The Nutrient Content of Stream Sediments



The Peculiarities of Perviousness

Feb. 12-13, 2014

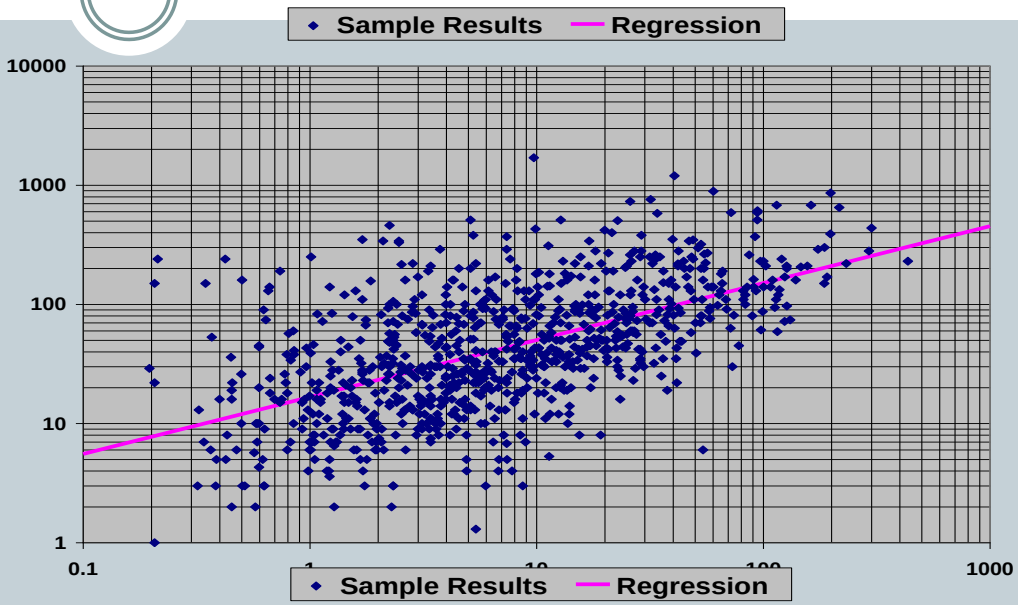
CENTER FOR WATERSHED PROTECTION

Chesapeake Bay Program
