

# Trials and Economics of Implementing Ag BMP's in Mercer County, Ohio

Theresa Dirksen, Ag Solutions Coordinator

September 13, 2018

# Mercer County and the Grand Lake St. Marys Watershed

- Highest livestock density in the state at approximately 370 animal units per 250 acres
- Highest soil test P levels in Ohio
- GLSM declared “distressed” in 2011



# GLSM “Distressed Watershed Designation”

- Currently 135 Comprehensive Nutrient Management Plans are being maintained
  - Mercer SWCD and local ODA staff maintain these plans
- 80 Feedlot Covers
- 110 Dry Manure Storage Barns
- 20 Holding Ponds/Anaerobic Lagoons
- 12 Wastewater Irrigation Systems
- 20 Silage Leachate Collection Systems
- 3 Treatment Wetlands
- 5 Mortality Compost Structures
- Cover crops more widely used
- **\$10.3 million over 4 years**



# Costs of BMP's

- Nutrient Management Planning
  - Grid soil sampling ~\$9/ac
  - Random soil sampling ~\$2/ac
  - Manure analysis cost per year ~\$35/sample
  - SWCD's provide technical service
- Feedlot Covers
  - ~\$14 - \$25 per square foot
- Dry Manure Storage Barns
  - ~\$20 per square foot
- Cover crops
  - ~\$30 - \$100 per acre
- **What is farmer's economic advantage?**





- Ag Solutions was formed in early 2011 and is a group of farmers who live and work in the Grand Lake St. Marys watershed area who have come together to seek effective, affordable solutions to the environmental issues impacting the lake while promoting the growth and vitality in our farm communities. Upon the group's formation, the group was facilitated by the Marion Community Development Organization (MCDO). Due to lack of funding and diminishing leadership, in 2016, the Mercer County Commissioners devoted funding to hire a coordinator
- Also own and operate a 180-head dairy farm in Mercer County

# Manure Dewatering Pilots



KDS Separator  
Swine Solids



KDS Separator  
Dairy Solids



GEA Centrifuge – Swine Manure



Digested Organics – Swine Manure

# Manure Dewatering Pilots

- Technologies work; issue is cost
- Liquid manure is currently land applied at agronomic rates for around \$0.01 per gallon
- Operating costs of any technology need to be in line with \$0.01 per gallon for adoption
- We are on the right track in finding options and/or combinations to achieve this



# KDS Separator Pilot – March 2018

Polymer, coagulant used as noted and electricity  
Final estimated operating cost = \$0.015 per gallon

Raw Swine		Swine Effluent (polymer)		Swine Solids (polymer)	
Moisture	95.22%	Moisture	98.06%	Moisture	79.53%
Volatile Solids	282.74 lb/1000 gal	Volatile Solids	95.86 lb/1000 gal	Volatile Solids	334.4 lb/ton
Total N	41.61 lb/1000 gal	Total N	33.8 lb/1000 gal	Total N	20.34 lb/ton
Ammonia N	40.09 lb/1000 gal	Ammonia N	31.78 lb/1000 gal	Ammonia N	8.66 lb/ton
Organic N	1.52 lb/1000 gal	Organic N	2.02 lb/1000 gal	Organic N	11.68 lb/ton
P	7.09 lb/1000 gal	P	0.92 lb/1000 gal	P	9.42 lb/ton
P2O5	16.21 lb/1000 gal	P2O5	2.1 lb/1000 gal	P2O5	21.58 lb/ton
K	21.94 lb/1000 gal	K	18.67 lb/1000 gal	K	5.2 lb/ton
K2O	26.42 lb/1000 gal	K2O	22.45 lb/1000 gal	K2O	6.26 lb/ton
Ortho P	467 ppm	Ortho P	69 ppm		

