



Chesapeake Bay Modeling: An Agricultural Perspective

**2015 Chesapeake Bay Program
*Conservation District and PA Agency Staff
Meeting***

Bucknell University

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MARYLAND

EXTENSION

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Chesapeake Bay Program

A Watershed Partnership

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Chesapeake Bay Modeling: An Agricultural Perspective

- **Topic Highlights:**

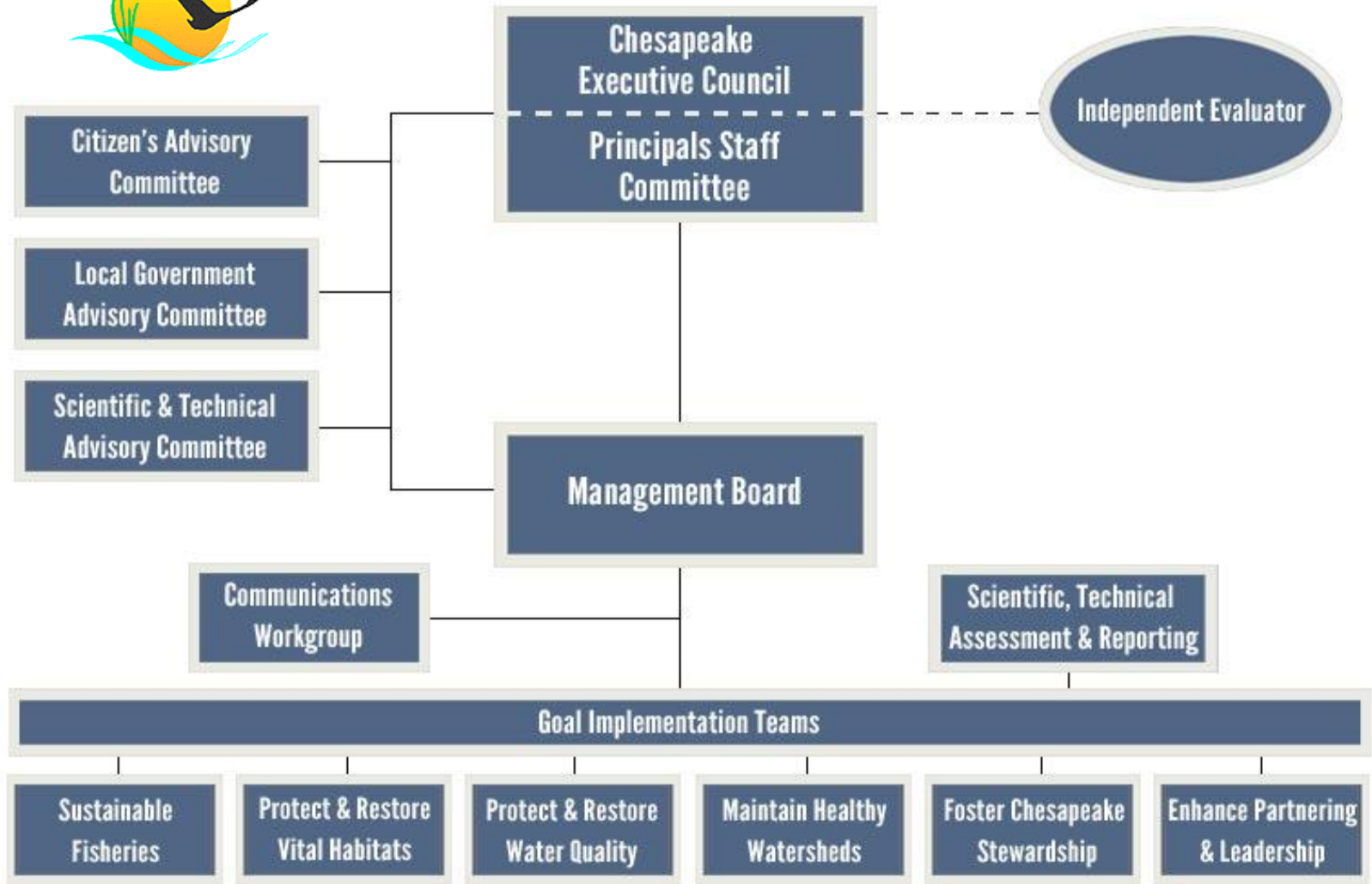
- Agriculture Workgroup
- Agricultural Best Management Practices (BMPs)
- Cover Crops BMP
- Conservation Tillage BMP
- Nutrient Application Management BMPs
- Resource Improvement BMPs
- Poultry Production Pilot
- BMP Verification Guidance
- Future of Agricultural Modeling
- Questions

