Determining the Relative Reductions of BMPs in the Phase II WIPs

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Analysis conducted by the Chesapeake Bay Program's Scenario Builder and Modeling Teams
April 11, 2013

Special thanks to: Sucharith Ravi, Amanda Pruzinsky, Jessica Rigelman and Jeremy Hanson

Objectives

- Identify the most common BMPs described in the Phase II Watershed Implementation Plans (WIPs).
- Identify the BMPs that contribute to the greatest reductions in nitrogen, phosphorus and sediment described in the Phase II WIPs.

Method

- Create a NO ACTION Scenario.
- Determine load reductions between Phase II WIP Scenario and NO ACTION.
- Isolate each BMP in a separate scenario using Scenario Builder processing rules.
- Determine load reductions from the isolated BMP scenario to the NO ACTION.
- Compare the load reductions from the isolated scenarios to those from the Phase II WIP to determine a percent share of the reductions attributable to each BMP.

Most Common Agricultural BMP Phase II WIP Acres Watershed-Wide

BMP	Acres
Conservation Plans	6,811,304
Enhanced Nutrient Application Management	2,082,419
Other Conservation-Till	2,002,283
Decision Agriculture	1,143,587
Cover Crop	1,136,034
Nutrient Application Management on Pasture	1,033,992
Nutrient Application Management on Crop	995,989
Prescribed Grazing	948,389
Land Retirement	609,407
Liquid & Poultry Injection	371,823
Continuous NoTill	321,901
Commodity Cover Crop	307,143
Precision Intensive Rotational Grazing	286,210
Forest Buffers	277,913
Crop Irrigation Management	251,767

Most Common Urban BMP Phase II WIP Acres Watershed-Wide

BMP	Acres
Filtering Practices	848,488
Infiltration Practices	655,730
Wet Ponds & Wetlands	411,753
Extended Dry Ponds	225,756
Dry Ponds	174,664
Forest Harvesting BMPs	164,821
Extractive Erosion and Sediment Control	149,635
Forest Conservation	113,977
SWM by Era (1985-2002)	98,803
Street Sweeping	89,474
Erosion and Sediment Control	83,551
Retrofit Stormwater Management	69,208
SWM by Era (2002-2010)	65,668
Impervious Surface & Urban Growth Reduction	61,956
Abandoned Mine Reclamation	61,285

BMP Units in Phase II WIPs Watershed-wide

BMP	Measurement	Units
Dirt&Gravel Road E&S	feet	28,929,712
Urban Stream Restoration	feet	2,332,664
NonUrban Stream Restoration	feet	1,128,757
Manure Transport Outside CBWS	tons	572,999
Street Sweeping	lbs	9,628,448
Livestock+Poultry Waste Management Systems	AU	2,772,306
Livestock+Poultry Mortality Composting	AU	71,664
Septic Denitrification	systems	266,978
Septic Connections	systems	232,085
Septic Pumping	systems	141,963

WIP Relative Load Reductions

Source Sectors

BMPs

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410-267-9844

Agriculture Workgroup Meeting
U.S. Fish and Wildlife Chesapeake Bay Field Office
Annapolis, MD
April 11, 2013

Agriculture Practices

LandRetire	Land Retirement	PrecRotGrazing	Prescribed Grazing
ForestBuffers	Forest Buffers	UpPrecIntRotGraze	Precision Intensive Rotational Grazing
ConserveTill	Conservation Tillage	MortalityComp	Mortality Composting
CoverCrop	Cover Crop	EffNutManDecAgVA	Decision Agriculture
AWMS	Animal Waste Management Systems	ForestBuffersTrp	Forest Buffers on Fenced Pasture Corridor
GrassBuffers	Grass Buffers	NoTill	Continuous NoTill
EnhancedNM	Enhanced Nutrient Application Management	WaterContStruc	Water Control Structures
CarSeqAltCrop	Carbon Sequestration	Cropirrmgmt	Crop Irrigation Management
ConPlan	Conservation Plans	EffNutManEnhanceVA	Enhanced Nutrient Application Management
ComCovCrop	Commodity Cover Crop	NonUrbStrmRest	NonUrban Stream Restoration
WetlandRestore	Wetland Restoration	LoafLot	Loafing Lot Management
DecisionAg	Decision Agriculture	OSWnoFence	Pasture Alternative Watering
PastFence	Stream Access Control with Fencing	ConserveTillom	Conservation-Till Specialty Crops
GrassBuffersTrp	Grass Buffers on Fenced Pasture Corridor	TreePlantTrp	Tree Planting on Fenced Pasture Corridor
DairyPrecFeed	Dairy Precision Feeding	PoultryPhytase	Poultry Phytase
PoultryInjection	Poultry Injection	SwinePhytase	Swine Phytase
TreePlant	Tree Planting	BioFilters	BioFilters
CaptureReuse	Capture & Reuse	HorsePasMan	Horse Pasture Management
ManureTransport	Manure Transport	LagoonCovers	Lagoon Covers
ContinuousNT	Continuous NoTill	NutMan	Nutrient Application Management on Crop
BarnRunoffCont	Barnyard Runoff Control	Alum	Ammonia Emission Reductions (Alum)
LiquidInjection	Liquid Injection		

Urban/Suburban Practices

Infiltration	Infiltration Practices
Filter	Filtering Practices
UrbanNutMan	Urban Nutrient Management
BioRet	BioRetention
WetPondWetland	Wet Ponds & Wetlands
SWMEra0210	SWM by Era (2002-2010)
ForestCon	Forest Conservation Act
ForestBufUrban	Forest Buffers
ExtDryPonds	Extended Dry Ponds
AbanMineRec	Abandoned Mine Reclamation
EandS	Erosion and Sediment Control
RetroSWM	Retrofit Stormwater Management
SWMEra8502	SWM by Era (1985-2002)
EandSext	Extractive Erosion and Sediment Control
UrbStrmRest	Urban Stream Restoration
barTOpul	Enhanced Construction EandS
VegOpChan	Vegetated Open Channel
ImpSurRed	Impervious Surface Reduction
UrbanTreePlant	Tree Planting
DryPonds	Dry Ponds
StreetSweep	Street Sweeping
PermPav	Permeable Pavement
UrbGrowRed	Urban Growth Reduction

Resource Practices – Septic – Wastewater+CSO

Resource Practices		***Septic***	***Wastewater+CSO***
ForHarvestBMP	Forest Harvesting BMPs	[Septic Connections]	
DirtGravel	Dirt&Gravel Road E&S	[Septic Denitrification]	
		[Septic Pumping]	

Method

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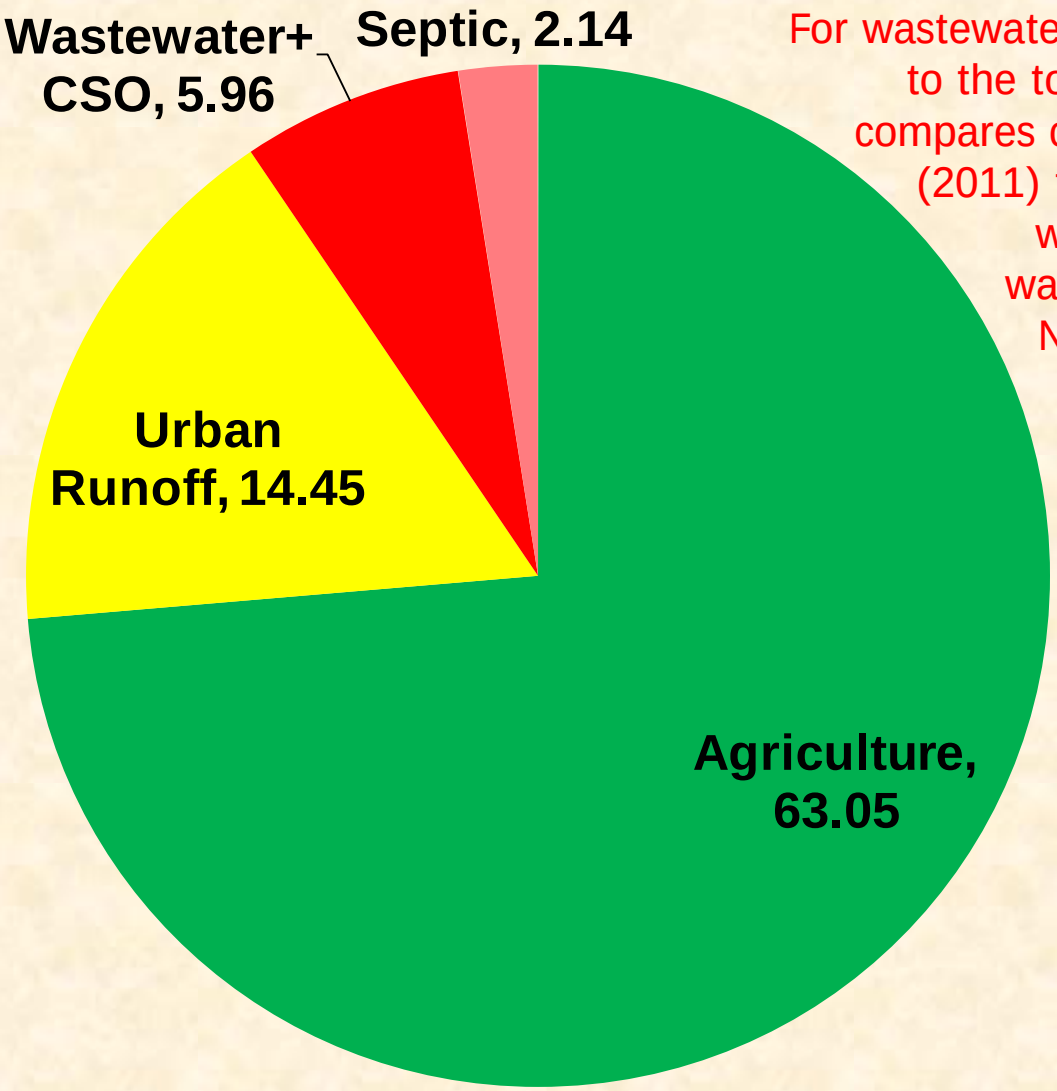
- For wastewater, the contribution to the total load reduction compares current discharges (2011) to WIP discharges while BMPs outside wastewater compare NO ACTION to WIPs.

Nitrogen Reductions

Relative influence on load reductions to the WIPs

Nitrogen Relative Load Reductions

CB Watershed – absolute million lbs.



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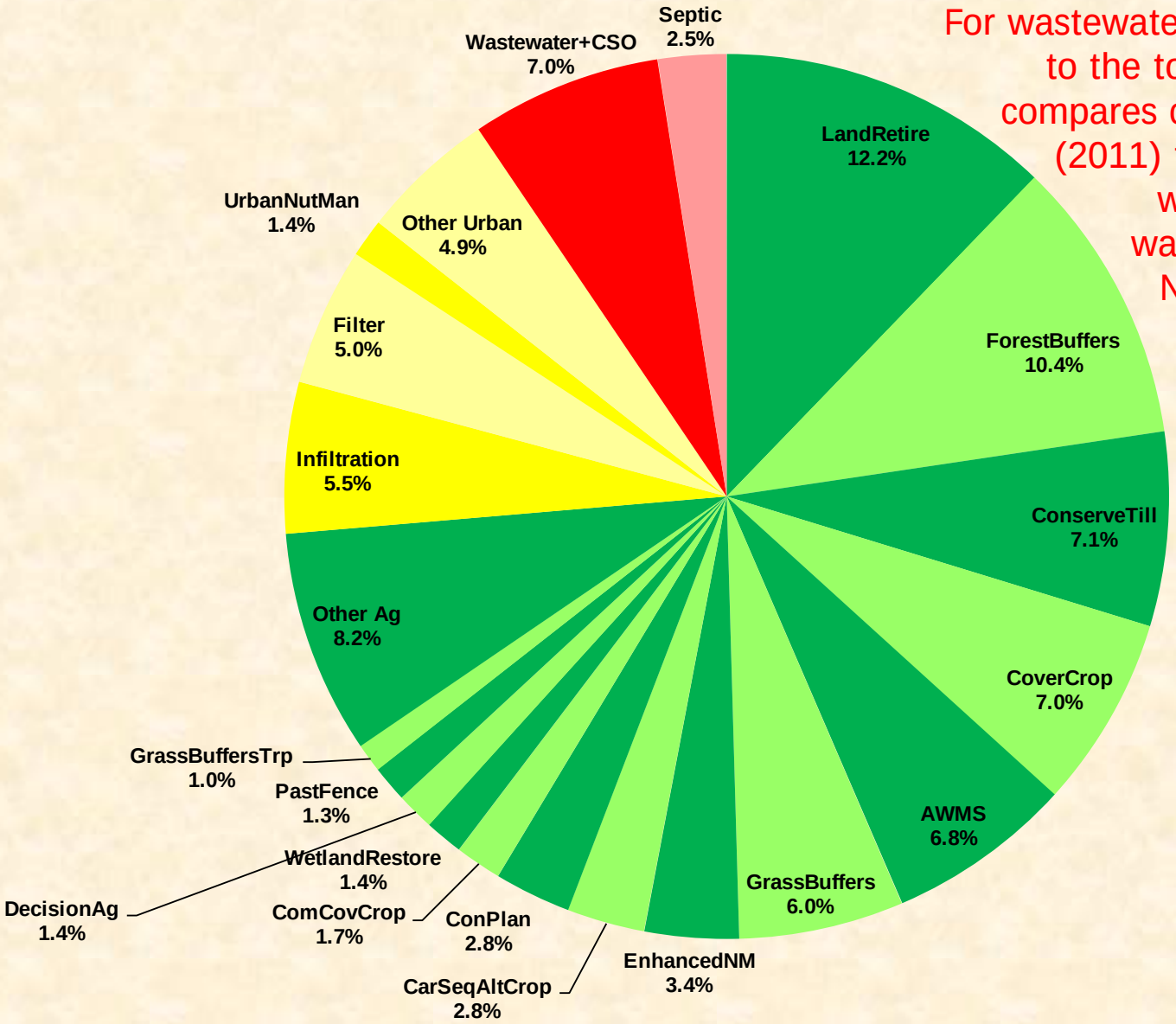
Nitrogen Relative Load Reductions

