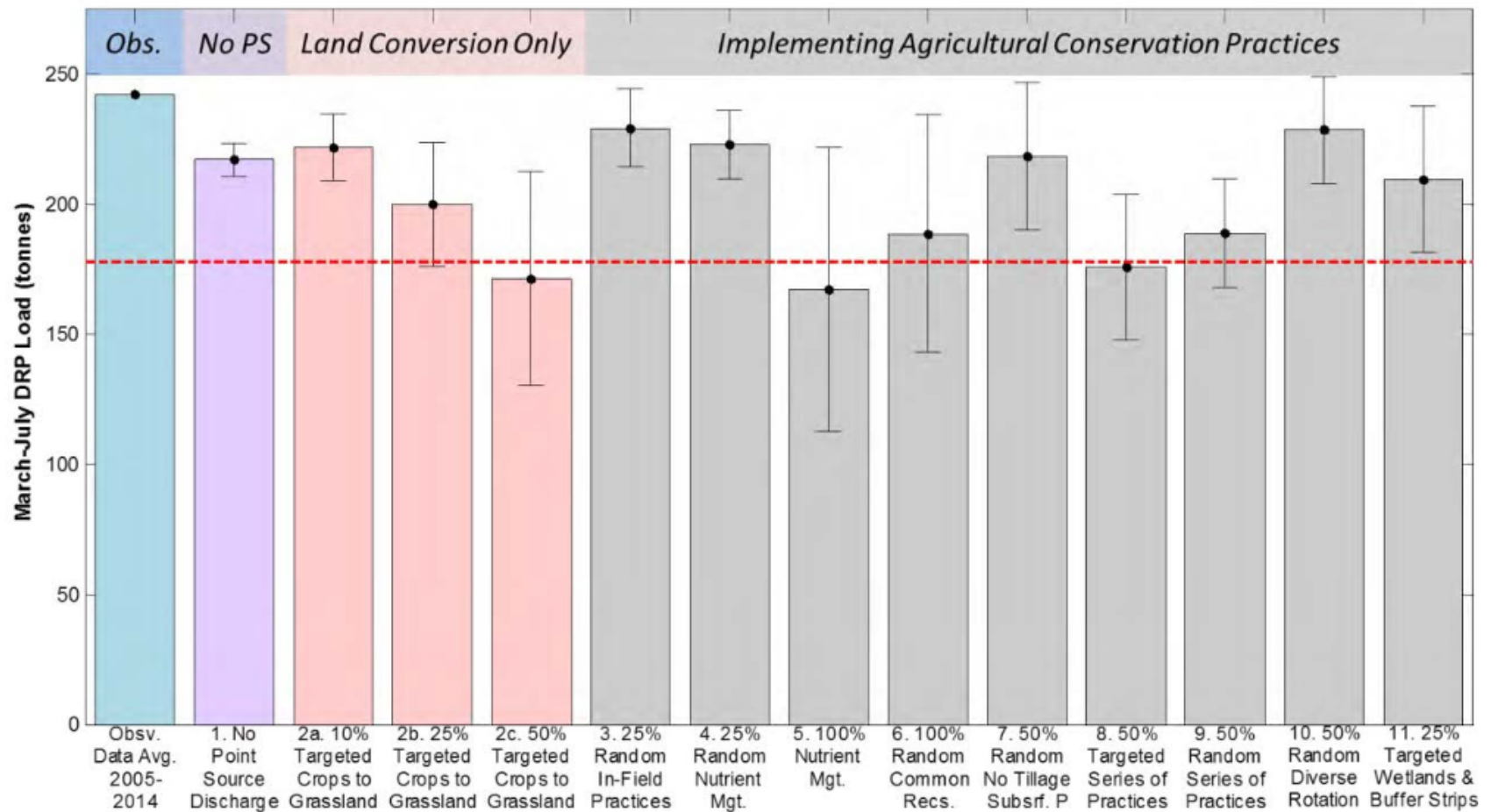
- Measure of
  - Beliefs
  - Barriers
  - Willingness to change

Table 9. Farmers' mean and standard deviation of confidence in implementing 4R strategies

Agricultural Practice	N	Mean (0-100)	Std. Deviation
Avoiding broadcasting when the forecast predicts a 50% or more chance of at least 1 inch of total rainfall in the next 12 hours	717	72.6	26.0
Avoiding surface application of phosphorus on frozen ground	712	87.0	23.7
Incorporating broadcast fertilizer (via tillage)	713	66.4	31.5
Subsurface placement of fertilizer (via banding or in-furrow with seed)	710	61.6	35.0
Determining rates based on regular soil testing once within the rotation (or every 3 years)	717	85.7	22.9
Incorporating winter wheat or a cereal rye cover into your rotation	712	61.5	32.1



