



Chesapeake Bay 2017 Midpoint Assessment— Policy Issues for Partnership Decisions



**Chesapeake Bay Program Principals' Staff Committee
December 19, 2017**

Overview of Meeting and Policy Decision Recommendations

**Teresa Koon, WV DEP, CBP Water Quality Goal
Implementation Team Vice Chair**

and

Lee Currey, MDE, CBP Modeling Workgroup Co-Chair

Decisions in December 2017 and April 2018

During tomorrow's meeting, we are asking for decisions on:

1. Adoption of Phase 6 suite of modeling tools
2. Draft Phase III WIP planning targets, including the Bay's assimilative capacity
3. Accounting for growth
4. Accounting for Conowingo infill
5. Factoring in climate change

In April 2018, we are asking for decisions on:

1. Final Phase III WIP planning targets

Overview of PSC Meeting

Today

Focused on building understanding and answering questions

Opportunity for evening jurisdictional caucuses

Tomorrow

Focused on consensus building and collaborative decision-making

Today's Meeting Flow

What's changed, the implications, and refined Partnership models



Phase III WIP planning targets methodology



Determining the Bay's assimilative capacity



Proposed draft Phase III WIP Planning Targets



4-month WIP Planning Targets review process

Today's Meeting Flow, Continued

Growth + Conowingo
infill + Climate
change = Cumulative accounting for
changing conditions
through 2025 in the
jurisdictions' Phase III WIPs

Tomorrow's Meeting Flow

Specific language for each decision will be presented to the PSC

- PSC approved modifications to the decision language made in real time

PSC will also be asked to approve

- Recommended public communication messages for each decision
- Specific language to be inserted into the final Phase III WIP expectations document for the growth, Conowingo infill and climate change decisions

WQGIT & Modeling Workgroup

Recommendations: Nitrogen

Jurisdiction	1985 Baseline	2013 Progress	Growth in Load to 2025	Conowingo Load Responsibility	Climate Change	2013 Progress +	Phase III Planning Target
NY	18.71	15.44	-0.52	0.49	0.400	15.80	10.62
PA	122.41	99.28	1.38	4.56	4.135	109.35	72.99
MD	83.56	55.89	0.76	1.30	2.194	60.15	45.39
WV	8.73	8.06	0.20	0.00	0.236	8.50	6.36
DC	6.48	1.75	0.00	0.00	0.006	1.76	2.25
DE	6.97	6.59	0.22	0.00	0.397	7.21	4.66
VA	84.29	61.53	0.86	0.00	1.722	64.11	56.37
BasinWide	331.15	248.54	2.91	6.34	9.09	266.89	198.64

*Units: millions of pounds

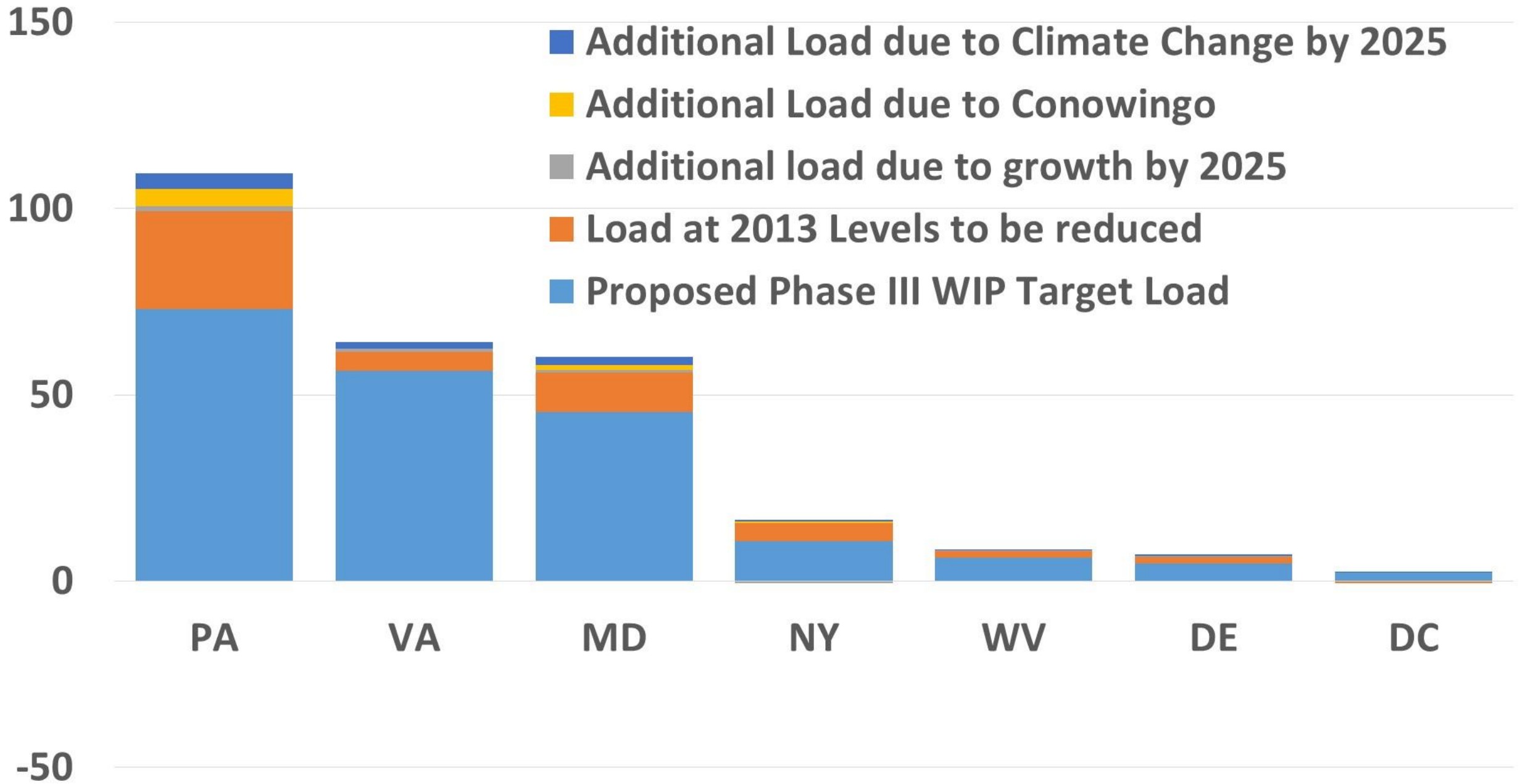
WQGIT & Modeling Workgroup

Recommendations: Phosphorus

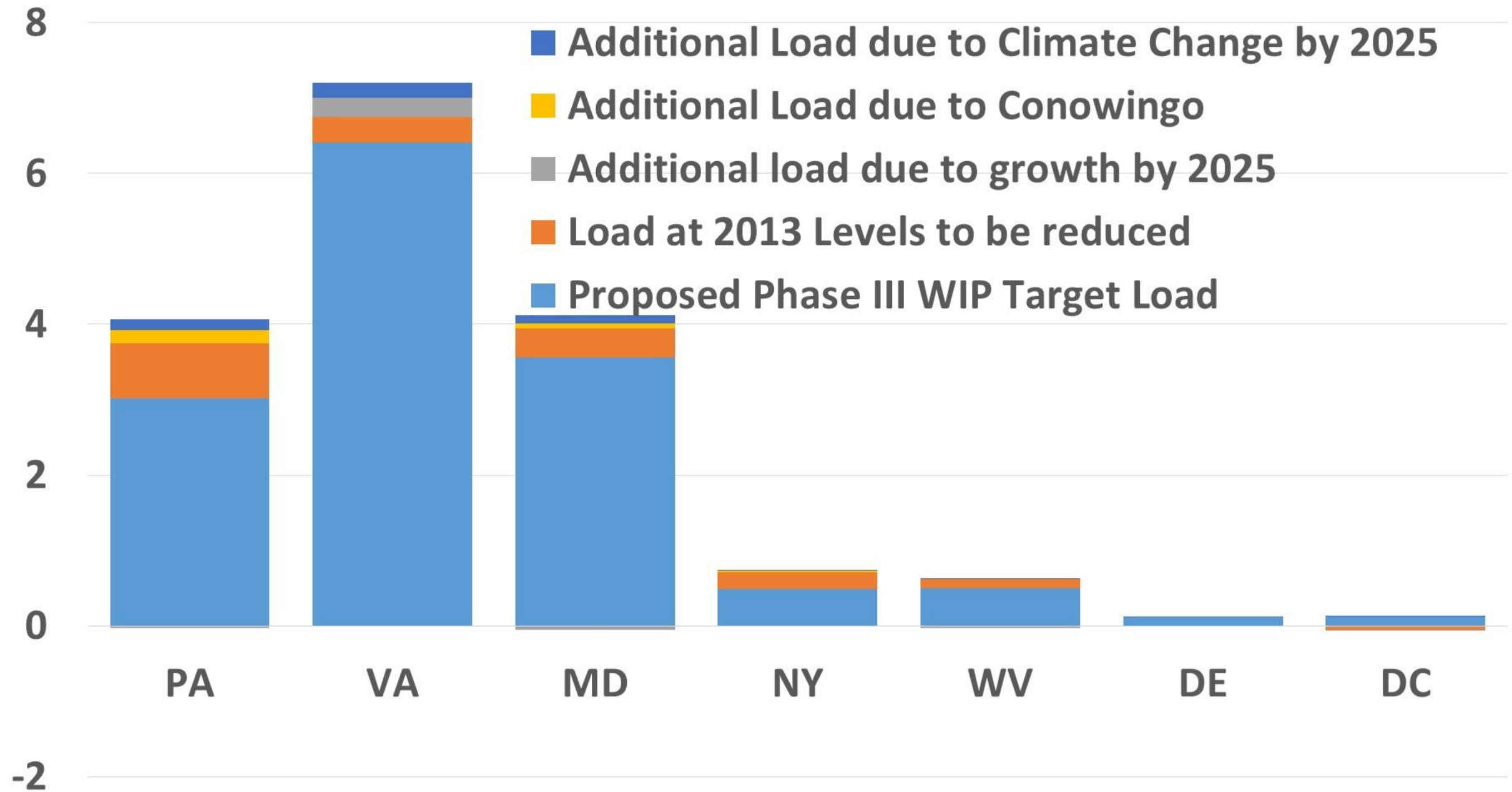
Jurisdiction	1985 Baseline	2013 Progress	Growth in Load to 2025	Conowingo Load Responsibility	Climate Change	2013 Progress +	Phase III Planning Target
NY	1.198	0.710	-0.010	0.020	0.014	0.734	0.491
PA	6.282	3.749	-0.034	0.177	0.141	4.034	3.012
MD	7.495	3.942	-0.053	0.069	0.114	4.071	3.553
WV	0.902	0.617	-0.027	0.000	0.019	0.610	0.493
DC	0.090	0.062	-0.001	0.000	0.001	0.063	0.120
DE	0.225	0.116	-0.004	0.000	0.006	0.117	0.116
VA	14.244	6.751	0.254	0.000	0.193	7.198	6.411
BasinWide	30.44	15.95	0.125	0.266	0.489	16.827	14.20

*Units: millions of pounds

Proposed Draft Nitrogen Targets



Proposed Draft Phosphorus Targets



Cautions About Comparisons Back to Phase II WIPs

Be cautious with comparing the proposed draft Phase III planning targets with the jurisdictions' Phase II WIP loads

- Different watershed models – more BMPs, different land uses and loading rates
- State-driven changes between Phase II and Phase III
- Phase II WIP planning targets were not derived using the Bay TMDL allocation methodology—they were based on a similar level of effort to the Phase I WIPs

WQGIT and Modeling Workgroup's Recommendations

1. Adoption of the Phase 6 suite of modeling tools for management application in the Phase III WIPs and two-year milestones through 2025
2. Approval of the proposed Bay's assimilative capacity
3. Approval of the draft Phase III WIP planning targets
4. Approval of the process for the 4-month Partnership review of the draft Phase III WIP planning targets

WQGIT and Modeling Workgroup's Recommendations (Continued)

5. Base Phase III WIP development on 2025 current zoning conditions
6. [Conowingo recommendation]
7. [Climate change recommendation]

What's Changed, the Implications, and Our Improved Models

Lee Currey, MDE, CBP Modeling Workgroup Co-Chair

What's Changed, Why, and Implications

A lot has changed since 2010 and our Phase I and Phase II WIPs

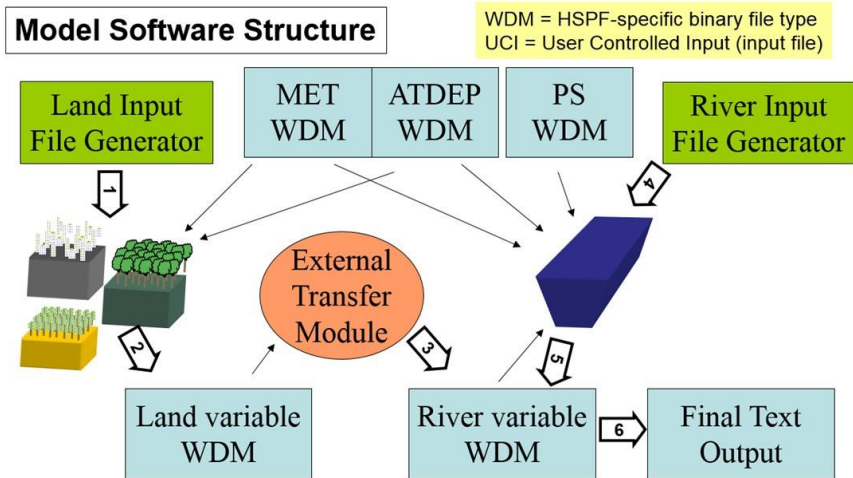
- Much improved modeling and other decision support tools
- High resolution land cover data for entire watershed
- Hundreds more BMPs available for crediting
- Significant data gathered from local agricultural and municipality partners incorporated into our models and other decision support tools

Improved Partnership Models

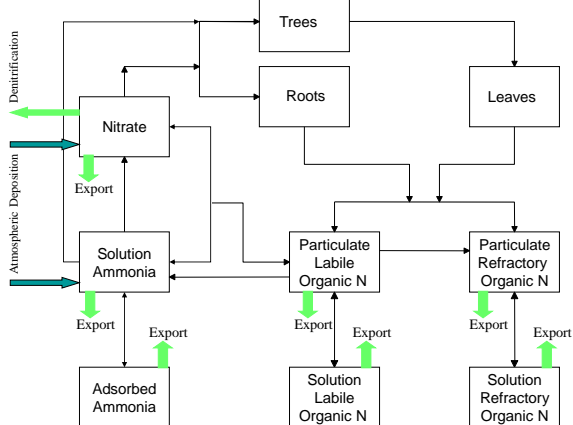
- 5 years of collaborative Partnership decision-making on every aspect of every model
- Multiple STAC-sponsored technical workshops from soil phosphorus to Conowingo
- Independent scientific peer reviews of every Partnership model
- Comprehensive fatal flaw review and issue resolution by the partners

Phase 6 Bay Watershed Model

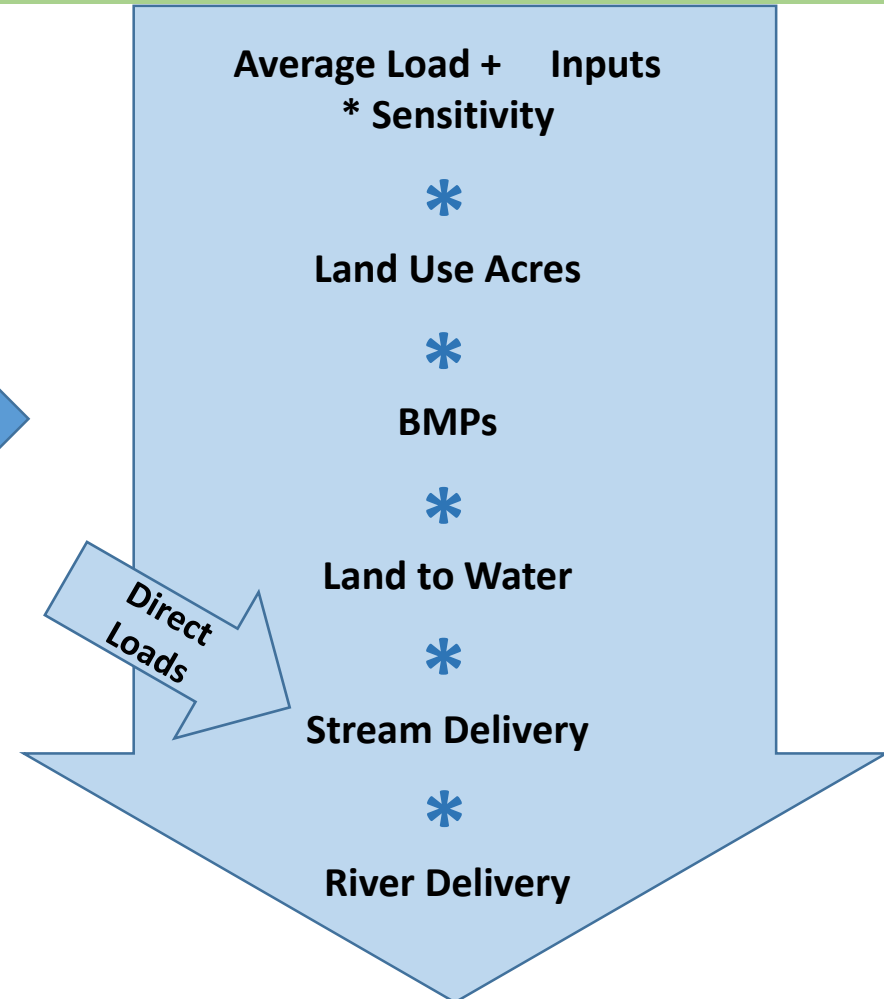
Prior Bay Watershed Models



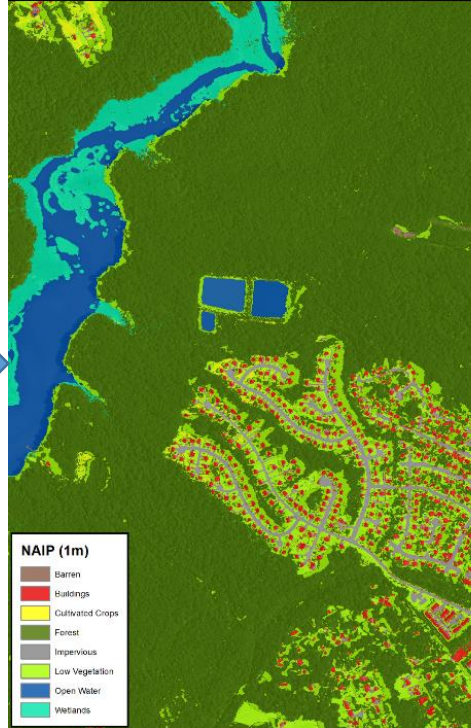
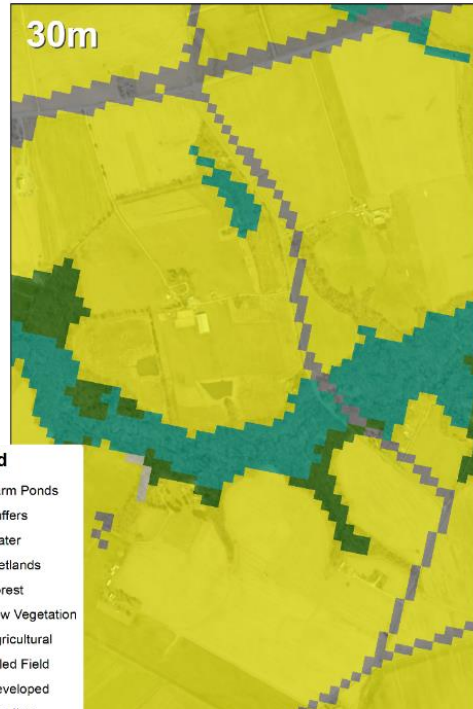
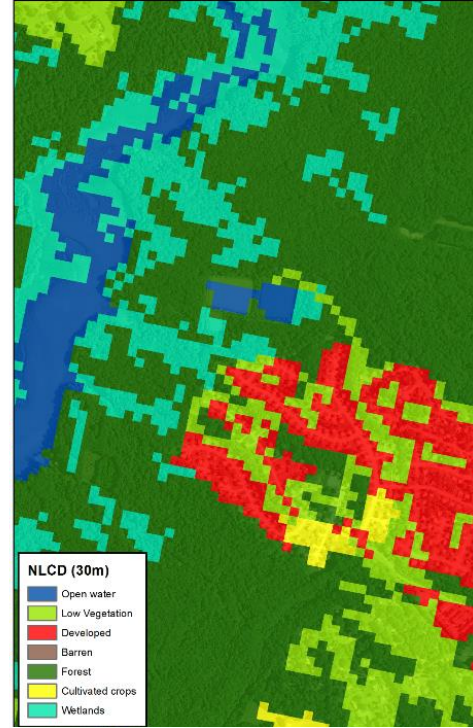
Each submodel has a complex hydrologic or nutrient cycling structure