CB Watershed – as percent



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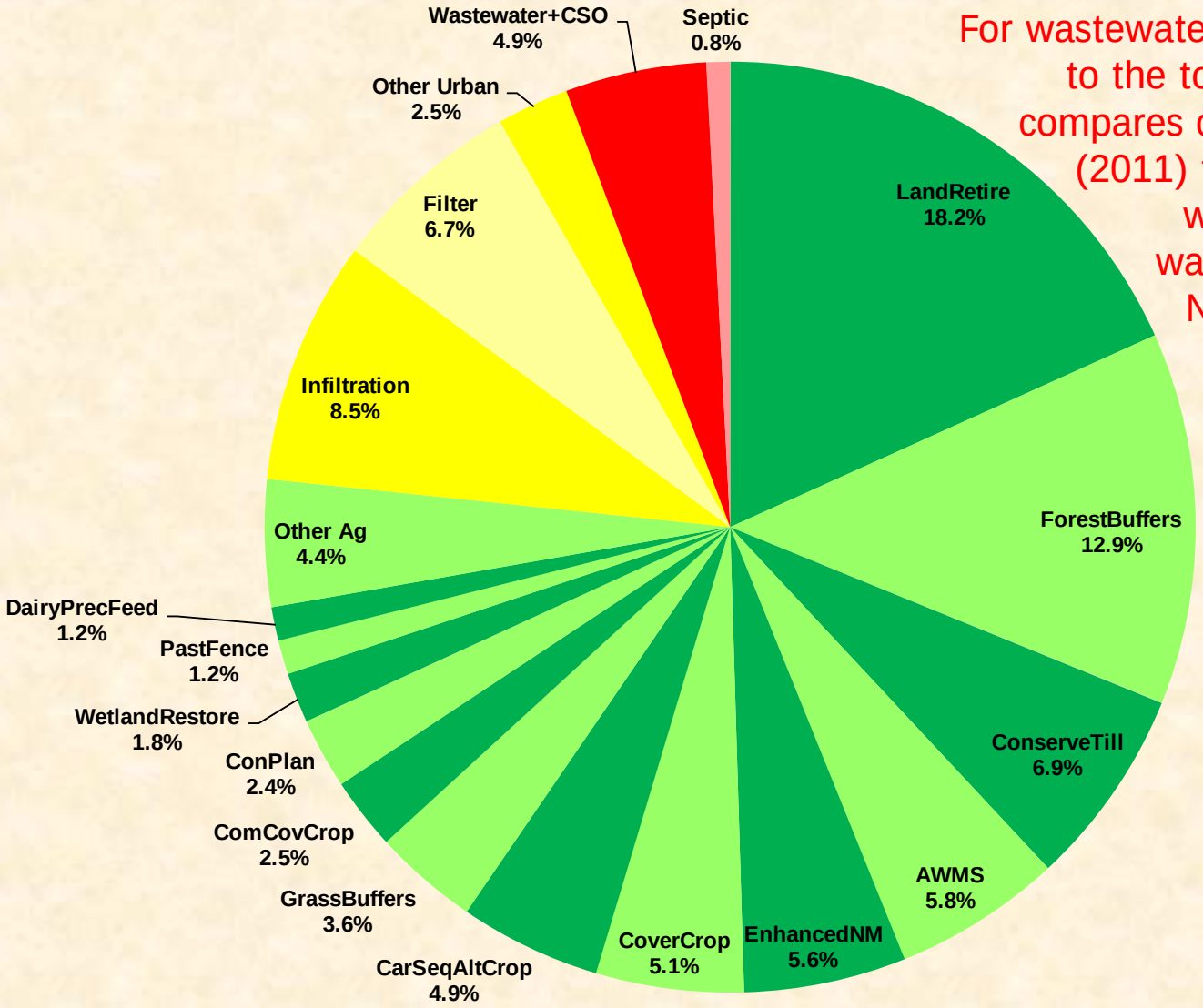
Nitrogen Relative Load Reductions

Pennsylvania



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Nitrogen Relative Load Reductions

Maryland

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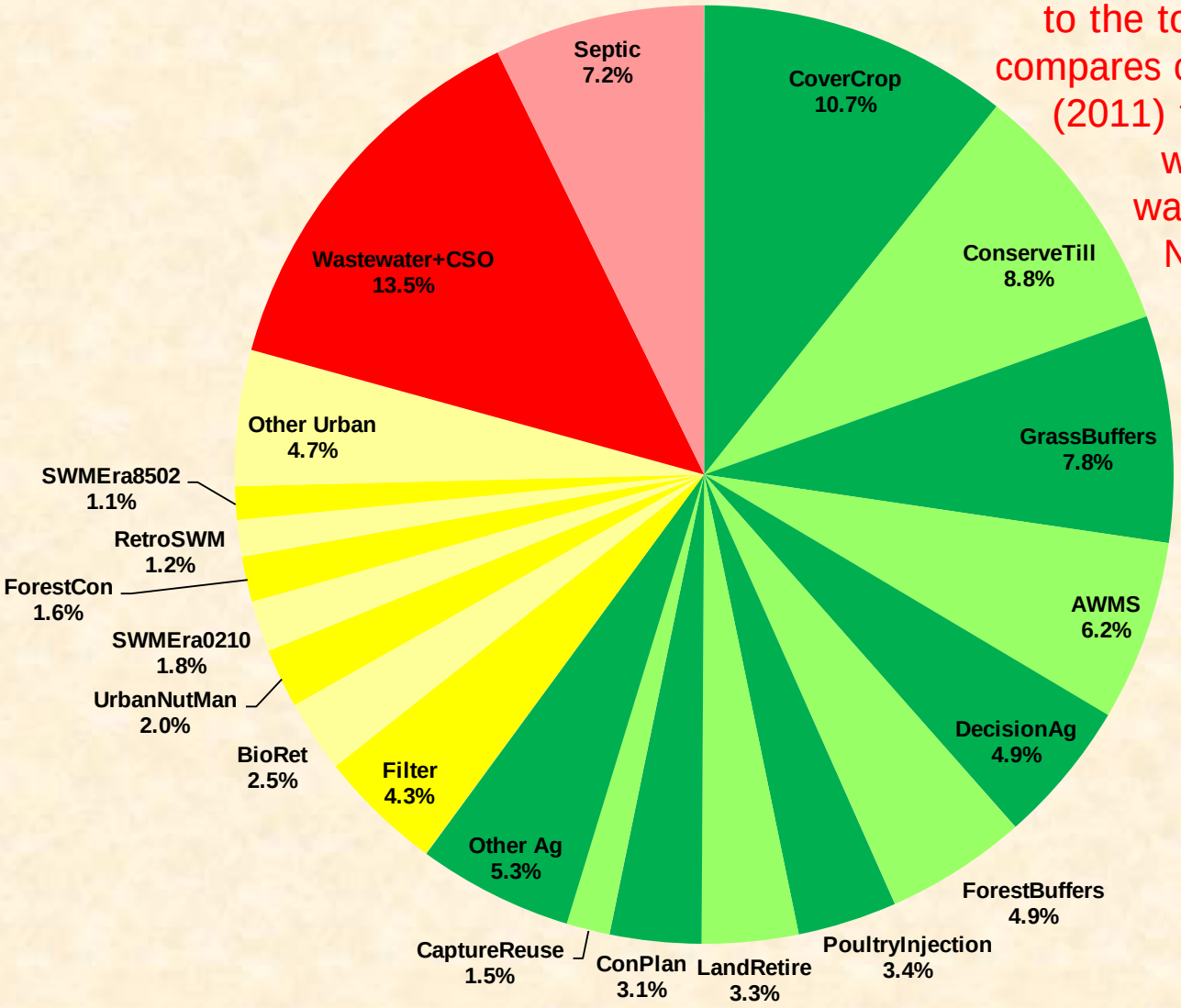