A Watershed Partnership

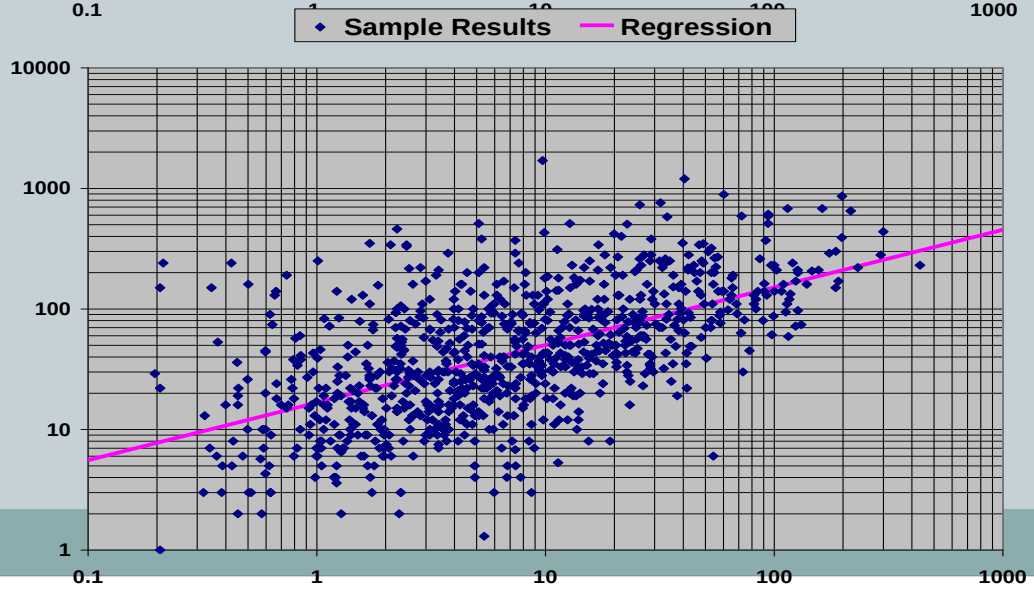
Measuring TSS and nutrient loads

TSS and TP vs. Flow

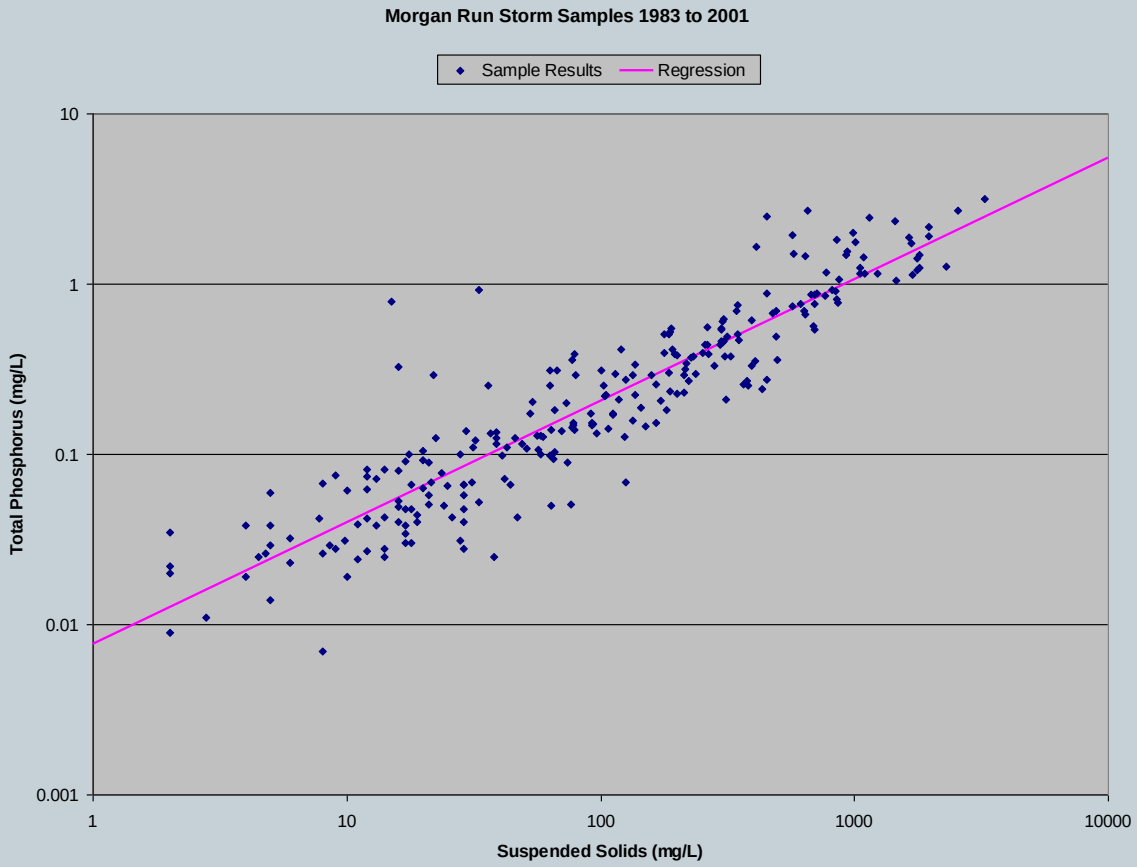
Typical flow vs. TSS