# Multi-Model WLEB practice adoption needed to reach targets



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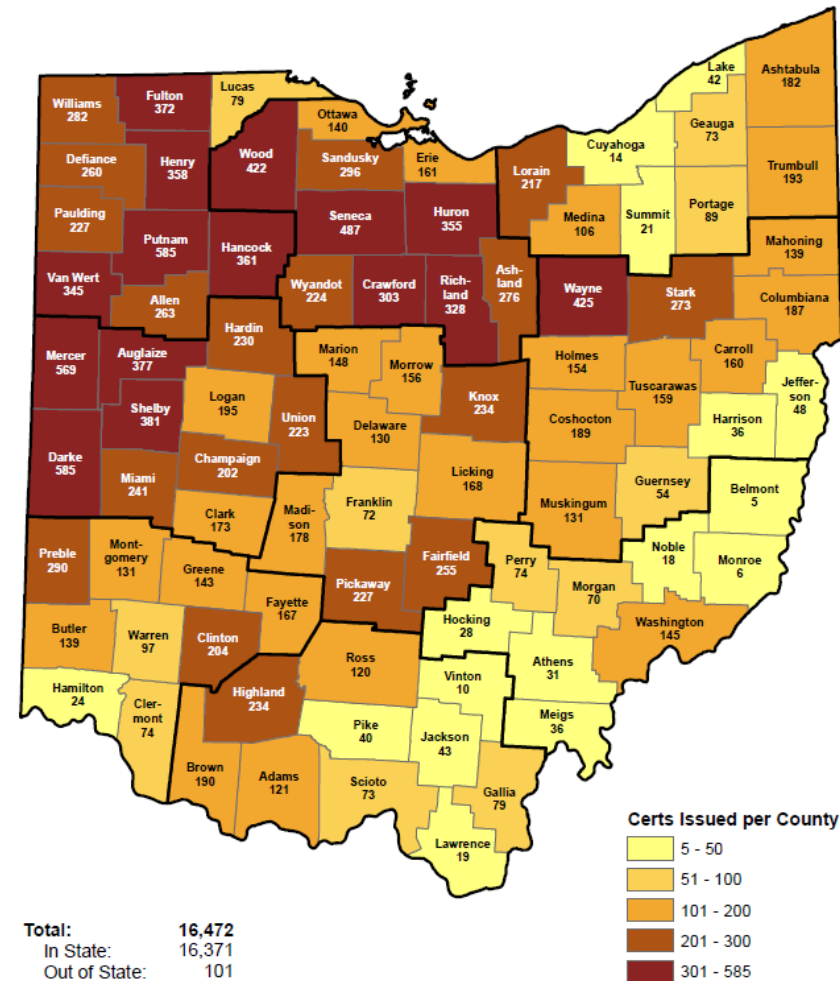
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# Fertilizer Applicator Certification Training (Statewide)