Nitrogen Relative Load Reductions

Virginia

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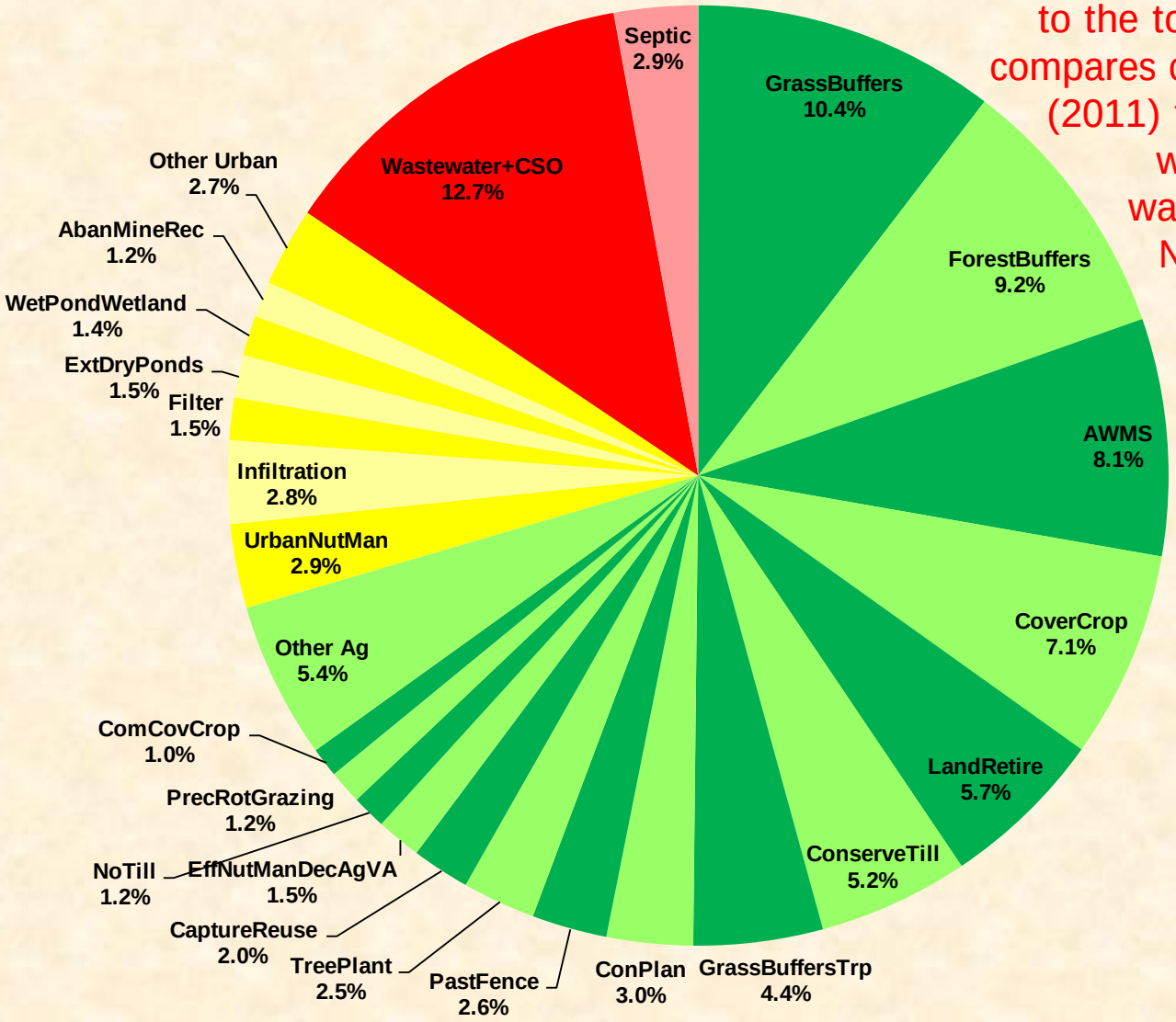
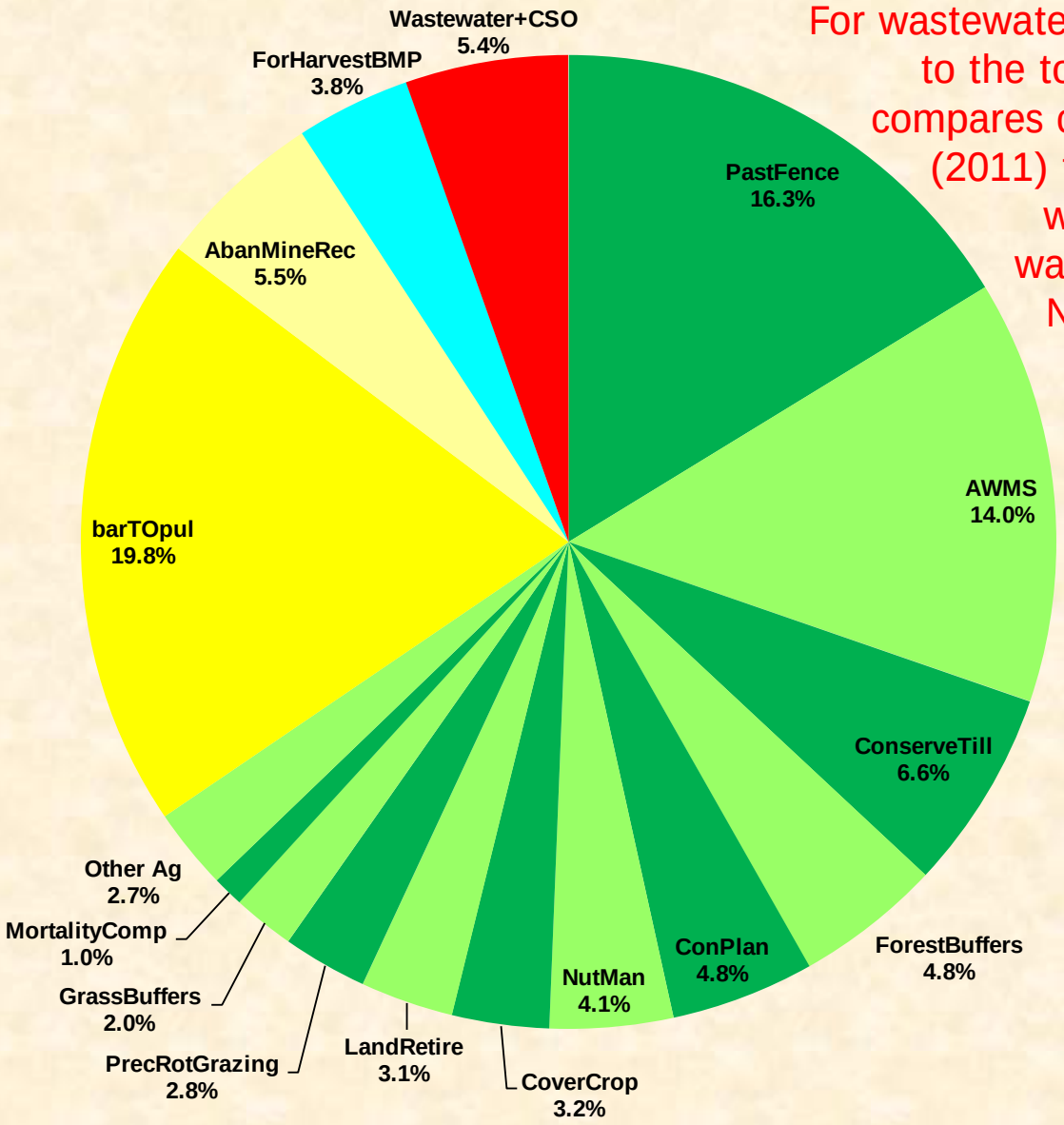


Nitrogen Relative Load Reductions

West Virginia



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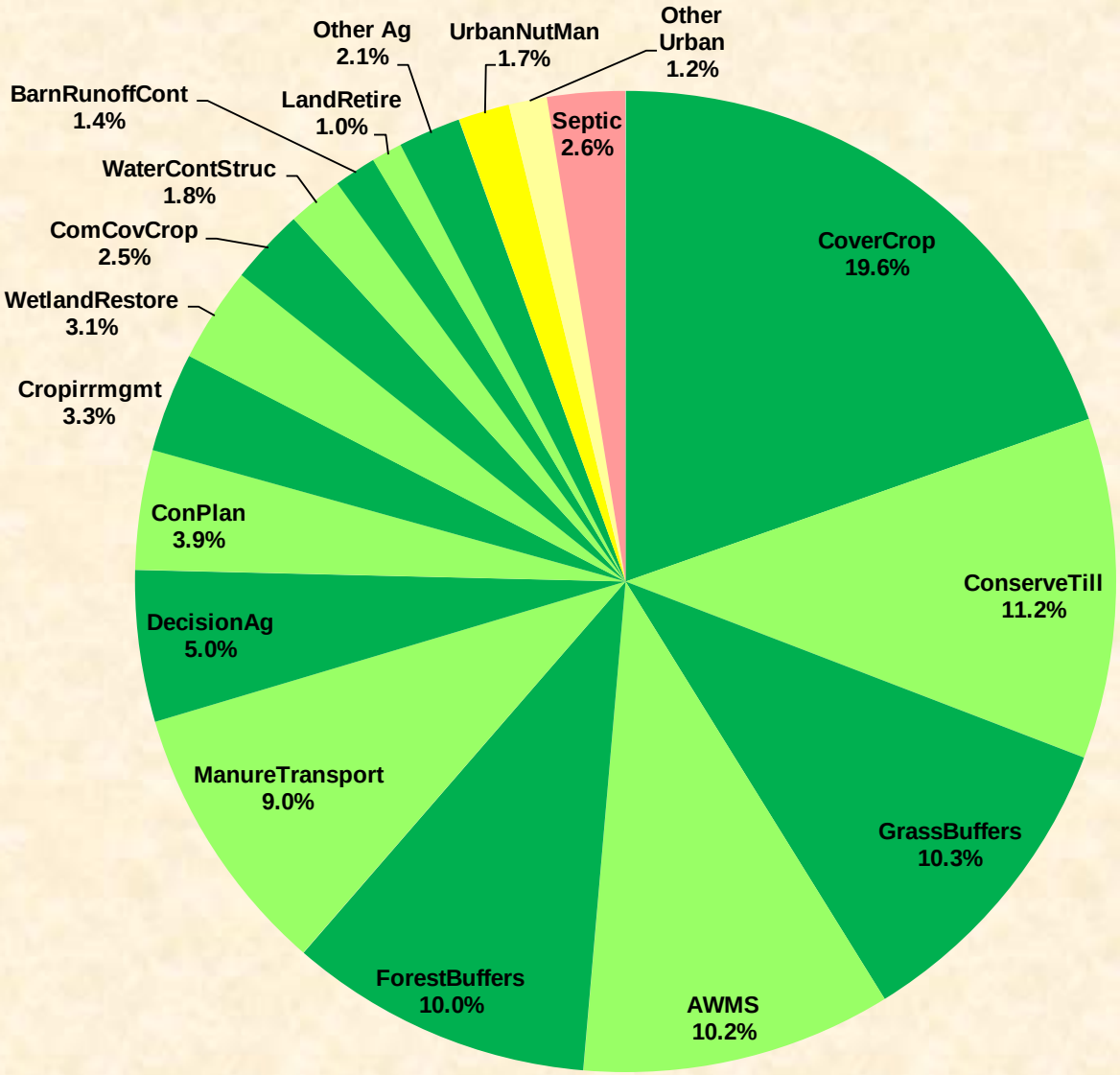
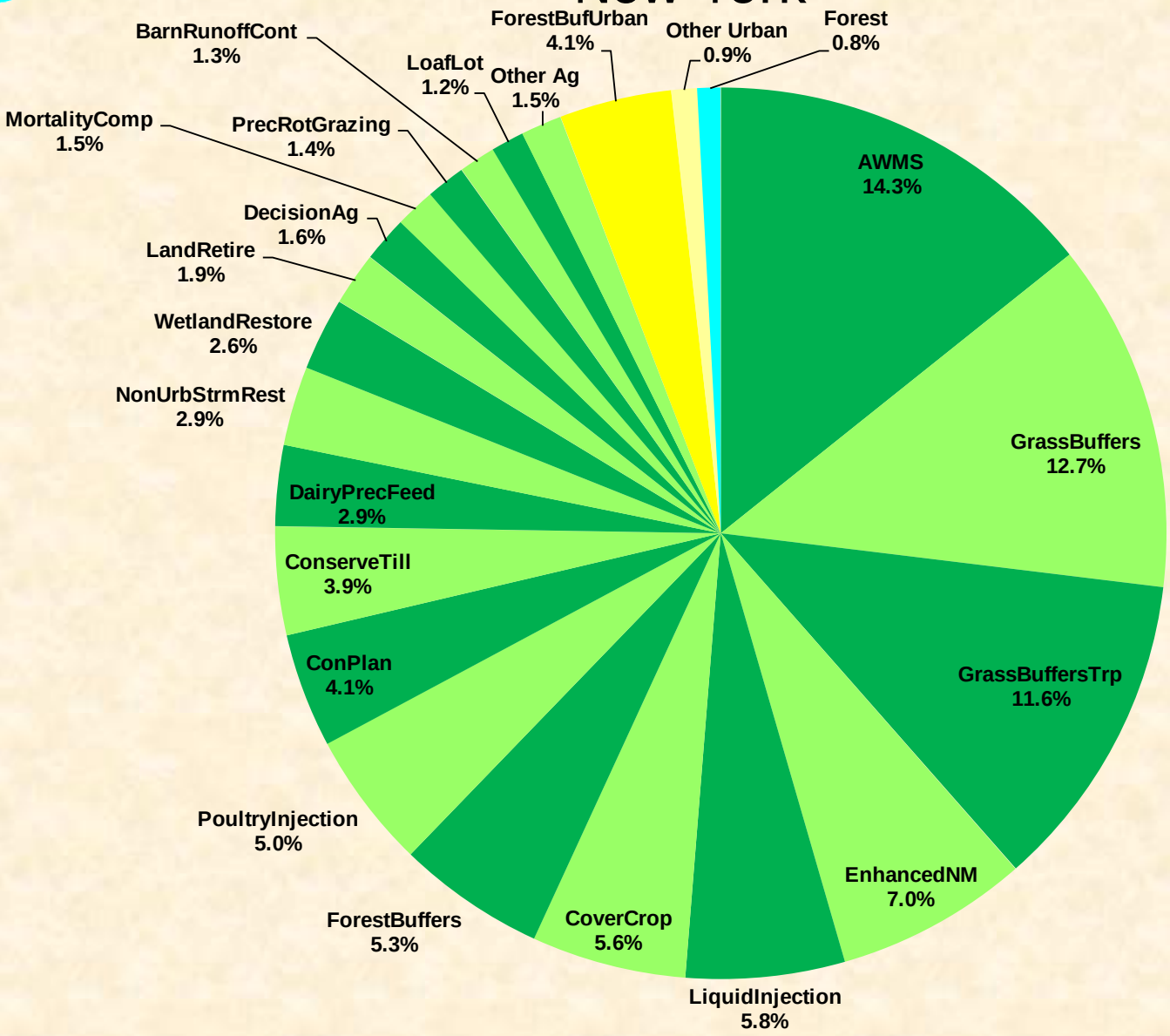
Nitrogen Relative Load Reductions

