

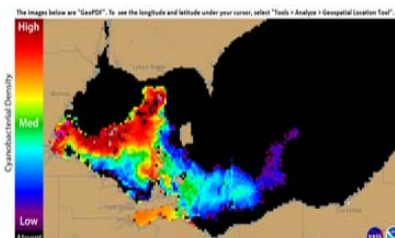
Building Nutrient and Water Quality Knowledge through Fertilizer Applicator Certification Training in Ohio

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INTRODUCTION

Microcystis cyanobacteria blooms in the Western Lake Erie Basin (WLEB) have affected regional water use since the mid 2000's. Concerns peaked during August, 2014 with a 72 hour "no drink order" for the water treatment system in Toledo, OH. The occurrence of toxin producing cyanobacteria species is linked to increased watershed phosphorus concentrations. Other Ohio water bodies have also experienced cyanobacteria outbreaks and other impairments related to excess nutrients. Non-point sources of P which include agriculture contributions have been targeted for reduction to improve water quality. Legislation came into effect August, 2014 requiring private and commercial fertilizer applicators to be certified if they applied fertilizer on 50 or more acres of agricultural production. The certification is in effect statewide. The certification requires attending a 3 hour educational session followed by application to the Ohio Department of Agriculture. Full enforcement began on September 30, 2017.

WLEB 2017 Bloom Coverage



Cyanobacteria Algal Bloom extent from NASA MODIS -Terra & Aqua 9/20/2017. Source: NOAA

CERTIFICATION CRITERIA

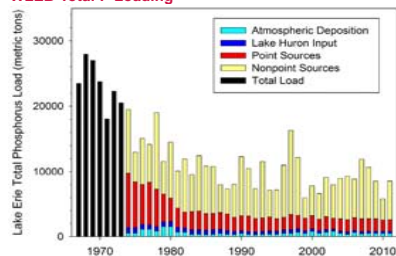
Fertilizer Applicator Certification is for private or commercial application of fertilizer where "Agricultural production" meaning the cultivation, primarily for sale of plants or any parts of plants occurring on more than 50 acres. 'Agricultural production' does not include the use of start-up fertilizer through a planter."

Fertilizer "means any substance containing nitrogen, phosphorus or potassium or any recognized plant nutrient element or compound that is used for its plant nutrient content or for compounding mixed fertilizers. Lime, limestone, marl, underground bone, water, residual farm products and un-manipulated animal and vegetable manures are excepted unless mixed with fertilizer material."

To attain the license the applicator must:

- Attend a three hour educational program sponsored by Ohio State University Extension.
- Apply to Ohio Department of Agriculture for the certification.
- Pay a \$30 fee if not already a certified pesticide applicator in the state.

WLEB Total P Loading



Total P contribution into Lake Erie. Source: Kleinman, et.al.

METHODS

Ohio State University Extension was tasked with designing and implementing the educational program to meet requirements for Fertilizer Certification. Curriculum consisted of five modules:

- laws and regulations
- nutrient water quality effects
- soil testing
- phosphorus management
- nitrogen management

An interactive workbook and supporting presentations were designed to address 4R nutrient stewardship. This initial training focused on nutrient rates and placement. Continuing credit of 1 hour for each 3 year period is required. Materials can be viewed at <https://agcrops.osu.edu/video/fact-videos>

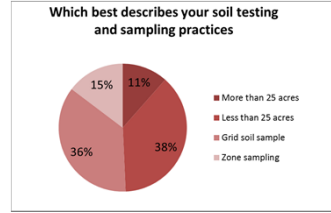
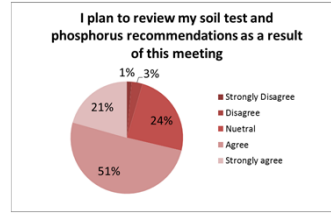
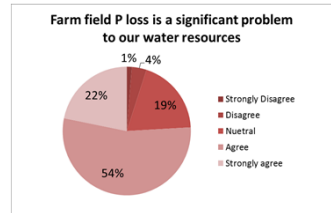
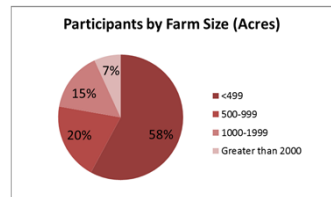
Workbook Exercise 2. Nutrient Recommendation and Fertilizer Rate Determination