% P Removal

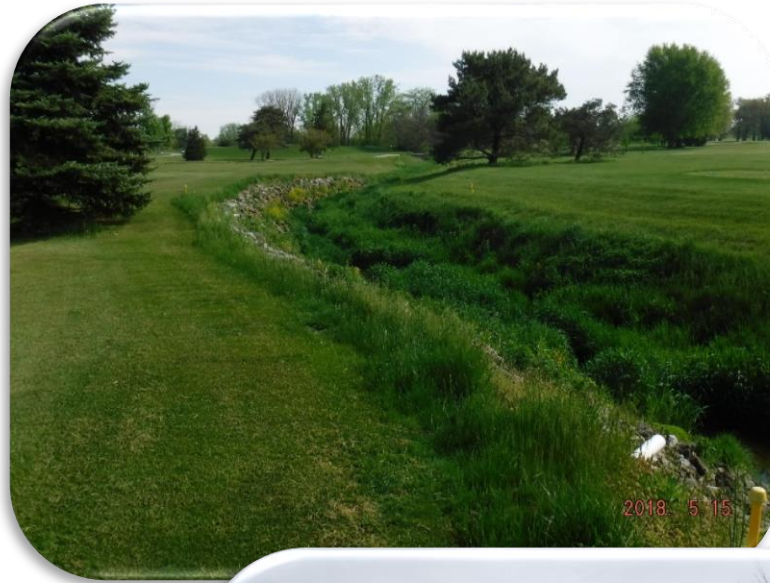
87.05%

Raw Dairy		Dairy Effluent (polymer + coagulant)		Dairy Solids (polymer + coagulant)	
Moisture	95.74%	Moisture	98.35%	Moisture	83.06%
Volatile Solids	258.49 lb/1000 gal	Volatile Solids	77.58 lb/1000 gal	Volatile Solids	278.6 lb/ton
Total N	16.7 lb/1000 gal	Total N	10.79 lb/1000 gal	Total N	10.28 lb/ton
Ammonia N	11.87 lb/1000 gal	Ammonia N	10.2 lb/1000 gal	Ammonia N	2.32 lb/ton
Organic N	4.83 lb/1000 gal	Organic N	0.59 lb/1000 gal	Organic N	7.96 lb/ton
P	1.78 lb/1000 gal	P	0.51 lb/1000 gal	P	1.62 lb/ton
P2O5	4.07 lb/1000 gal	P2O5	1.18 lb/1000 gal	P2O5	3.72 lb/ton
K	12.54 lb/1000 gal	K	9.78 lb/1000 gal	K	3.46 lb/ton
K2O	15.09 lb/1000 gal	K2O	11.81 lb/1000 gal	K2O	4.16 lb/ton
Ortho P	122 ppm	Ortho P	48 ppm		

% P Removal

71.01%

# Other BMP's



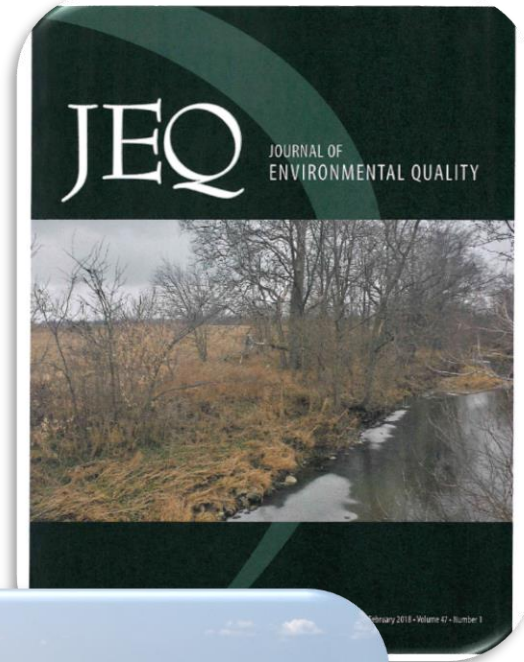
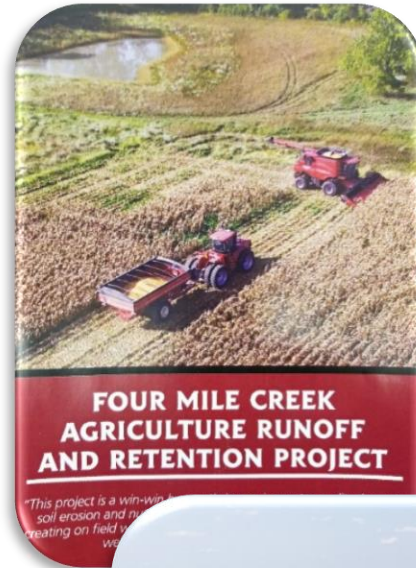
# Other BMP's

- It takes cost-share or grants to offset cost of establishment
  - Trials with “new” practices or things “new” to Mercer County
- 
- Allows us to educate
  - Stream Restoration
  - Wetlands (treatment trains and more)
  - Waterway with wetlands
  - Drainage retention (saturated buffers)

