
Conservation Tillage
Phase 6 Panel

Panel Membership

Name	Affiliation	Role
Wade Thomason	VT	Panel Chair
Bill McCollum	DuPont Pioneer	Panel Member
Kevin Ganoe	Cornell	Panel Member
Dale Gates	NRCS	Panel Member
Mark Reiter	VT	Panel Member
Sjoerd Duiker	PSU	Panel Member
Bill Keeling	VADEQ	Watershed Technical Workgroup representative
Jeff Sweeney	CBPO	Modeling Team representative
Mark Dubin	UMD	AgWG Coordinator
Emma Giese	CRC	Staff

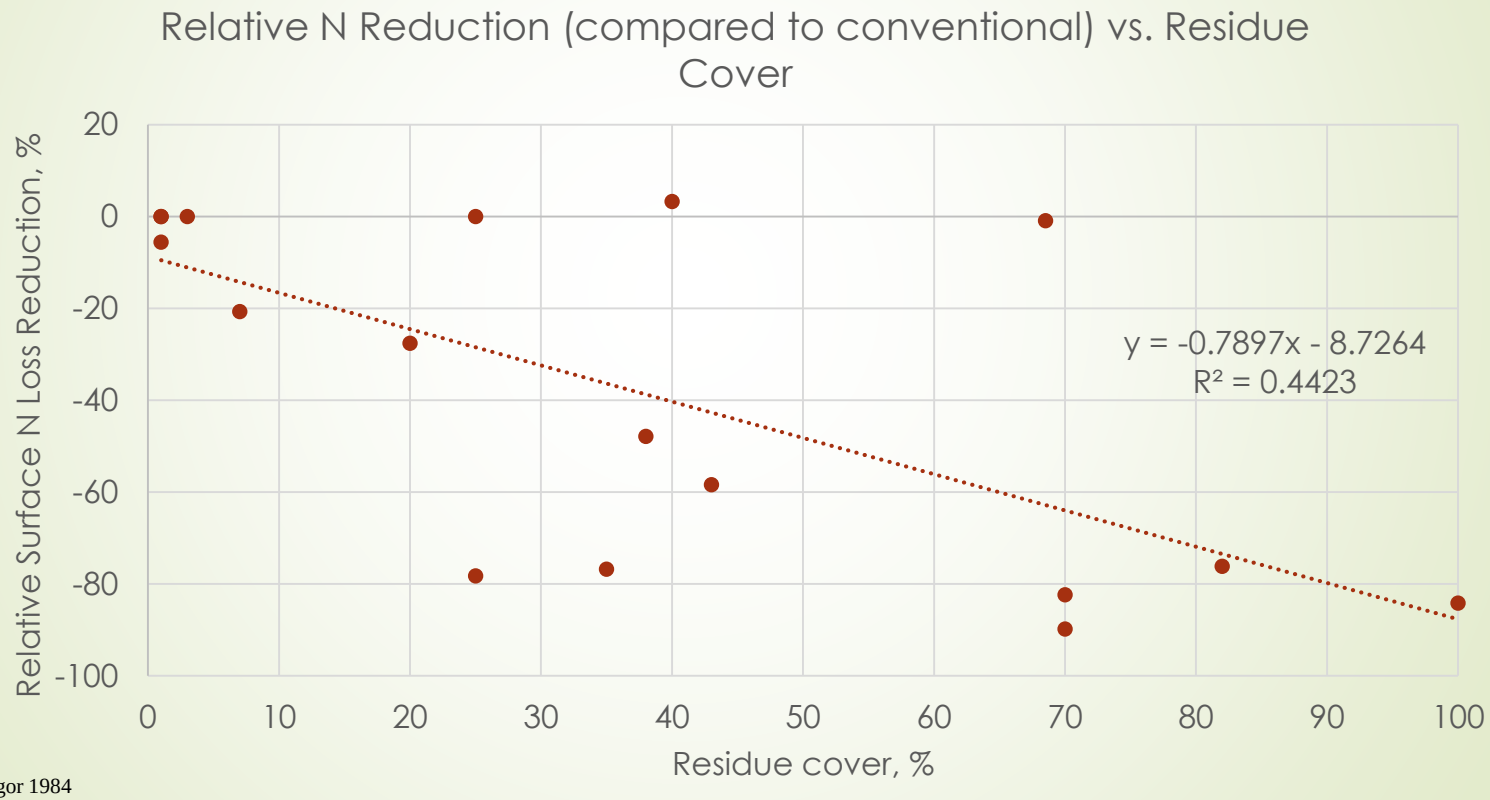
Tillage categories and info.