Phase 6 Watershed Model



Phase 5 30-Meter Resolution Land Use/Land Cover Data



Phase 6 1-Meter Resolution Land Use/Land Cover Data

Hundreds More BMPs

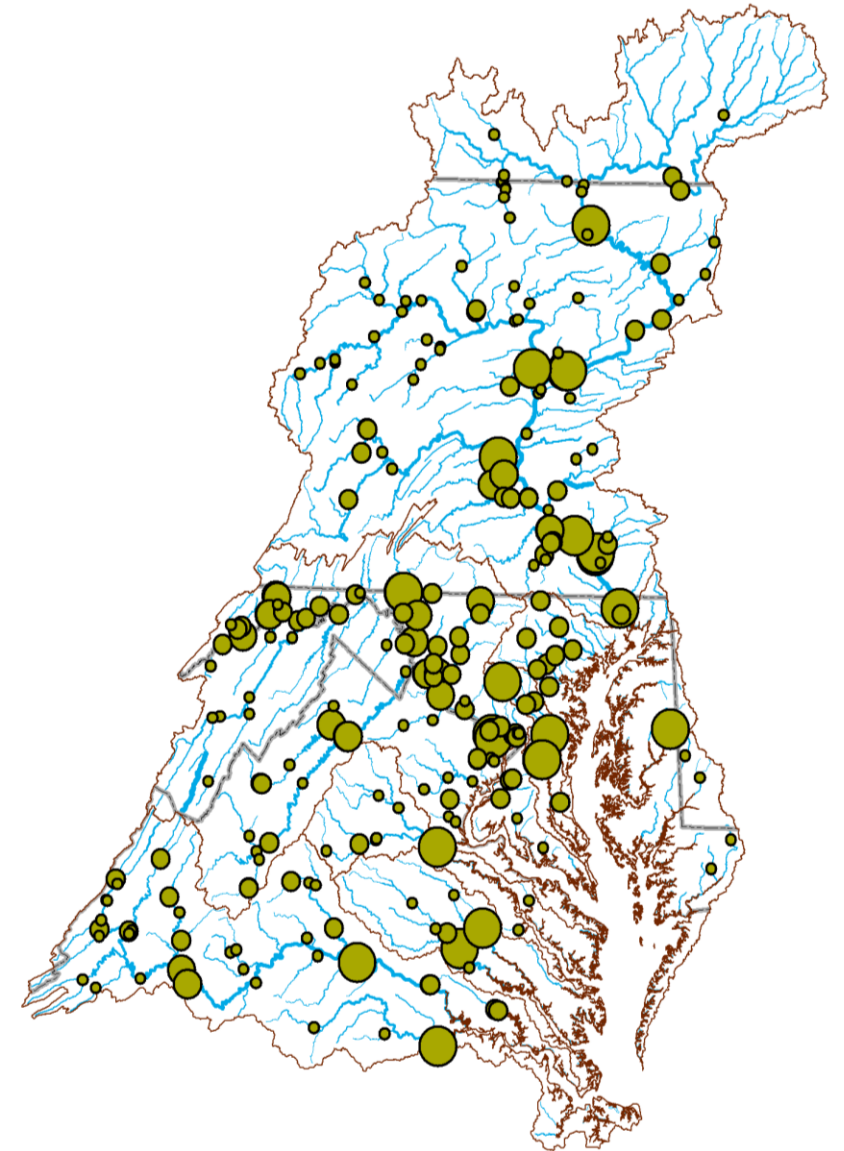
Advanced Grey Infrastructure Nutrient Discovery Program	Dry Waste Storage Structure RI	Headwater Wetland Gains - Reestablished	Nutrient Management P Placement	Stream Restoration Urban	Waste Treatment - Dairy	Cover Crop Traditional - FED	Cover Crop Traditional - NutRND
Ag Shoreline Management	Dry Well	Headwater Wetland Restoration	Nutrient Management P Rate	Streambank and Shoreline Protection	Waste Treatment - Horse	Cover Crop Traditional - FEO	Cover Crop Traditional - NutRNO
Ag Shoreline Non-Vegetated	Erosion & Sediment Control	High Residue Tillage Management	Nutrient Management P Timing	Streambank Restoration	Waste Treatment - Layer	Cover Crop Traditional - FFEA	Cover Crop Traditional - NutTED
Ag Shoreline Vegetated	Erosion and Sediment Control Level 1	Horse Pasture Management	Pasture and Hay Planting	Streambank Stabilization	Waste Treatment - Other Cattle	Cover Crop Traditional - FPED	Cover Crop Traditional - NutTEO
Alternative Crop/Switchgrass RI	Erosion and Sediment Control Level 2	Hydrodynamic Structures	Permanent wildlife habitat, non-easement	Street Cleaning Practice 1	Waste Treatment - Poultry	Cover Crop Traditional - FPEO	Cover Crop Traditional - NutTLD
Alternative Crops	Erosion and Sediment Control Level 3	IFAS	Permeable Pavement - NoSVNoUDAB	Street Cleaning Practice 2	Waste Treatment - Pullet	Cover Crop Traditional - FPND	Cover Crop Traditional - NutTLO
Alternative Water System	Establishment of permanent introduced grasses and legumes	IFAS Elevated Mound	Permeable Pavement - NoSVUDAB	Street Cleaning Practice 3	Waste Treatment - Swine	Cover Crop Traditional - FPNO	Cover Crop Traditional - NutTND
Amendments for the Treatment of Agricultural Waste	Exclusion Fence with Forest Buffer	IFAS Shallow Pressure	Permeable Pavement - NoSVUDCD	Street Cleaning Practice 4	Waste Treatment - Turkey	Cover Crop Traditional - LEA	Cover Crop Traditional - NutTNO
Animal Compost Structure RI	Exclusion Fence with Forest Buffer RI	IMF	Permeable Pavement - SVNoUDAB	Street Cleaning Practice 5	Waste Treatment Lagoon	Cover Crop Traditional - LED	Cover Crop Traditional - NutWED
Animal Mortality Facility	Exclusion Fence with Grass Buffer	IMF Elevated Mound	Permeable Pavement - SVUDAB	Street Cleaning Practice 6	Wastewater Treatment Strip	Cover Crop Traditional - LEO	Cover Crop Traditional - NutWEO
Animal Trails and Walkways	Exclusion Fence with Grass Buffer RI	IMF Shallow Pressure	Permeable Pavement - SVUDCD	Street Cleaning Practice 7	Water Control Structure	Cover Crop Traditional - LGHEA	Cover Crop Traditional - NutWLD
Animal Waste Management Systems (All Types)	Exclusion Fence with Narrow Forest Buffer	Impervious Disconnection	Prescribed Grazing	Street Cleaning Practice 8	Water Control Structure RI	Cover Crop Traditional - LGHED	Cover Crop Traditional - NutWLO
Barnyard Clean Water Diversion RI	Exclusion Fence with Narrow Forest Buffer RI	Infiltration Basin	Proprietary Ex Situ	Street Cleaning Practice 9	Watering Facility	Cover Crop Traditional - LGHEO	Cover Crop Traditional - NutWND
Barnyard Runoff Controls	Exclusion Fence with Narrow Grass Buffer	Infiltration Practices	Proprietary Ex Situ Elevated Mound	Street Cleaning Practice 10	Watering Trough RI	Cover Crop Traditional - LGHND	Cover Crop Traditional - NutWNO
Biofiltration	Exclusion Fence with Narrow Grass Buffer RI	Infiltration Trench	Proprietary Ex Situ Shallow Pressure	Street Cleaning Practice 11	Wet Extended Detention	Cover Crop Traditional - LGHNO	Cover Crop Traditional - OHEA
Bioretention - A/B soils, no underdrain	Extension of CREP Watering System	Land Reclamation, Abandoned Mined Land	Rain Garden	Street Sweeping	Wet Pond	Cover Crop Traditional - LGLEA	Cover Crop Traditional - OHED
Bioretention - C/D soils, underdrain	Feed Management	Land Retirement to Mixed Open	Reduced Tillage	Structure for Water Control	Wet Ponds & Wetlands	Cover Crop Traditional - LGLED	Cover Crop Traditional - OHEO
Bioswale	Field Border	Land Retirement to Pasture	Reduction of Impervious Surface	Surface Sand Filter	Wet Swale	Cover Crop Traditional - LGLEO	Cover Crop Traditional - OHND
Channel Bed Stabilization	Filter Strip	Loafing Lot Management System	Reforestation of Erodible Crop and Pastureland	Tidal Algal Flow -way	Wetland Creation	Cover Crop Traditional - LGLND	Cover Crop Traditional - OHNO
Cisterns & Rain Barrels	Filtering Practices	Manure Incorporation High Disturbance	Regenerative Stormwater Conveyance	Tree Planting	Wetland Functional Gains - Enhanced	Cover Crop Traditional - LGLNO	Cover Crop Traditional - OKEA
Composter Facilities	Filtration	Manure Incorporation High Disturbance Immediate	Retirement of Highly Erodible Land	Tree/Shrub Establishment	Wetland Gains - Established	Cover Crop Traditional - LND	Cover Crop Traditional - OKED
Conservation Cover	Floating Treatment Wetland 1	Manure Incorporation High Disturbance Late	Retrofit Runoff Reduction	Underground Infiltration System	Wetland Gains - Reestablished	Cover Crop Traditional - LNO	Cover Crop Traditional - OKEO
Conservation Plans	Floating Treatment Wetland 2	Manure Incorporation Low Disturbance	Retrofit Stormwater Treatment	Urban Filter Strip Runoff Reduction	Wetland Rehabilitation	Cover Crop Traditional - NutARED	Cover Crop Traditional - REA
Conservation Tillage	Floating Treatment Wetland 3	Manure Incorporation Low Disturbance Immediate	Ridge Tillage	Urban Filter Strip Stormwater Treatment	Wetland Restoration	Cover Crop Traditional - NutAREO	Cover Crop Traditional - RED
Constructed Wetland	Floating Treatment Wetland 4	Manure Incorporation Low Disturbance Late	Riparian Forest Buffer	Urban Forest Buffer	Windbreak/Shelterbelt Establishment	Cover Crop Traditional - NutARND	Cover Crop Traditional - REO
Constructed Wetland Elevated Mound	Floating Treatment Wetland 5	Manure Injection	Riparian Herbaceous Cover	Urban Forest Planting	Woodland Buffer Filter Area	Cover Crop Traditional - NutARNO	Cover Crop Traditional - RLD
Constructed Wetland Septic	Forest Buffer on Watercourse RI	Manure Transport	RMF	Urban Infiltration Practices	Commodity Cover Crop - Early	Cover Crop Traditional - NutBED	Cover Crop Traditional - RLO
Constructed Wetland Shallow Pressure	Forest Buffers	Monitored Non-Tidal Algal Flow -way	RMF Elevated Mound	Urban Nutrient Management Plan	Commodity Cover Crop - Standard	Cover Crop Traditional - NutBEO	Cover Crop Traditional - RND
Conversion to Hayland RI	Forest Conservation	Monitored Tidal Algal Flow -way	RMF Shallow Pressure	Urban Nutrient Management Plan - MDCA	Cover Crops	Cover Crop Traditional - NutBND	Cover Crop Traditional - RNO
Conversion to Pasture RI	Forest Harvesting Practices	Mulch Tillage	Roof runoff management	Urban Nutrient Management Plan - MDDIY	CoverCropComLate	Cover Crop Traditional - NutBNO	Cover Crop Traditional - TEA
CREP Riparian Forest Buffer	Forest Nutrient Exclusion Area on Watercourse Narrow RI	Narrow Forest Buffers	Roof Runoff Structure	Urban Nutrient Management Plan - PlanHR	Cover Crop Traditional - AREA	Cover Crop Traditional - NutBRED	Cover Crop Traditional - TED
CREP Wetland Restoration	Forest Stand Improvement	Narrow Urban Forest Buffer	Rotational Grazing RI	Urban Nutrient Management Plan - PlanLR	Cover Crop Traditional - AREO	Cover Crop Traditional - NutBREO	Cover Crop Traditional - TEO
CREP Wildlife Habitat	Grass Buffer on Watercourse RI	New Runoff Reduction	SCWQP	Urban Shoreline Management	Cover Crop Traditional - AREO	Cover Crop Traditional - NutFPED	Cover Crop Traditional - TLD
Critical Area Planting	Grass Buffer Strip	New Stormwater Treatment	Septic Connections	Urban Shoreline Non-Vegetated	Cover Crop Traditional - ARND	Cover Crop Traditional - NutFPEO	Cover Crop Traditional - TLO
D&G Road - E&S Control and Outlets	Grass Buffers	No Tillage	Septic Denitrification	Urban Shoreline Vegetated	Cover Crop Traditional - ARNO	Cover Crop Traditional - NutFPND	Cover Crop Traditional - TND
D&G Road - Outlets Only	Grass Filter Strips	Non-Tidal Algal Flow -way	Septic Effluent Elevated Mound	Urban stream restoration	Cover Crop Traditional - BEA	Cover Crop Traditional - NutFPNO	Cover Crop Traditional - TNO
D&G Road - Surface Aggregate and Reseed Roadbed	Grass Nutrient Exclusion Area on Watercourse Narrow RI	NSF 40	Septic Effluent Shallow Pressure	Vegetated Open Channels	Cover Crop Traditional - BED	Cover Crop Traditional - NutOHED	Cover Crop Traditional - WEA
Dead Bird Composting Facility	Grassed Waterway	NSF 40 Elevated Mound	Septic Tank Advanced Treatment	Vegetated Treatment Area	Cover Crop Traditional - BEO	Cover Crop Traditional - NutOHEO	Cover Crop Traditional - WED
Default - Bioretention - A/B soils, underdrain	Grazing Land Protection	NSF 40 Shallow Pressure	Septic Tank Pumpout	Waste Control Facilities	Cover Crop Traditional - BND	Cover Crop Traditional - NutOHND	Cover Crop Traditional - WEO
Disconnection of Rooftop Runoff	Green Roofs	Nutrient Management Core N	Solid/Liquid Waste Separation Facility	Waste Storage Facility	Cover Crop Traditional - BNO	Cover Crop Traditional - NutOHNO	Cover Crop Traditional - WLD
Dry Detention Ponds	Hardwood tree planting	Nutrient Management Core P	Storm Drain Cleaning	Waste Storage Pond	Cover Crop Traditional - BREO	Cover Crop Traditional - NutREO	Cover Crop Traditional - WLO
Dry Detention Ponds & Hydrodynamic Structures	Headwater CREP Wetland Restoration	Nutrient Management N Placement	Stream Channel Stabilization	Waste Storage Structure	Cover Crop Traditional - BRED	Cover Crop Traditional - NutREO	Cover Crop Traditional - VND
Dry Extended Detention Ponds	Headwater Wetland Creation	Nutrient Management N Rate	Stream Improvement for Fish Habitat	Waste Treatment - Beef	Cover Crop Traditional - BREO	Cover Crop Traditional - NutRLO	Cover Crop Traditional - WNO
Dry Swale	Headwater Wetland Gains - Established	Nutrient Management N Timing	Stream Restoration Ag	Waste Treatment - Broiler	Cover Crop Traditional - FEA	Cover Crop Traditional - NutRLO	

Local Agricultural and Municipality Data

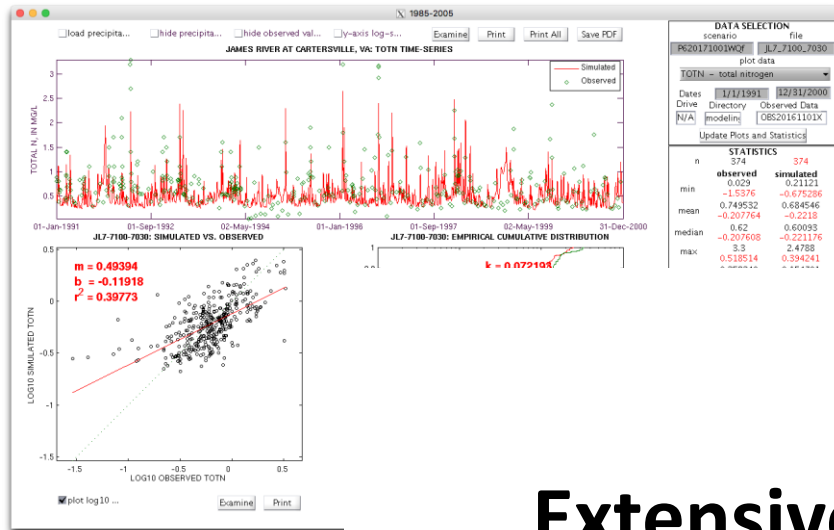
- Municipal Separate Storm Sewer Systems
- Combined Sewer Systems
- Sewer Service Areas
- Land Cover
- Land Use
- Parcels
- Roads
- Beaches
- Institutional lands
- Federal lands
- Golf courses
- Surface mines
- Landfills
- Protected lands
- Streams
- Wetlands
- Tidal zones
- Floodplains
- Frequently flooded soils
- Livestock populations
- Poultry populations
- Crop, hay and pasture acreages
- Crop yields
- Soil P concentrations
- BMPs

Our Models are Tested using Decades of Monitoring Data

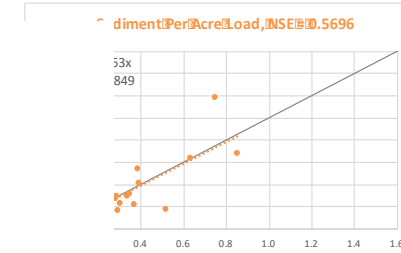
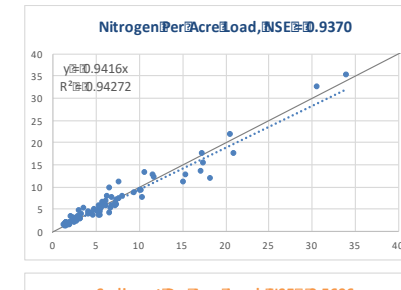
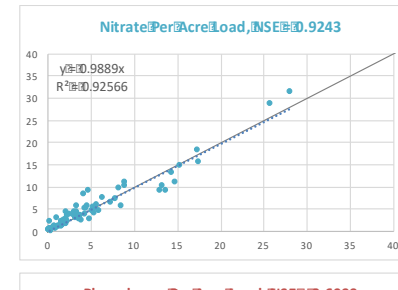
- Hundreds of thousands of water quality monitoring data points
- Hundreds of monitoring stations
- Nitrogen, phosphorus, and sediment
- Data records lasting up to 3 decades



Size of circle denotes relative number of data points: 100s to 1,000s

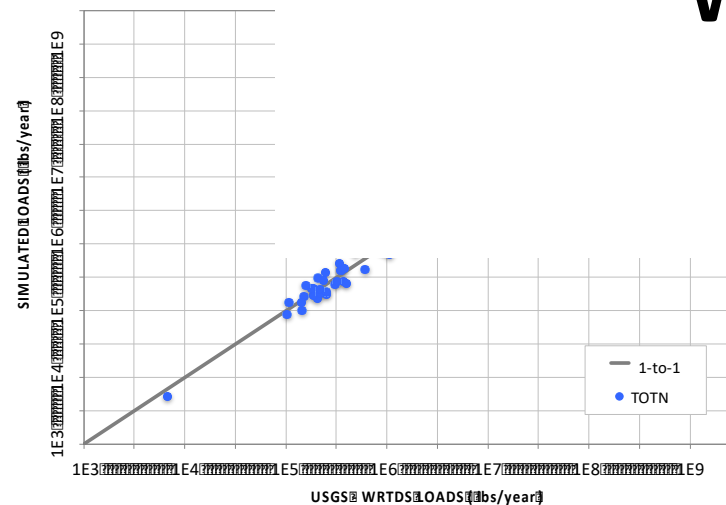


[1] Model calibration is mad

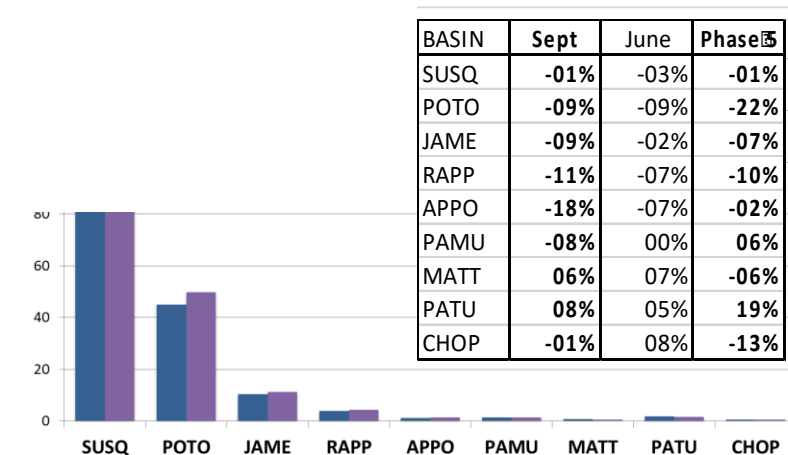


Geographic Efficiencies

Extensive Testing of the Models Throughout the Watershed



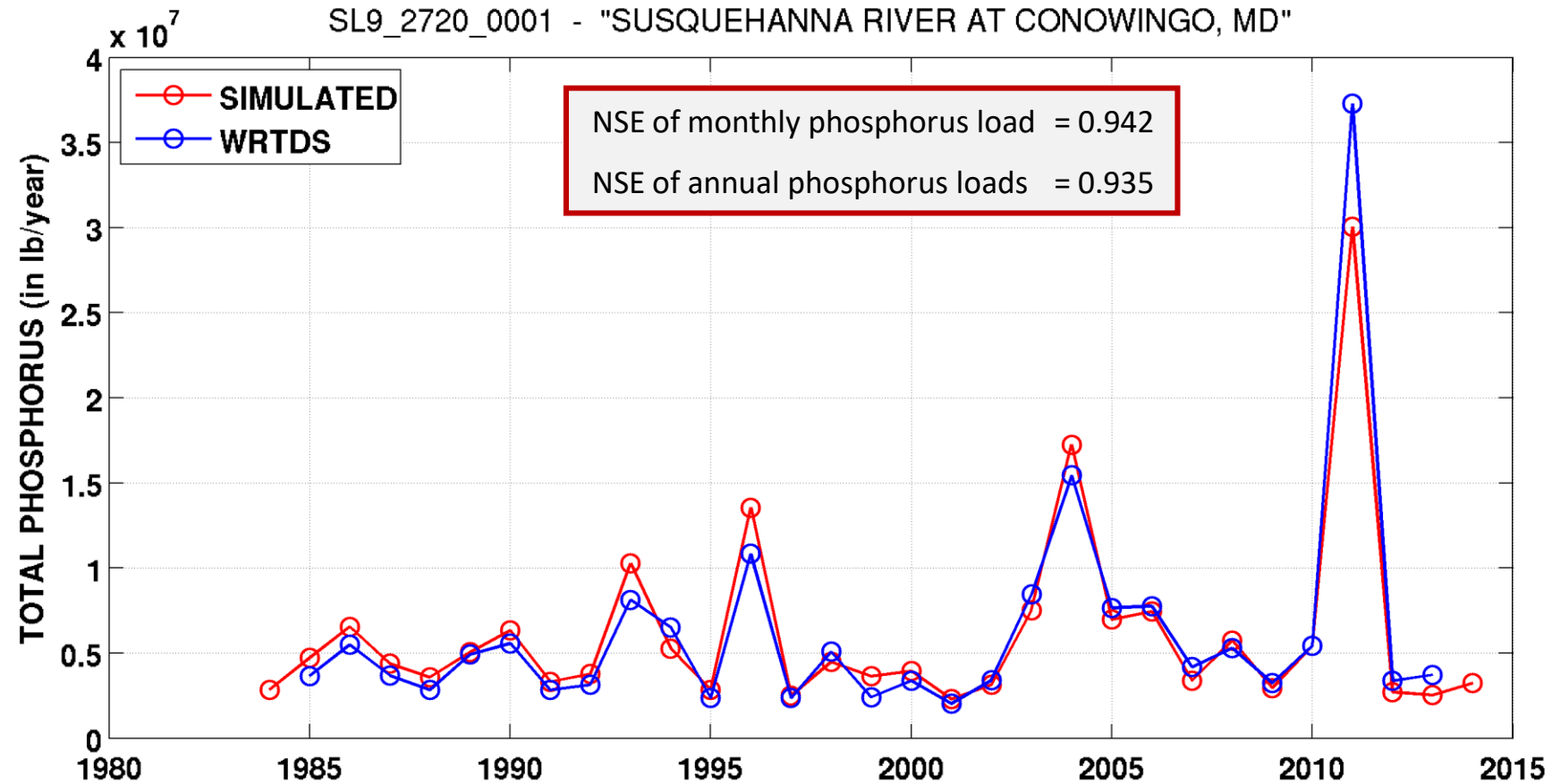
[3] Simulated vs. WRTDS loads



[4] Agreement between the simulated and WRTDS loads at the RIM sites

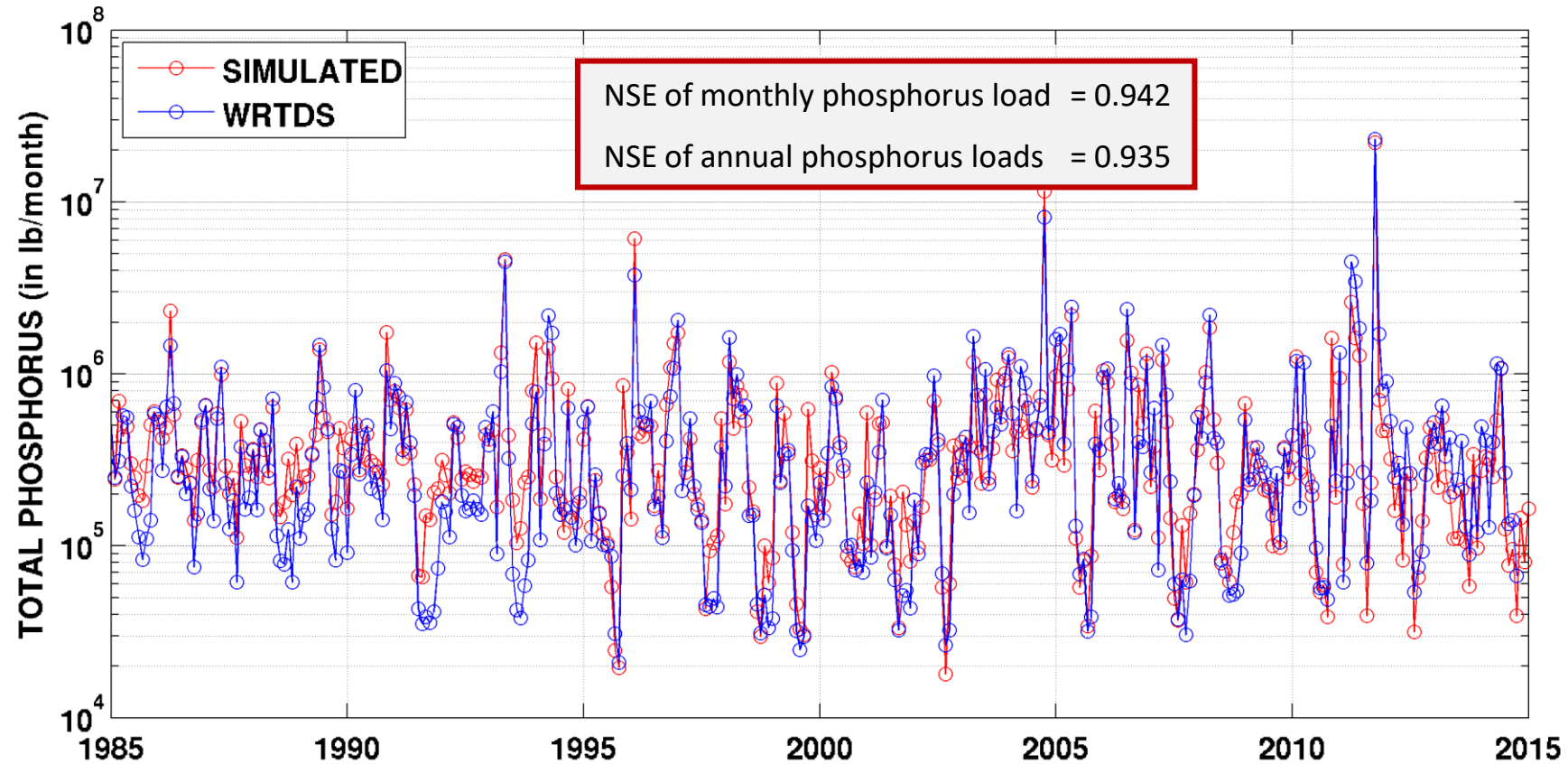
Best Match with Monitoring Data Ever!

Conowingo Phase 6 Simulation Compared to Annual WRTDS Loads



Best Match with Monitoring Data Ever!