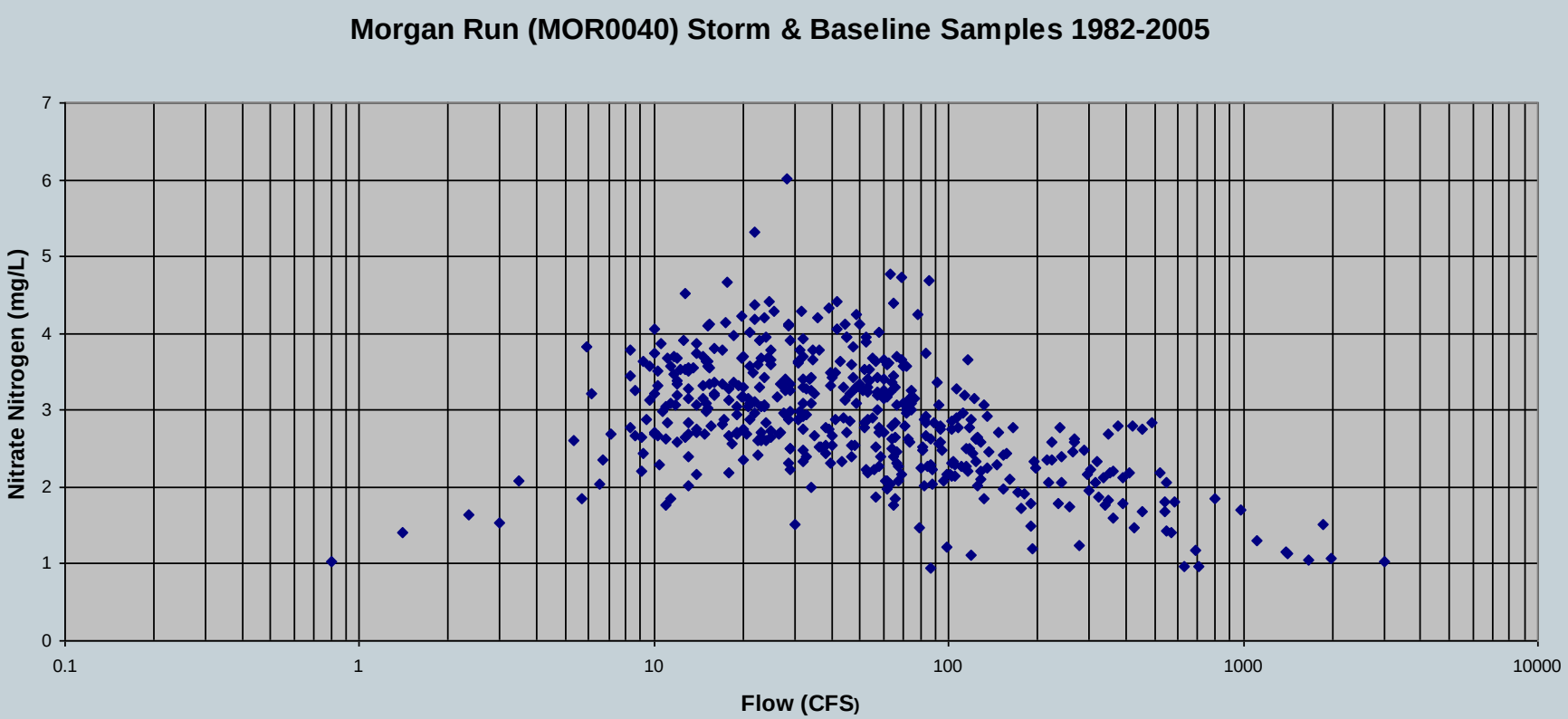
Typical flow vs. TP



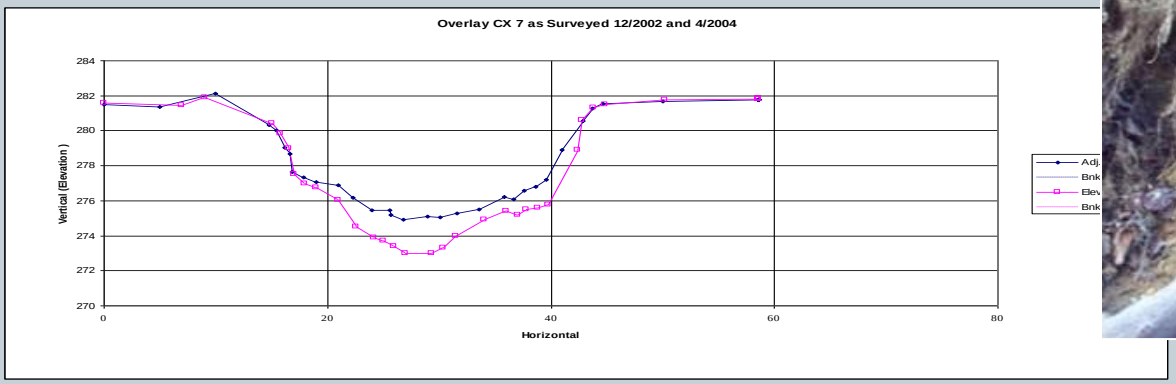
Typical TSS vs. TP relationship



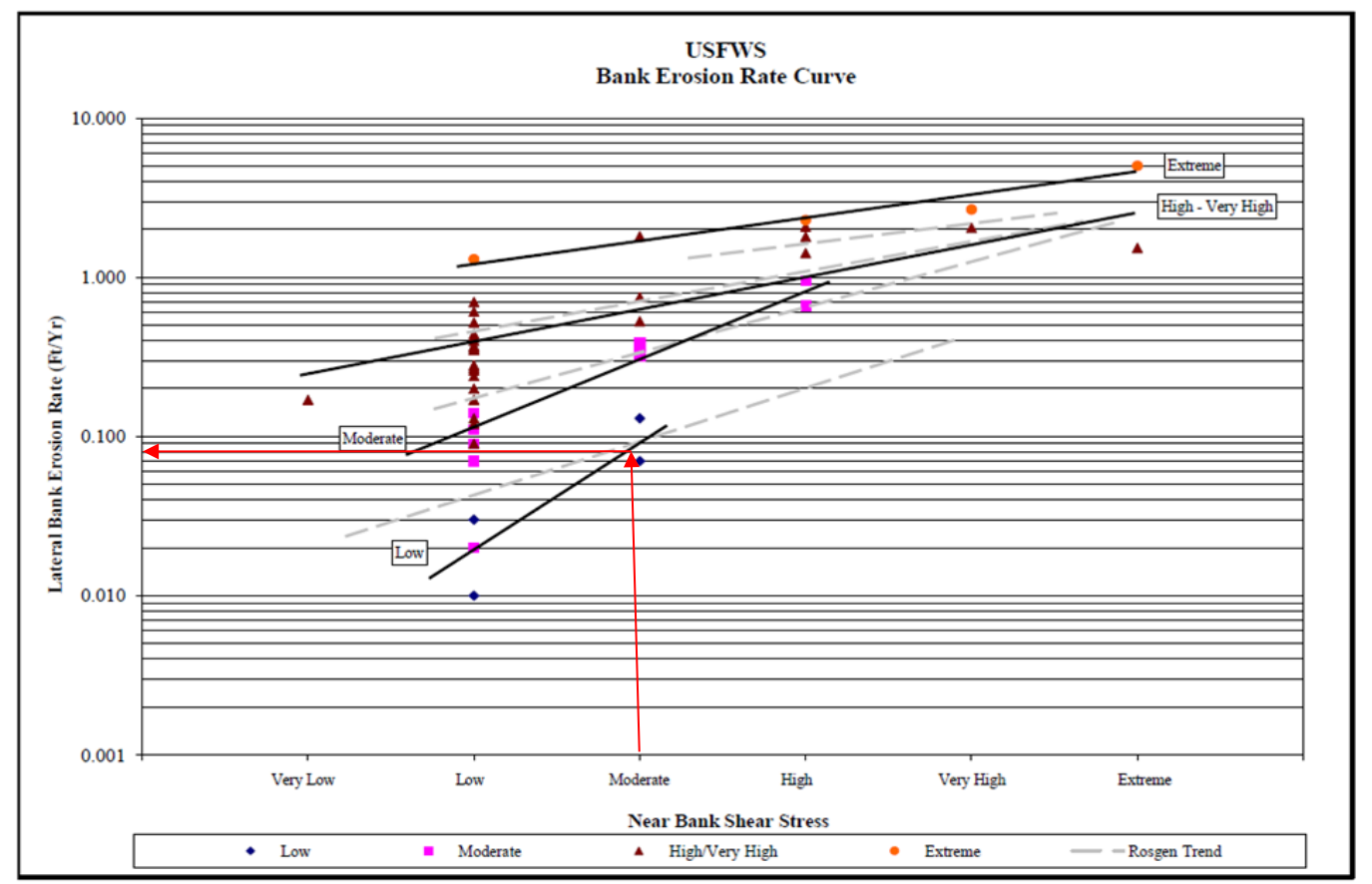
Typical Nitrate vs. Flow