Chesapeake Bay Modeling: An Agricultural Perspective



- Agriculture Workgroup (AgWGW)
 - Agricultural forum for federal, state, and local agencies, conservation districts, universities, agribusiness, and the corporate sector.
 - Recommend prioritization of federal and state technical and financial resources on specific practices.
 - Technical leadership to support the development and implementation of agricultural elements of the Chesapeake Bay TMDL.
 - Identify, define, quantify, and incorporate agricultural conservation practices into the Chesapeake Bay Program modeling tools.

CBP Partnership Structure

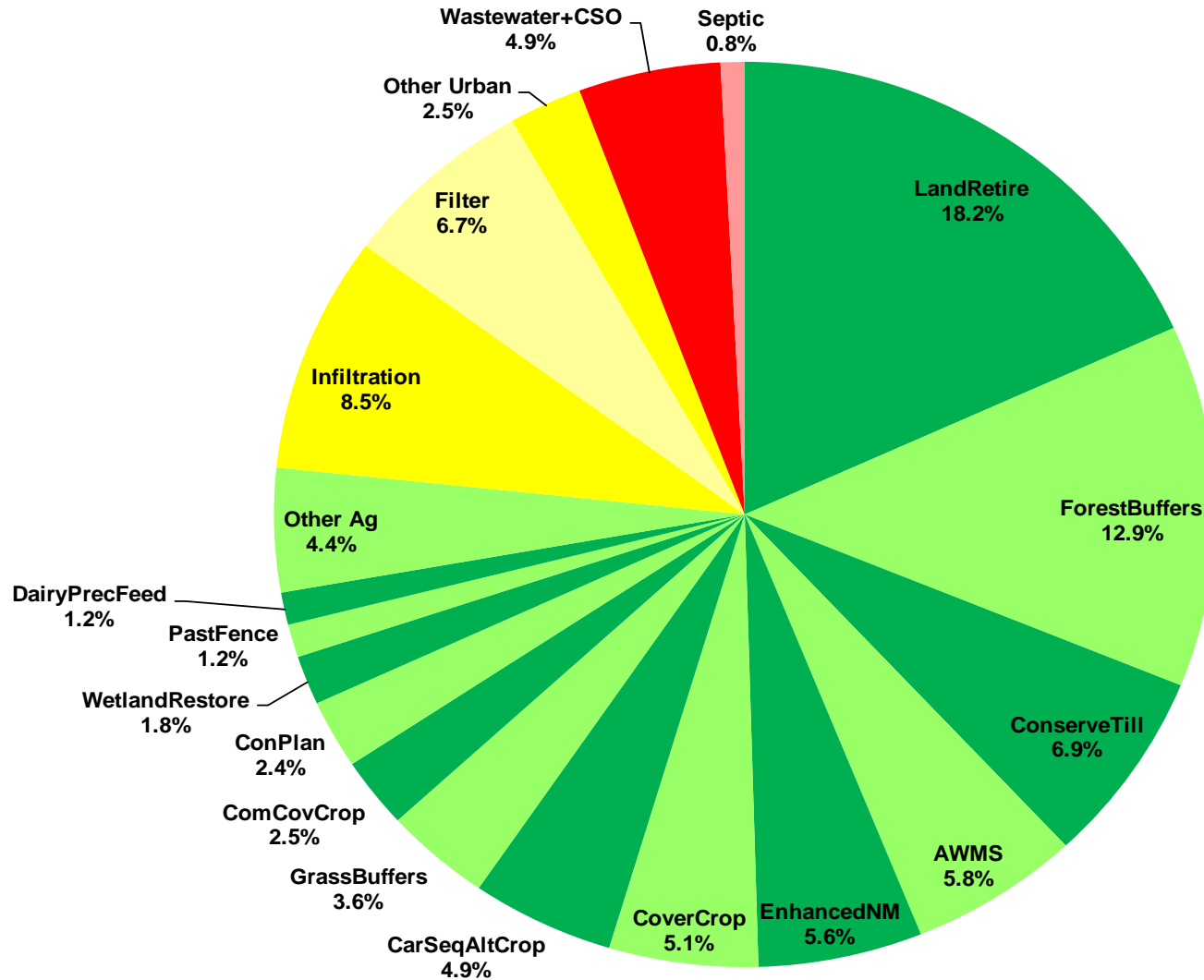


CBP Agricultural Practices



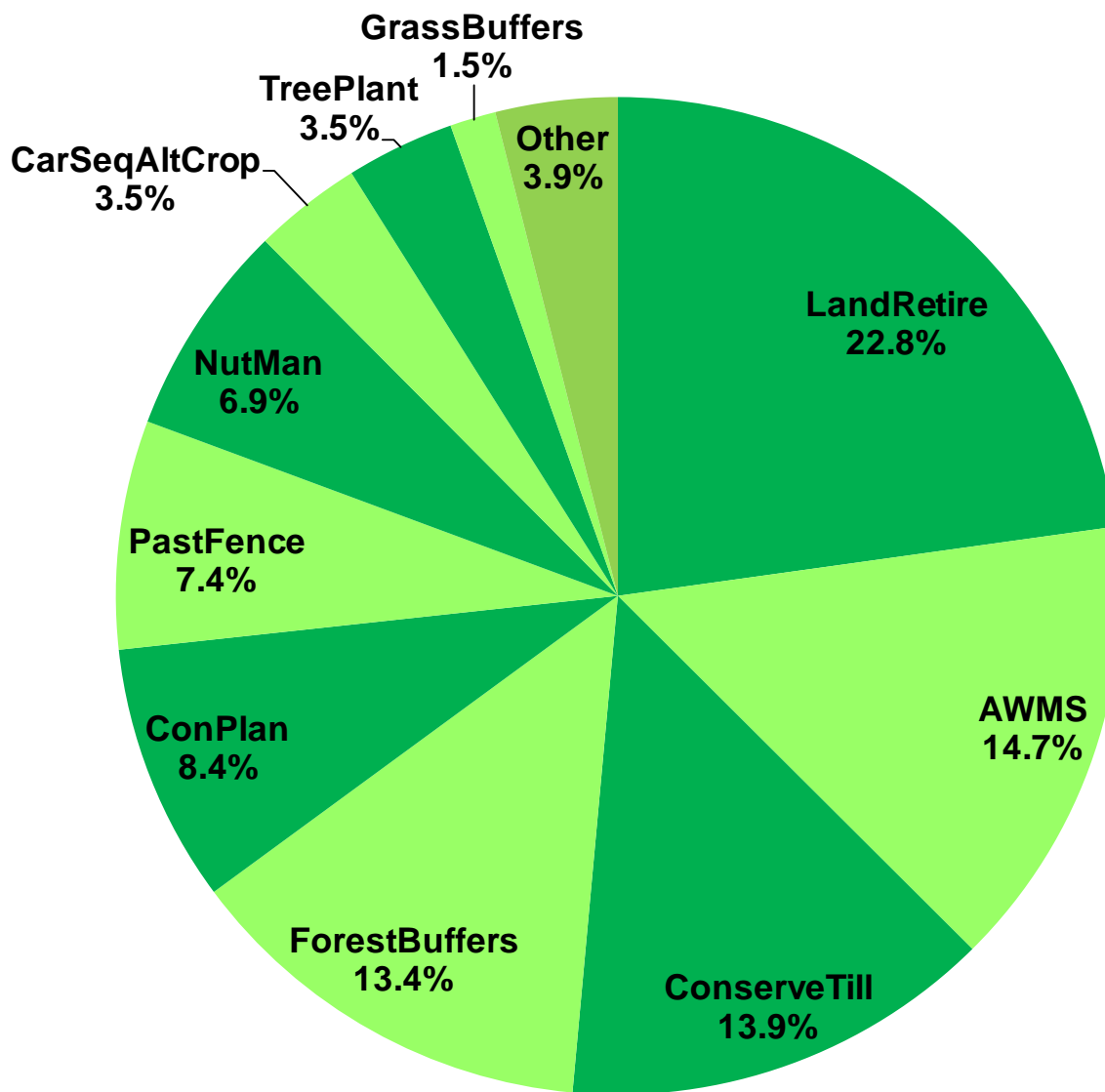
LandRetire	Land Retirement	PrecRotGrazing	Prescribed Grazing
ForestBuffers	Forest Buffers	UpPrecIntRotGraze	Precision Intensive Rotational Grazing
ConserveTill	Conservation Tillage	MortalityComp	Mortality Composting
CoverCrop	Cover Crop	EffNutManDecAgVA	Decision Agriculture
AWMS	Animal Waste Management 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		