Conowingo Phase 6 Simulation Compared to Monthly WRTDS Loads



Day Two Requested Policy Decision

Adoption of the Partnership's Phase 6 suite of modeling tools for applications supporting the development and implementation of each jurisdiction's Phase III WIP and subsequent 2-year milestones through 2025

Phase III WIP Planning Targets Methodology

**Gary Shenk, USGS, CBP Phase 6 Watershed Model
Coordinator**

Review of the Phase III Planning Targets Methodology

- A step by step walk through of the agreed-to Phase III planning targets methodology
- How it works to allocate updated cap loads equitably among the jurisdictions

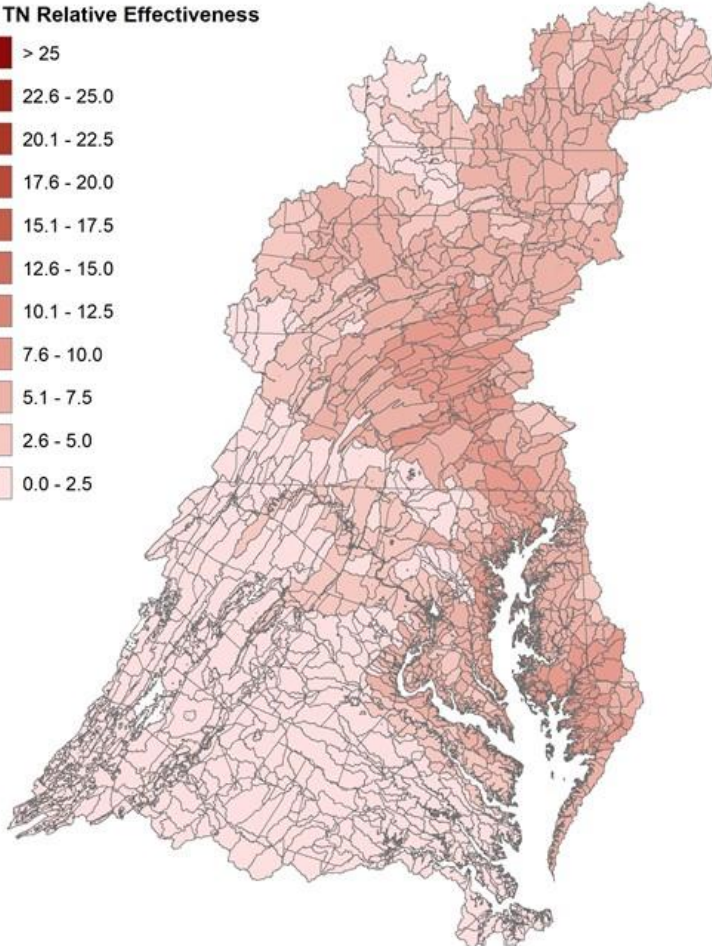
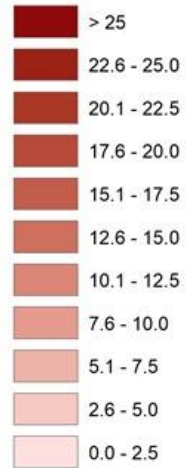
Three Partnership Principals

- Allocated loads must result in achievement of the states' Bay water quality standards
- Major river basins that contribute the most to Bay water quality problems must do the most to resolve those problems
- All tracked and reported reductions in loads are credited toward achieving assigned loads

More Impact, Do More

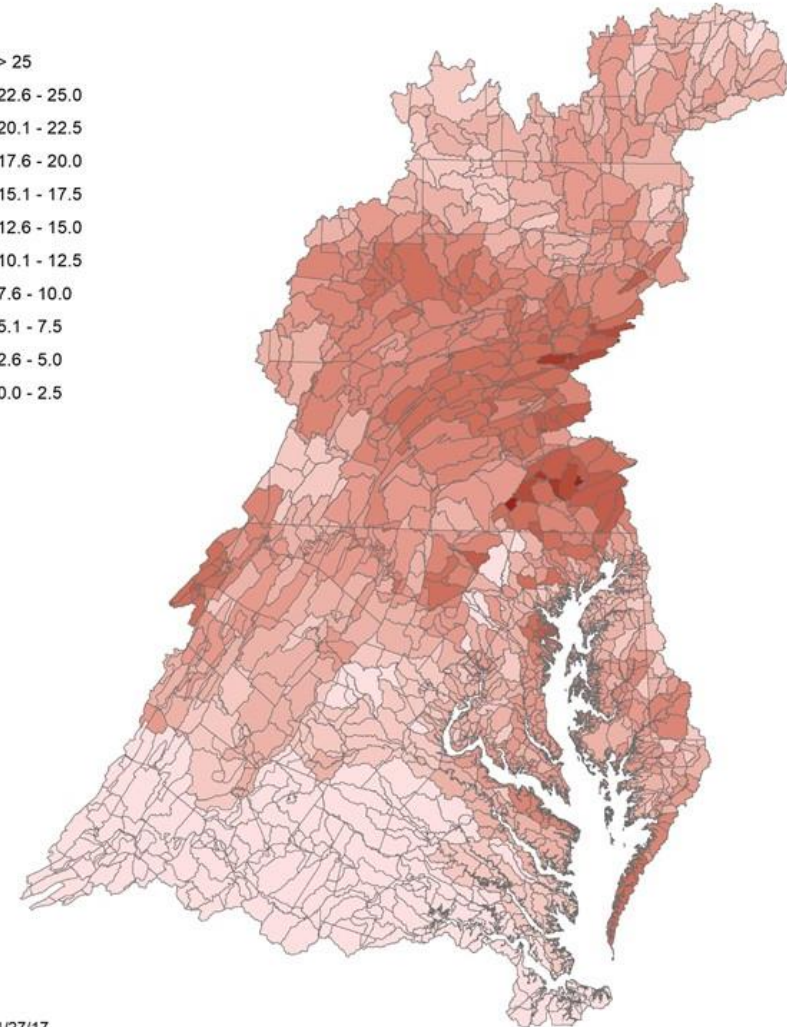
Ph5 Nitrogen

P 5.3 TN Relative Effectiveness



Ph6 Nitrogen

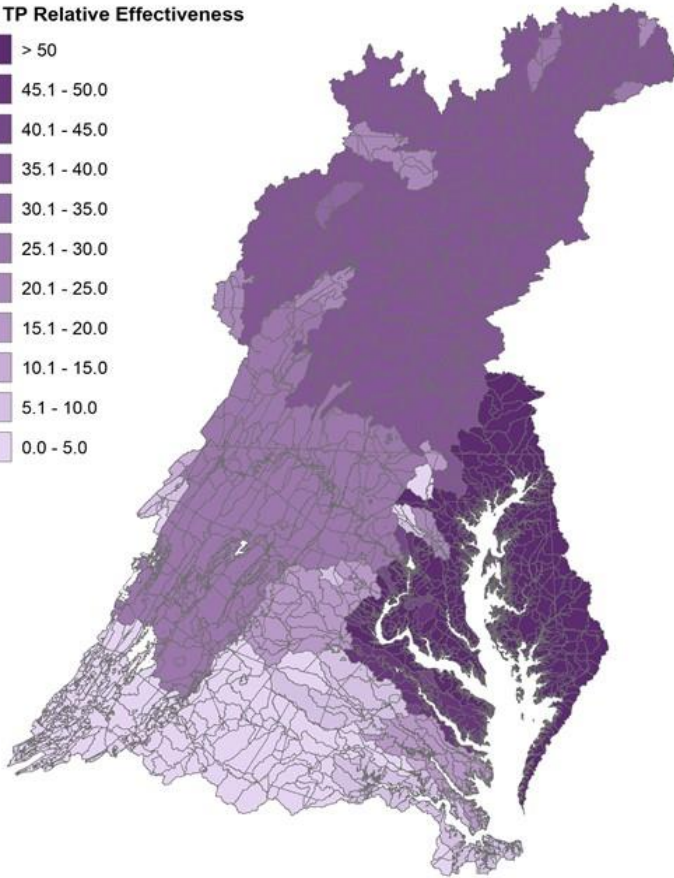
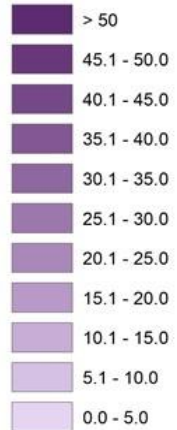
Ph
TN



More Impact, Do More

Ph5 Phosphorus

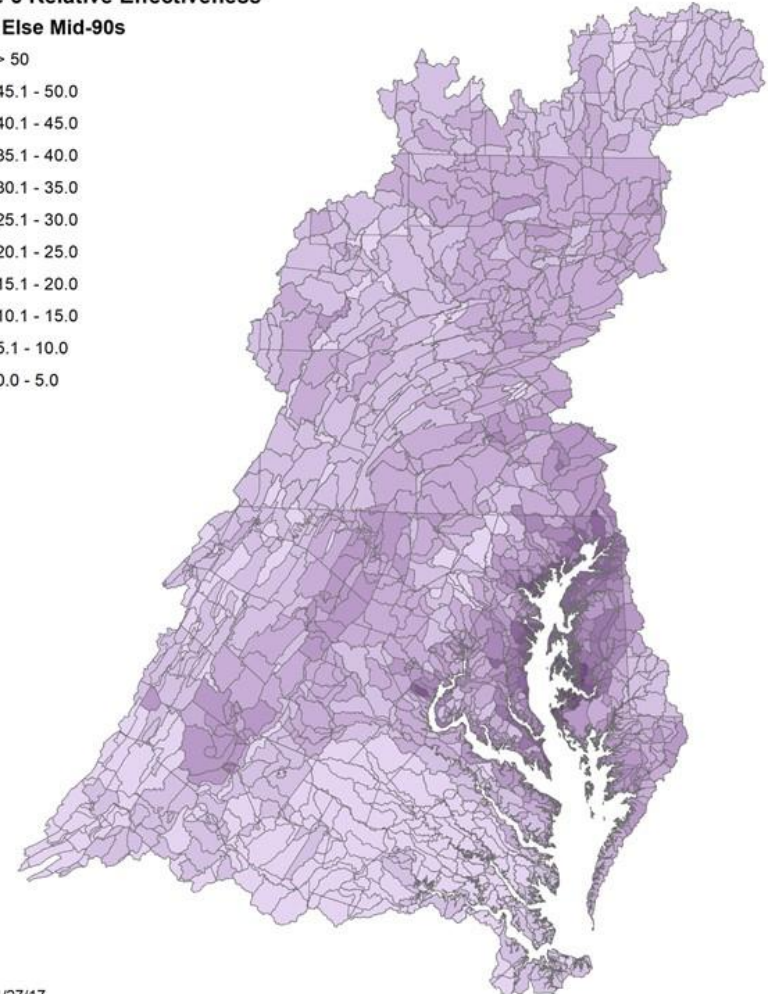
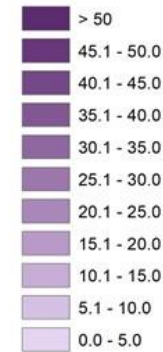
P 5.3 TP Relative Effectiveness



Ph6 Phosphorus

Phase 6 Relative Effectiveness

TP All Else Mid-90s



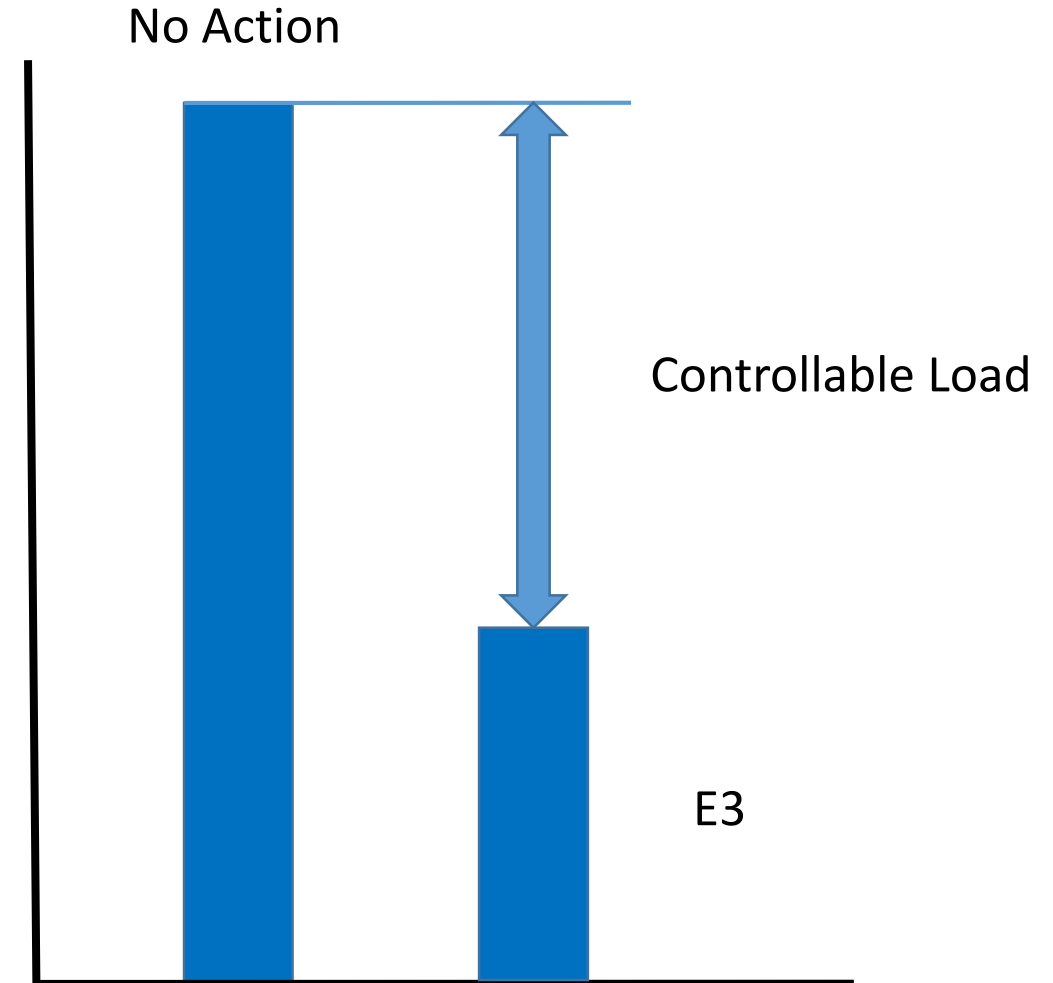
Defining the Controllable Load

No Action:

- Watershed conditions with minimal to no controls on load
- Wastewater at primary treatment

E3 or “Everything by Everyone, Everywhere”:

- Watershed conditions with maximum controls on loads, regardless of cost
- Wastewater at high level of nutrient control
 - 3mg/l TN, 0.1 mg/l TP



Year/Projection	Open Water	Deep Water	Deep Channel
1983	30	11	7
1985	18	11	7
1990	17	11	7
1993	14	10	7
2000	12	8	6
2010	5	4	2
2013	5	4	2
WIP+18%TN	2	2	1
WIP+6%TN	1	1	1
WIP-6%TN	0	0	0
WIP-11%TN	0	0	0

	1985	1990	1993	2000	2010	2013	WIP+18%TN	WIP+6%TN		WIP-6%TN	WIP-11%TN		
No Action	Progress	Progress	Progress	Progress	Progress	Progress	& +12%TP	& +4%TP	WIP2	& -8%TP	& -16%TP	E3	All Forest
404TN	347TN	338TN	337TN	317TN	266TN	253TN	224TN	205TN	195TN	185TN	174TN	133TN	40TN
41.7TP	30.4TP	27.7TP	23.7	21.9TP	16.9TP	15.9TP	14.8TP	14.4	13.7TP	13.0TP	11.9TP	8.6TP	3.9TP

Allowing for Special Cases

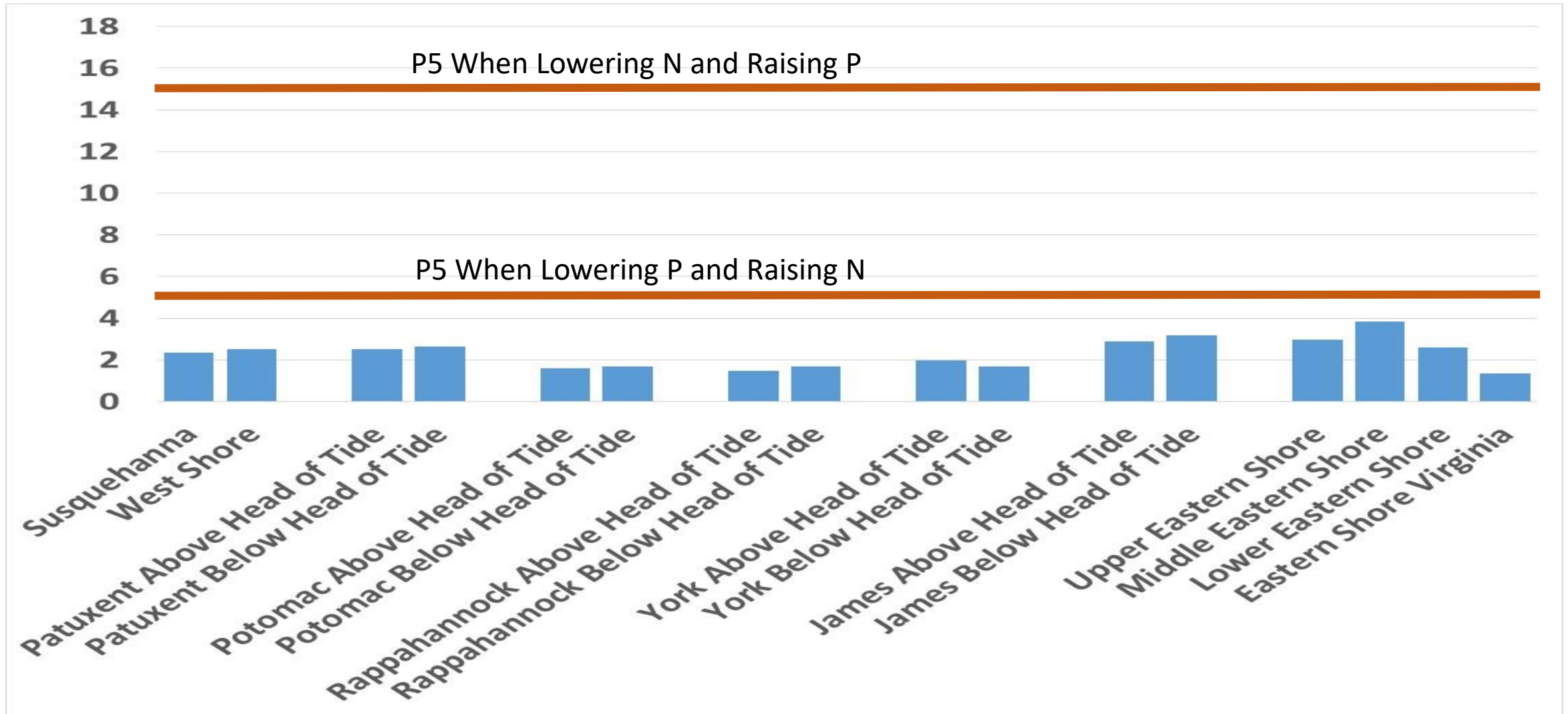
- Previously agreed to consider special cases put forth by jurisdictions
- Consideration of special cases factored into four-month review process
- CBPO will provide support to jurisdictions considering special cases
- Final decisions on allowance of special cases will be made by the PSC in April 2018

Nitrogen and Phosphorus Exchanges

- Science supports exchanges in nitrogen and phosphorus load reductions
- Better science has resulted in changes to our existing exchange ratios
 - Better simulation of observed nutrient limitation in the Bay
 - Inclusion of new P sources from Conowingo and Shoreline makes each pound of P less important

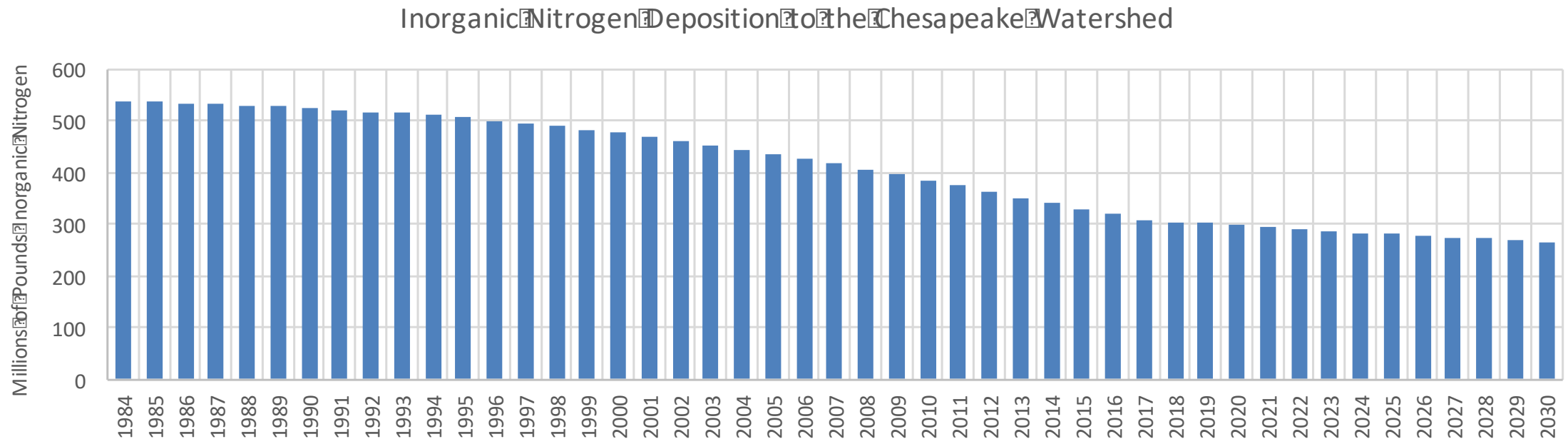
	<u>Phase 5</u>	<u>Phase 6</u>
Nitrogen for Phosphorus:	5	1.34 – 3.84
Phosphorus for Nitrogen:	0.067	0.26 – 0.75

Nitrogen and Phosphorus Exchanges



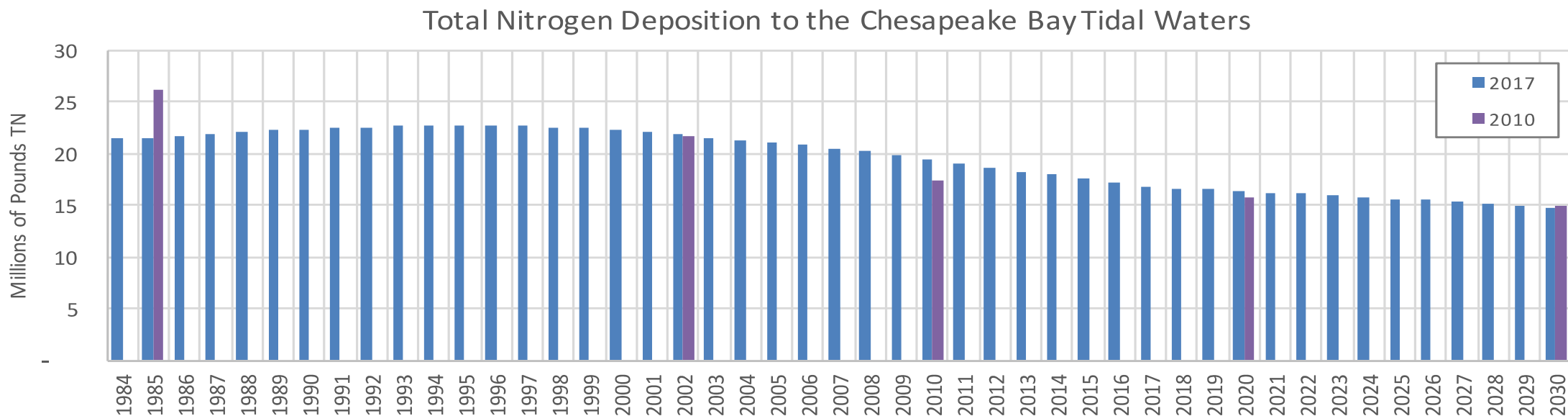
Accounting for Nitrogen Air Deposition to Bay Watershed

- Updated estimated benefits to Bay and watershed from clear air actions.
- From 1985 through 2025, the jurisdictions will receive an estimated 254 million lbs. less nitrogen on their lands and rivers.



Accounting for Nitrogen Air Deposition to Bay Tidal Waters

- From 1985 through 2025, loads will be reduced from 21.5 to 15.6 million lbs.
- By 2030, load drops to 14.9 millions lbs., 0.8 million pounds below EPA's Bay TMDL allocation (15.7 million lbs.)

