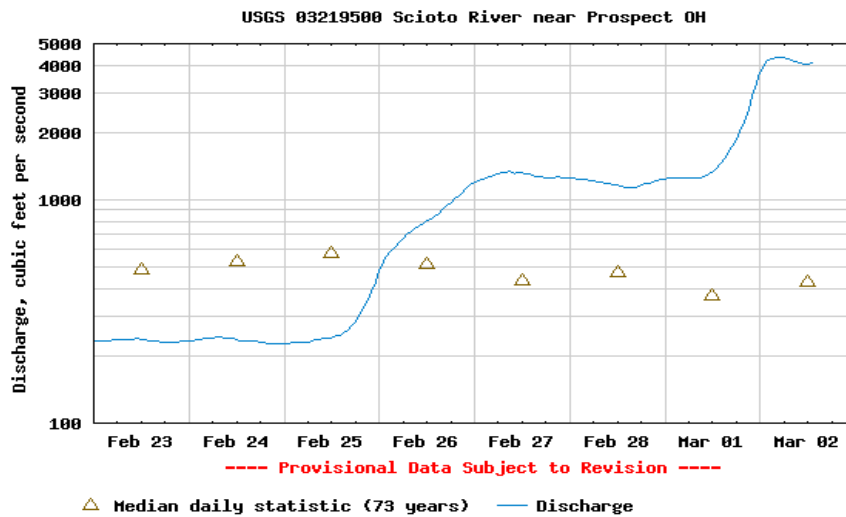


## Thaw Hydrograph Feb 22-March 3, 2007



### Phosphorus Leaching Through Intact Soil Columns Before and After Poultry Manure Application-March 2005 Kleinman, Srinivasan, Sharpley, Gburek

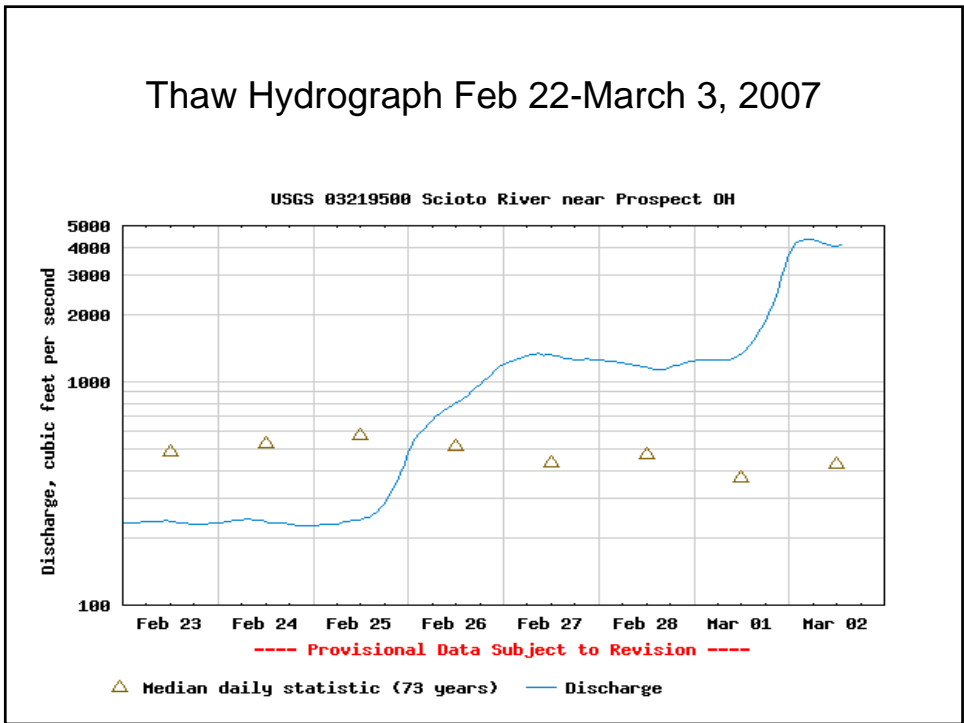
- The study “highlights the role of manure in temporarily increasing the potential for subsurface P transport in soils.”
- “Before manure application, concentrations of P in leachate were low, with DRP consisting of less than 10% of total P in leachate.”
- After manure application, all columns exhibited significant increases in leachate P concentrations, primarily due to DRP, identifying soluble P in manure as the major source of leachate P.”