Delaware



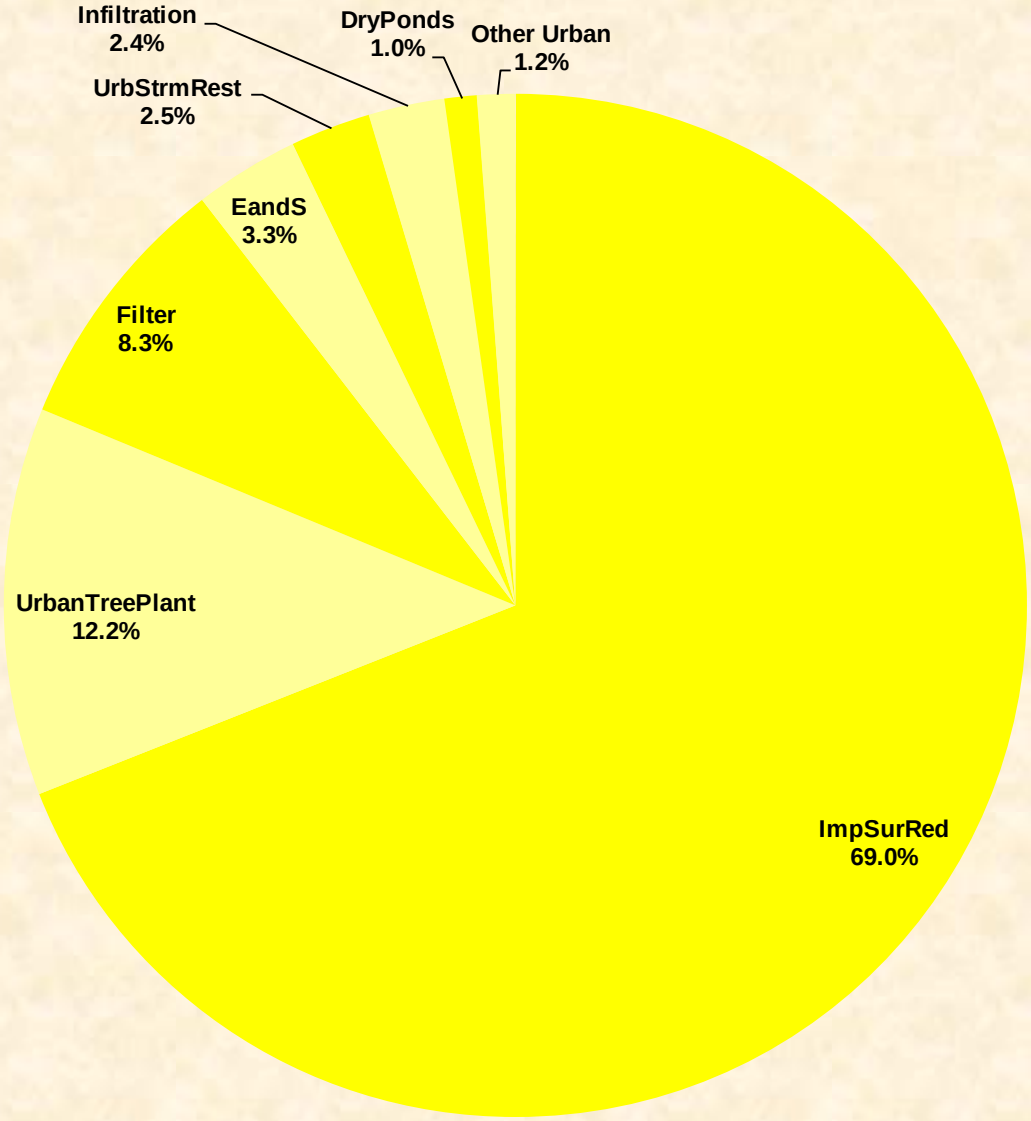
Nitrogen Relative Load Reductions

New York



Nitrogen Relative Load Reductions

District of Columbia

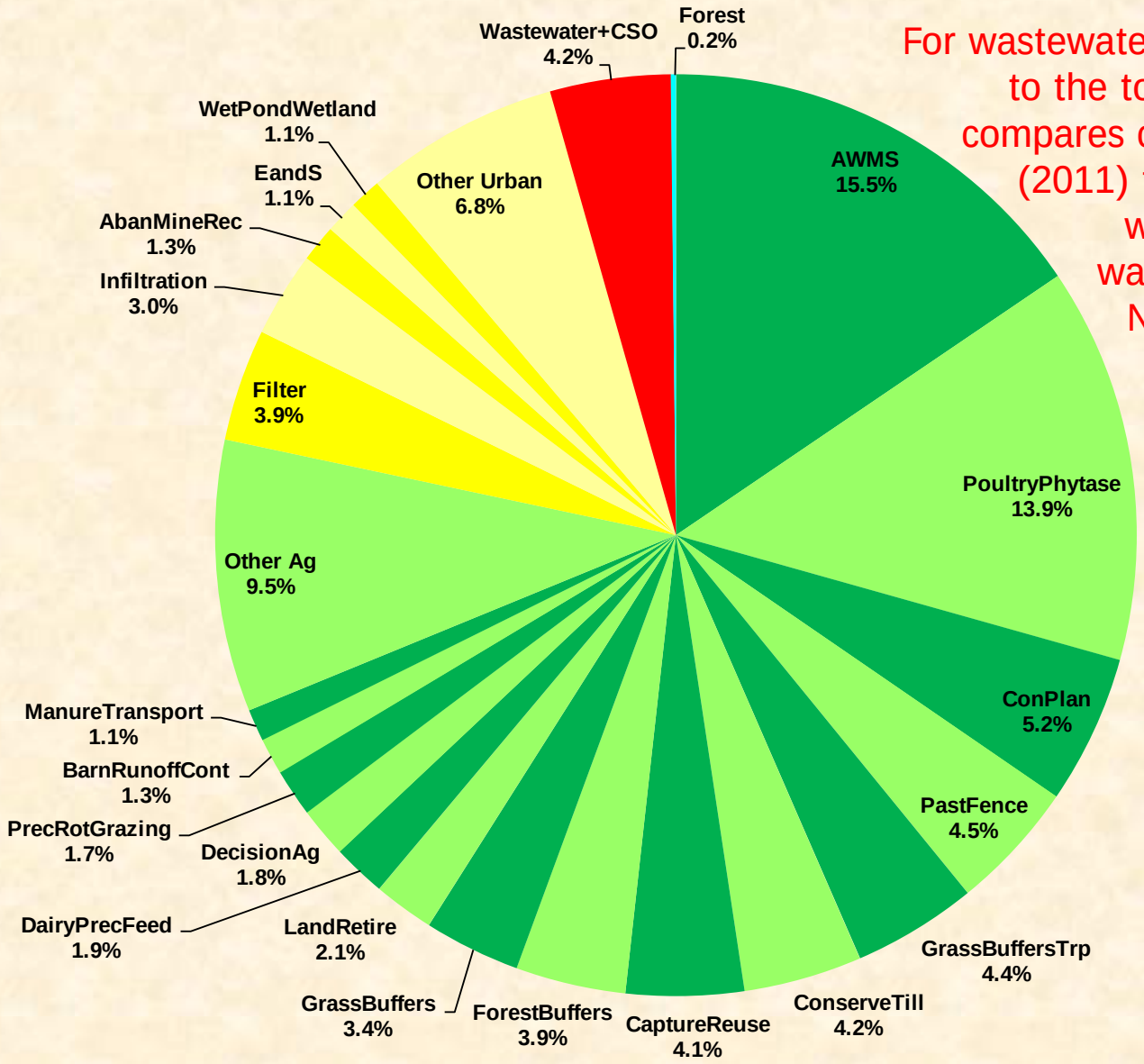


Phosphorus Reductions

Relative influence on load reductions to the WIPs

Phosphorus Relative Load Reductions

CB Watershed



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Phosphorus Relative Load Reductions

Pennsylvania

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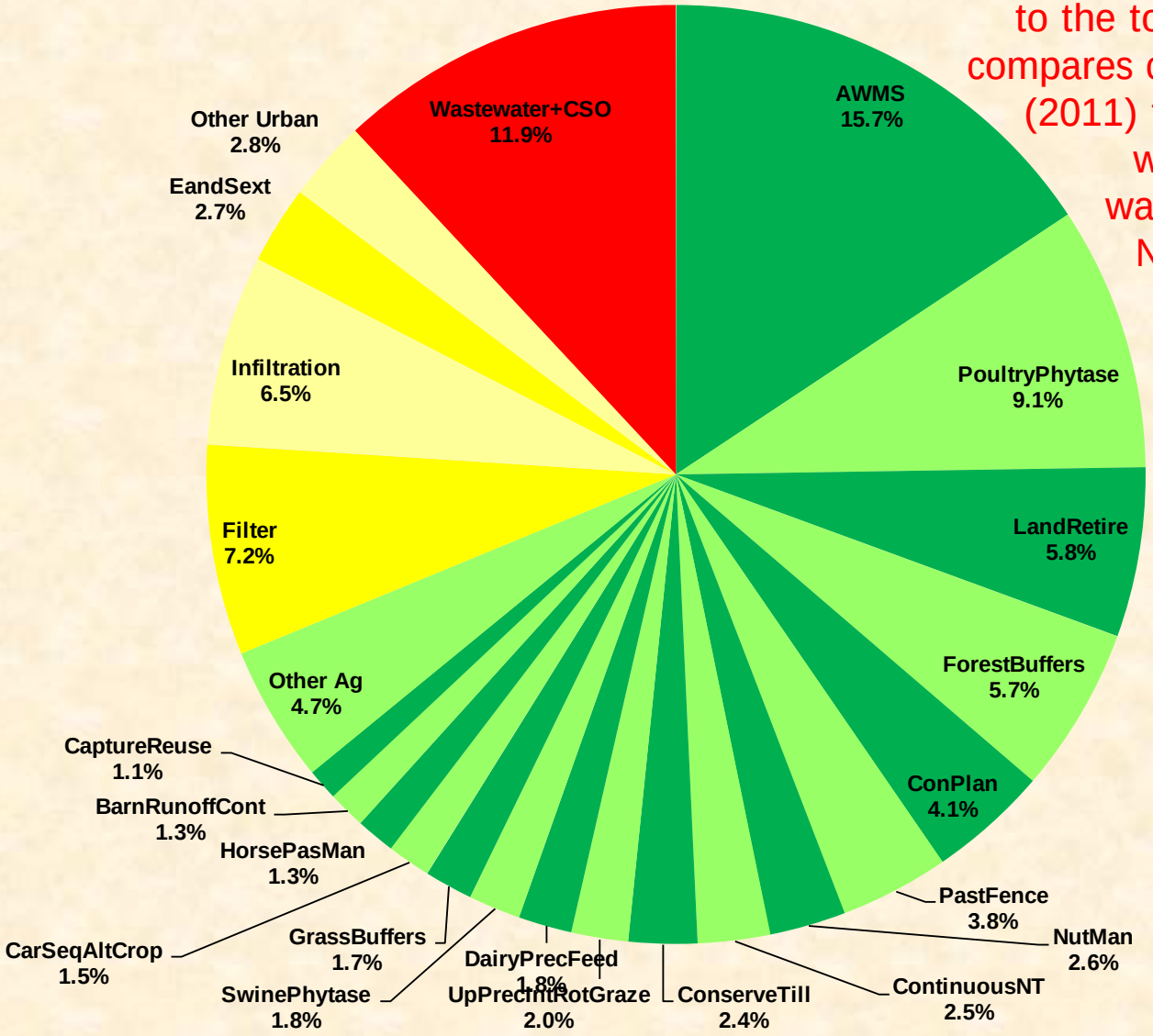
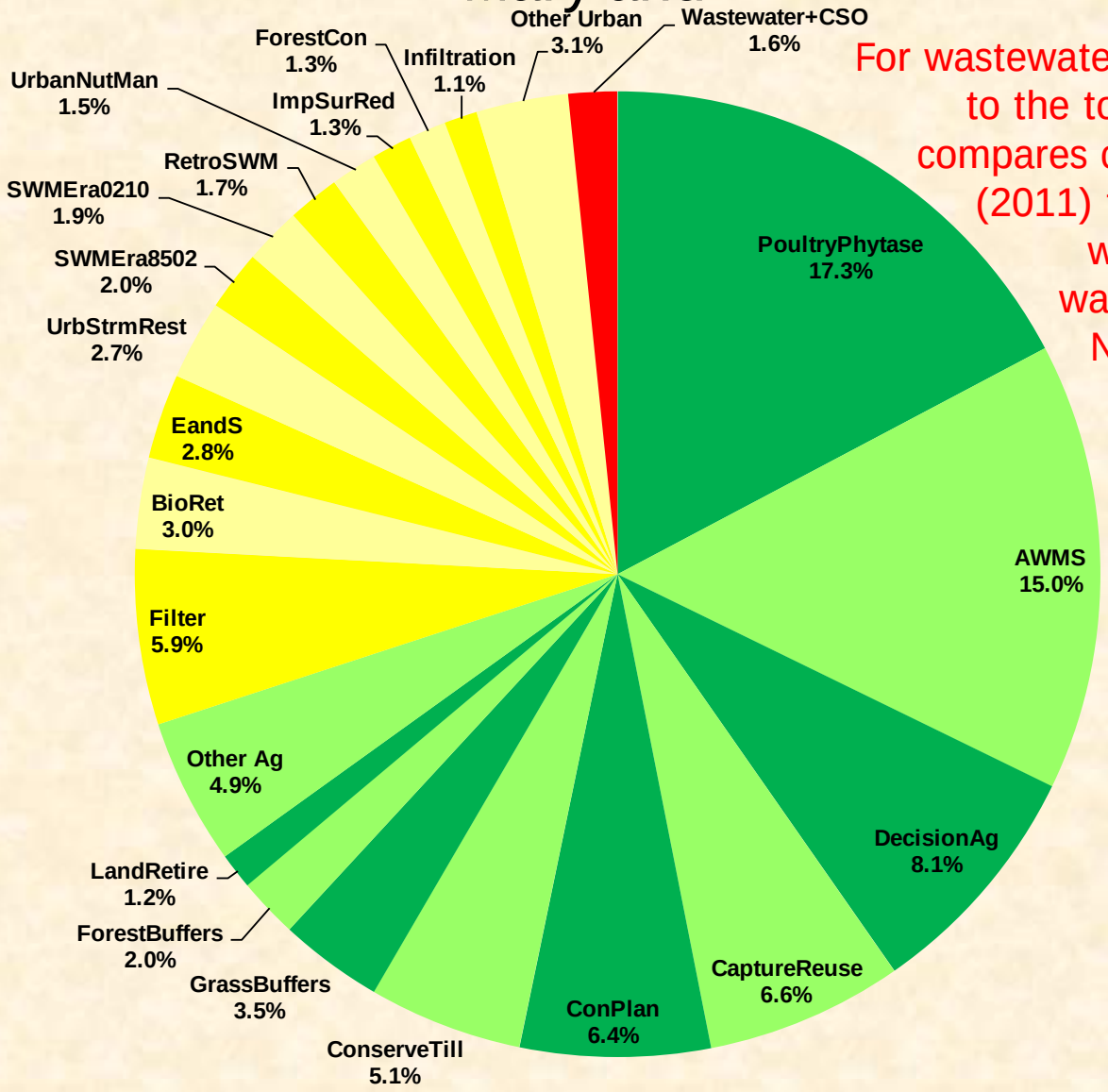