Category	Residue cover and soil disturbance	Corollary Phase 5.3.2 practice	Other relevant standard
1. Conventional/high till	< 15% cover OR 15 – 29% cover with full width tillage.	high till/conventional tillage	
2. Low residue, strip till/no-till	15 – 29% cover, strip till or no-till, and less than 40% soil disturbance	N/A - This is a new category for the conservation tillage practice.	NRCS Conservation Practice Standard Code 329
3. Conservation tillage	30 – 59% cover	conservation tillage	NRCS Conservation Practice Standard Code 345
4. High residue, minimum soil disturbance tillage	≥60% cover, minimum disturbance	High residue, minimum soil disturbance tillage (HRTill)	

Sediment and N

Low residue, strip till/no-till 16-29% residue	Conservation tillage 30-59% residue	HRMSD ≥60% residue
Sediment Losses (relative to conventional/high tillage)		
-18%	-41%	-79%
Surface N Losses (relative to conventional/high tillage)		
Uplands: -5%	Uplands: -10%	Uplands: -14%
Coastal Plain: -2%	Coastal Plain: -4%	Coastal Plain: -12%

Nitrogen



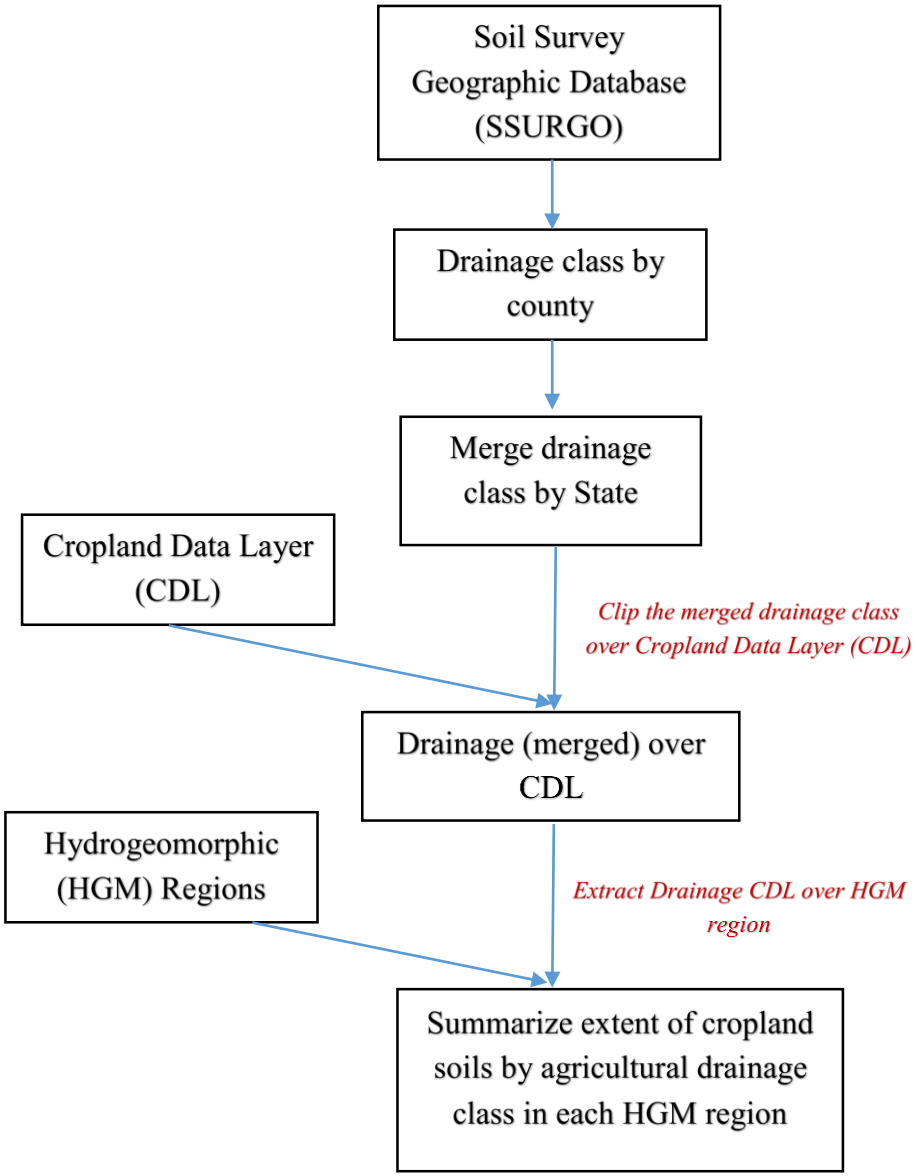
Chichester 1977
McDowell and McGregor 1984
Romkens et al. 1973
Shipitalo et al. 2013