Geomorphic monitoring



Predicting bank erosion from geomorphic measurements



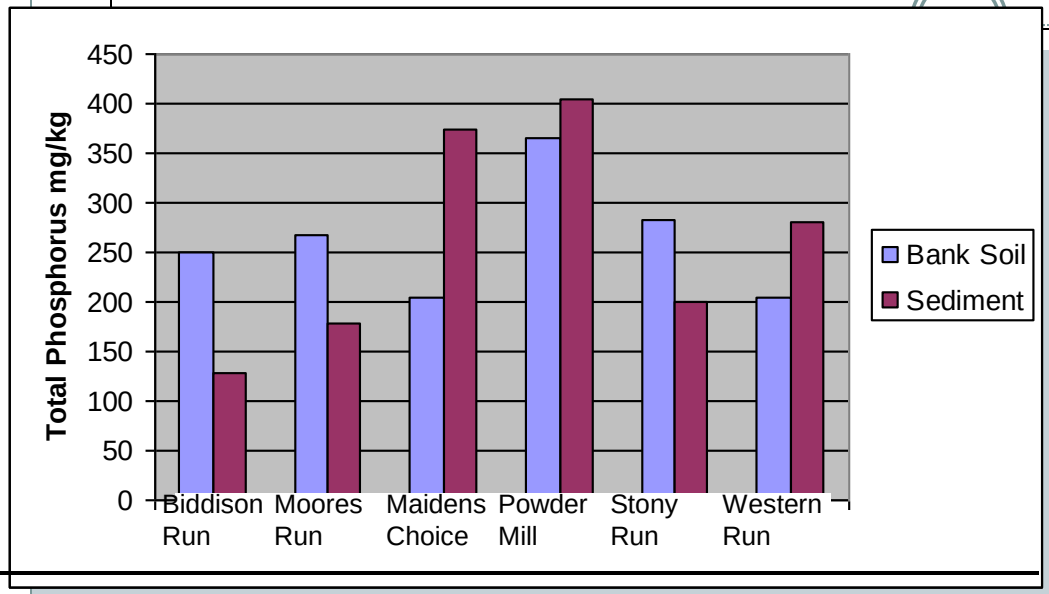
VALIDATED 2005
BANK EROSION POTENTIAL
Hickey Run, Washington D.C.