Phosphorus Relative Load Reductions

Maryland



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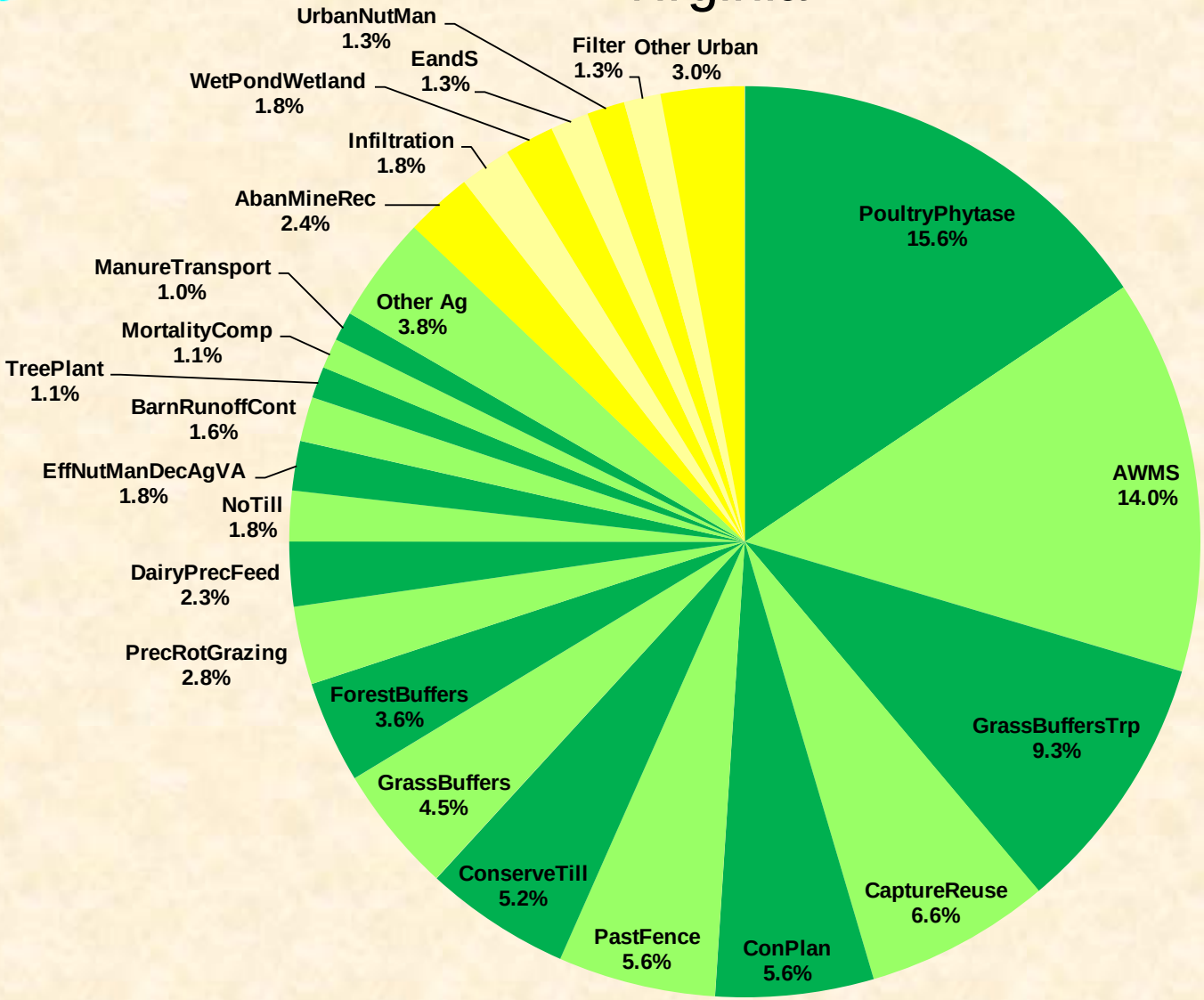
Phosphorus Relative Load Reductions

Virginia



Phosphorus Relative Load Reductions

West Virginia

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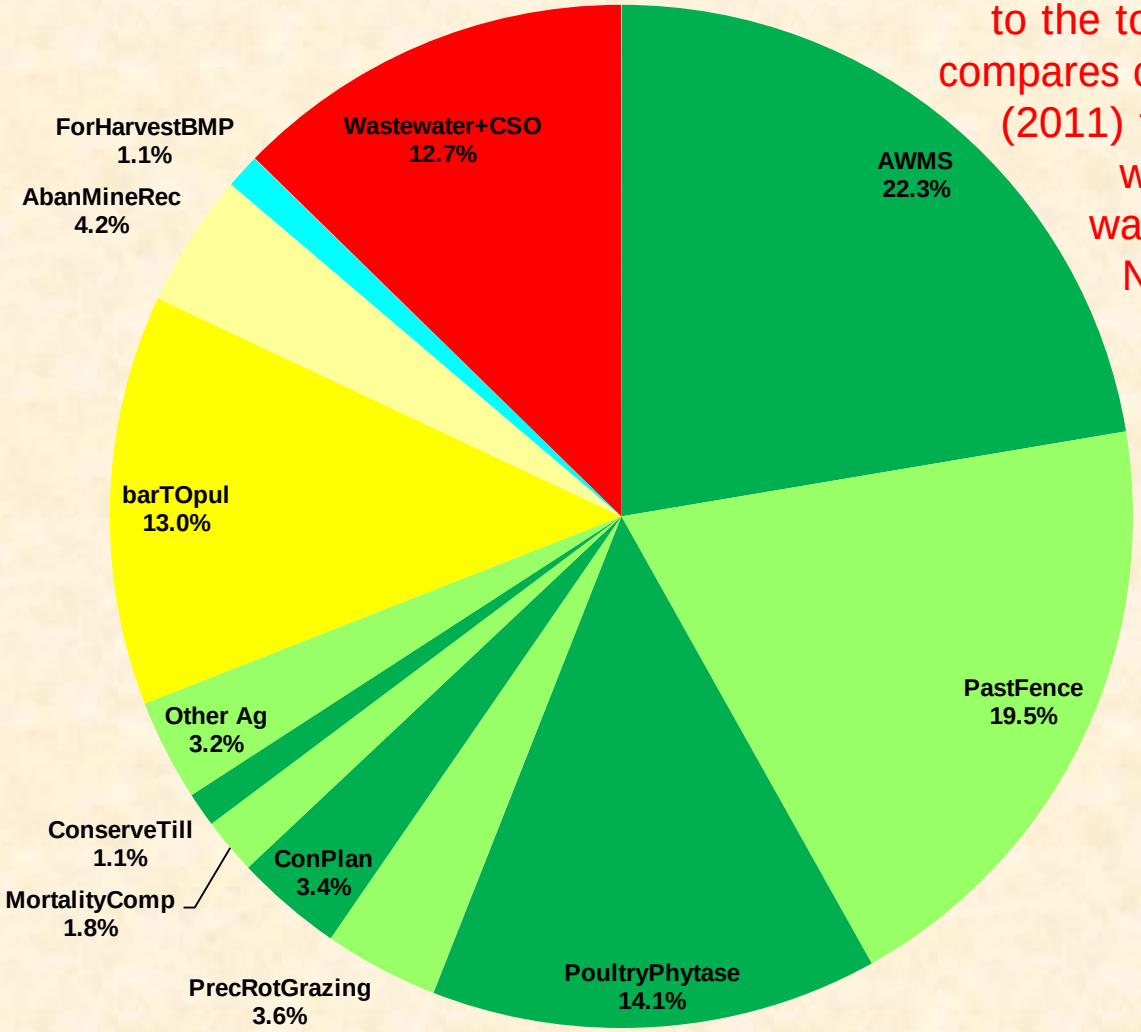
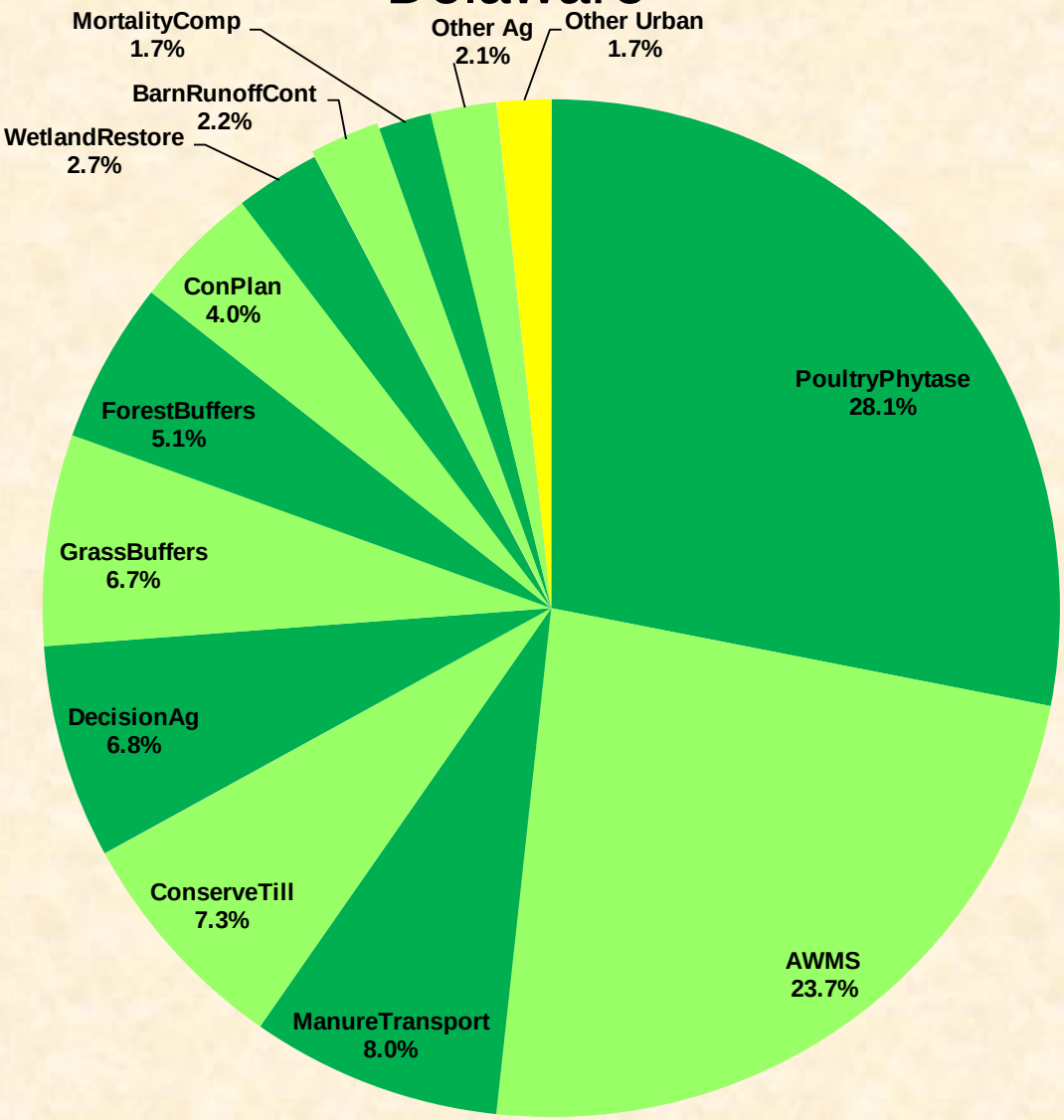