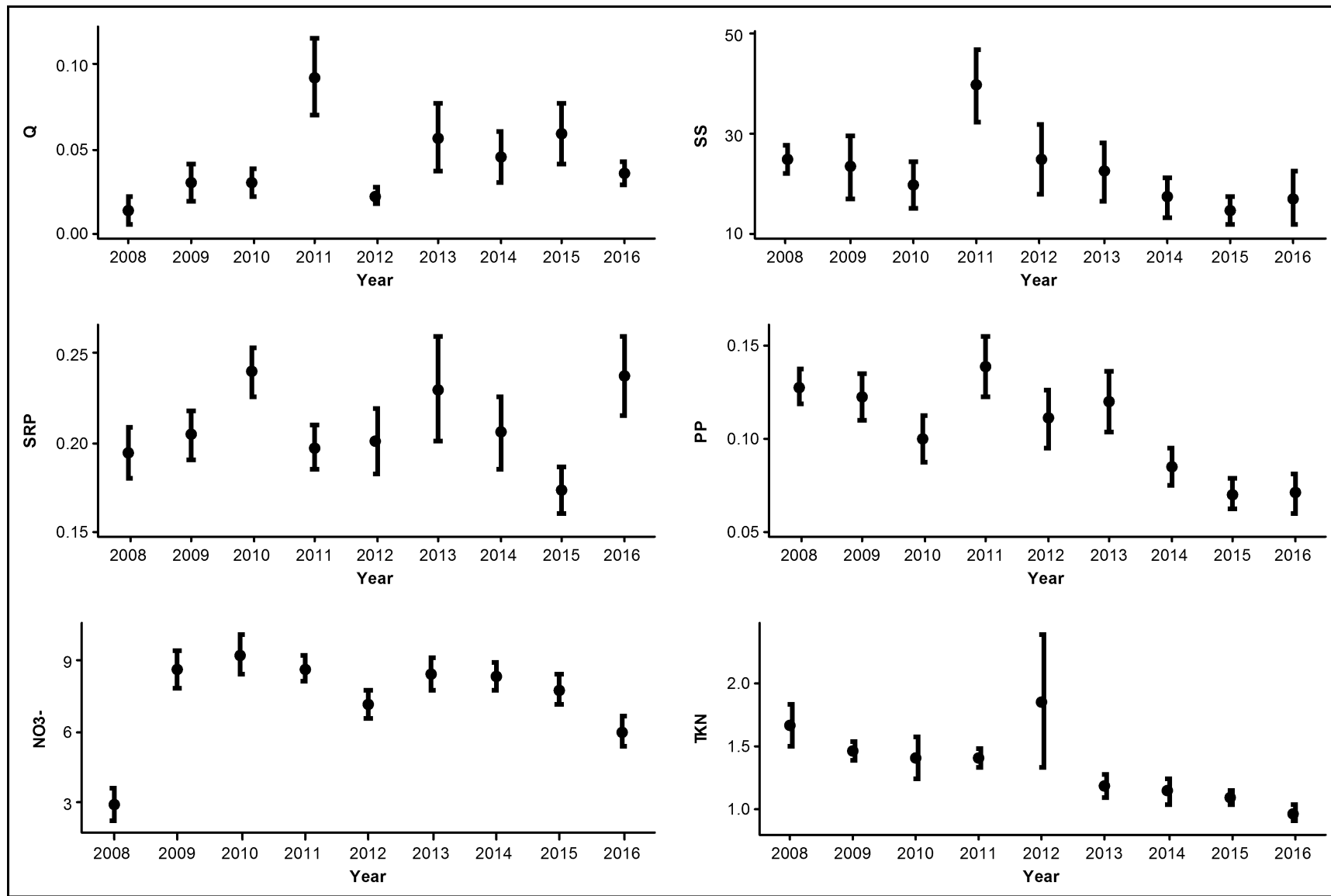


# Monitoring with Wright State University Lake Campus

- GLSM Distressed Watershed rules efficacy project
- Saturated buffer and drainage retention ponds
- Reconstructed wetlands



# Annual Flow and Nutrient Summary



# Questions?

Theresa Dirksen, PE

Ag Solutions Coordinator

Mercer County Community & Economic Development

101 N. Main St. Room 102

Celina, OH 45822

419-586-4209

[theresa.dirksen@mercercountyohio.org](mailto:theresa.dirksen@mercercountyohio.org)

Facebook: <https://www.facebook.com/AgSolutions/>