Nitrogen Relative Load Reductions Pennsylvania WIP

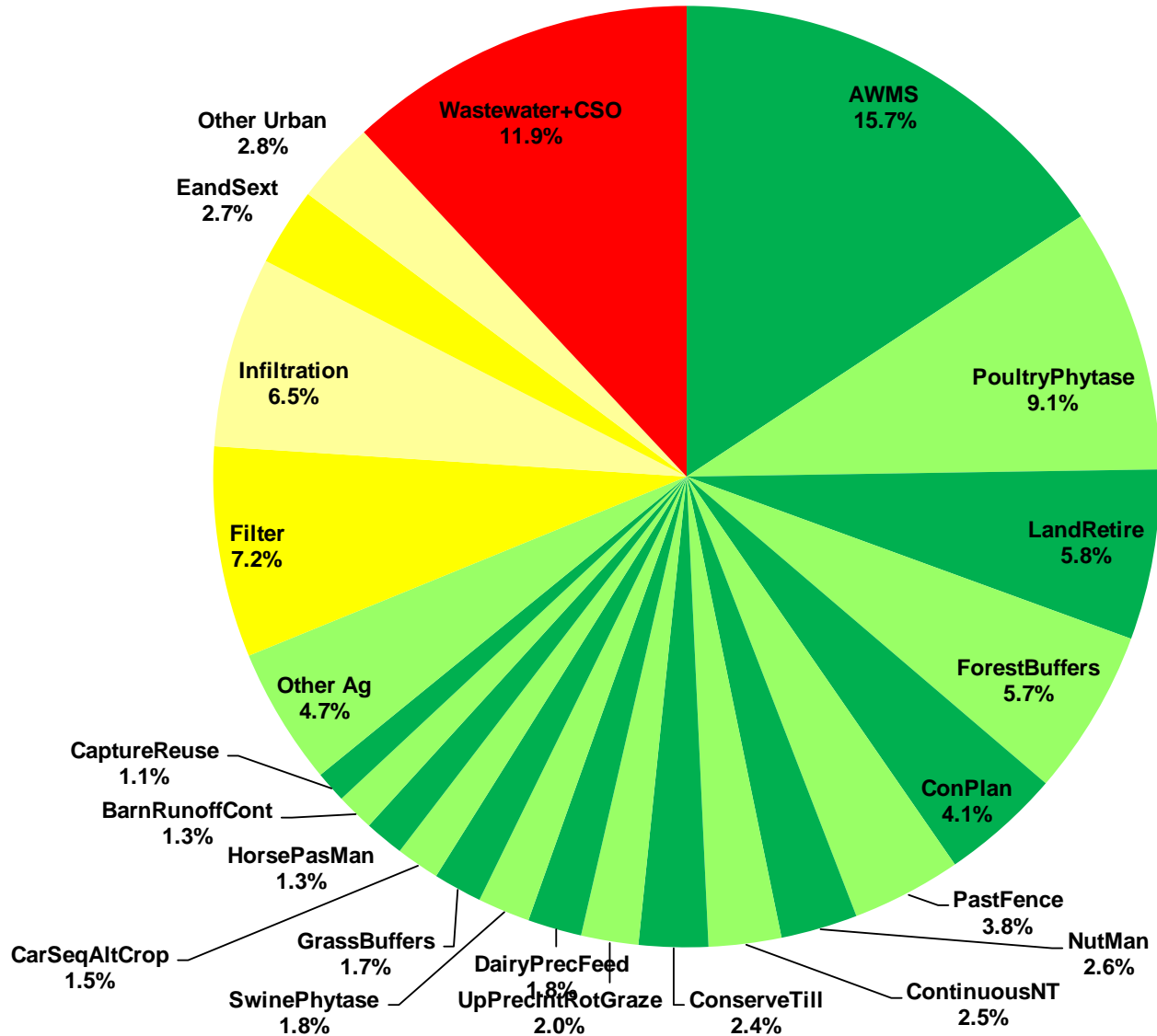


Agriculture Nitrogen Load Reduction by BMP

Pennsylvania 2013 Progress

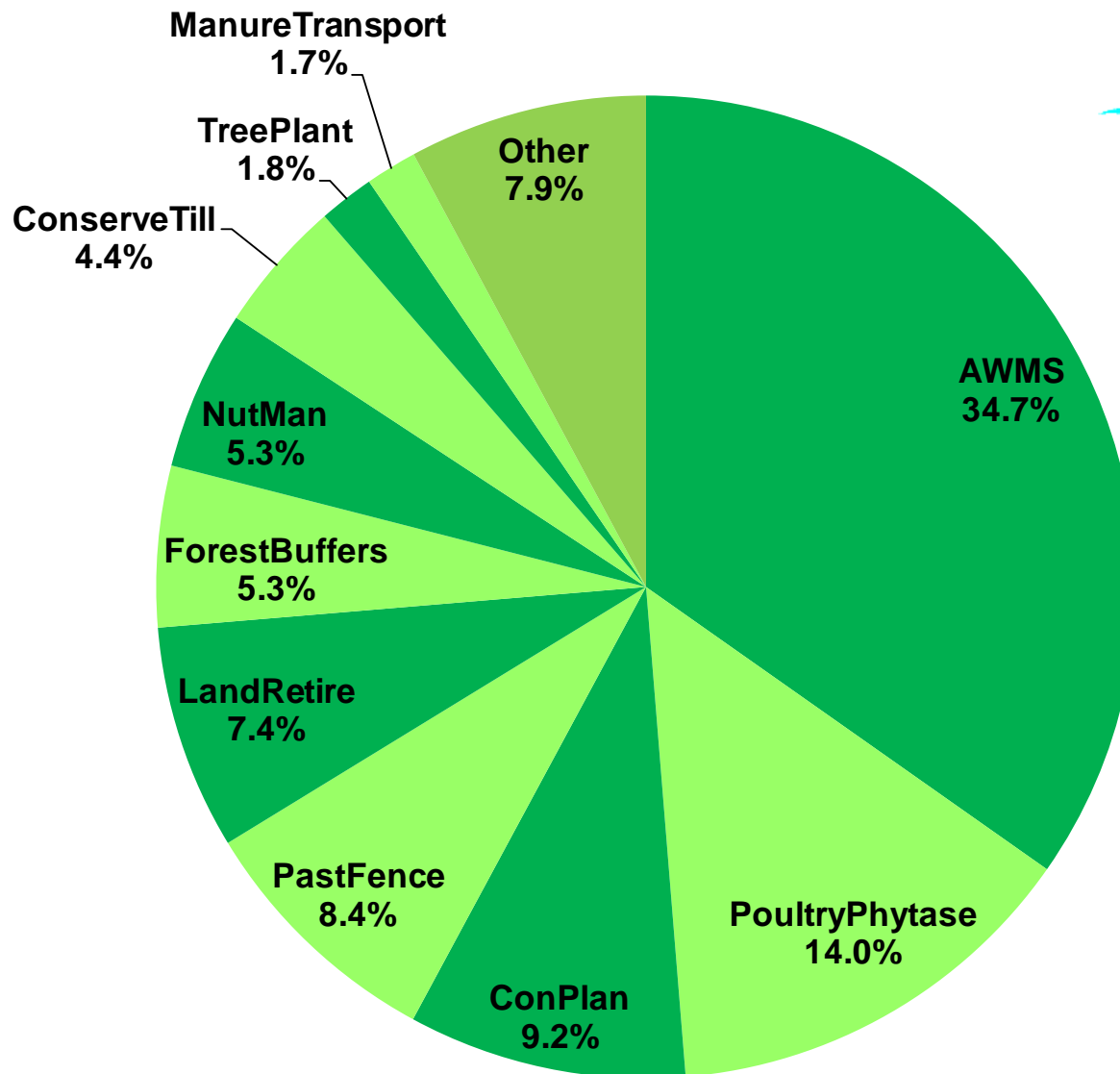


Phosphorus Relative Load Reductions Pennsylvania **WIP**

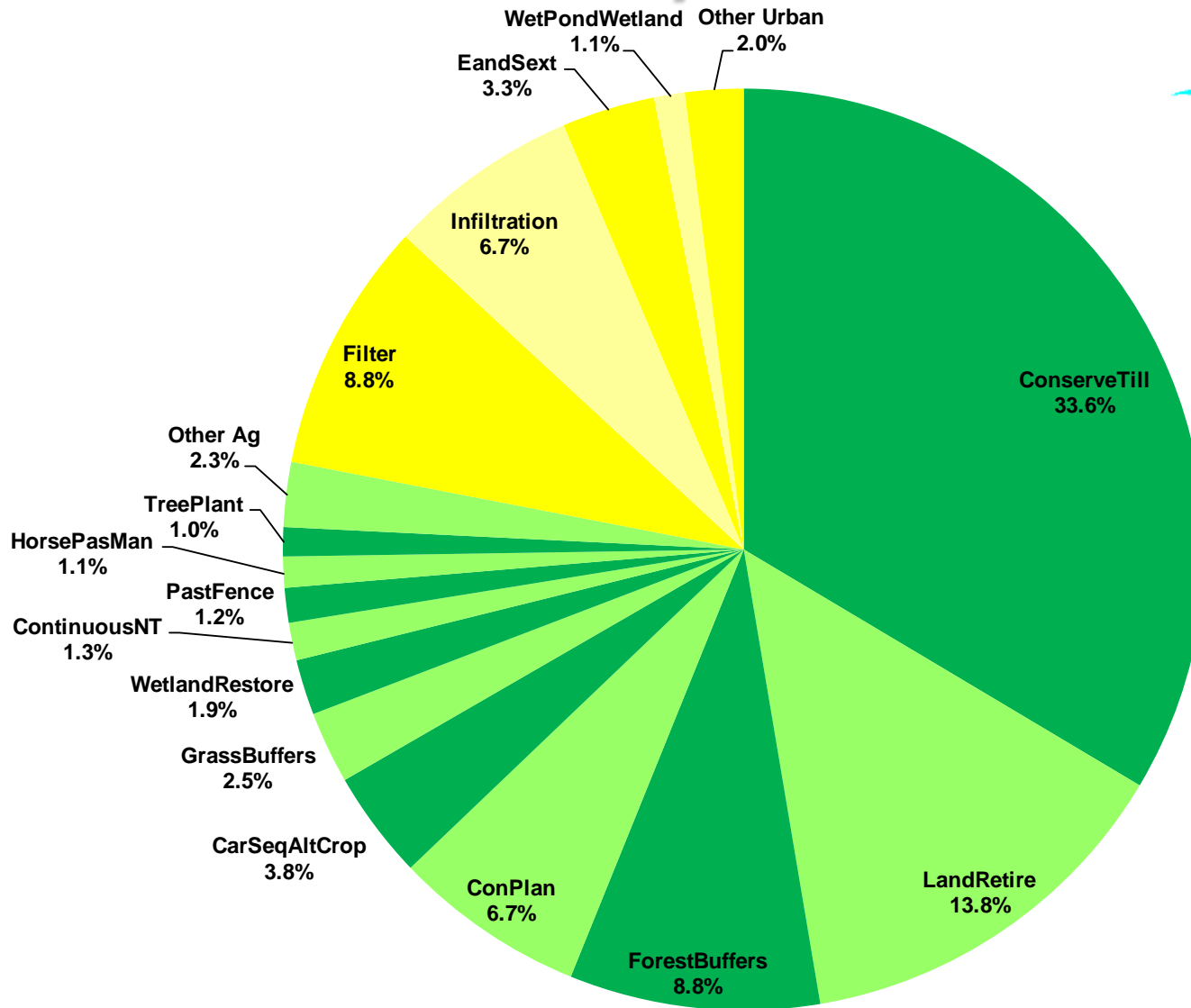


Phosphorus Relative Load Reductions

Pennsylvania 2013 Progress

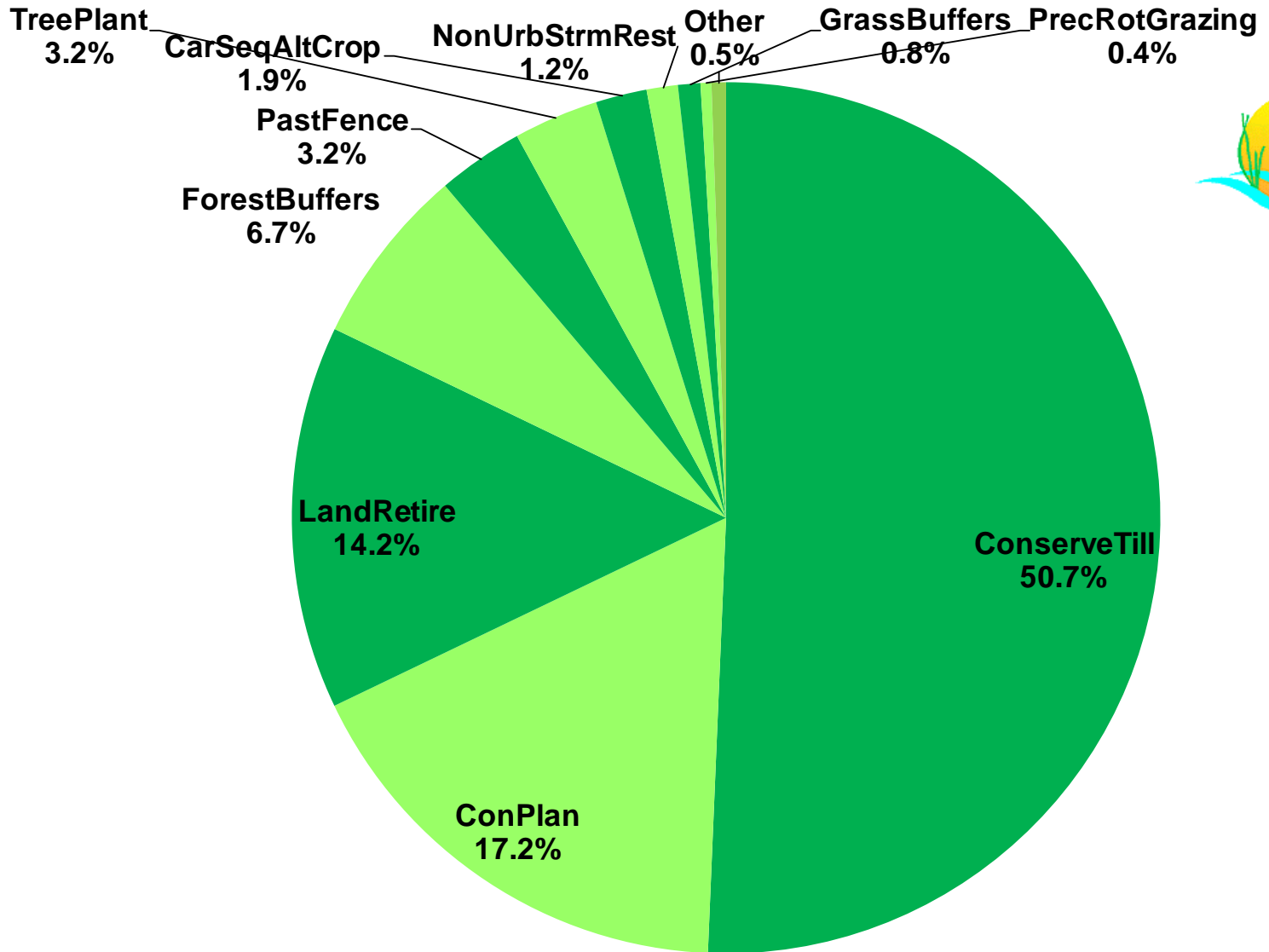


Sediment Relative Load Reductions Pennsylvania WIP



Agriculture Sediment Load Reduction by BMP

Pennsylvania 2013 Progress





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- Traditional Cover Crops-