Exercise 2: Recommendation and Fertilizer Worksheet Table: (completed answers)										
Field #1: Field 22										
Method	Recommended Phosphorus	N/P ₂ O ₅ Ratio	Rate	200 bu/yr						
2017 Crop	Corn	100	200	200						
2017 Crop	Soybeans	100	100	100						
Method	Method used for P ₂ O ₅ Rate	Soil Test	2016	2017	Total					
P	15.38 kg P ₂ O ₅	P	60	60	120					
			From Sale 11	From Sale 11						
Fertilizer Used	Manufacturer's Recommendation in Label	N/P ₂ O ₅ Ratio	Amount of Fertilizer applied in 2016	2017	Grain Response					
P	150	15:20	200 bu (200 × 0.12)	200 bu (200 × 0.12)	(200 × 0.12)					
			200 bu (200 × 0.12)	200 bu (200 × 0.12)	32 bu of W					
Field #2: Field 11										
Method	Recommended Phosphorus	N/P ₂ O ₅ Ratio	Rate	200 bu/yr						
2017 Crop	Corn	100	200	200						
2017 Crop	Soybeans	100	100	100						
Method	Method used for P ₂ O ₅ Rate	Soil Test	2016	2017	Total					
P	15.38 kg P ₂ O ₅	P	75	75	150					
			From Sale 11	From Sale 11						
Fertilizer Used	Manufacturer's Recommendation in Label	N/P ₂ O ₅ Ratio	Amount of Fertilizer applied in 2016	2017	Grain Response					
P	100	15:20	200 bu (200 × 0.12)	200 bu (200 × 0.12)	(200 × 0.12)					
			200 bu (200 × 0.12)	200 bu (200 × 0.12)	28 bu of W					

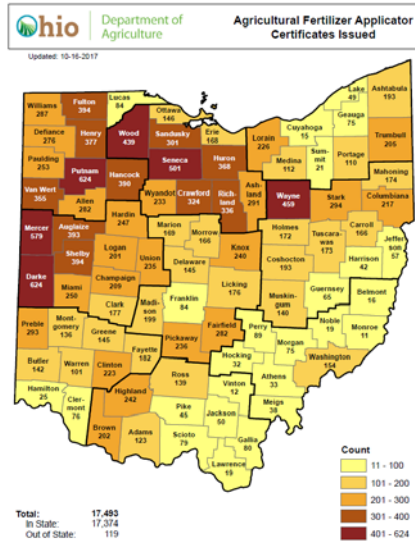
RESULTS

An after meeting survey was completed by 5196 participants for the period fall 2014 through summer 2017. Answers to questions/statements from the survey provide the following information:

- Have you attended OSU programs in the past. 18% No.
- I have improved my knowledge about nutrient management. Agree/strongly agreed was 93%.
- I will change my nutrient management practices as a result of this meeting. Agree/strongly agreed was 58%.



Certified Applicators-Number and Location



CONCLUSIONS

Fertilizer Applicator Training has been successful in helping farmers understand the issue of nutrient enrichment and providing information that has caused them to look at their current fertility recommendations to identify opportunities to improve nutrient management.

BIBLIOGRAPHY

- Ohio Department of Agriculture (ODA). 2017. Report of Certified Fertilizer Applicators by County. Columbus, OH.
- NOAA. Lake Erie HAB Bulletin. 2017. <https://idesandcurrents.noaa.gov/habeerie.html> (accessed 16 Oct. 2017).
- Kleinman, JA, (et.al.). 2015. Implementing agricultural phosphorus science and management to combat eutrophication. AMBIO 2015, 44(Suppl. 2):S297-S310 DOI 10.1007/s13280-015-0631-2.

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