Phosphorus Relative Load Reductions

Delaware



Phosphorus Relative Load Reductions

New York

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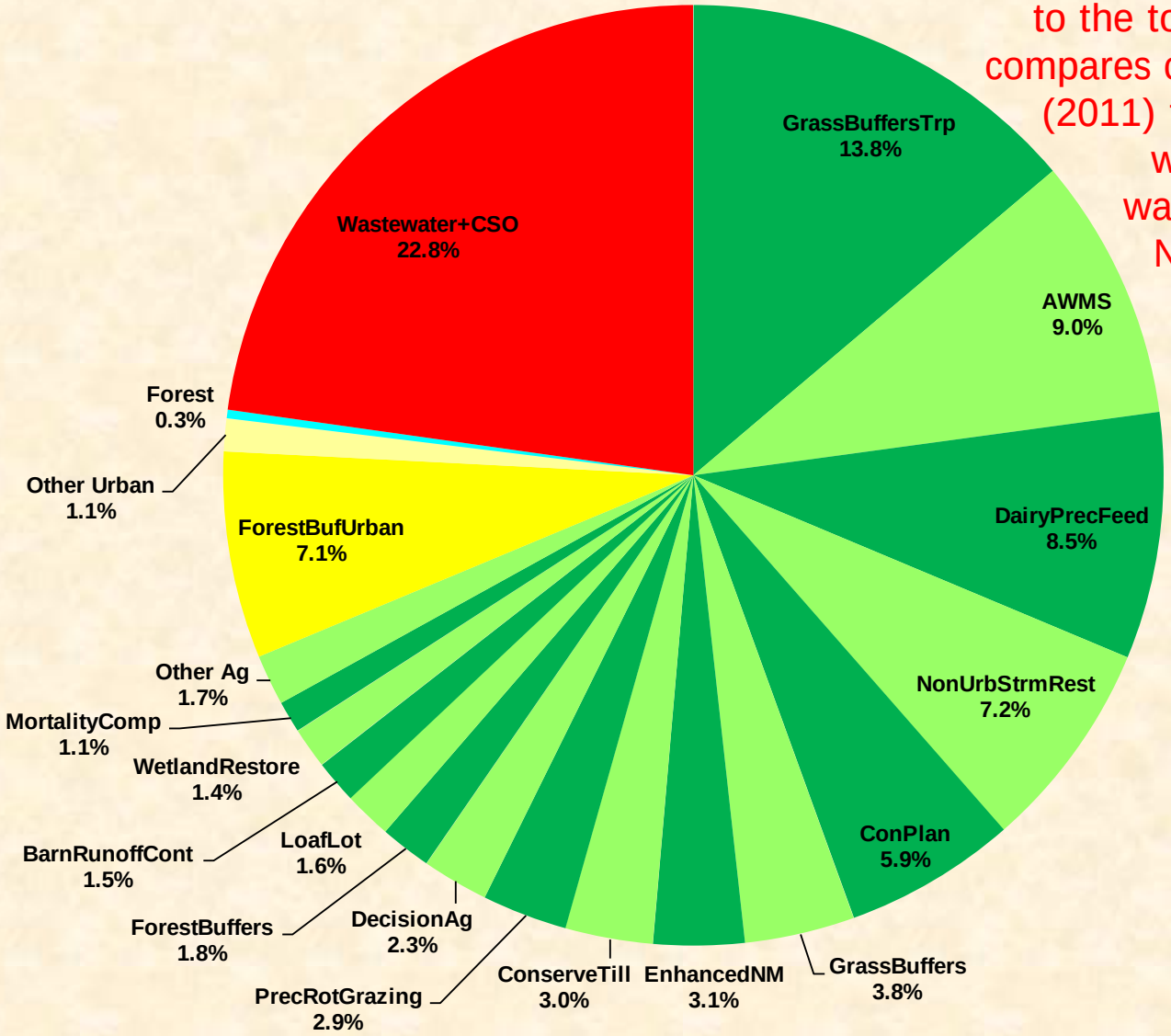
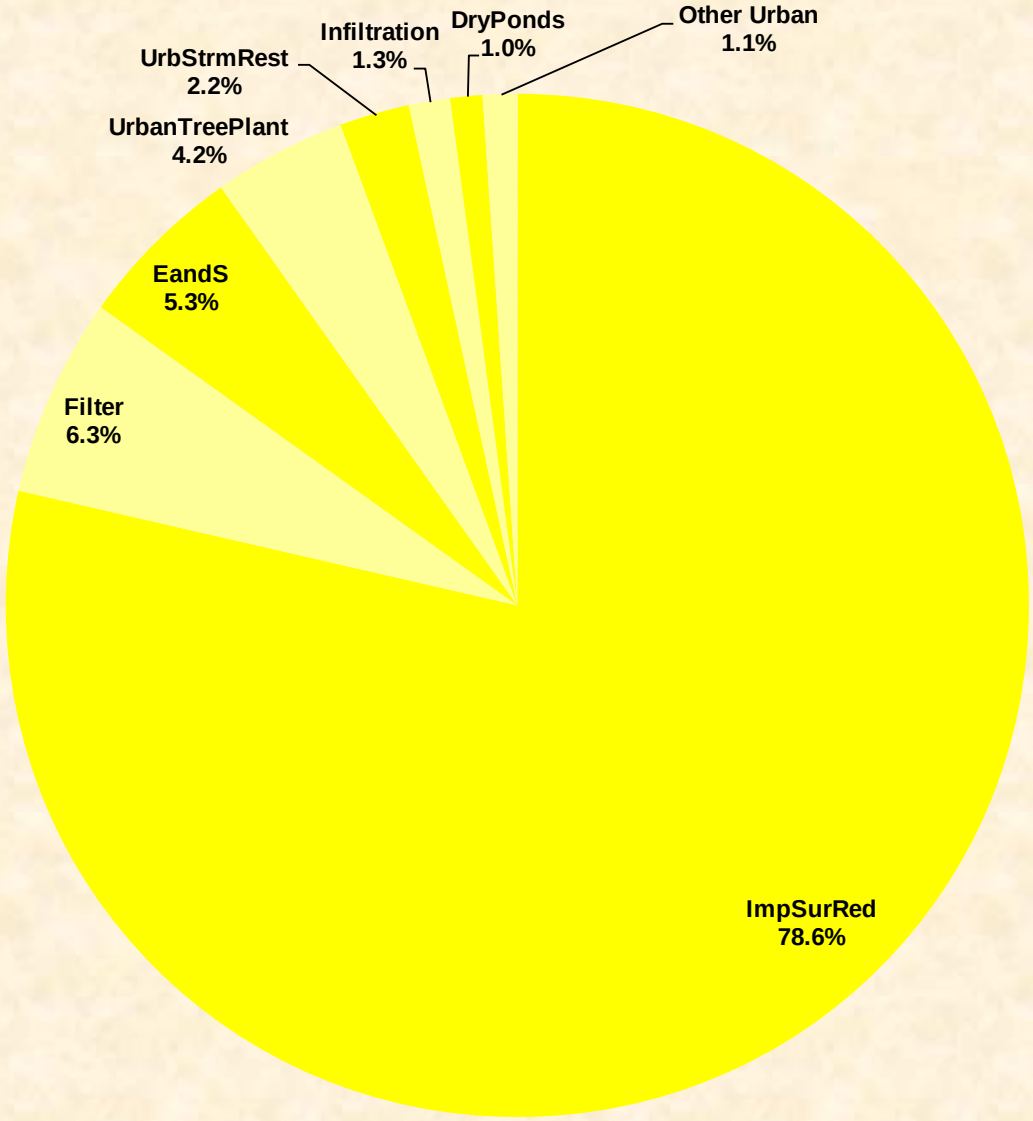


