Table 1. Field Best Management Practices (BMP's) for the reduction of dissolved phosphorus (DP) loading (concentration x flow) to streams and ditches in NW Ohio. (03/09/2017)

	PRACTICE LOCATION		FIELD REDUCTION RATING POTENTIAL		"TOOLBOX" of BMP's for DP		
BMP PRACTICE	IN FIELD	EDGE OF FIELD	DP CONCEN-TRATION	RUNOFF AMOUNT*	HOW THE PRACTICE WORKS	RELATIVE PRACTICE COSTS	LIKELY PRACTICE USE*
Nutrient Management							
Soil Testing - agronomic	X		+3	0	Measures P requirements for optimal crop growth. Key to application rates.	Low	High
Soil Testing - environmental	X		+5	0	Measures potential for DP losses in surface flow and leaching. Key to rates/method of application.	Low	Medium
Vegetative Mining	X		+2	0	Uses cropping system to drawdown high soil test levels. May take 15 or more years.	Low	Medium
P Application Rate	X		+5	0	Key component of all P Indexes. Major determinant of DP availability.	Low	High
Variable Rate P Application	X		+5	0	A refinement of application rates reflected as well in application location.	Medium	High
Time of P Application	X		+4	0	Considers: rain forecast; saturated, frozen or snow covered soils; growing crops.	Low	Medium
P Application Method:							
Broadcast, shallow incorp.	X		+1	0	Incorporated 2 to 3 inches within 24 hours of application using full width tillage.	Low	High
Broadcast, AerWay incorp.	X		+2	+2	Can allow DP to infiltrate 6 to 8 inches while maintaining residue cover to slow runoff.	Low	Medium
Band with corn planter	X		+3	0	Placed at corn planting time in a band at least 2 to 3 inches deep.	Low	Medium
Subsurface injection	X		+4	+1	Placed typically in a band more than 5 inches deep. Improved short term infiltration.	Medium	Low
P Application Location	X		+3	0	Setbacks from watercourses, surface tile inlets, sinkholes and tile blow outs. Avoidance of flood plains, steep slopes or poorly drained soils.	Low	Medium
Conservation Tillage							
Mulch Tillage/Residue Mgt.	X		-1	+1	P can stratify. Slows runoff, increases infiltration and soil organic matter.	Low	High
No-tillage/Residue Mgt.	X		-1	+2	P can stratify. Macropore formation. Improved infiltration. Improved soil organic matter levels.	Low	High
Continuous No-till	X		-2	+3	Increased P stratification/macropore formation. Greater infiltration and soil organic matter.	Low	Low
Cont. No-till with Cov. Crops	X		-3	+4	Highest P stratification potential. Greatest infiltration. Highest soil organic matter levels.	Low	Low
Non Inversion Tillage	X		-2	+2	Reduces compaction and retains crop residues to promote infiltration. P can stratify.	Medium	Medium
Inversion Tillage	X		+4	-1	Incorporates P fertilizers at depth. Eliminates P stratification. Can increase surface runoff.	Medium	Low
Conservation Cropping							
Crop Rotation	X		+1	+1	Basis for P nutrient uptake, slowing runoff and increased soil organic matter content.	Low	High
Cover Crops that winter kill	X		-3	+1	Adds to P stratification and DP release before crop uptake. Improves infiltration.	Medium	Medium
Cover Crops - don't winter kill	X		+1	+2	Adds to P stratification; improved P retention for crop uptake. More infiltration, organic matter.	Medium	Medium
Strip Cropping	X		+1	+2	Wheat or hay with row crops. Disperses P fertilizer application and crop/residue cover.	Medium	Low
Hayland Planting	X		-2	+3	Permanent cover. Slows runoff and increases soil organic matter. P can stratify.	Medium	Low
CRP Cover - Grass	X		-2	+4	Significant increases in percolation plus soil organic matter. Retards surface runoff. P can stratify.	Medium	Medium
CRP Cover - Trees	X		+1	+5	Permanent increases in percolation. Retards runoff. Greater P retention in woody vegetation.	High	Low
Conservation Buffers							
Filter Strips - Grass		X	-2	+3	Needs proper design/installation. Improved infiltration. P stratifies with time.	Medium	Medium
Filter/Recharge Areas		X	-2	+4	Grassed areas where water drains from field. Retards runoff. P stratifies with time.	Medium	Medium
Riparian Strips - Trees		X	+1	+4	P uptake is permanent. Greater percolation, retention of runoff. Surface runoff dispersal.	High	Low
In Field Buffers - Grass	X		-2	+3	Greater infiltration. Retards runoff across landscape. P stratifies with time.	Medium	Medium
Field Windbreaks - Trees	X	X	+1	+3	P uptake is permanent. Improved infiltration. Retards runoff from fields.	High	Low
Water Management							
Controlled Traffic	X		+1	+2	Reduces wheel traffic compaction. Improves infiltration. Improves crop uptake of P.	Low	Medium
Tile Drain Outlet Control		X	+1	+1	Helps reduce runoff in fields having soils with preferential flow. Greater P uptake by crops.	Medium	Low
Tile Drain Inlet Control	X		+3	+3	Blind inlets halt direct delivery of runoff DP to streams and permit greater infiltration.	Medium	Low
Tile Main Repair	X		+3	+3	Repairs eliminate direct entry of runoff DP to streams and permit greater infiltration.	Medium	Medium
Wetland Construction		X	+1	+2	Slows/disperses runoff. Groundwater recharge. Reductions in DP are less with time.	High	Low

* Runoff Amount would include both surface and subsurface contributions following storm or snowmelt events.

Review and clarification of rankings based on more current research and the concept that P concentrations in runoff are a function of:

1. Amount of P fertilizers applied
2. Depth of P fertilizer application
3. Depth of tillage
4. Permanent nature of the soil cover

Important questions in any exercise of this type:

1. How do increased in soil OM levels alter need for added commercial fertilizers? Need Tri State Fertility Guide update.
2. How do practice mixes impact P concentration in runoff amounts?
3. How do practice mixes impact runoff amounts themselves?

VALUE	RATING	
-3	Moderate negative effect	(NEW RATING VALUE
-2	Somewhat moderate negative effect	
-1	Minor negative effect	
0	Little or no effect	
+1	Minor positive effect	
+2	Somewhat moderate positive effect	
+3	Moderate positive effect	
+4	Somewhat major positive effect	
+5	Major positive effect	

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