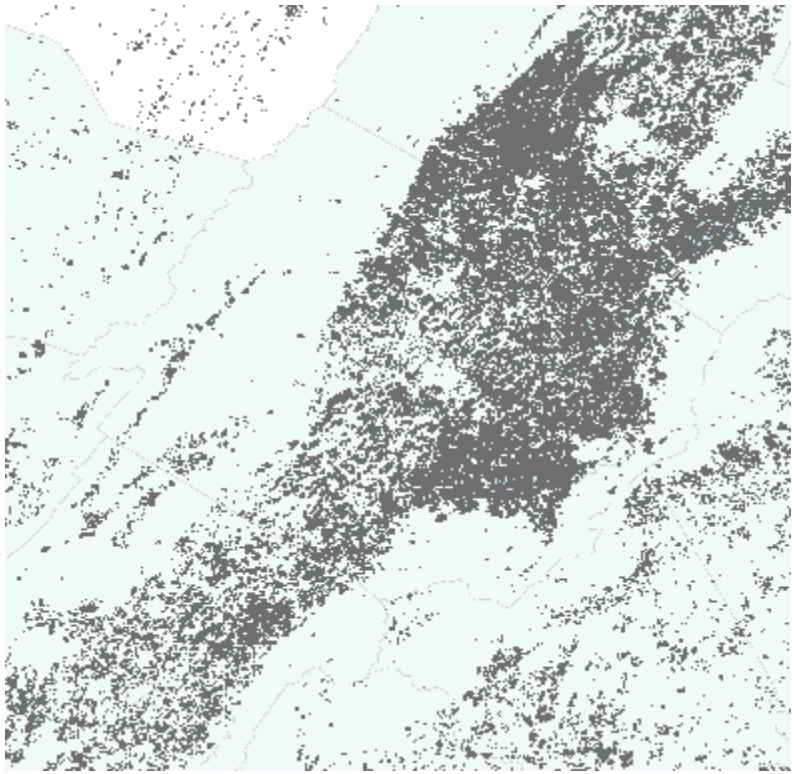
Sediment and N

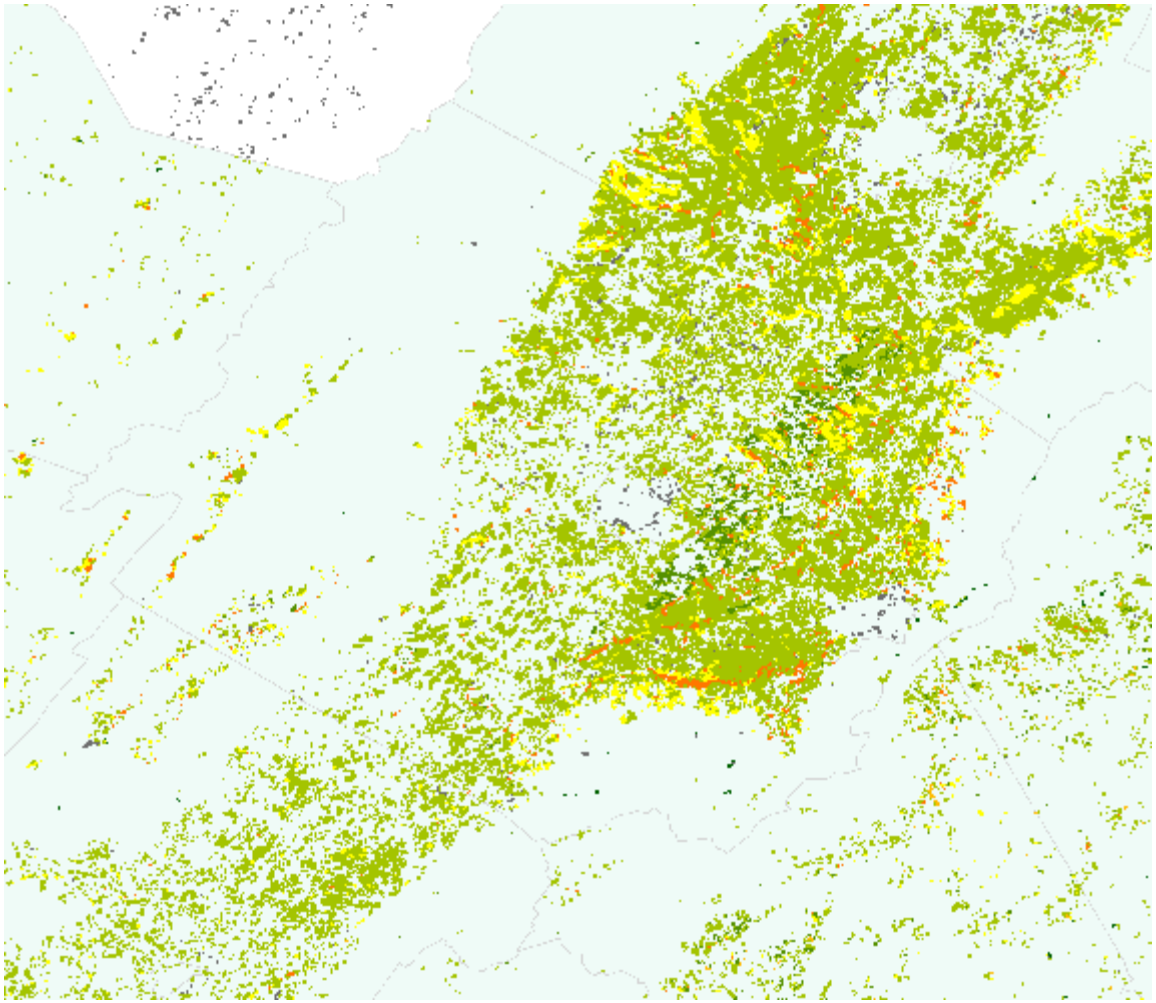
Low residue, strip till/no-till 16-29% residue		Conservation tillage 30-59% residue		HRMSD ≥60% residue	
Sediment Losses (relative to conventional/high tillage)					
-18%		-41%		-79%	
Surface N Losses (relative to conventional/high tillage)					
Uplands:	-5%	Uplands:	-10%	Uplands:	-14%
Coastal Plain:	-2%	Coastal Plain:	-4%	Coastal Plain:	-12%