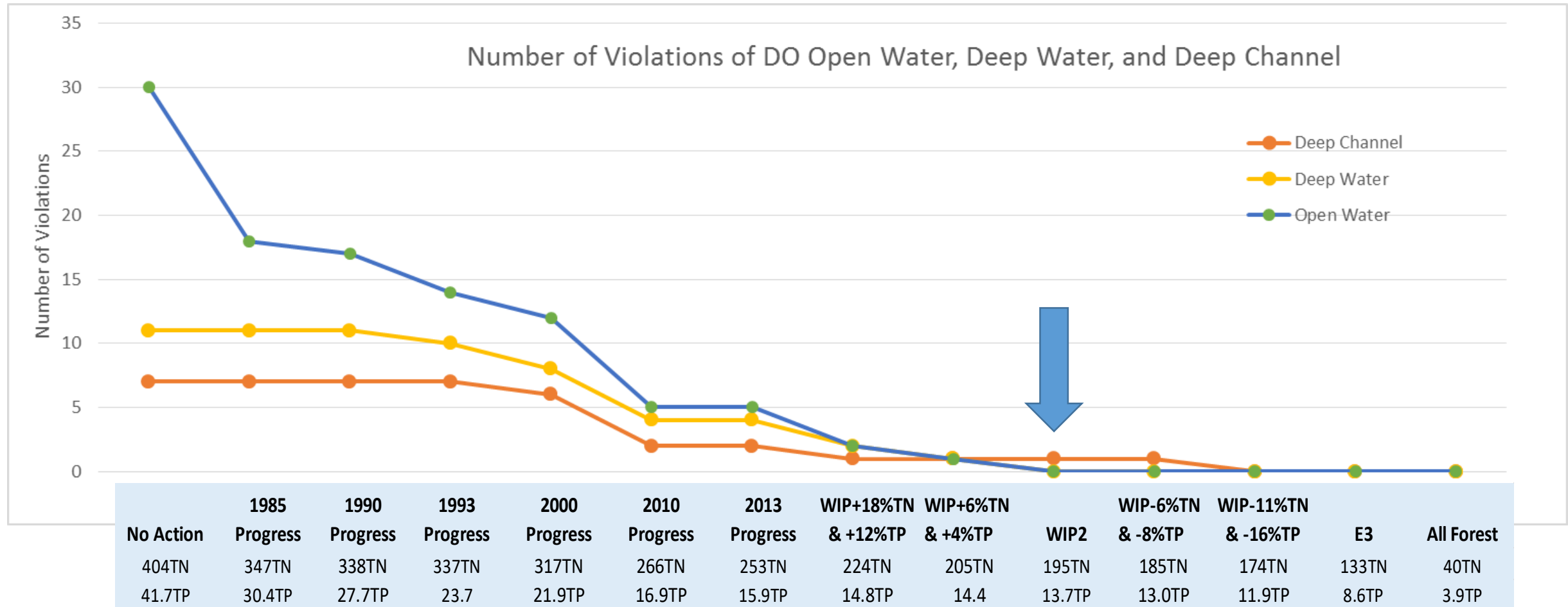


Determining the Bay's Ability to Absorb Pollutants (Assimilative Capacity)

**Dave Montali, WV, CBP Modeling Workgroup Co-Chair
and**

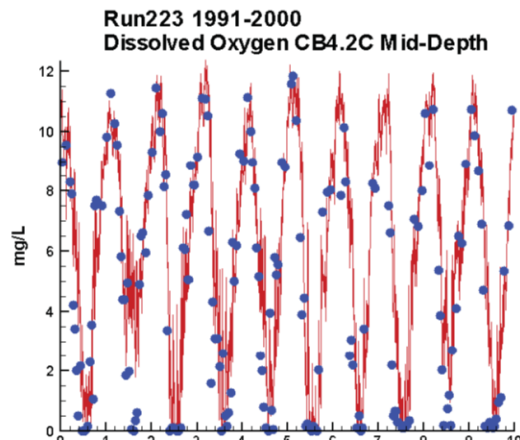
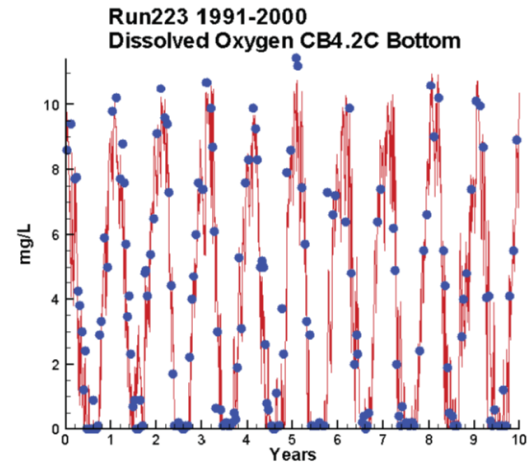
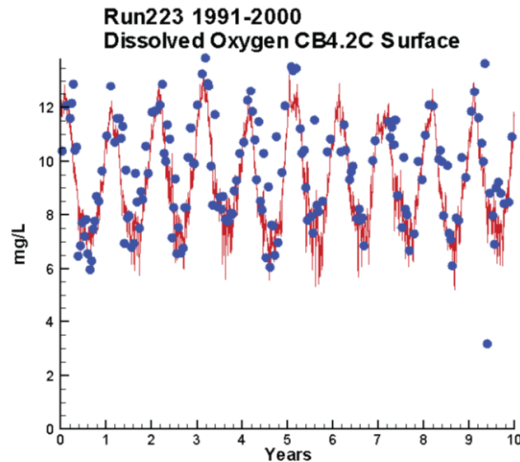
**Rich Batiuk, U.S. EPA CBPO Associate Director for Science,
Analysis and Implementation**

Here's Where We Want to Get to

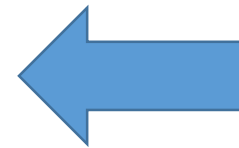


What's Changed and the Implications

An improved Water Quality and Sediment Transport Model (WQSTM) is providing a better simulation of dissolved oxygen in the tidal Bay affording higher confidence in implementation planning for 2025.



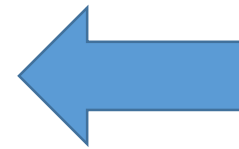
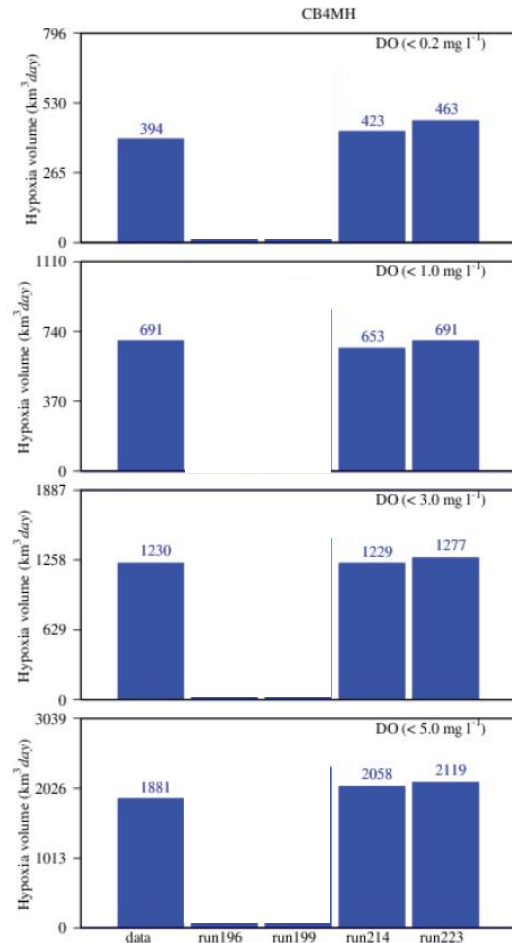
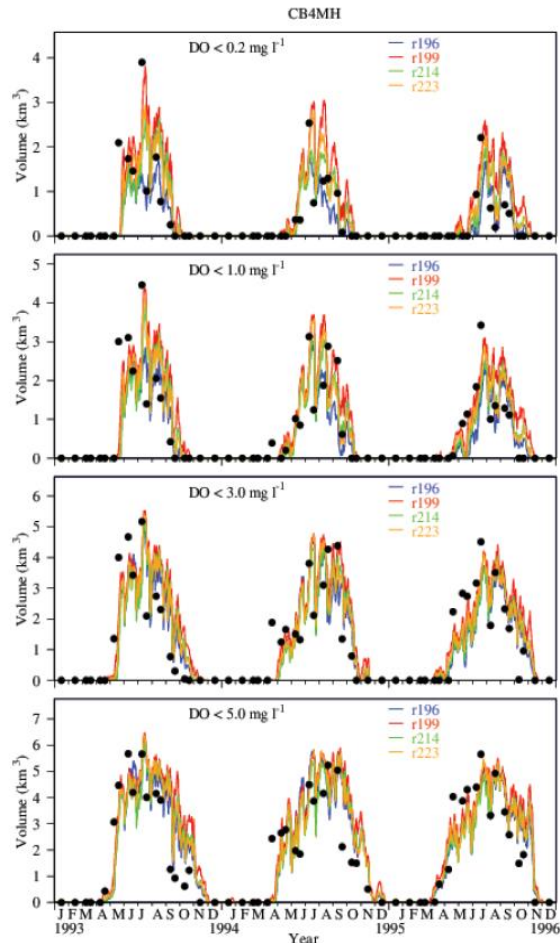
	Mean Difference	Absolute Mean Difference
Top DO	-0.5205	0.9002
Mid DO	1.0038	1.4866
Bot DO	-0.4165	0.9393



Good simulation of DO concentrations of Open Water, Deep Water, and Deep Channel (CB4 shown here)

What's Changed and the Implications

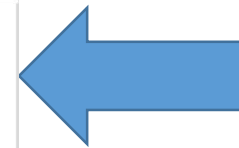
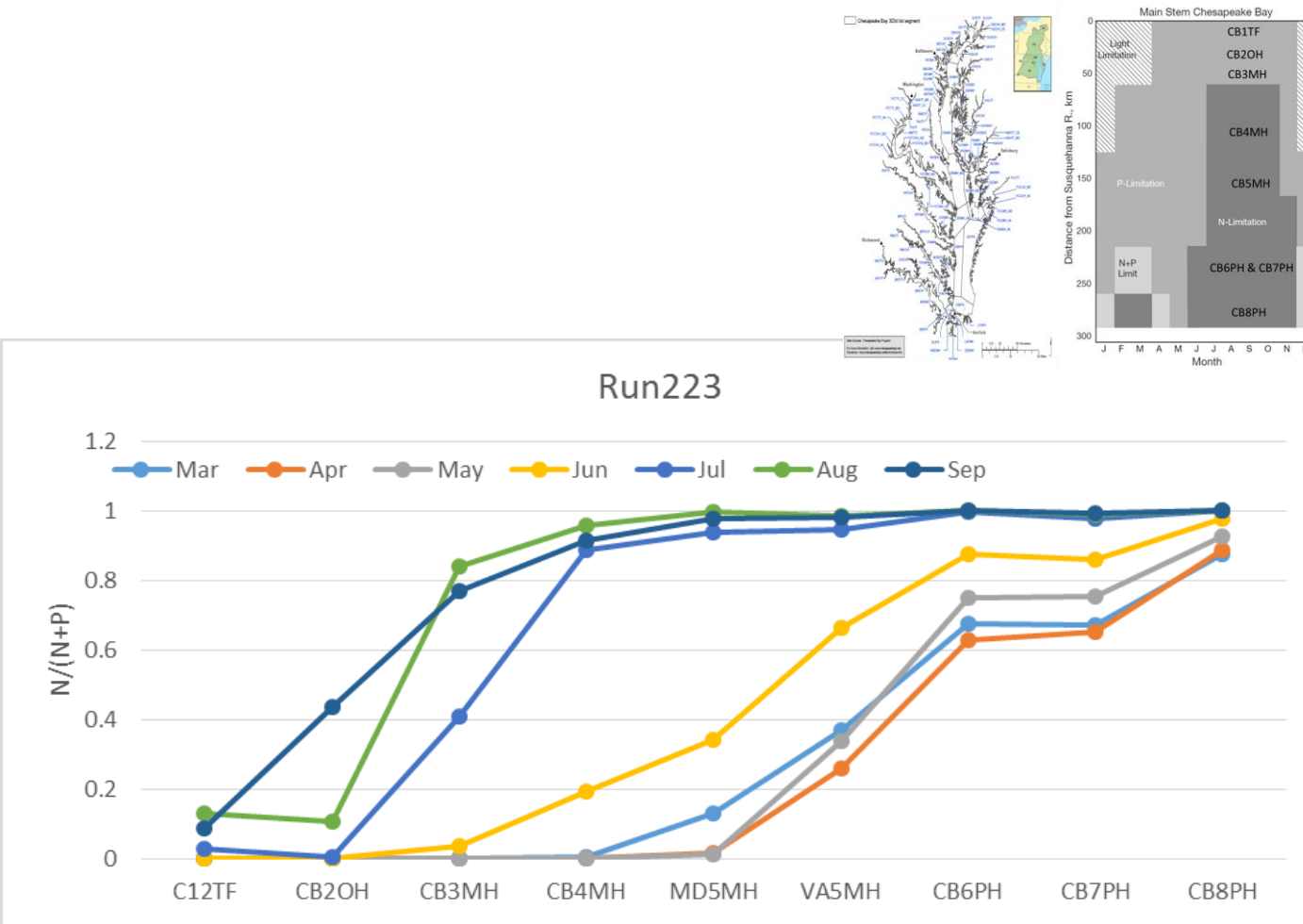
An improved WQSTM is providing a better simulation of dissolved oxygen in the tidal Bay affording higher confidence in implementation planning for 2025.



High fidelity of the model representation of hypoxia to observations (CB4 shown here)

What's Changed and the Implications

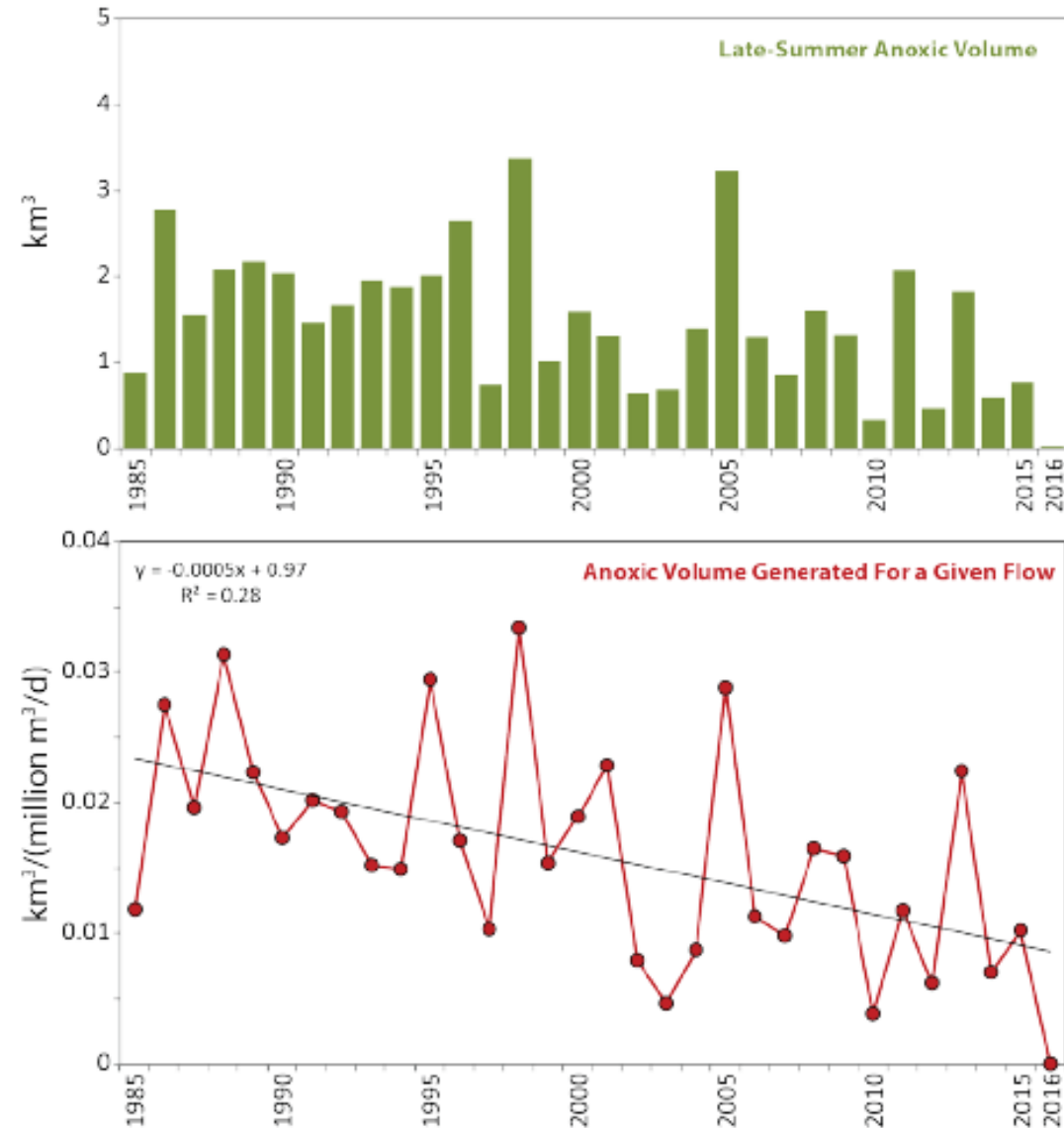
An improved WQSTM is providing a better simulation of dissolved oxygen in the tidal Bay affording higher confidence in implementation planning for 2025.



Simulated nutrient limitation throughout the Bay is better than in any previous model

What's Changed and the Implications

The Chesapeake Bay's summertime dead zone is decreasing in size!



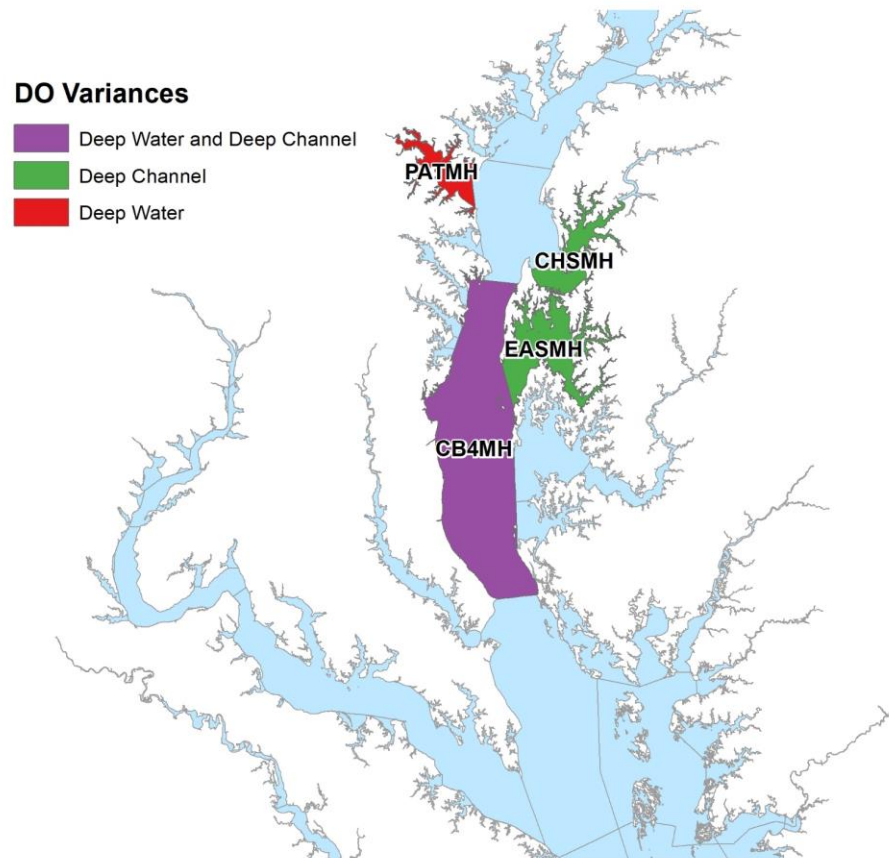
What Hasn't Changed

Delaware, District of Columbia, Maryland and Virginia's Chesapeake Bay water quality standards regulations have not changed since 2012

- Five tidal habitat-based designated uses
- Dissolved oxygen, SAV, water clarity and chlorophyll *a* criteria to protect those uses
- Fully consistent criteria attainment assessment procedures
- How we use model output to assess criteria attainment under model-simulated load conditions

Maryland's Restoration Variances

Maryland's water quality standards regulations still contain restoration variances agreed to by the Partners/approved by EPA in 2010 and updated in 2012



Patapsco River Deep-water 7%

Lower Chester River Deep-channel 16%

Eastern Bay Deep-channel 2%

Middle Central Chesapeake Bay

- Deep-water 7%
- Deep-channel 2%

Segments Attaining Oxygen Standards: Open-Water Use

Segments NOT in Attainment

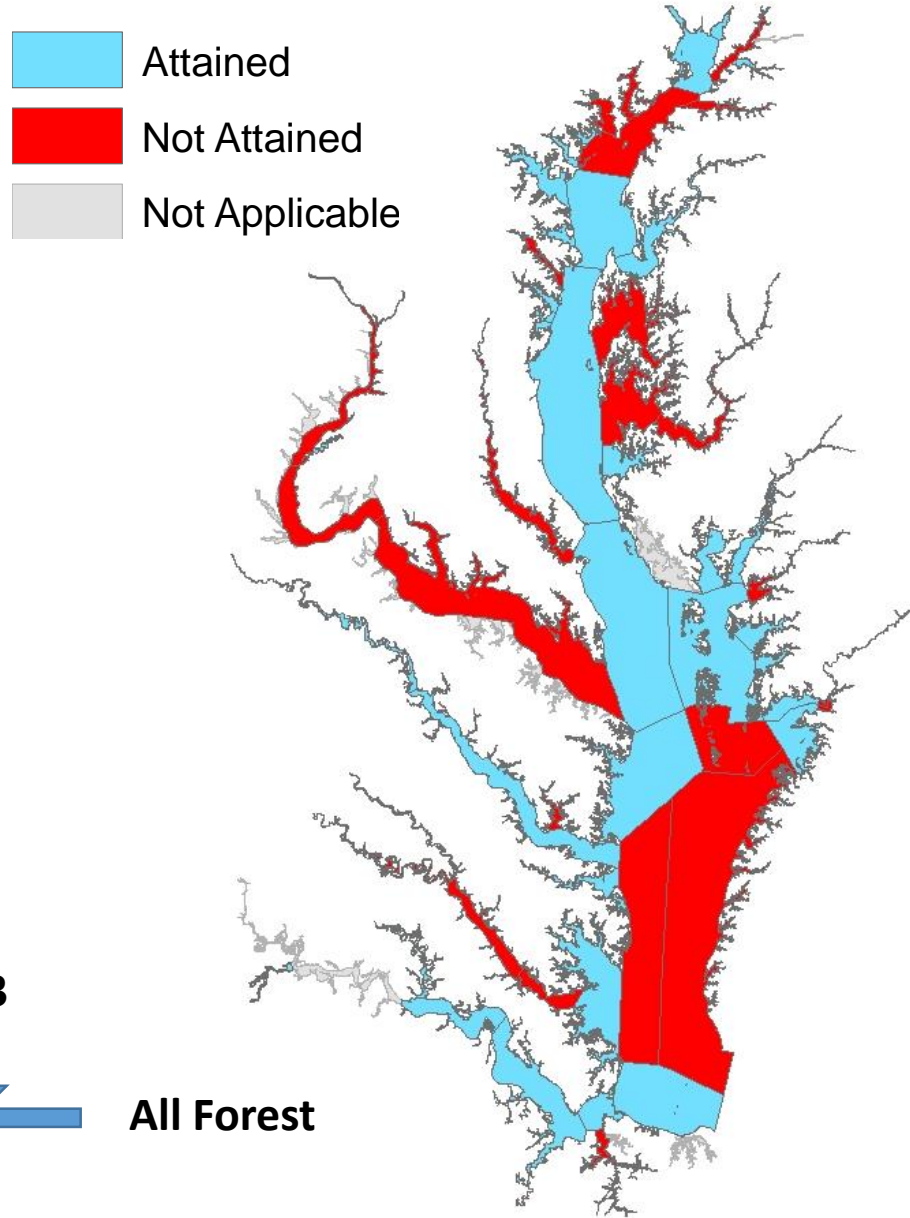
- CB2OH
- CB6PH
- CB7PH
- BSHOH
- SEVMH
- PAXOH
- PAXMH
- POTTF_DC
- POTTF_MD
- ANATF_DC
- ANATF_MD
- PISTF
- POTOH1_MD
- POTOMH_MD
- PMKOH
- YRKMH
- YRKPH
- ELIPH
- C&Dcanal
- ELKOH
- SASOH
- EASMH
- CHOTF
- CHOOH
- CHOMH2
- CHOMH1
- POCTF
- POCOH_MD
- POCOH_VA
- TANMH_VA