 - Short term vegetative crop grown after the main cropping season.
 - Reduce nutrient losses to ground and surface water by sequestering excess nutrients.
 - No additional nutrients are applied in either the fall or spring.
 - Cover crop is terminated without harvesting.



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- Traditional Cover Crops-
 - Rye
 - Wheat
 - Barley
 - Annual Ryegrass **NEW!**
 - Annual Legumes **NEW!**
 - Annual Legume plus Grass Mixtures **NEW!**
 - Brassica (winter hardy) **NEW!**
 - Forage Radish **NEW!**
 - Forage Radish plus Grass Mixtures **NEW!**
 - Triticale **NEW!**
 - Oats (winter hardy) or (winter killed) **NEW!**



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- Commodity Cover Crops-
 - Short term vegetative crop grown after the main cropping season
 - Reduce nutrient losses to ground and surface water by sequestering excess nutrients.
 - No additional nutrients are applied in the fall, however additional nutrients can be applied in the spring after March 1st.
 - Cover crop can be harvested.

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- Commodity Cover Crops-
 - Rye
 - Wheat
 - Barley



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- Conventional Tillage Land Use:
 - 0-29% crop residue after planting.
 - Base land use (e.g. non-reported).
- Conservation Tillage Land Use:
 - 30+% crop residue after planting.
 - Reported land use (e.g. CRM transect survey).
 -





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- High-Residue Minimum Soil-Disturbance BMP- **NEW!**
 - Residue management practice eliminating soil disturbance by plows and implements intended to invert residue.
 - Low or no till with 60+% crop residue cover after planting.
 - Annual practice involves all crops in a multi-crop, multi-year rotation.