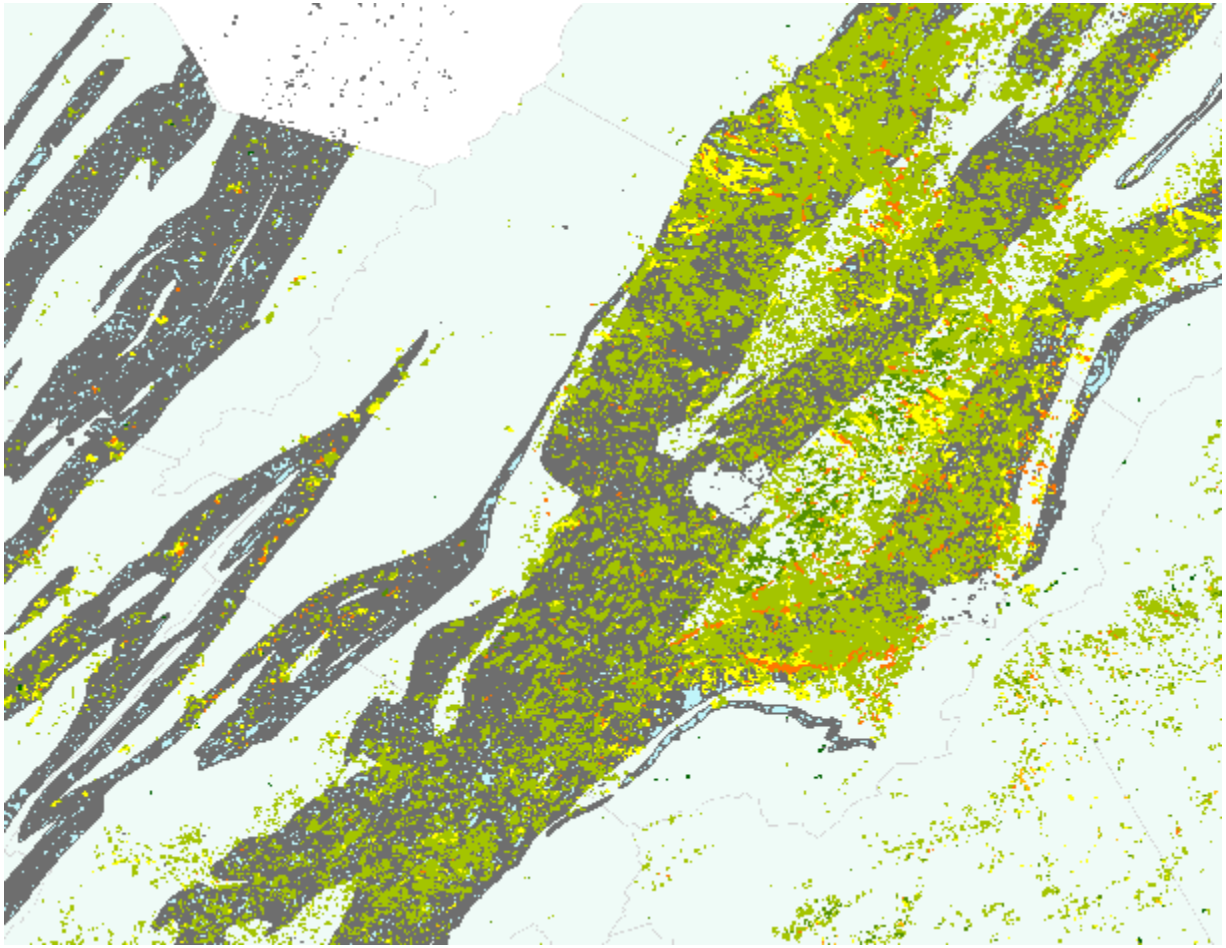
Phosphorus

- Entirely too much variation in P loss by tillage practice to combine all data
- Lit Review Summary separated by agricultural drainage class
  - Excessively well drained, well drained, moderately well drained
    - 12 observations from peer-reviewed literature from w/i the Bay watershed
  - Somewhat poorly drained, poorly drained, very poorly drained
    - 5 observations from peer-reviewed literature from w/i the Bay watershed


Soil Survey Geographic Database (SSURGO)
Drainage class by county
Merge drainage class by State
Cropland Data Layer (CDL)
Clip the merged drainage class over Cropland Data Layer (CDL)
Drainage (merged) over CDL
Hydrogeomorphic (HGM) Regions
Extract Drainage CDL over HGM region
Summarize extent of cropland soils by agricultural drainage class in each HGM region







CBW cropland drainage area by HGM region

Proportion of Cropland	%Well drained	% Poorly drained
Appalachian Plateau, Siliciclastic	76%	24%
Appalachian Plateau, Carbonate	81%	19%
Blue Ridge	93%	7%
Coastal Plain Disected Upland	85%	15%
Coastal Plain Lowland	68%	32%
Coastal Plain Upland	75%	25%
Mesozoil Lowland	78%	22%
Piedmont Carbonate	98%	2%
Piecmont Chrystalline	97%	3%
Valley and Ridge Carbonate	97%	3%
Valley and Ridge Siliciclastic	92%	8%

Literature values for Surface P loss reductions (well-drained average)

		Surface P Loss Reduction
Low residue, strip till/no-till	16-29% residue	-9%
Conservation Tillage	30-59% residue	-64%
High Residue, Min Soil Disturbance	≥60% residue	-72%