2010 No
Action

E3

All Forest

404 TN
41.7 TP

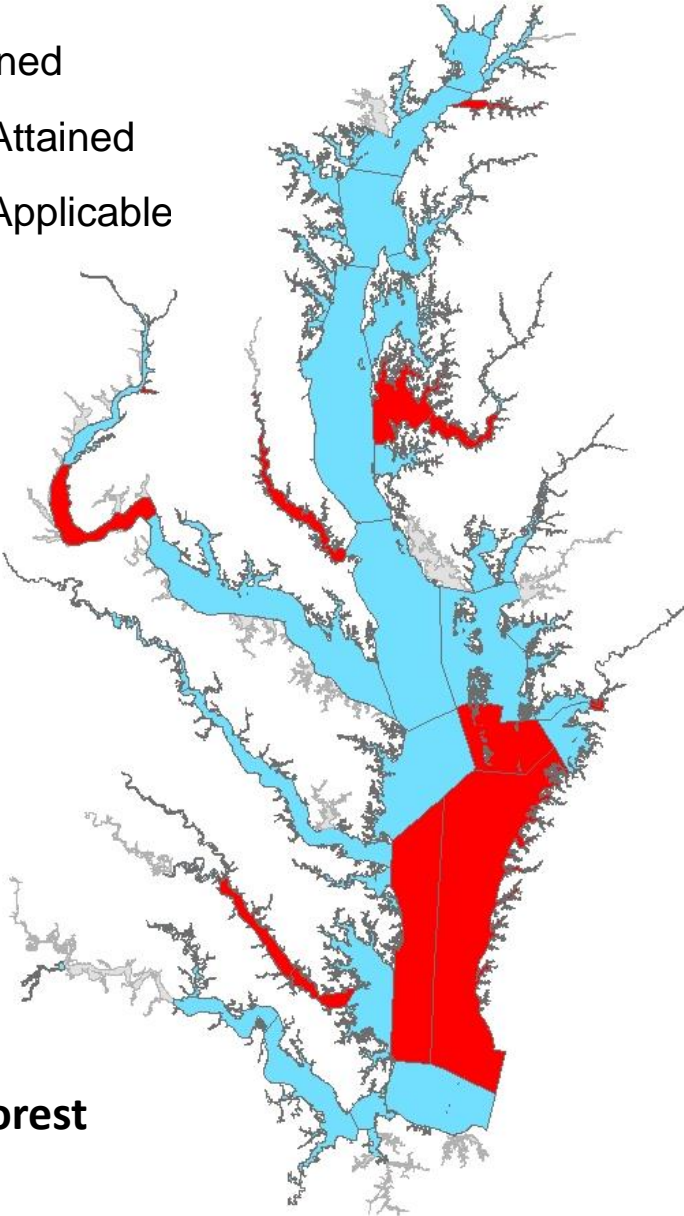


2010 No Action

Segments Attaining Oxygen Standards: Open-Water Use

Segments NOT in Attainment

- CB6PH
- CB7PH
- PAXOH
- PAXMH
- ANATF_DC
- ANATF_MD
- PISTF
- POTOH1_MD
- YRKMH
- YRKPH
- C&Dcanal
- SASOH
- CHOMH2
- CHOMH1
- POCTF
- POCOH_MD
- POCOH_VA
- TANMH_VA

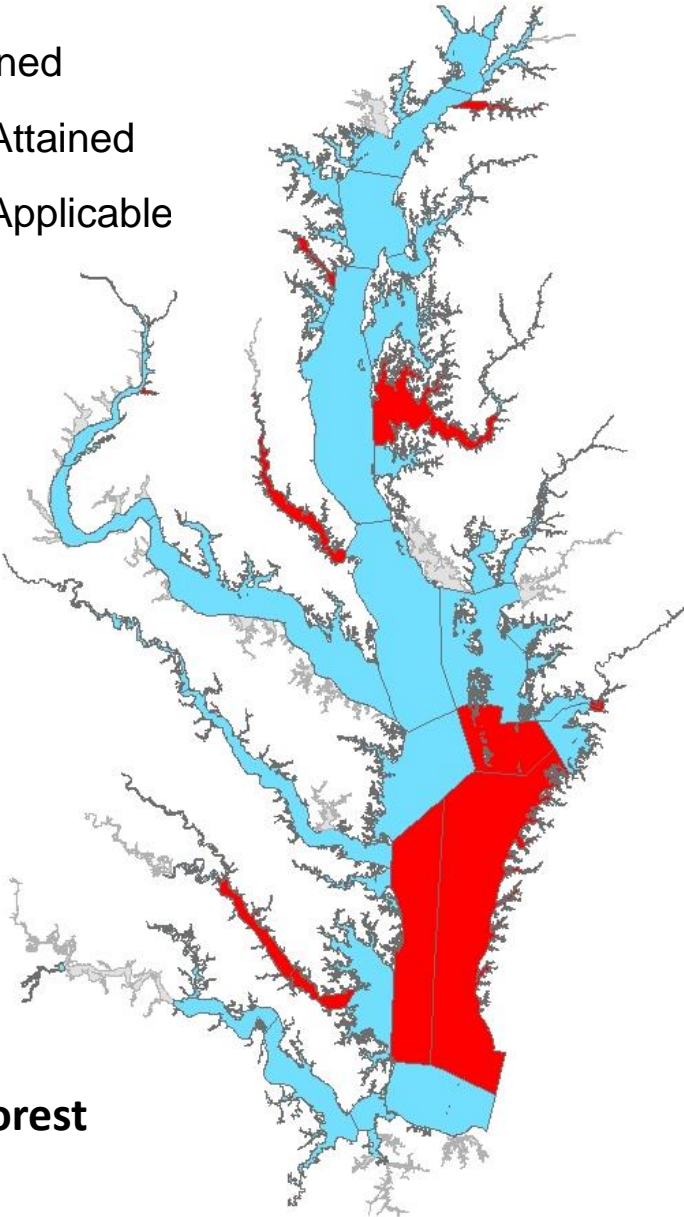


1985 Progress

Segments Attaining Oxygen Standards: Open-Water Use

Segments NOT in Attainment

- CB6PH
- CB7PH
- PAXOH
- PAXMH
- ANATF_DC
- ANATF_MD
- PISTF
- POTOH1_MD
- YRKMH
- YRKPH
- C&Dcanal
- SASOH
- CHOMH2
- CHOMH1
- POCTF
- POCOH_MD
- POCOH_VA
- TANMH_VA

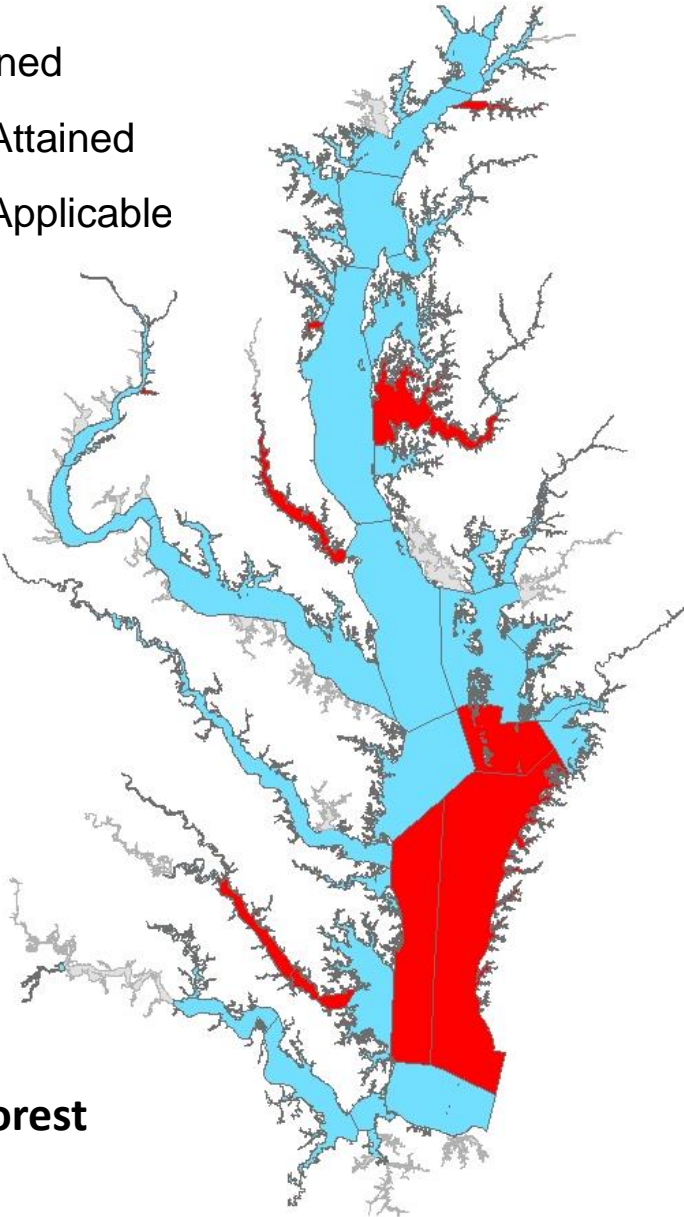


1990 Progress

Segments Attaining Oxygen Standards: Open-Water Use

Segments NOT in Attainment

- CB6PH
- CB7PH
- WSTMH
- PAXOH
- PAXMH
- ANATF_DC
- ANATF_MD
- PISTF
- YRKMh
- YRKPH
- SASOH
- CHOMH2
- CHOMH1
- TANMH_VA

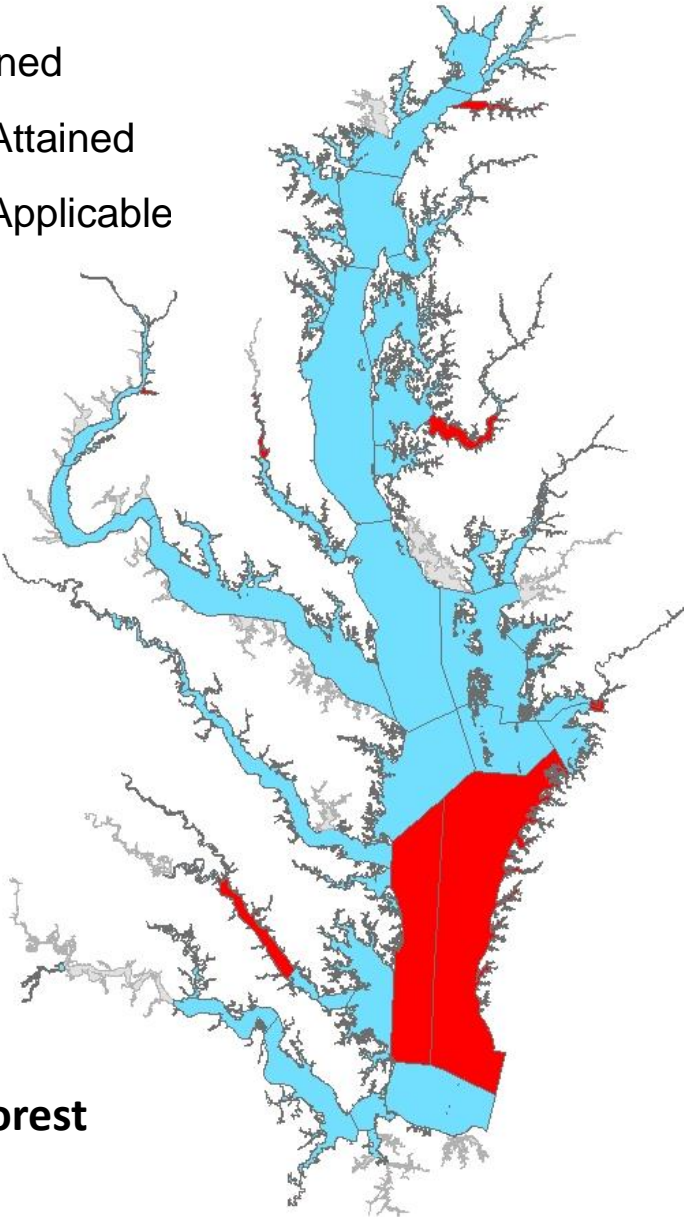


1993 Progress

Segments Attaining Oxygen Standards: Open-Water Use

Segments NOT in Attainment

- CB6PH
- CB7PH
- PAXOH
- ANATF_DC
- ANATF_MD
- PISTF
- YRKMH
- SASOH
- CHOMH2
- POCTF
- POCOH_MD
- POCOH_VA

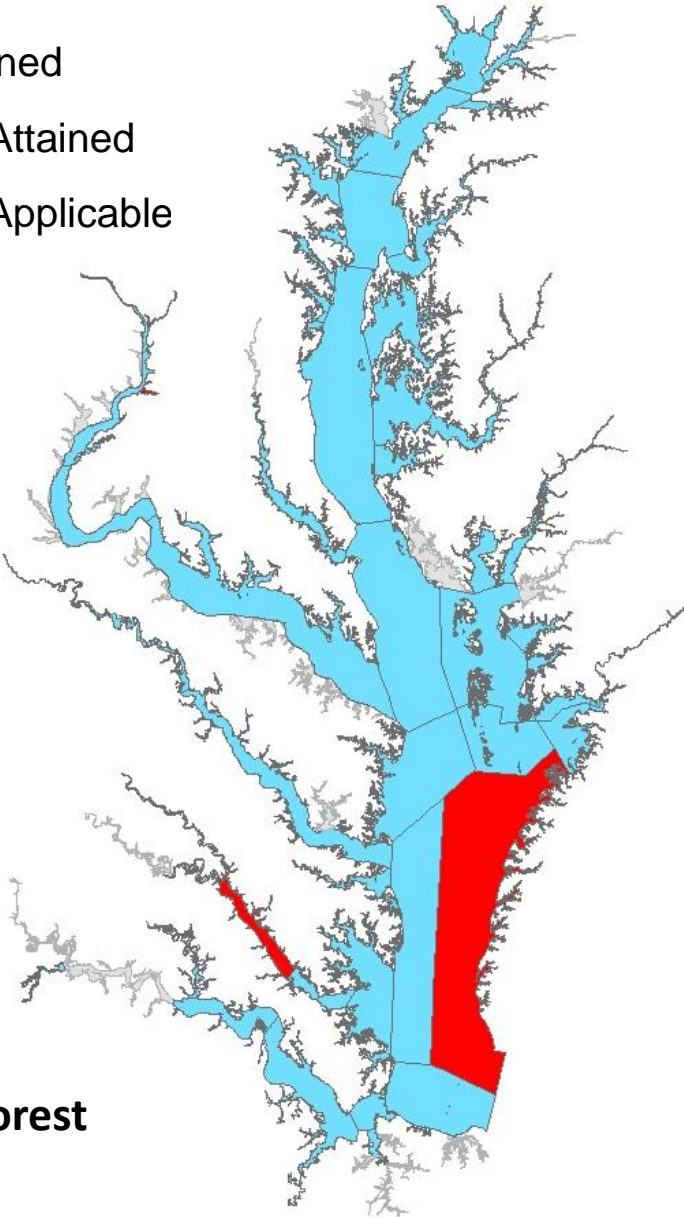


2000 Progress

Segments Attaining Oxygen Standards: Open-Water Use

Segments NOT in Attainment

- CB6PH
- CB7PH
- PAXOH
- ANATF_DC
- ANATF_MD
- PISTF
- YRKMH
- SASOH
- CHOMH2
- POCTF
- POCOH_MD
- POCOH_VA

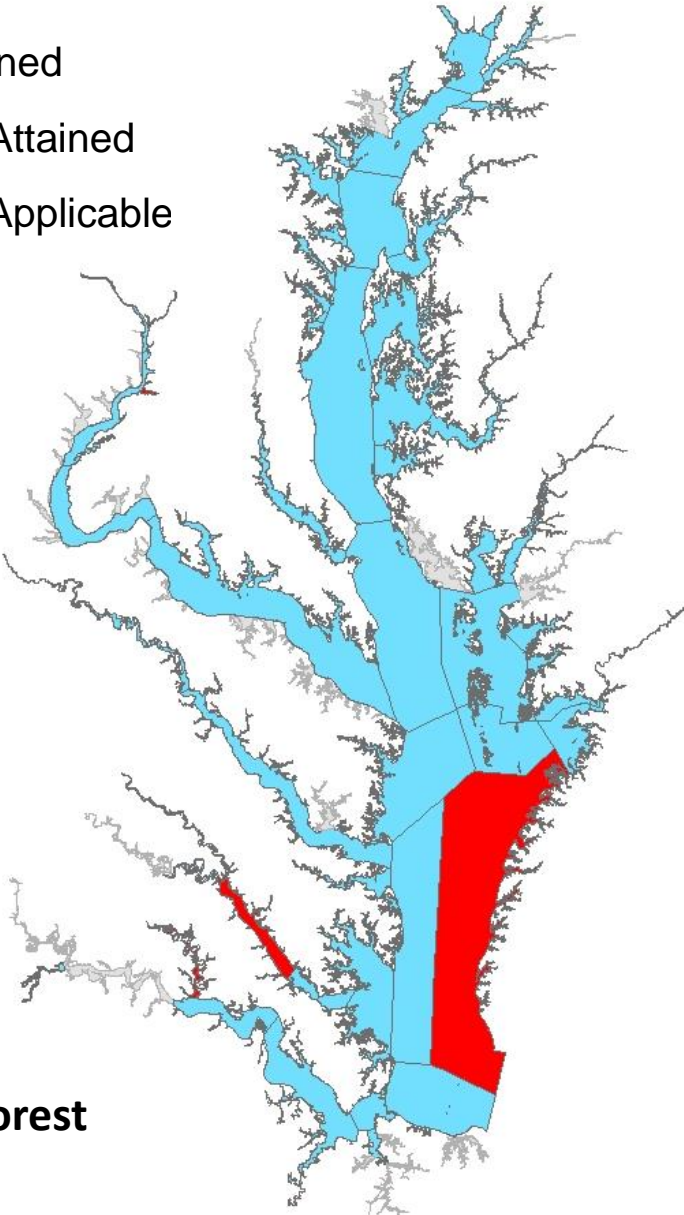


2010 Progress

Segments Attaining Oxygen Standards: Open-Water Use

Segments NOT in Attainment

- CB7PH
- ANATF_DC
- ANATF_MD
- PISTF
- YRKMH
- CHKOH

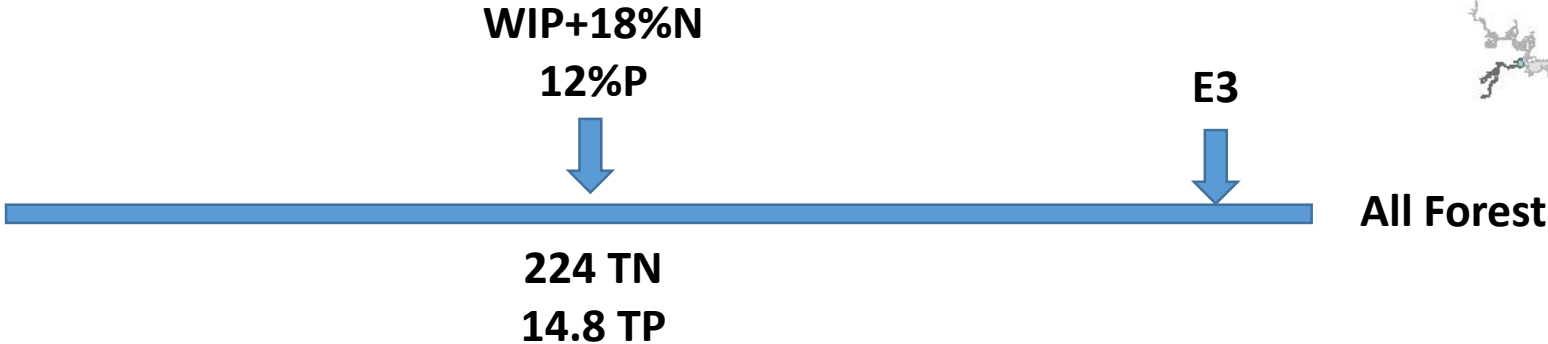
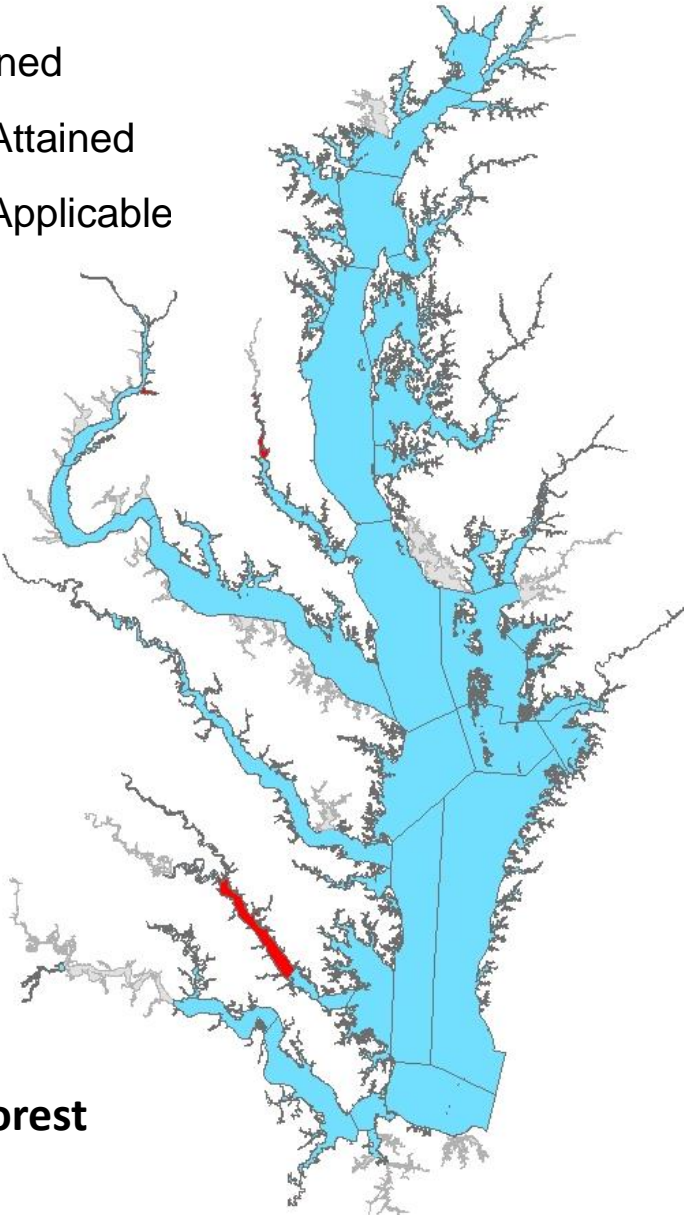


2013 Progress

Segments Attaining Oxygen Standards: Open-Water Use

Segments NOT in Attainment

- PAXOH
- ANATF_DC
- ANATF_MD
- PISTF
- YRKMH

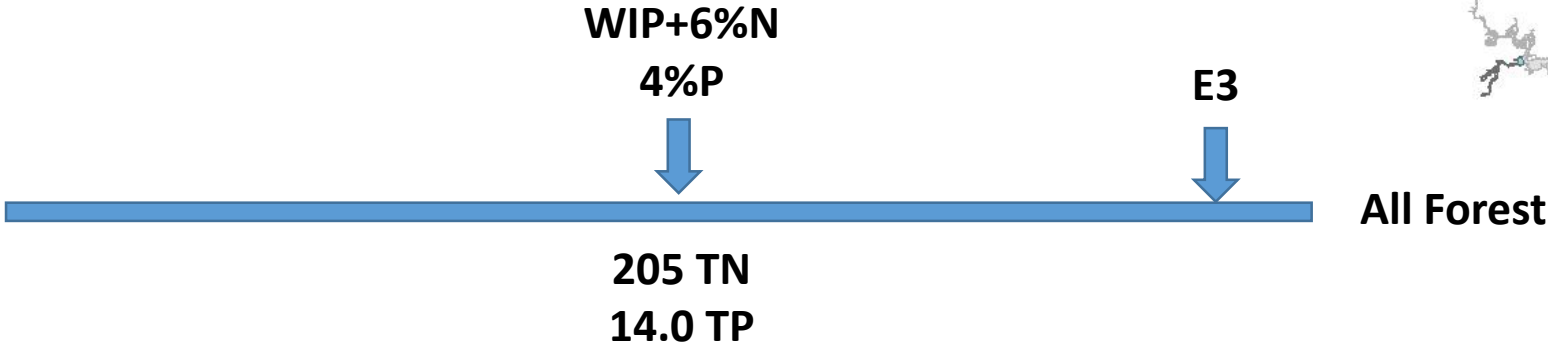
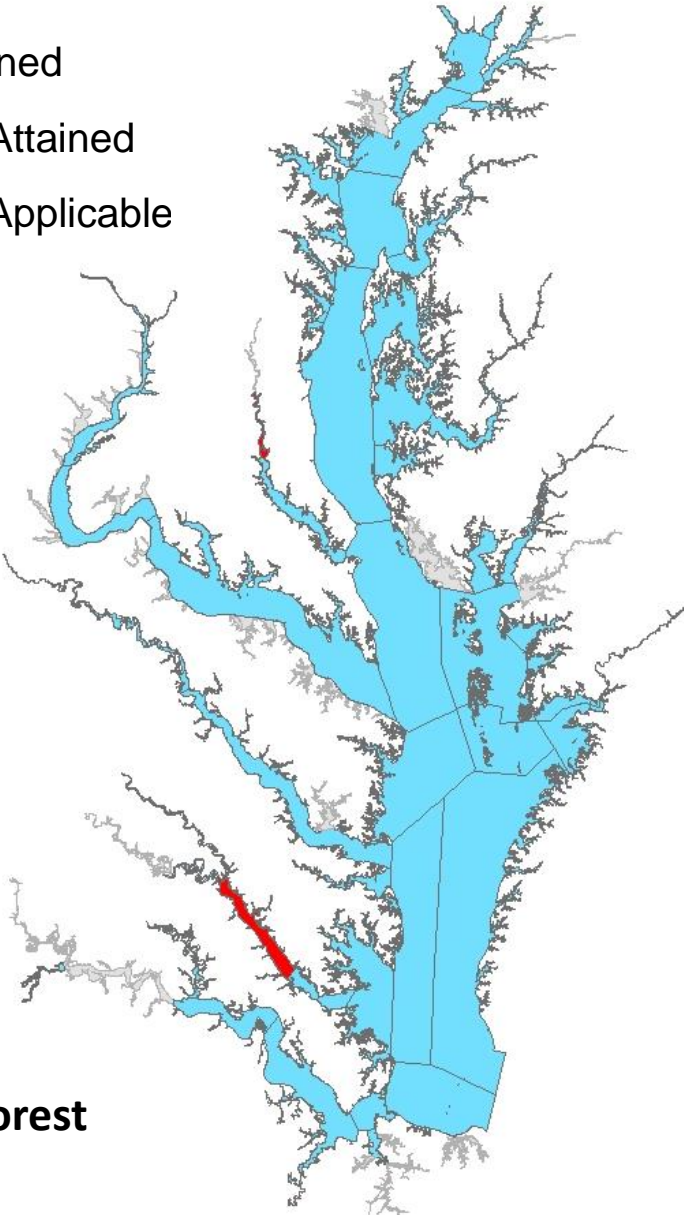