Poultry-Layer Manure Land Application-Union County  
 Samples Collected Feb 26, 2007



Parameters (mg/L) →	BO D5	Susp Solid	NH3-N	NO3 + NO2	Total P
Location					
Patrick Harmon Rd South Tile	360	15	<b>47.3 (64X)</b>	0.51	<b>5.38 (13X)</b>
Bokes Creek Upstream	5.7	18	0.750	1.62	0.421
Bokes Creek Downstream	5.1	19	0.706	1.71	0.370





Effect of Broadcast Manure on Runoff Phosphorus Concentrations over Successive Rainfall Events  
 Peter J.A. Kleinman and Andrew N. Sharpley (JEQ-2003)

- Implication to Phosphorus Site Assessment Indices
  - ...findings of this study suggest that differential erosion of broadcast manure can be an important contributor to the variation in runoff TP concentrations among soils. In many areas, manure is broadcast onto no-till and grassed soils that have low erosion rates. While soil erosion is included as a transport factor in all site assessment indices, it is possible that erosion of applied manure is not adequately represented.

Downstream land where separated sand solids from Dairy Manure were land applied onto frozen /snow covered land

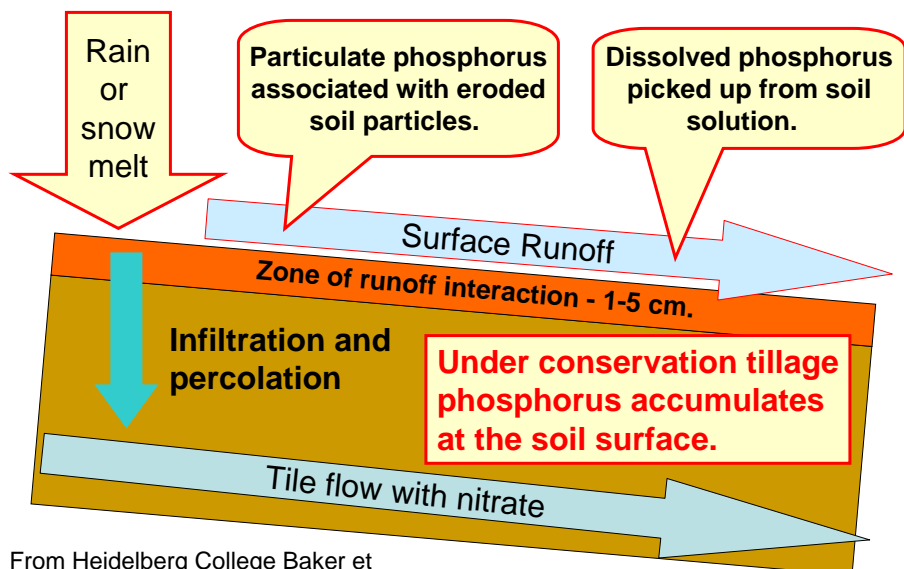


Parameters (mg/L) → Location	BOD5 (mg/L)	Susp.solids (mg/L)	NH3-N (mg/L)	NO3+NO2 (mg/L)	Total P (mg/L)
<b>UT Cessna Creek on Rd. 90 (Downstream from manure app location) (02-26-07)</b>	<b>16</b>	<b>20</b>	<b>1.19</b>	<b>2.97</b>	<b>1.11</b>
<b>UT Cessna Creek on Rd. 90 (03-01-07)</b>	30	334 (~17X)	2.96 (2.5X)	1.70	1.48 (1/3 higher)

Effect of Broadcast Manure on Runoff Phosphorus Concentrations over Successive Rainfall Events  
Peter J.A. Kleinman and Andrew N. Sharpley (JEQ-2003)

- Broadcast manure concentrates soluble P at the soil surface where it is readily available to runoff into water (Sharpley et al., 1984)
- Of existing manure application methods, broadcasting generally results in the greatest potential for soluble P losses in runoff (Zhao et al., 2001)

### How does phosphorus move from fields to streams?



From Heidelberg College Baker et al.