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- Crop Group Nutrient Application Management BMP (Tier I) **NEW!**
 - Nutrient application with basic land grant university (LGU) recommendations.
 - Farm-specific by application of nitrogen (N) and phosphorus (P) with 4-R's (source, rate, timing and placement).
 - Realistic farm-wide yield goals.
 - Credit for N sources (soil, sod, past manure and current-year applications).
 - N based application rates based on LGU recommendations for fields receiving manure.
 - P application rates based on LGU recommendations based on soil tests for fields without manure.

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- Field Level Nutrient Application Management BMP (Tier 2) **PENDING!**
- Adaptive Nutrient Application Management BMP (Tier 3) **PENDING!**





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- Resource Improvement (RI) BMPs-
NEW!
 - Practices which provide similar annual environmental benefits for water quality but may not fully meet all the design criteria of existing governmental design standards.
 - RI BMP's can be the result of a farmer choosing not to completely follow all the details of the design standard from the District or NRCS, but will contain all the critical elements for water quality resource improvement.



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- State Poultry Production Data
 - State data limited to primarily litter nutrient concentration and some litter volume production data.
 - USDA-NASS Agriculture Census poultry production data limited to single day populations (12/31).
 - Additional data still required to calculate poultry litter nutrient balances annually.



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- Industry Poultry Production Data
 - Commercial integrators collect data on each flock:
 - Species of birds produced
 - Number of birds placed and harvested
 - Weights of harvested birds
 - Days in house



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- Integrator Poultry Production Survey- **NEW!**
 - USDA-NASS poultry production pilot survey with commercial integrators vs. growers.
 - Flock level data will be aggregated to the county scale to protect private information.
 - Annualized production data set.
 - Six state survey (full state surveys).
 - Pilot proposed to address the following bird types:
 - Broilers
 - Layers
 - Turkeys

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- Pilot Project Partners-

- Penn State University

- USDA-NASS Academic Cooperator.
- Publish aggregated project data.

- Pennsylvania DEP

- Administer EPA project funding.

- USDA-NASS

- Collect Poultry Production Data from Poultry Integrators.
- Aggregate Project Data.
- Review and Submit Aggregated Data to PSU.





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- Pilot Project Partners-

- Regional Commercial Poultry Integrators as USDA-NASS Commercial Data Partner
 - Sign data release agreements with USDA-NASS.
 - Participate in USDA-NASS production data survey.
- Regional Poultry Associations
 - Providing educational outreach to regional integrators.



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- Agricultural BMP Verification Guidance- **NEW!**
 - **Three** BMP Categories:
 - Visual Assessment BMPs: Single Year
 - Example- Cover Crops
 - Visual Assessment BMPs: Multi-Year
 - Example- Animal Waste Management Systems
 - Non-Visual Assessment BMPs
 - Example- Nutrient Application Management



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- Agricultural BMP Verification Guidance- **NEW!**
 - **Four** BMP Implementation Mechanism Types:
 - Non-Cost-Shared BMPs:
 - Example- Farmer or privately funded practices.
 - Cost-Shared BMPs:
 - Example- Federal, state and county financial assistance programs.
 - Public grant funded NGO programs.
 - Regulatory Program BMPs:
 - Example- State nutrient management regulatory programs.
 - Permit Program BMPs:
 - Example- Federal/state CAFO programs.



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- Agricultural BMP Verification Guidance- **NEW!**
 - **Two** Verification Inspection Categories:
 - Initial Inspections:
 - Example- BMP Implementation inspections for cost-shared BMPs.
 - Initial BMP identification assessments for non-cost shared BMPs.
 - Follow-up Checks:
 - Example- O & M compliance inspections for federal, state, and county contractual BMPs.
 - Compliance inspections for regulatory or permit state programs.



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- Agricultural BMP Verification Guidance- **NEW!**
 - **Three** Verification Inspection Levels:
 - Initial Inspections:
 - Minimum 100% BMP implementation inspections for cost-shared BMPs or initial BMP identification assessments.
 - Transect sub-sampling allowed for Visual Assessment BMPs: Single Year.
 - Follow-up Checks:
 - Minimum 10% sub-sampling for BMPs accounting for more than 5 percent of the state WIP sector goals.
 - Minimum 5% sub-sampling for BMPS accounting for 5 percent or less of the state WIP sector goals.
 - Minimum once per 5-year permit program BMPs.



Questions & Comments