Phosphorus Relative Load Reductions

District of Columbia

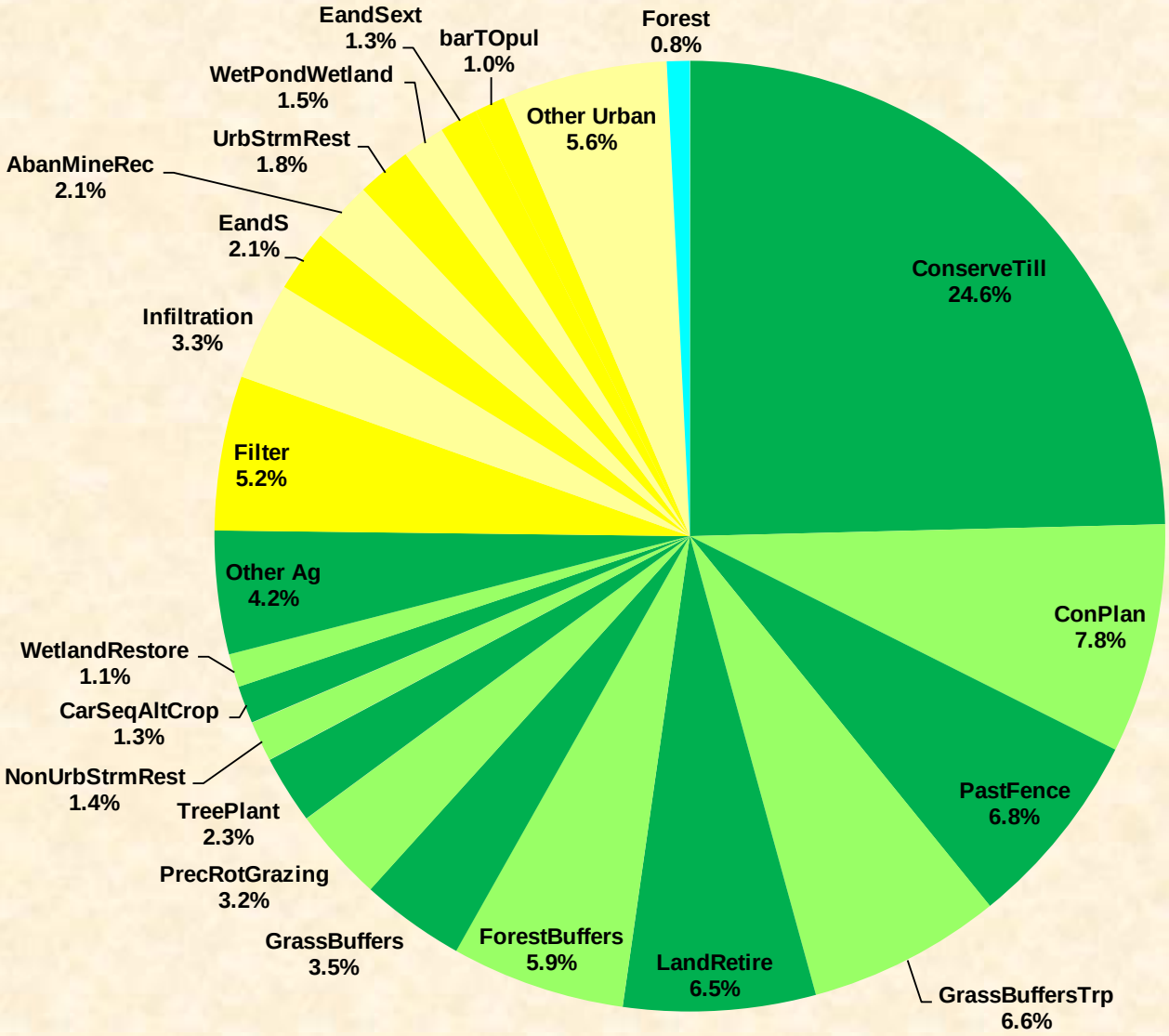


Sediment
(Total Suspended Solids)
Reductions

Relative influence on load reductions to the WIPs

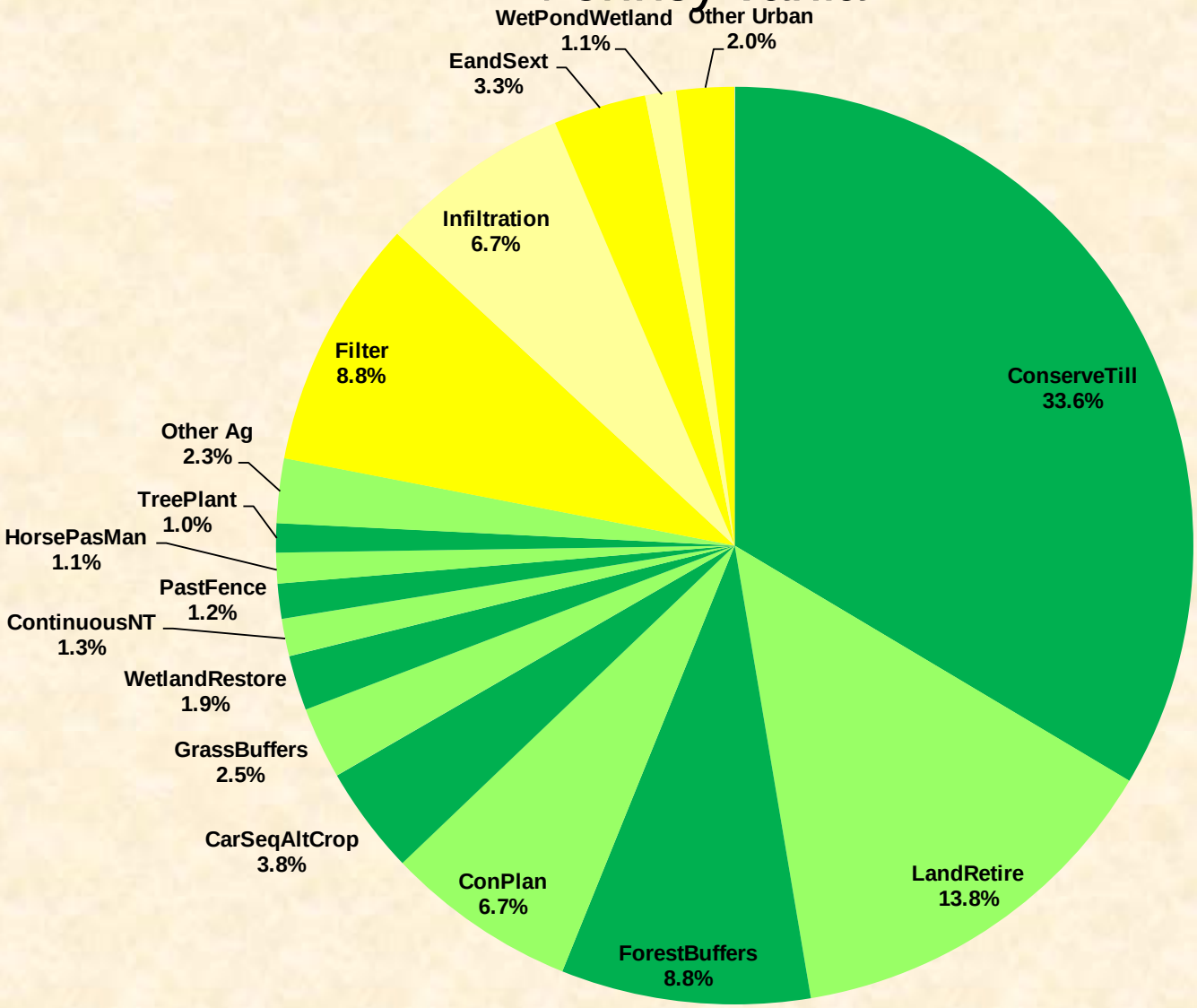
Sediment Relative Load Reductions

CB Watershed



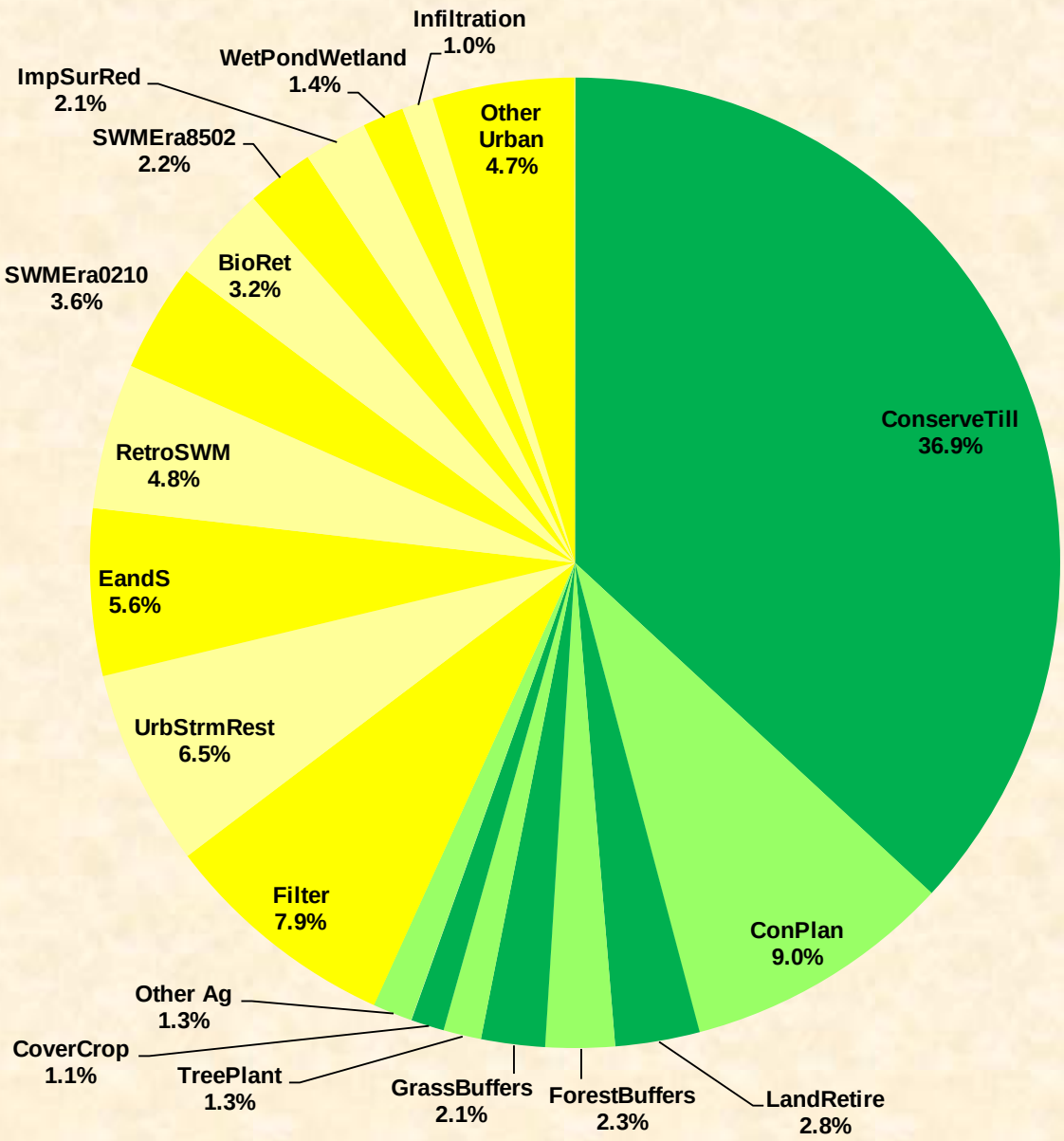
Sediment Relative Load Reductions

Pennsylvania



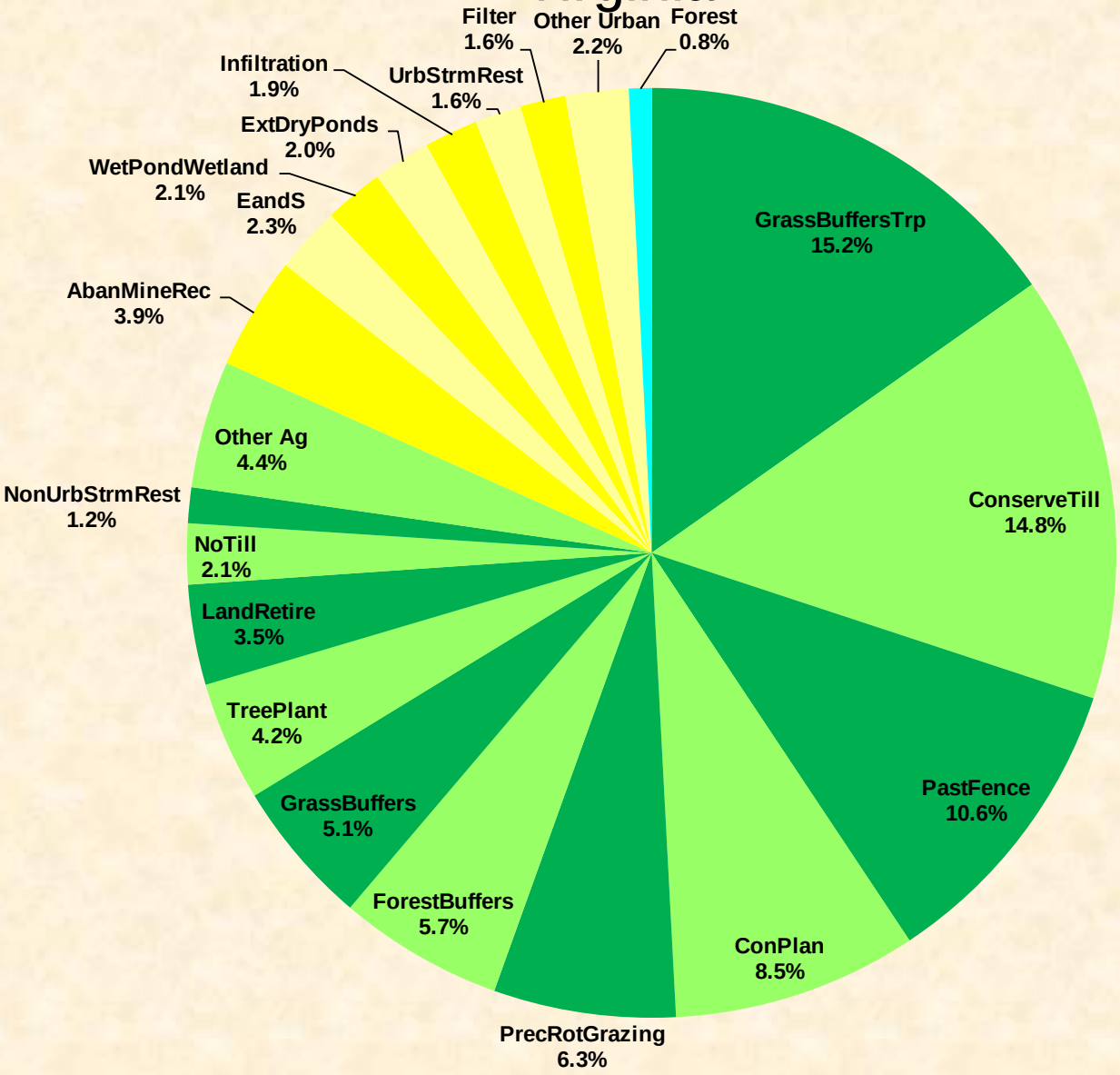