## Poultry Manure Runoff Associated with Thaw

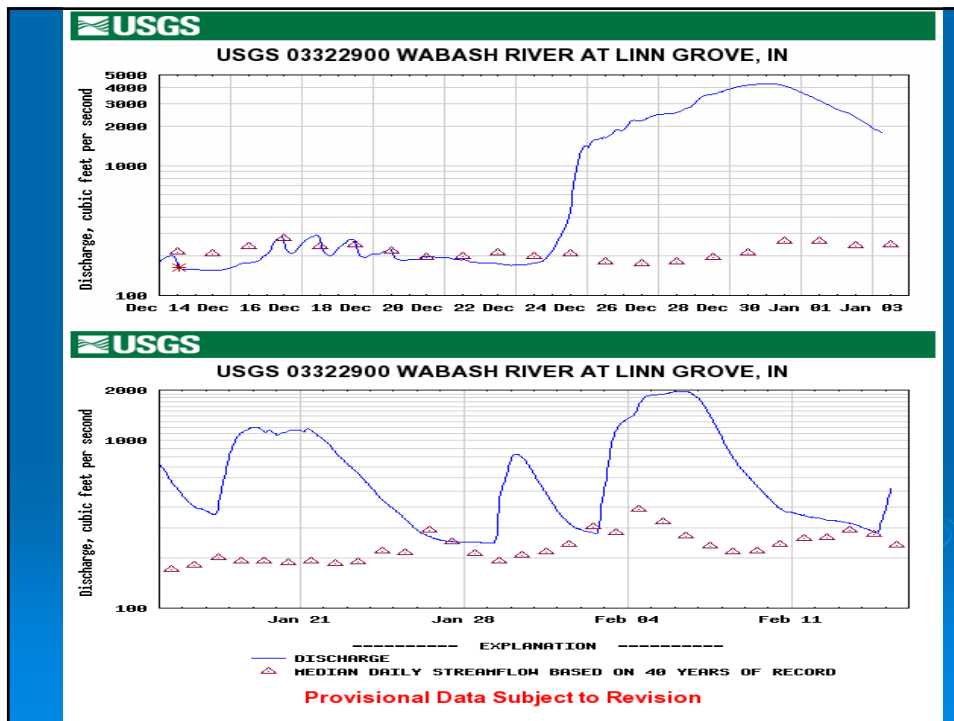




# Water Quality Sample Results

(From One Poultry Manure Runoff Incident)

Sample Location	Typical Ambient Stream (mg/L)	Field Runoff (mg/L)	Roadside Tributary (mg/L)	At Confluence With Stream (mg/L)	Appx 1 Mile Down-stream (mg/L)
BOD5	<2.0	1200	150	50	40
TSS	<5	74	16	27	22
Ammonia	0.10	74.7	10.7	3.19	2.34
Total P	0.06	25.7	3.06	1.53	1.45



Effect of Broadcast Manure on Runoff Phosphorus Concentrations over Successive Rainfall Events  
Peter J.A. Kleinman and Andrew N. Sharpley (JEQ-2003)

➤ Trends with successive Rain Events

- Results confirm the importance of timing and sequence of runoff event relative to manure application on runoff P concentrations, as illustrated by DRP, TP, and SS concentration in runoff from Buchanan soil broadcast with 100 kg TP/ha
- Runoff water may remove sufficient quantities of P from the soil surface such that less P is available to runoff over time.
- McDowell and Sharpley (2002, 2003) found that eroded sediments are generally enriched with P relative to other solids at the soil surface, and are a key source of P in runoff from soils receiving recent applications of manure

Effect of Broadcast Manure on Runoff Phosphorus Concentrations over Successive Rainfall Events  
Peter J.A. Kleinman and Andrew N. Sharpley (JEQ-2003)

- Due to the high concentration of soluble P in manure, much of the increase in runoff TP concentrations from manure-amended soils was related to soluble P losses, as evidenced by the contribution of DRP to runoff TP concentrations. In runoff from soils broadcast with manure, DRP concentrations ranged from 30-93% of TP concentrations, with the contribution of DRP to TP increasing with application rate.