WIP+18% N12%P

Segments Attaining Oxygen Standards: Open-Water Use

Segments NOT in Attainment

- ANATF_MD
- YRKMH

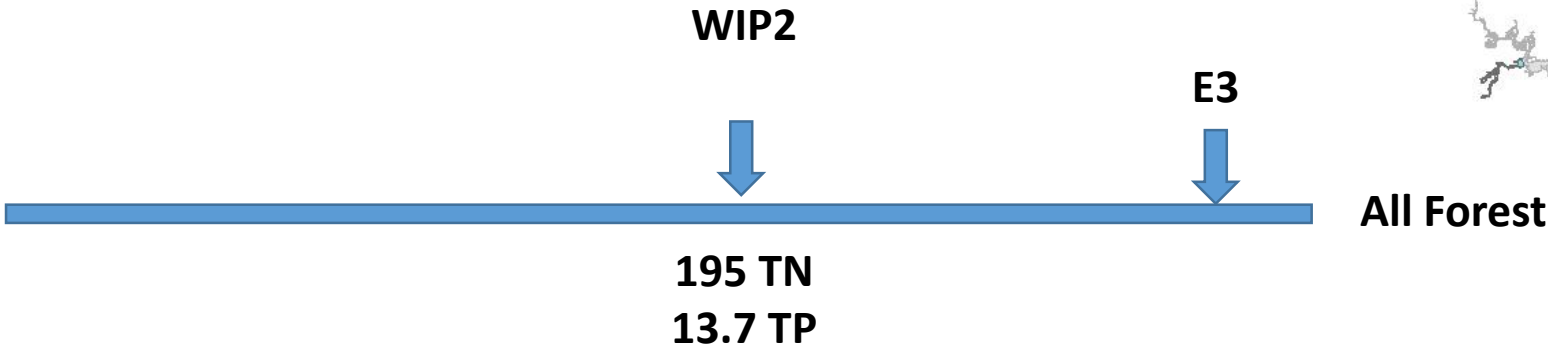
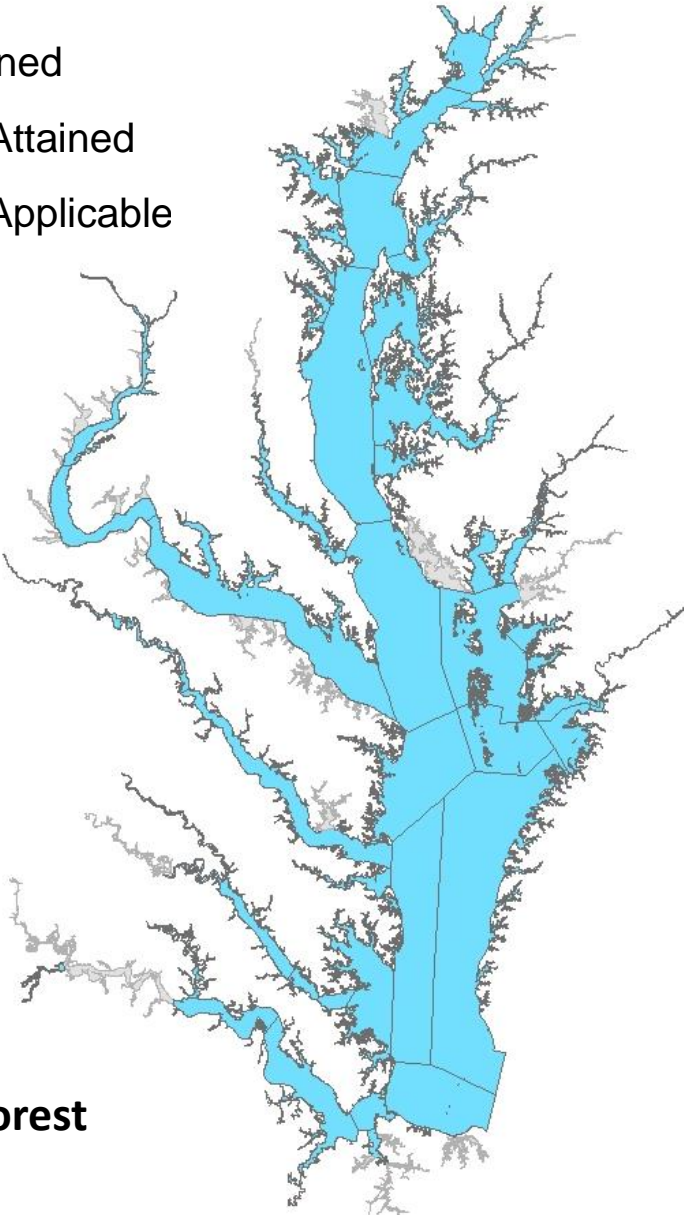


WIP+6% N4%P

Segments Attaining Oxygen Standards: Open-Water Use

Segments NOT in Attainment

- Attained
- Not Attained
- Not Applicable

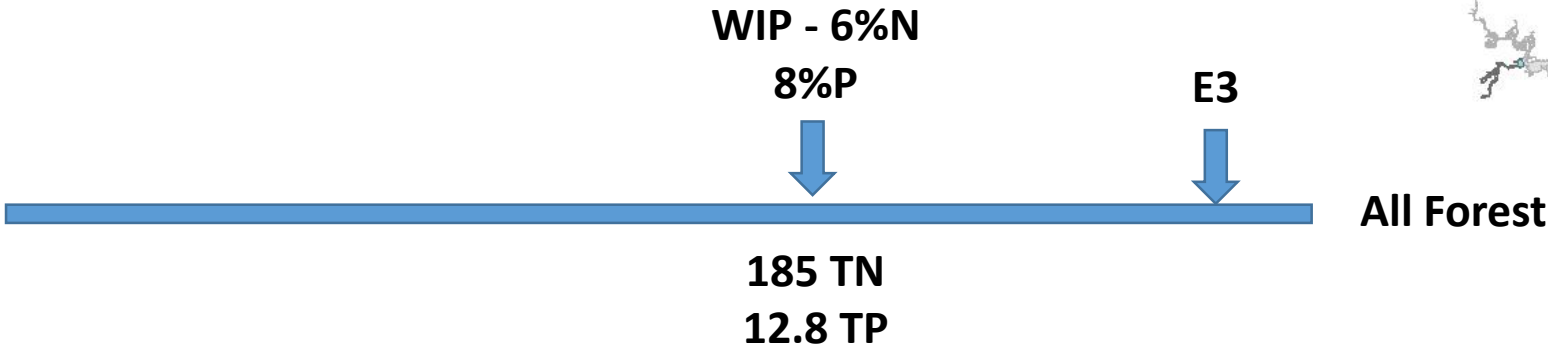
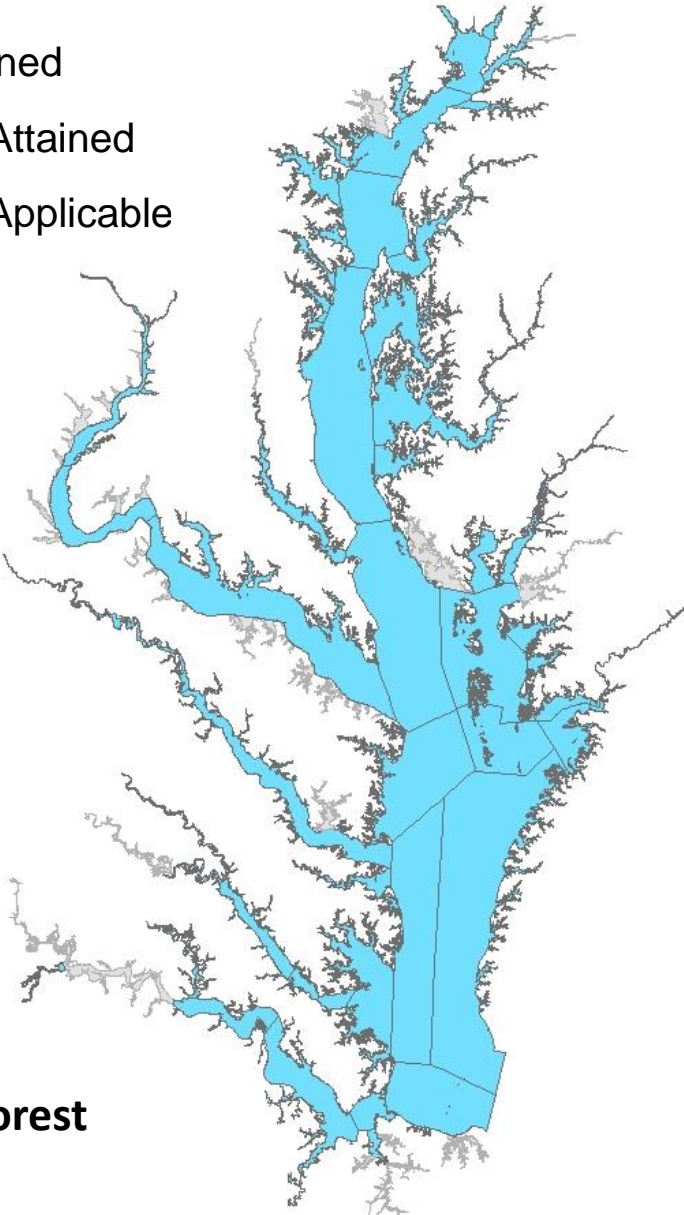


WIP2

Segments Attaining Oxygen Standards: Open-Water Use

Segments NOT in Attainment

- Attained
- Not Attained
- Not Applicable

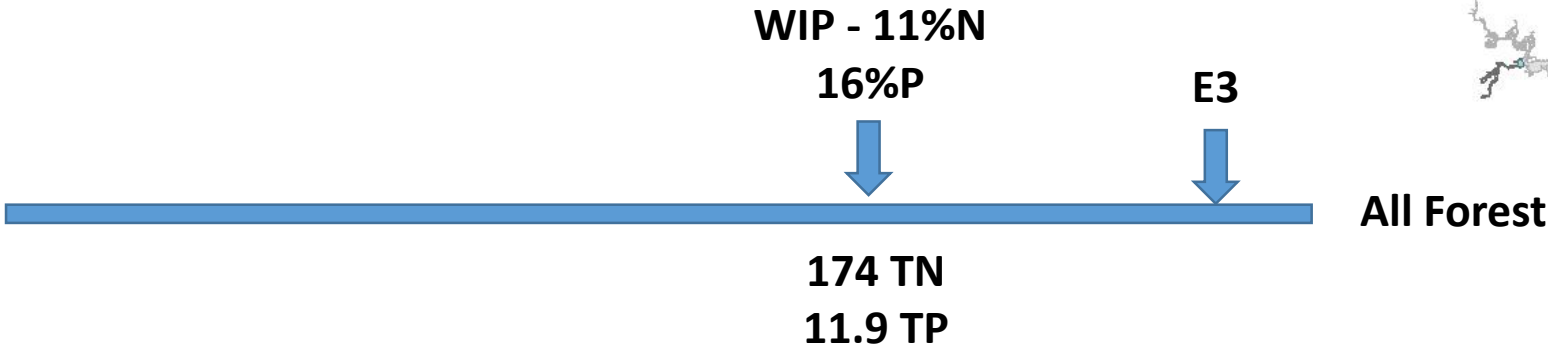
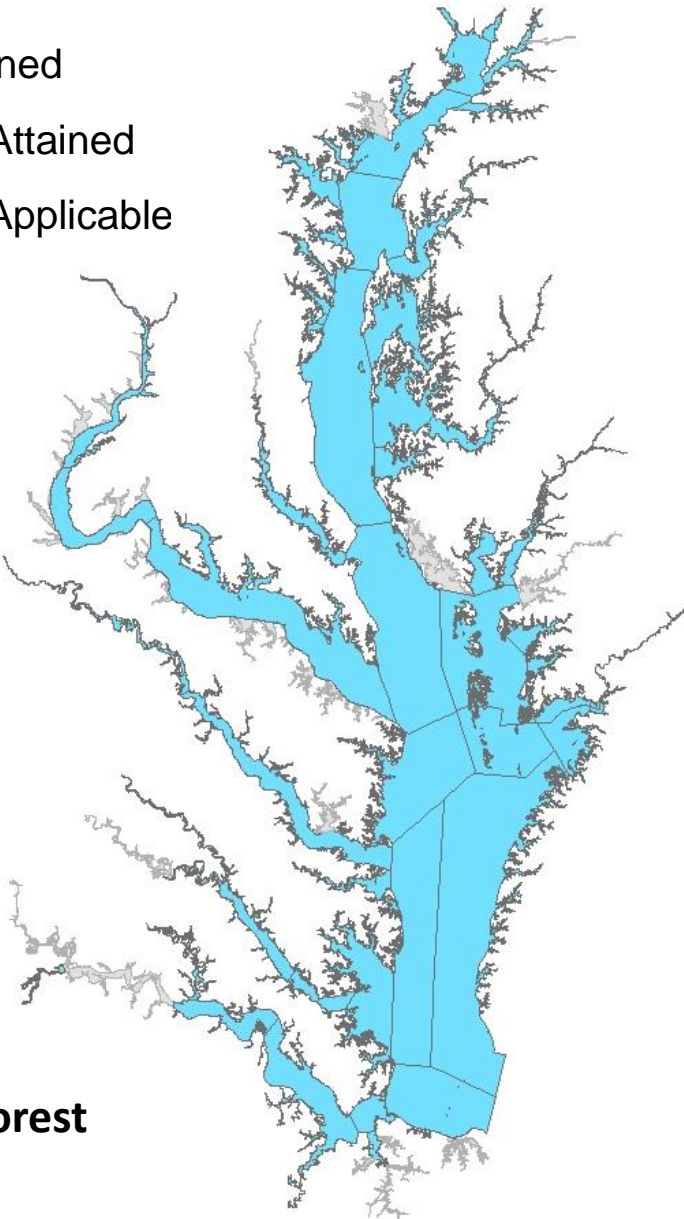


WIP -6%N 8%P

Segments Attaining Oxygen Standards: Open-Water Use

Segments NOT in Attainment

- Attained
- Not Attained
- Not Applicable

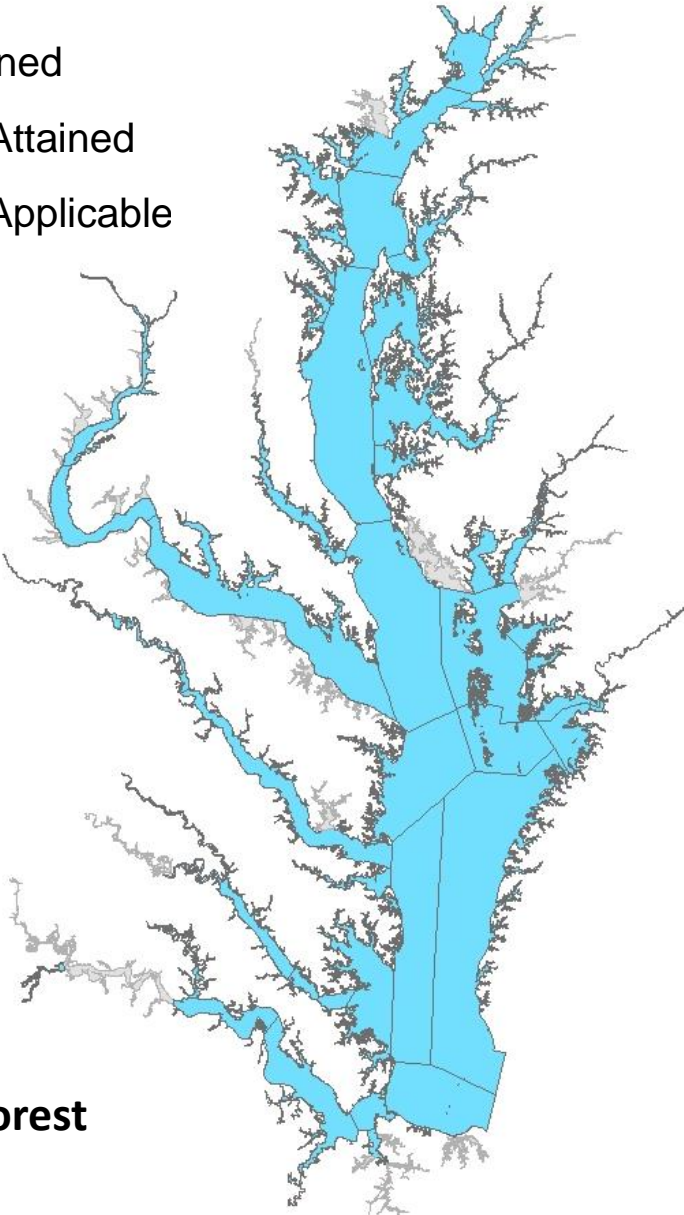


WIP -11%N 16%P

Segments Attaining Oxygen Standards: Open-Water Use

Segments NOT in Attainment

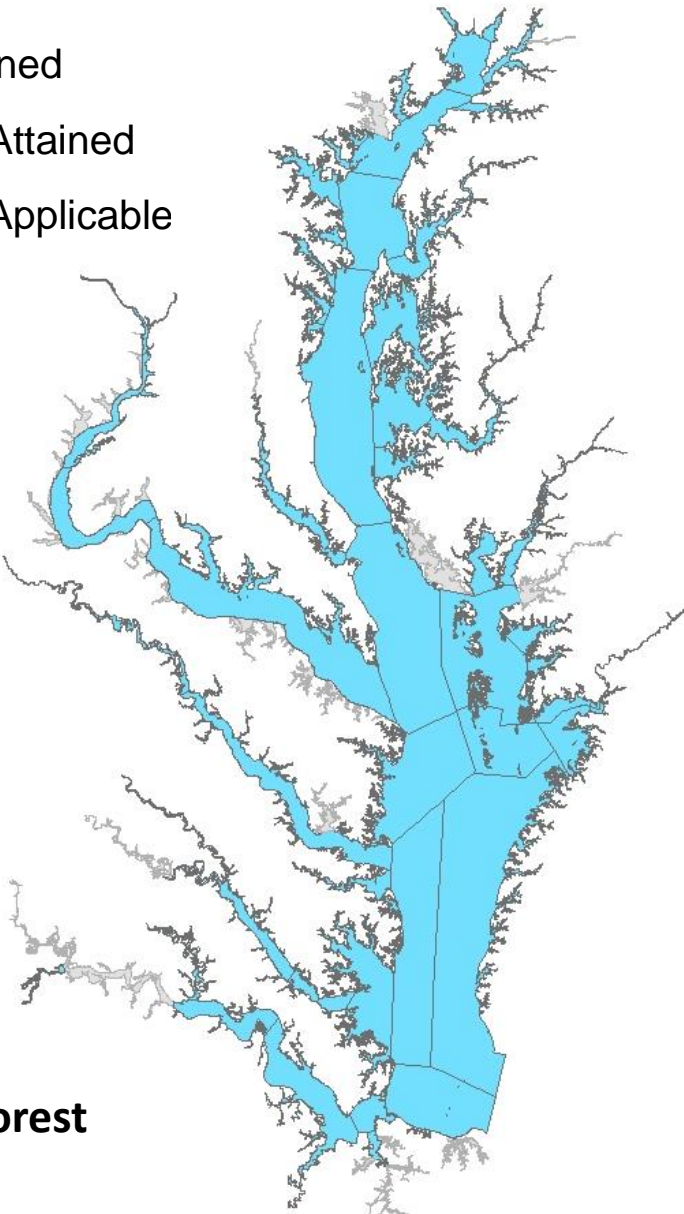
- Attained
- Not Attained
- Not Applicable



Segments Attaining Oxygen Standards: Open-Water Use

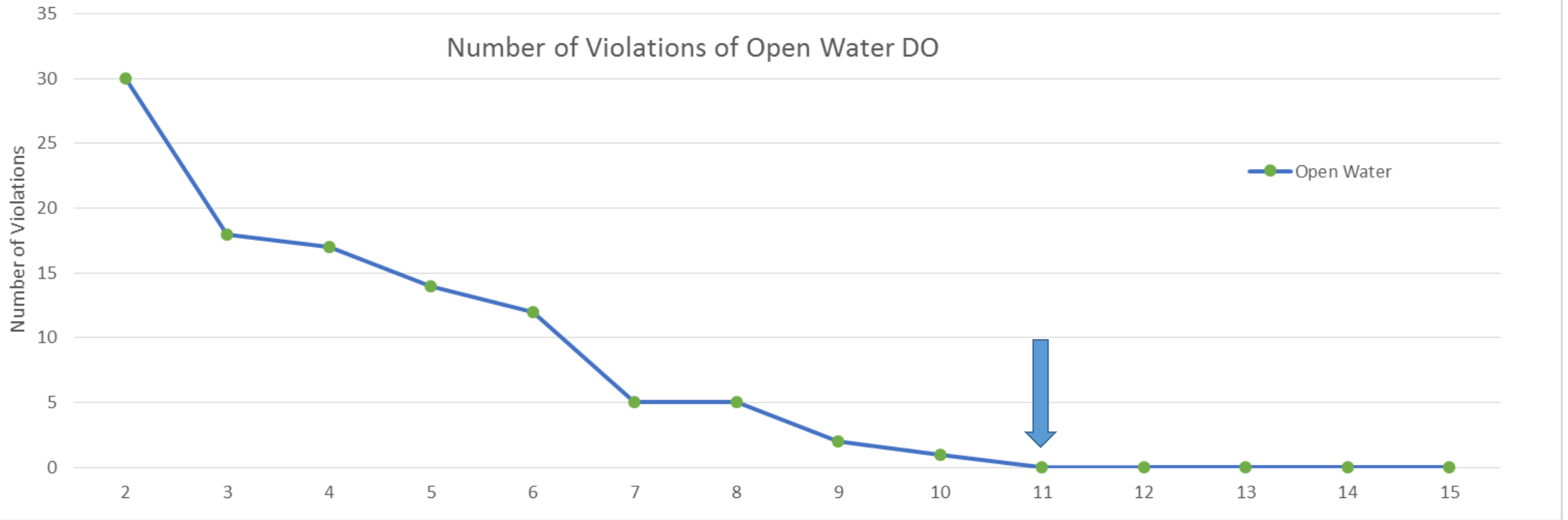
Segments NOT in Attainment

- Attained
- Not Attained
- Not Applicable



All Forest

Segments Attaining Oxygen Standards: Open-Water Use

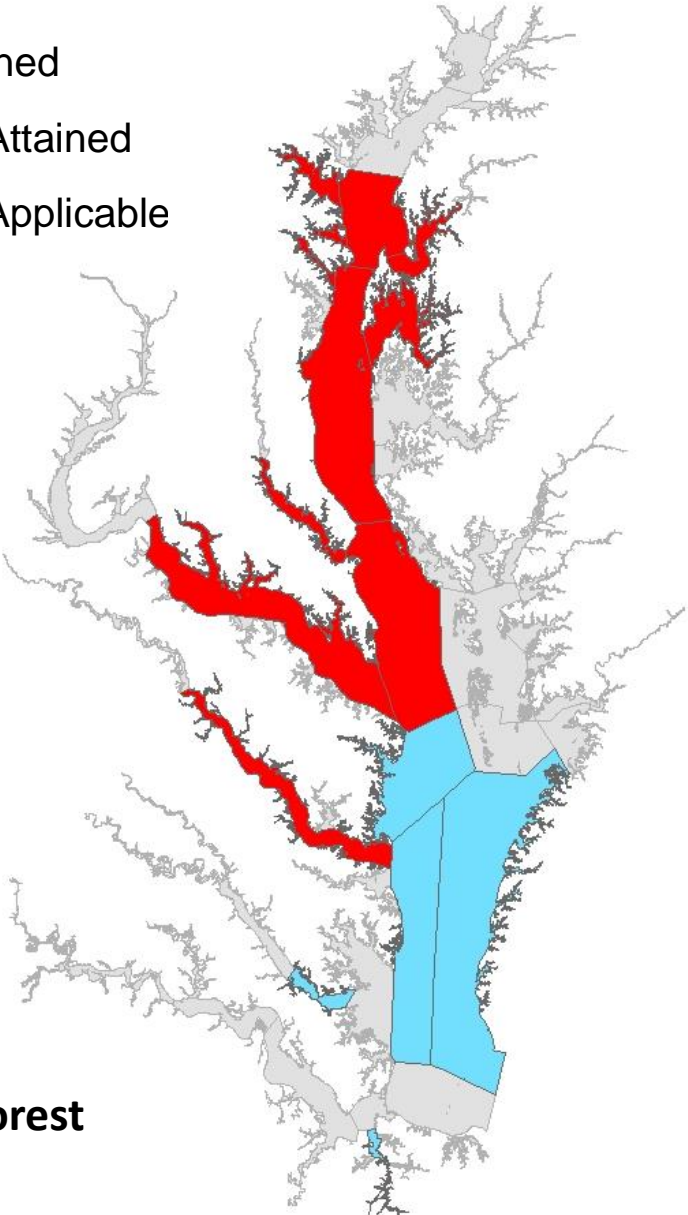


No Action	1985	1990	1993	2000	2010	2013	WIP+18%TN	WIP+6%TN		WIP-6%TN	WIP-11%TN		
	Progress	Progress	Progress	Progress	Progress	Progress	& +12%TP	& +4%TP	WIP2	& -8%TP	& -16%TP	E3	All Forest
404TN	347TN	338TN	337TN	317TN	266TN	253TN	224TN	205TN	195TN	185TN	174TN	133TN	40TN
41.7TP	30.4TP	27.7TP	23.7	21.9TP	16.9TP	15.9TP	14.8TP	14.4	13.7TP	13.0TP	11.9TP	8.6TP	3.9TP