Literature values for Surface P loss increases (poorly-drained average)

125%

P calculations

Literature values for P losses for the HRMSD and conservation tillage practices :

(% well drained cropland)(literature reduction value) + (% poorly drained cropland)*(literature increase value) = P loss value for HGM region*

Low residue, strip-till/no-till practice estimates of P losses are:

(% well drained cropland)(literature reduction value) = P loss value for HGM region*

HGM Region	Surface P Losses		
	Low residue, strip till/no-till	Conservation Tillage	High Residue, Min Soil Disturbance
	16-29% residue	30-59% residue	≥60% residue
	Load Reduction Rel to High-Till	Load Reduction Rel to High-Till	Load Reduction Rel to High-Till
Appalachian Plateau, Siliciclastic	-7%	-17%	-27%
Appalachian Plateau, Carbonate	-7%	-27%	-38%
Blue Ridge	-8%	-50%	-63%
Coastal Plain Disected Upland	-8%	-35%	-47%
Coastal Plain Lowland	-6%	-2%	-11%
Coastal Plain Upland	-7%	-16%	-26%
Mesozoil Lowland	-7%	-21%	-32%
Piedmont Carbonate	-9%	-60%	-74%
Piecmont Chrystalline	-9%	-58%	-71%
Valley and Ridge Carbonate	-9%	-57%	-71%
Valley and Ridge Siliciclastic	-8%	-49%	-62%

Questions and comments

- Working to align terminology and explanations with the Manure Injection panel report
- Providing additional data and clarification on relevant vs absolute sediment losses by region
- Providing additional literature review and summary of N losses by tillage/residue
- Providing additional clarification on P loss matrix, specifically for the low-residue NT practice