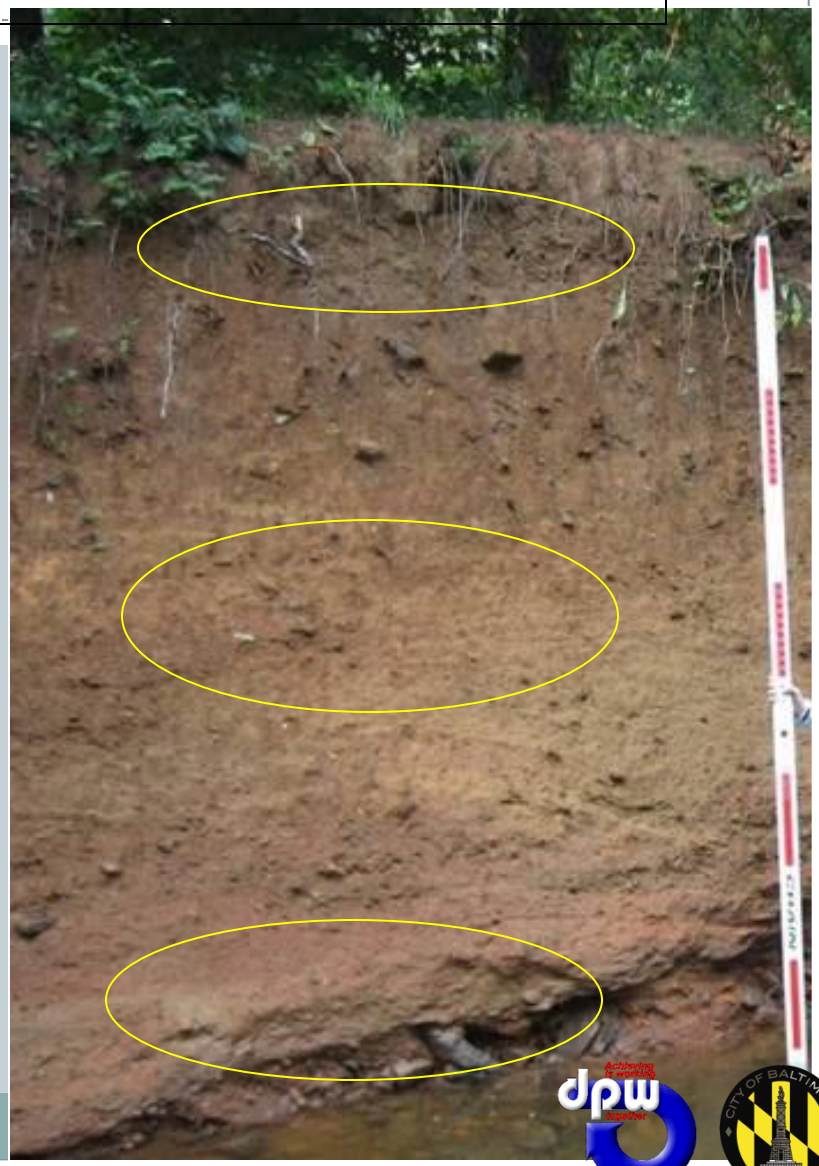
Reach ID	Cross Section	Reach Length	Bank Length	Bank Height	Bank Area	BKF Height	BEHI	Near Bank Stress	Predicted Erosion Rate (ft/yr)	Predicted Erosion Sub-Total (ft^3/yr)	Predicted Total Reach Erosion (ft^3/yr)	Predicted Total Reach Erosion (yd^3/yr)	Predicted Erosion Rate (tons/yr)	Predicted Erosion Rate (tons/yr/ft)
Reach 6														
Bank 1			376	10	3760	1.7	High	Low	0.4	1504.00				
Bank 2	XS #17 (LB)		260	4.5	1170	1.7	Low	Low	0.017	19.89				
Bank 3	XS #16 (RB)		144	6.5	936	1.7	High	Low	0.4	374.40				
Bank 4	XS #15 (RB)		578	15	8670	1.7	High	Low	0.4	3468.00				
Bank 5			329	8	2632	1.7	High	Low	0.4	1052.80				
Bank 6	XS #15 (LB)		381	12	4572	1.7	Very High	Low	0.4	1828.80	8247.89	305	397.12	0.33
Reach 5														
Bank 7			160.5	10	1605	2.01	High	Low	0.4	642.00				
Bank 8	XS #14 (RB)		192	8.5	1632	2.01	Very High	Low	0.4	652.80				
Bank 9	XS #14 (LB)		122.4	2.3	281.52	1.4	Low	Low	0.017	4.79				
Bank 10			55	7	385	1.4	Very High	Low	0.4	154.00	1453.59	54	69.99	0.26
Reach 4														
Bank 11	XS #13 (RB)													
Bank 12	XS #12 (RB)													
Bank 13														
Bank 14														
Bank 15	XS #9/10 (LB)													
Bank 16	XS #9/10 (RB)													
Bank 17														
Bank 18														
Bank 19														
Bank 20	XS #8 (LB)													
Reach 3														
Bank 21	XS #6 (LB)													
Bank 22			100	6.5	650	1.88	High	Low	0.4	260.00				
Bank 23			62.5	8	500	1.23	N/A	N/A	0.00	N/A				