Segments Attaining Oxygen Standards: Deep-Water Use

Segments NOT in Attainment

- CB3MH
- CB4MH
- CB5MH_MD
- PATMH
- MAGMH
- SEVMH
- PAXMH
- POTMH
- RPPMH
- CHSMH
- EASMH



2010 No
Action



E3



All Forest

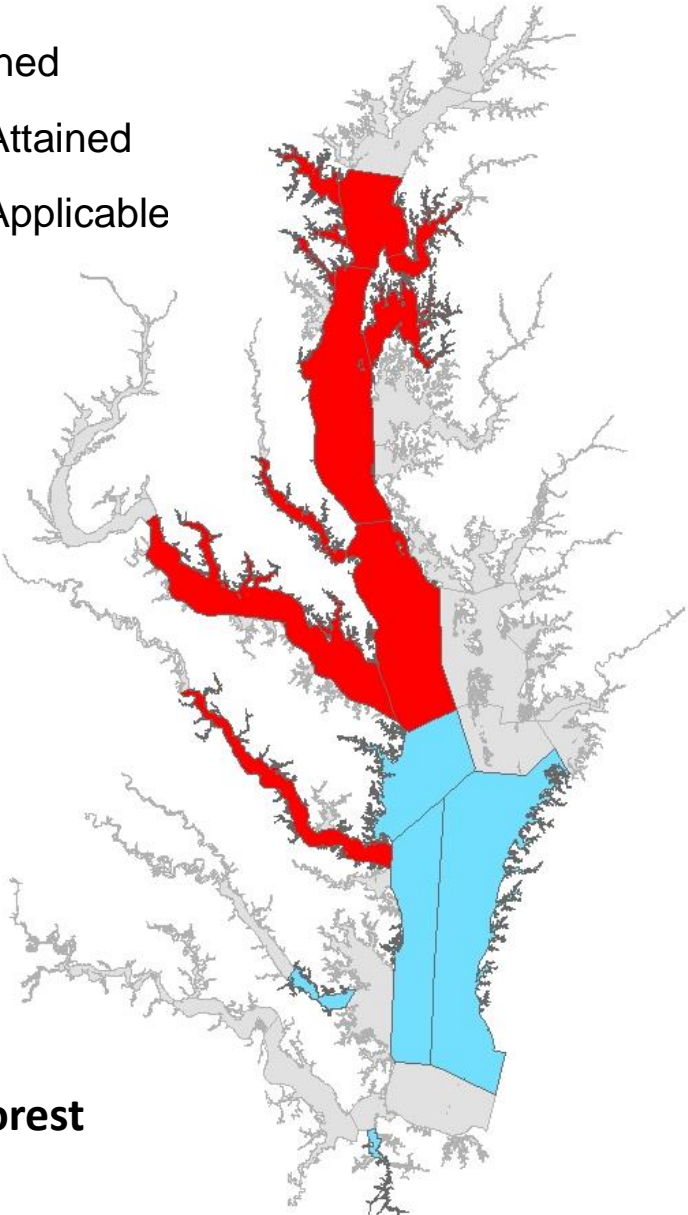
404 TN
41.7 TP

2010 No Action

Segments Attaining Oxygen Standards: Deep-Water Use

Segments NOT in Attainment

- CB3MH
- CB4MH
- CB5MH_MD
- PATMH
- MAGMH
- SEVMH
- PAXMH
- POTMH
- RPPMH
- CHSMH
- EASMH

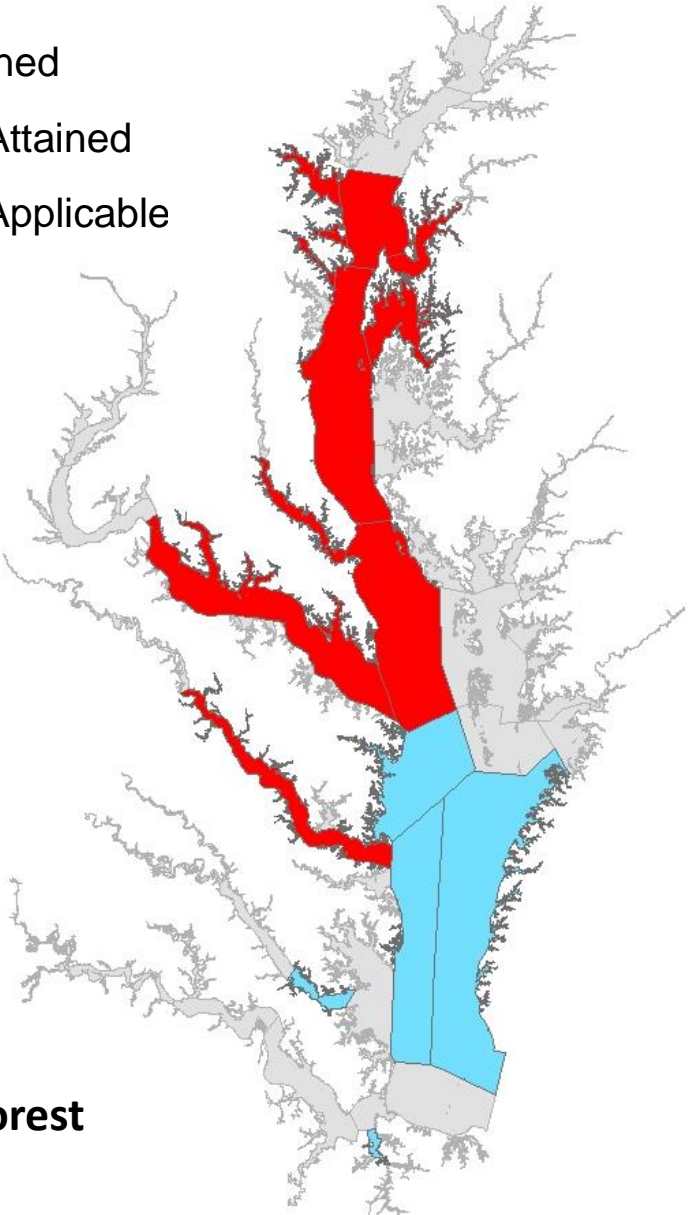


1985 Progress

Segments Attaining Oxygen Standards: Deep-Water Use

Segments NOT in Attainment

- CB3MH
- CB4MH
- CB5MH_MD
- PATMH
- MAGMH
- SEVMH
- PAXMH
- POTMH
- RPPMH
- CHSMH
- EASMH



1990
Progress



E3



All Forest

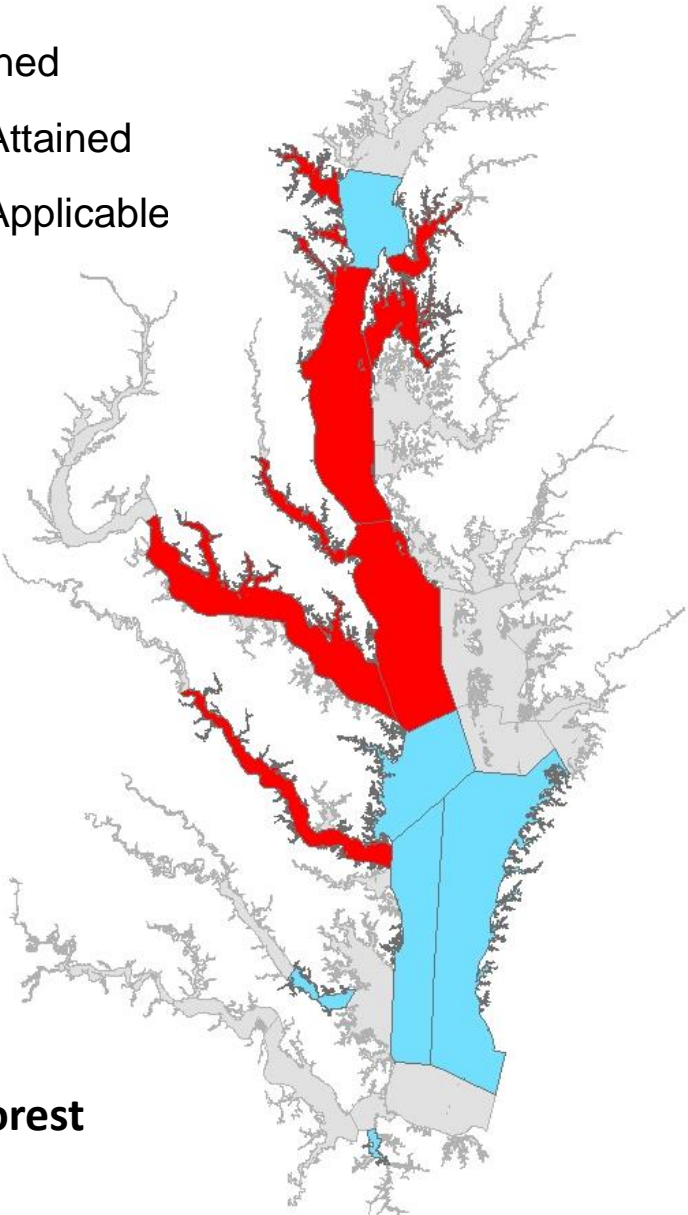
338 TN
27.7 TP

1990 Progress

Segments Attaining Oxygen Standards: Deep-Water Use

Segments NOT in Attainment

- CB4MH
- CB5MH_MD
- PATMH
- MAGMH
- SEVMH
- PAXMH
- POTMH
- RPPMH
- CHSMH
- EASMH

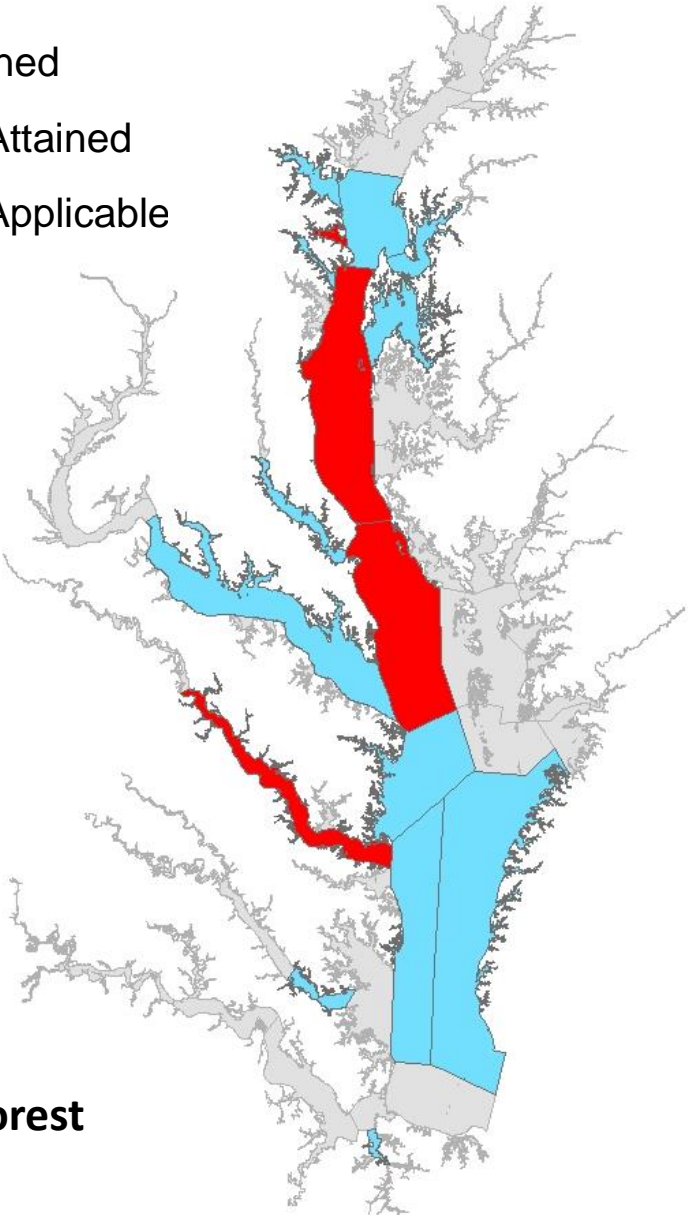


1993 Progress

Segments Attaining Oxygen Standards: Deep-Water Use

Segments NOT in Attainment

- CB4MH
- CB5MH_MD
- PATMH
- MAGMH
- PAXMH
- POTMH
- RPPMH
- CHSMH

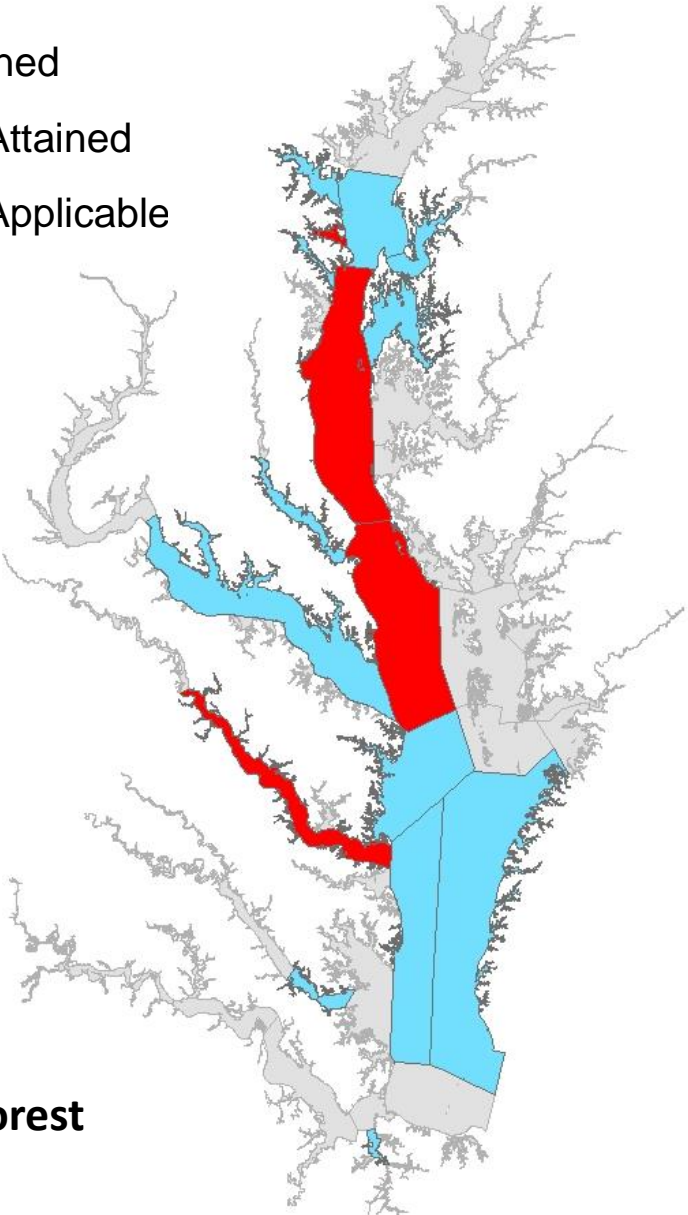


2000 Progress

Segments Attaining Oxygen Standards: Deep-Water Use

Segments NOT in Attainment

- CB4MH
- CB5MH_MD
- MAGMH
- RPPMH

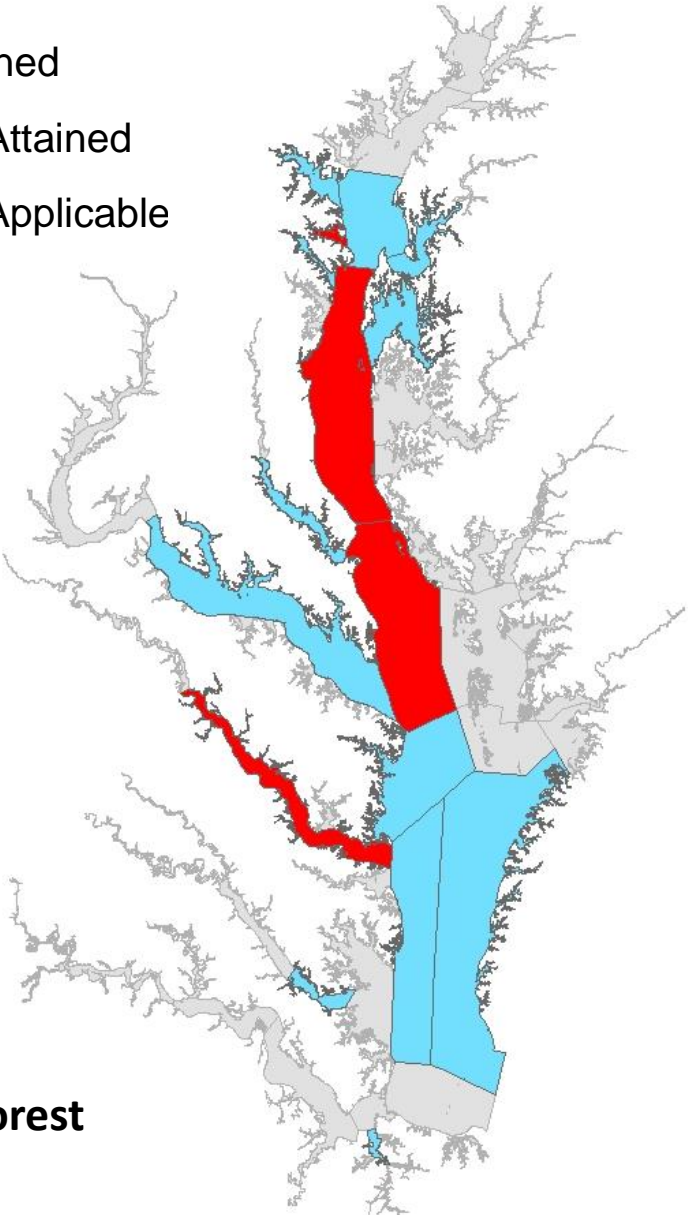


2010 Progress

Segments Attaining Oxygen Standards: Deep-Water Use

Segments NOT in Attainment

- CB4MH
- CB5MH_MD
- MAGMH
- RPPMH

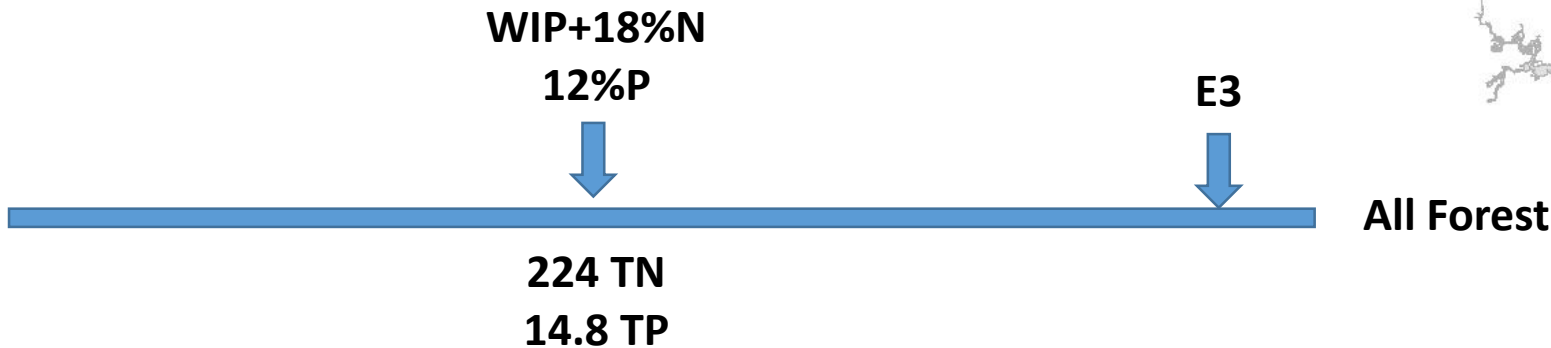
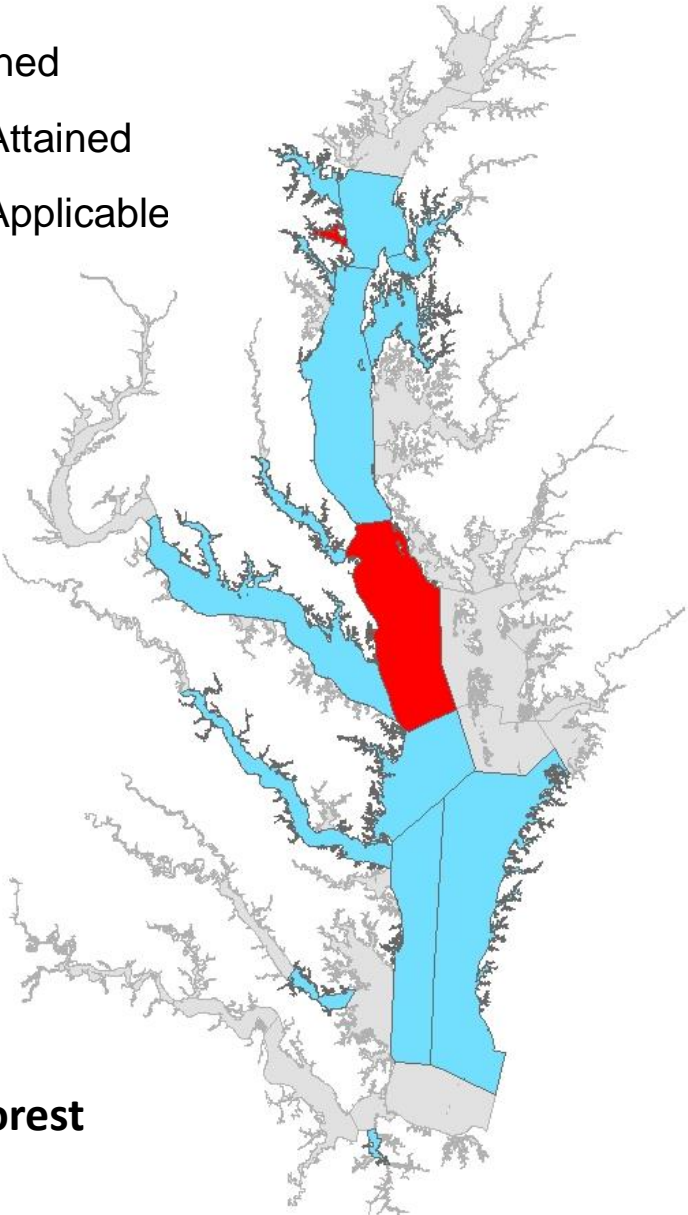