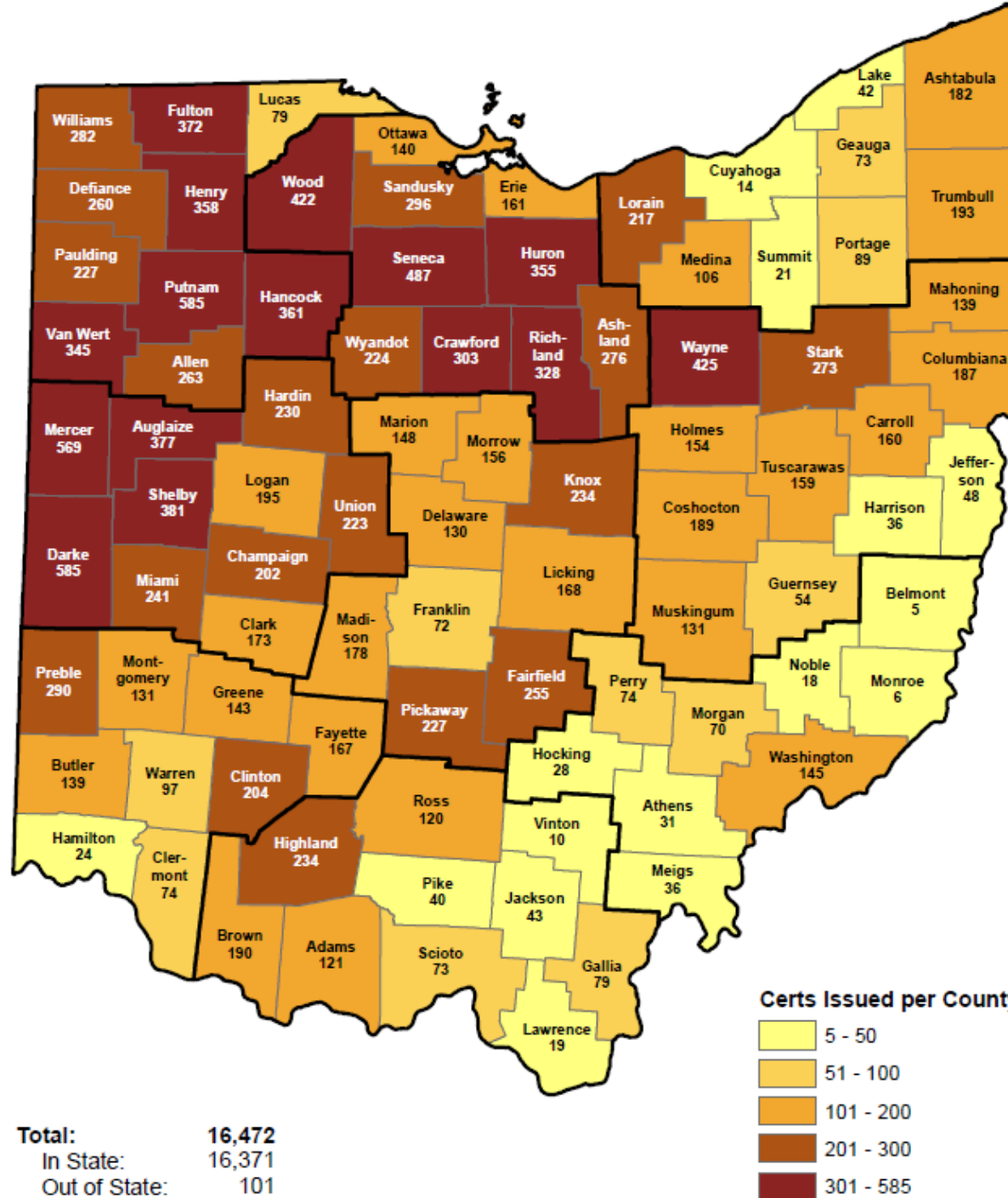
- Required for “50 or more acres of agricultural production.”
- **Ohio Department of Ag** is the issuing authority SB 150 (2014)
- **Ohio State University Extension** delivers 3 hour educational Sessions
- Since September, 2014 total of 16,472 participated in 300+ sessions
- CEU's required to maintain certification renewed every 3 years





## Fertilizer

- Require agricultural producers to obtain a fertilizer certificate
- Ohio is the only state in the nation issuing fertilizer certificates
- Ohio's fertilizer certificate delivery system is the only one in the nation
- Since 1990, 16,472 fertilizer certificates have been issued
- CEU's fertilizer certificate program is the only one in the nation



# FACT Training Content

- Water Quality Impacts of Nutrients
  - Microcystis/ Microcystin
  - Sediment, DRP & Total P, Nitrates
  - River & Edge of Field data



Source: Toledo Blade



- 4R Nutrient Stewardship
  - Rate
  - Timing
  - Placement
  - Source



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## Survey results from the training tell us...

- 5,510 Surveys summarized
- 16% had not attended OSUE programs in the past

Question	Agree or Strongly Agree % answering
Farm P is a significant problem to water quality	76
I have improved my knowledge of nutrient management	91
I plan to review soil test and current P recommendations they are using as result of meeting	82

CFAES

OSU Extension

Home

Critical Concerns

BMP Practices

FAQ

Submit

People

Critical Concern - Meet N  
Requiring Crop Needs

Read more >



## Content

***Critical Concerns-*** Pictures and descriptions.

***BMP Practices-*** Reference and application information

Source- In Field

Transport- Water control and filtering



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# Agricultural Fertilizer Applicator Law

- Fertilizer Applicator Certification (2014)
  - State wide
- Fertilizer/Manure Application Conditions (2015)
  - Targeted to Western Lake Erie basin
  - Extended Certification State wide to Any application of manure from concentrated animal feeding facility



# Fertilizer/Manure Application Criteria

For applications of granular fertilizer (defined as nitrogen or phosphorous) or manure in the western basin, a person may not apply:

- (1) On snow-covered or frozen soil
- (2) When the top two inches of soil are saturated from precipitation
- (3) When the local weather forecast prediction for the application area contains greater than a 50% chance of precipitation exceeding:

one inch in a 12 hour period for granular fertilizer

one-half inch in a 24 hour period for manure

unless the fertilizer/nutrient is injected into the ground, incorporated within 24 hours of surface application or applied on to a growing crop.



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  - c) Crop Observation and Recommendation Network Newsletter
3. Farmer Engagement
  - a) DRP disk
  - b) Nutrient Management Plans
  - c) Manure application