Bank 24	XS #5 (RB)		50	20	1000	1.73	Very High	Extreme	2.65	2650.00				
Bank 25			175	3.5	612.5	1.48	Moderate	Low	0.11	67.38				
Bank 26			162.5	7.5	1218.75	1.48	Very High	Low	0.4	487.50	5738.58	213	276.30	0.36
Reach 2	Concrete Channel													
Reach 1														
Bank 27			1170	7.5	8775	3.76	Low	Low	0.017	149.18				
Bank 28			1170	10.5	12285	4	Low	Low	0.017	208.85	358.02	13	17.24	0.01

Table 3. Streambank study results on Mitchell River, North Carolina (Harmon and Jessup, 1999).

Bank Erodibility Hazard (BEHI)	Near-Bank Stress (NBS)	Predicted Streambank Erosion (Colorado curve) m/yr - ft/yr		Observed Streambank Erosion m/yr - ft/yr	
Moderate	High	0.12	0.38	0.09	0.30
Moderate	Extreme	0.45	1.5	0.21	0.70
High	Extreme	0.76	2.5	0.85	2.8
Extreme	Extreme	4.27	14.0	3.35	11.0

Nutrient content of stream soils





Stream channel nutrient data

Table 5. TN and TP Concentrations in Sediments in Different Parts of the Urban Landscape[1]						
Location	Mean TP	TP Range	Mean TN	TN Range	Location	Reference
Streambank Sediments	0.439	0.19-0.90	--	--	MD	BDPW, 2006
	1.78		5.41		MD	Stewart, 2012
	1.43	0.93-1.87	4.4	2.8-6.8	PA	Land Studies, 2005 [2]
	1.05	0.68-1.92	2.28	0.83-4.32	PA	Walter et al., 2007 [2,4]

[1] all units are lb/ton
[2] the Pennsylvania data on streambank sediments were in rural/agricultural subwatersheds
[3] catch basin values are for sediment only, excluding leaves
[4] median TN and TP values are reported

Reconciling the two methods