GLSM Watershed—December '05



## GLSM Thaw- December 2005

	NH3-N (mg/L)	Total P (mg/L)	Nitrate+ Nitrite (mg/L)
12-27-05 Average of 15 samples from GLSM and Wabash watershed (Flow 15 times greater than frozen period)	0.603	0.573	19.03
12-27-05 "Control" from Loramie Creek (i.e., less density of livestock)	0.246	0.333	6.75
% Difference from GLSM Thaw concentrations	59% less	42% less	65% less
2-16-06 Average of 7 samples in GLSM 'shed	0.14	0.21	11.1
% Difference from GLSM Thaw concentrations	77% less	63% less	42% less

## Feedlot Runoff:

A lot of manure concentrated in one spot = Higher concentration of pollutants (load?)

Location Philothea Feedlot runoff							
	Parameter	Storet	Result	RL	Units	Date	Qualifier
	BOD5	P310	47	2	mg/L	02/08/2008	
USDP	Total Suspended Solids	P530	2210	20	mg/L	02/11/2008	
SP	Ammonia	P610	6.10	0.25	mg/L	02/13/2008	
	Nitrate+nitrite	P630	0.23	0.1	mg/L	02/13/2008	
	Total Phosphorus	P665	53.4	0.7	mg/L	02/21/2008	
	Total Phosphorous, dissolved	P666	14.7	0.25	mg/L	02/21/2008	
Comments	Send results to R Wilson Runoff 4230 Philothea Rd.- dairy feedlot						
Comments	Syringe method for DP						
Sample							
Notes							

Robin Shepard  
JWSC-J/A 2005

### Nutrient management planning: Is it the answer to better management?

- “Study results show implementation of current nutrient management plans is far from fully achieved, and the evolution to phosphorus (P)-based CNMPS would require even more follow up assistance to farmers. The complexity of P-based plans, and because so few farmers currently credit on-farm sources of P<sub>2</sub>O<sub>5</sub> will make widespread success difficult, possibly unrealistic. Given the information and educational needs associated with implementing a plan, it may be more effective to work extensively with a few farmers in targeted areas that are determined to be more susceptible to nutrient loss (Eghball and Power 1999; Heathwaite, et al., 2000, Nowak and Chabot, 2004).



Although tremendous effort has gone into federal and state programs to protect water resources from nonpoint sources of pollution by promoting and/or requiring a nutrient management plan (NMP), just having an NMP does not reduce excess nutrient application nor does it guarantee improvements in water quality.”

## P-Task Force

- Recommendations to Director Korleski expected to be ready in May 2008.
  - OEPA should monitor or require monitoring for dissolved reactive P.
  - Agriculture and Agronomics (laundry list)
    - Soil tests (soil test methods and use)
    - Work toward updated and Improved Agricultural BMPs which specifically address to issues raised today. Improve and Phosphorus Index and use it.
    - Should open doors for increase for water quality research in agricultural landscape, for multivariate study
  - Point sources (ortho-phosphate in Drinking water, lawns fertilizers and detergents) aren't off the hook

	BOD5 (mg/L)	SuspSolids (mg/L)	Total P (mg/L)	NH4 (mg/L)
Dairy Manured-Stream 3-12-08	530 (117X)	1120 (25X)	6.37 (24X)	41.6 (49X)
Control (1 mile away) 3-12-08	4.5	45	0.264	0.851

Thaw event

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Information on Ohio EPA Water Quality Information:  
<http://www.epa.state.oh.us/dsw/index.html>