Sediment Relative Load Reductions

Maryland



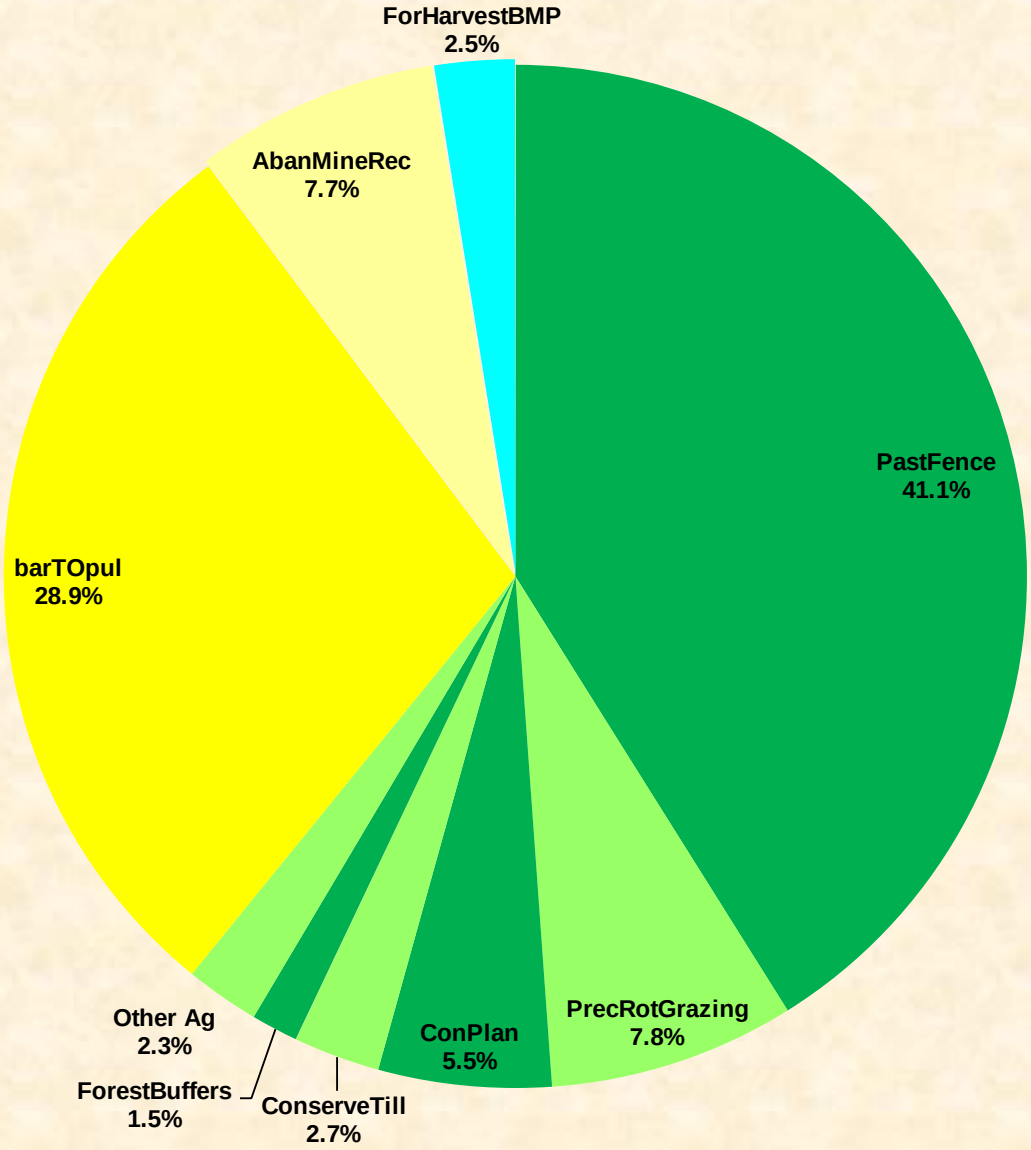
Sediment Relative Load Reductions

Virginia



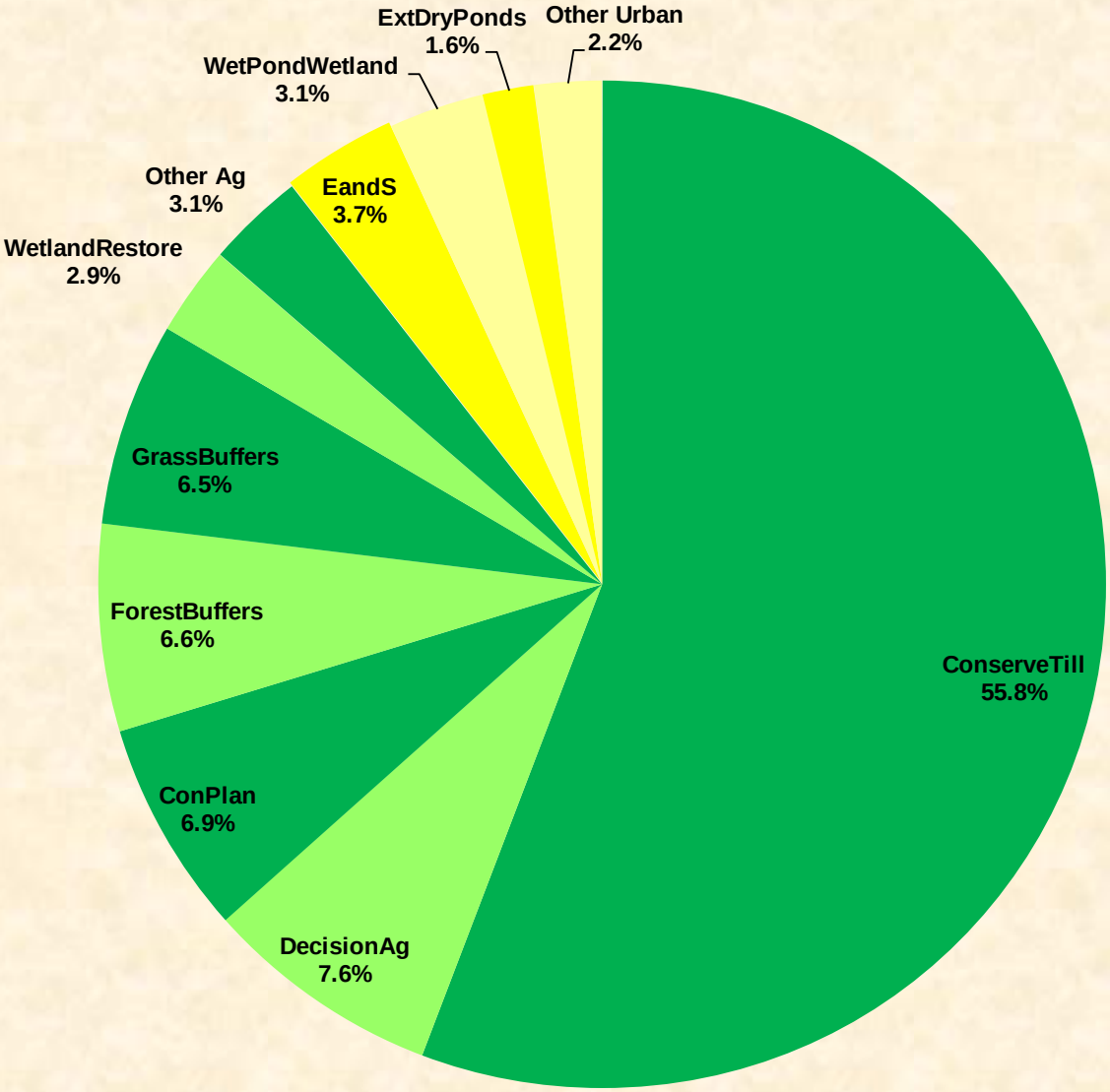
Sediment Relative Load Reductions

West Virginia



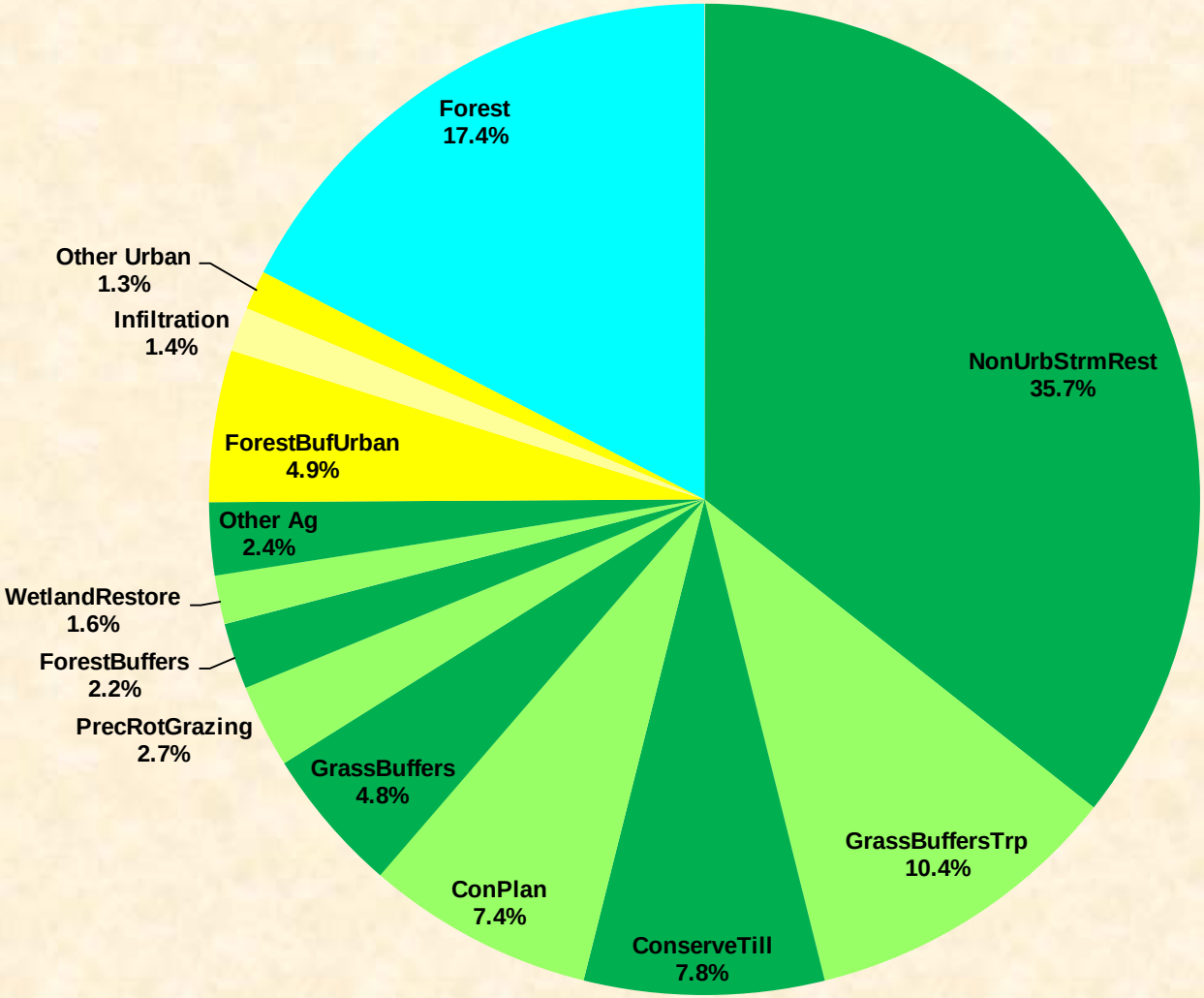
Sediment Relative Load Reductions

Delaware



Sediment Relative Load Reductions

New York



Sediment Relative Load Reductions

District of Columbia