2013 Progress

Segments Attaining Oxygen Standards: Deep-Water Use

Segments NOT in Attainment

- CB5MH_MD
- MAGMH

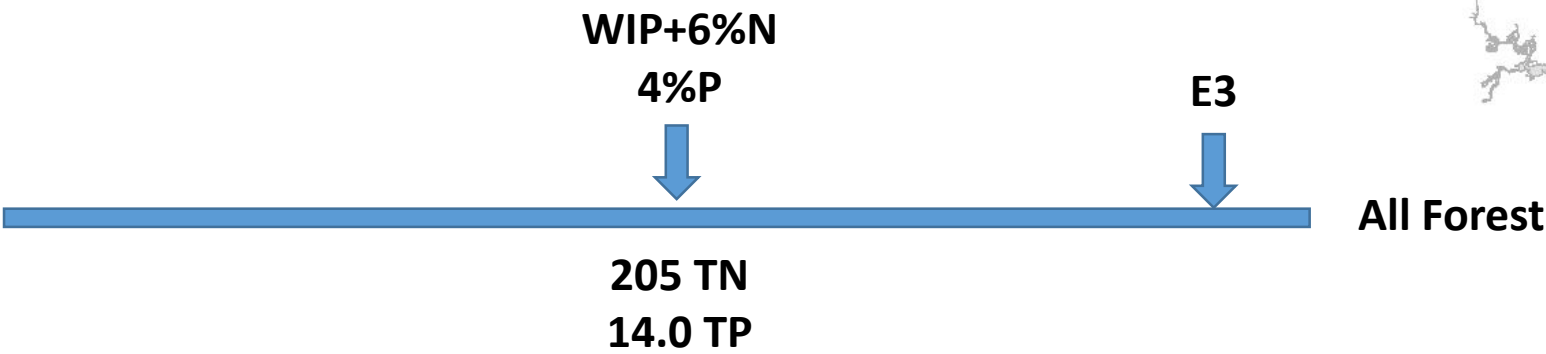
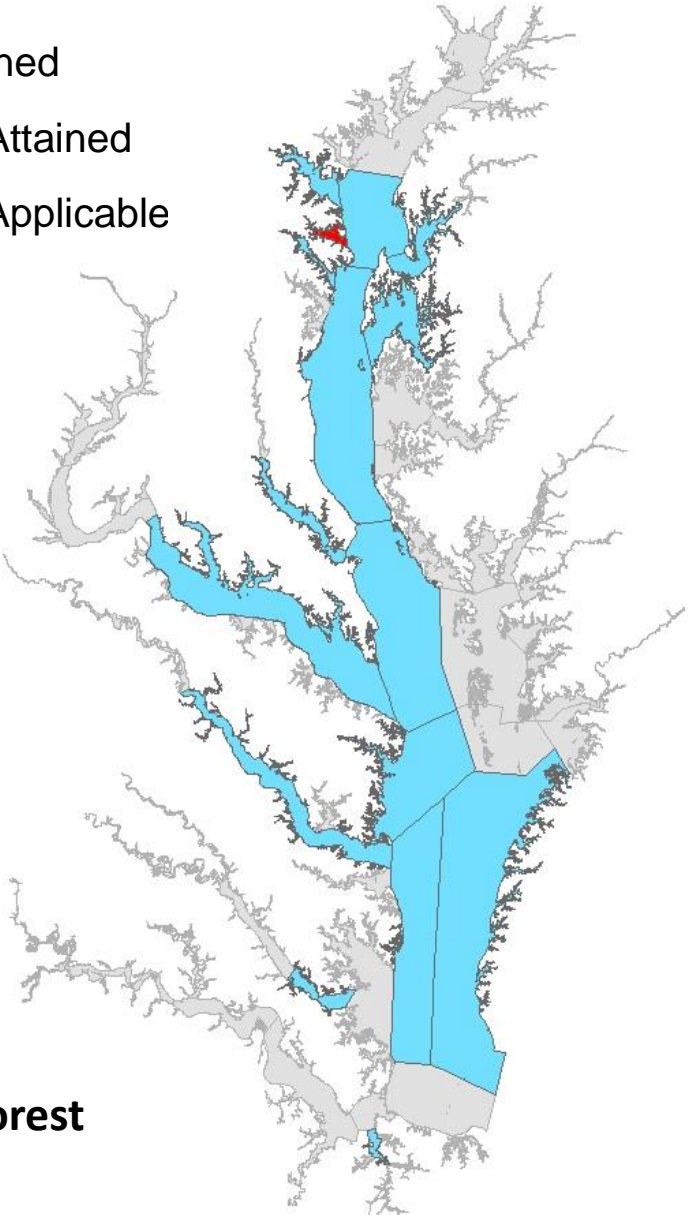


WIP+18%N 12%P

Segments Attaining Oxygen Standards: Deep-Water Use

Segments NOT in Attainment

- MAGMH

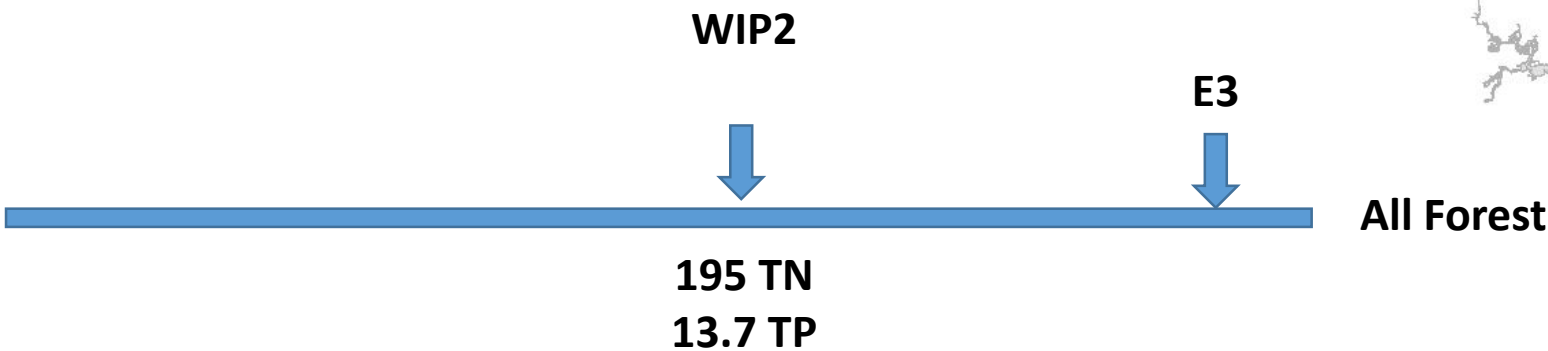
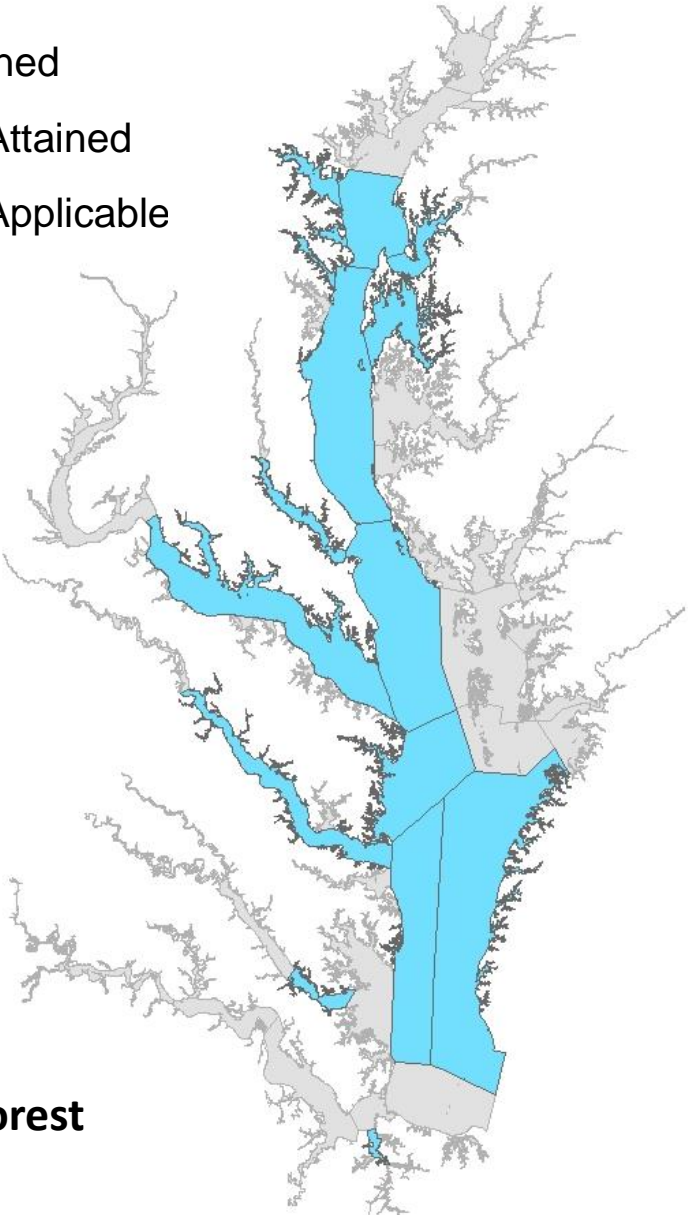


WIP+6%N 4%P

Segments Attaining Oxygen Standards: Deep-Water Use

Segments NOT in Attainment

- Attained
- Not Attained
- Not Applicable

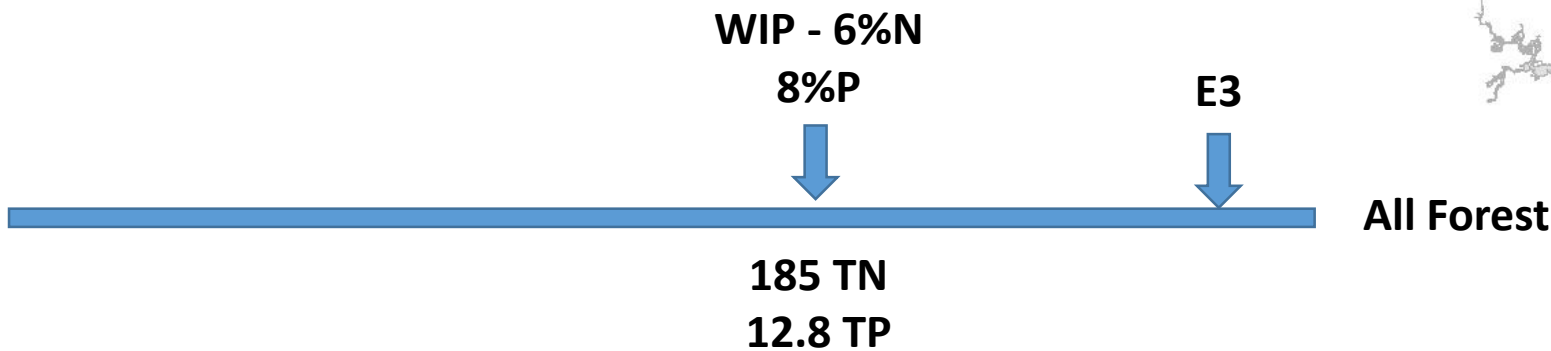
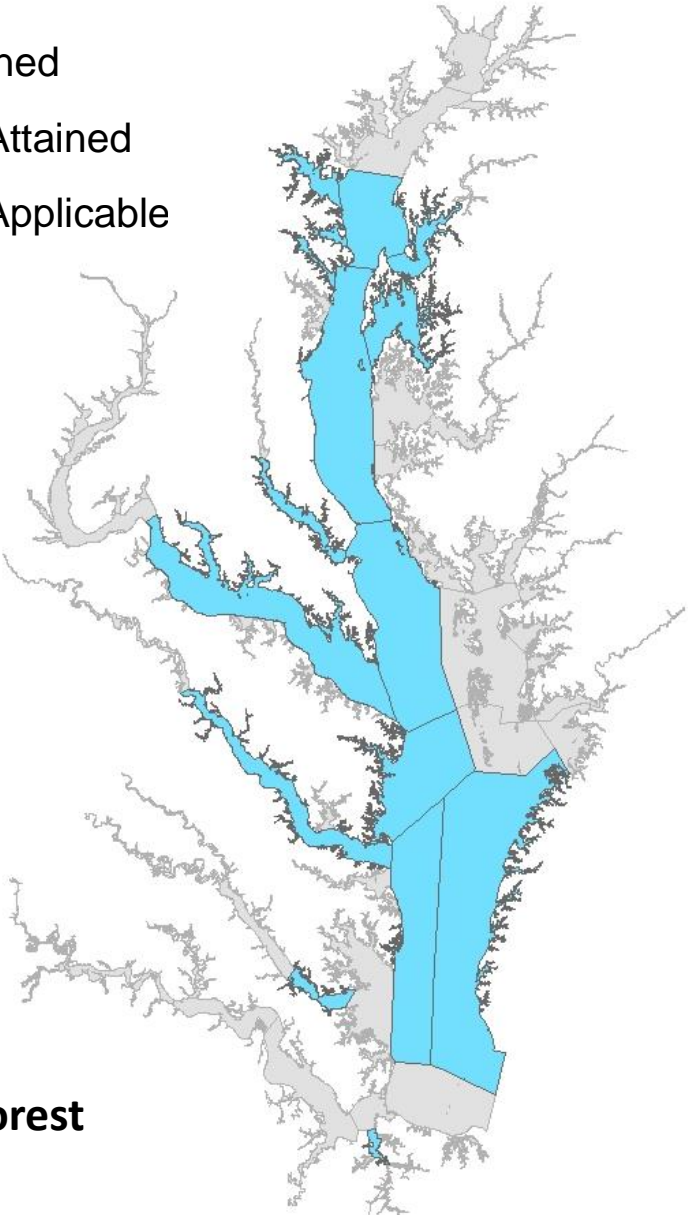


WIP2

Segments Attaining Oxygen Standards: Deep-Water Use

Segments NOT in Attainment

- Attained
- Not Attained
- Not Applicable

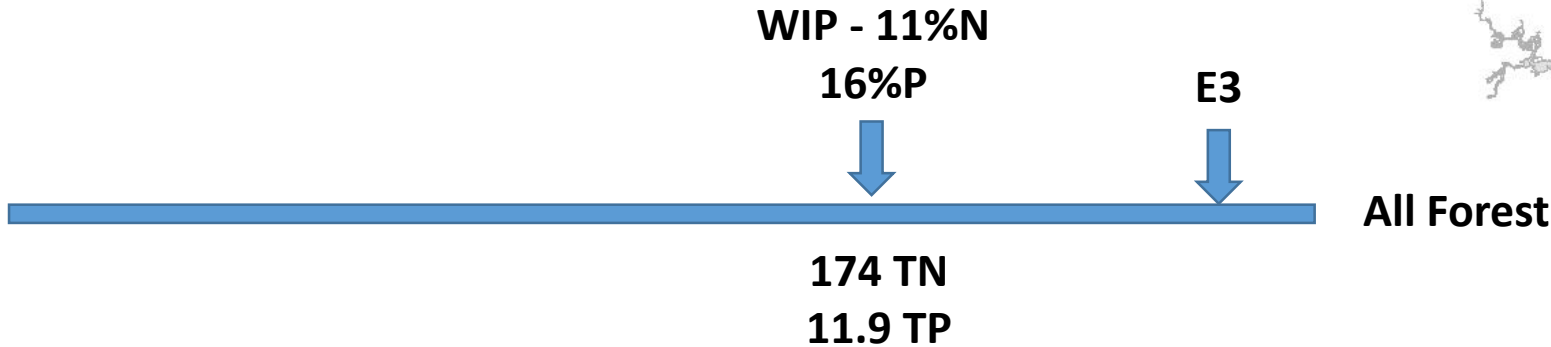
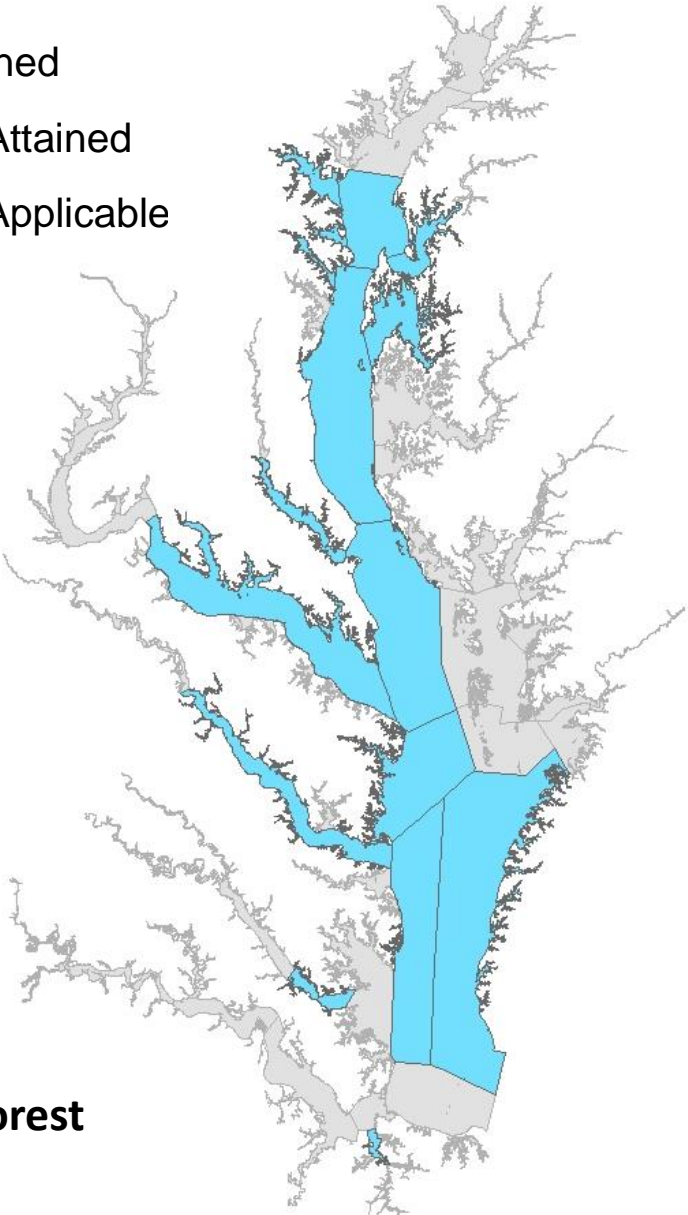


WIP -6%N 8%P

Segments Attaining Oxygen Standards: Deep-Water Use

Segments NOT in Attainment

- Attained
- Not Attained
- Not Applicable

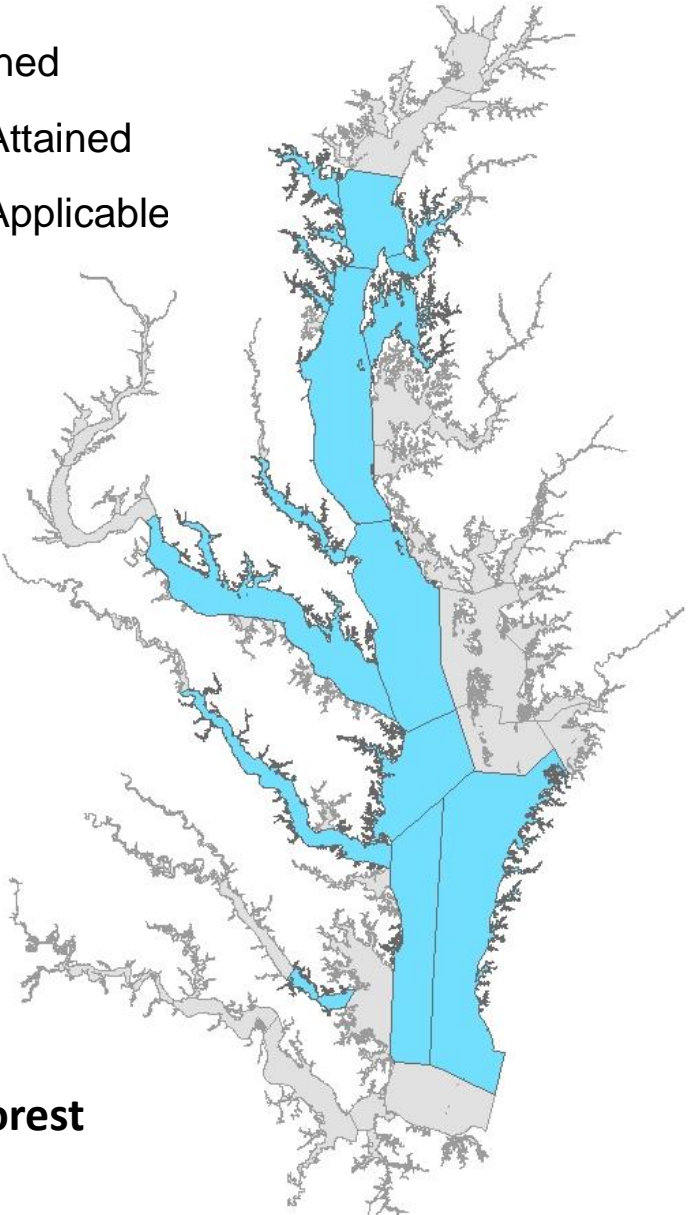


WIP -11%N 16%P

Segments Attaining Oxygen Standards: Deep-Water Use

Segments NOT in Attainment

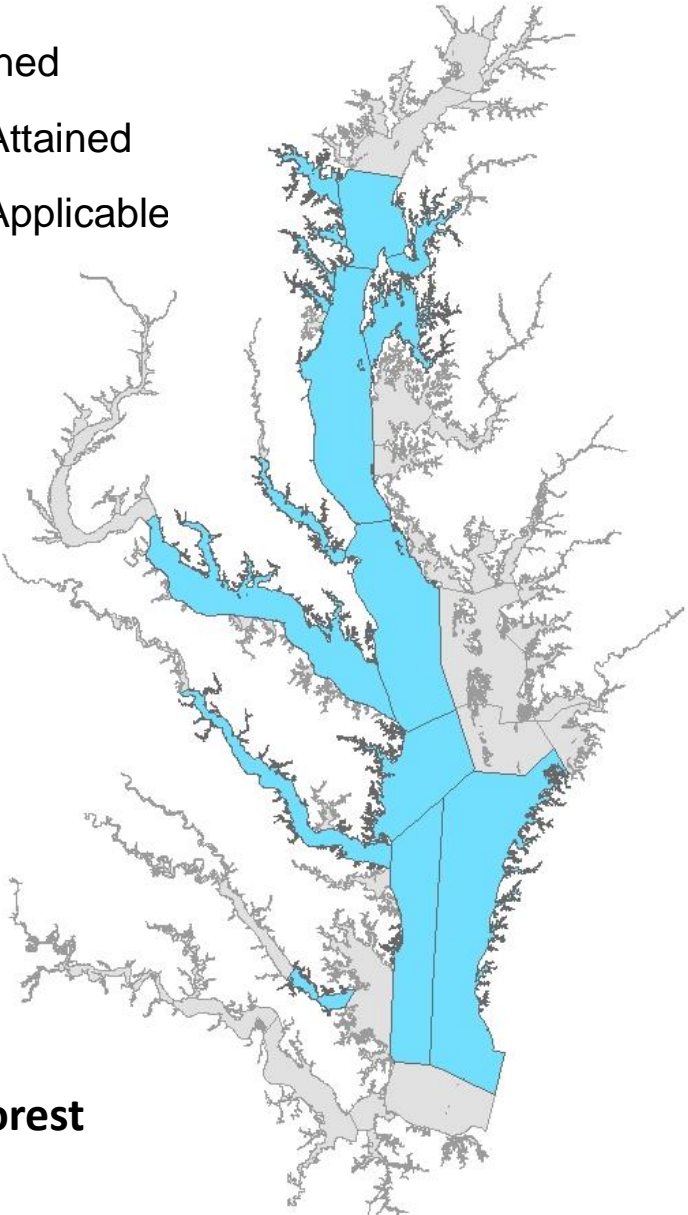
- Attained
- Not Attained
- Not Applicable



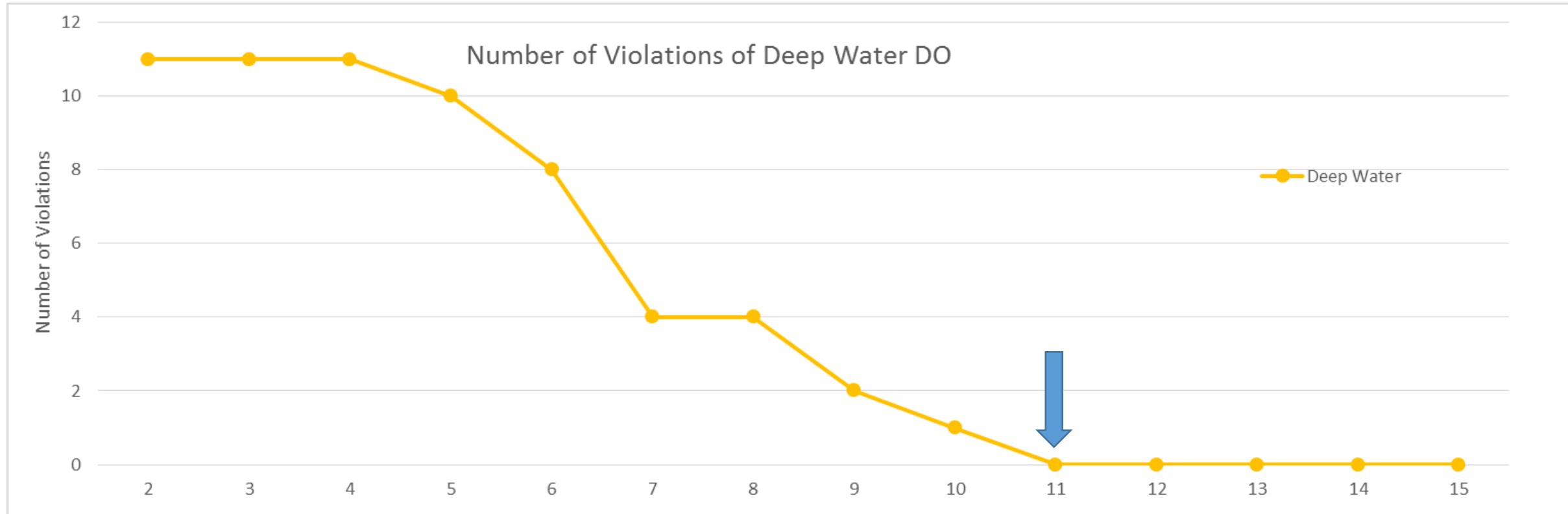
Segments Attaining Oxygen Standards: Deep-Water Use

Segments NOT in Attainment

- Attained
- Not Attained
- Not Applicable



Segments Attaining Oxygen Standards: Deep-Water Use

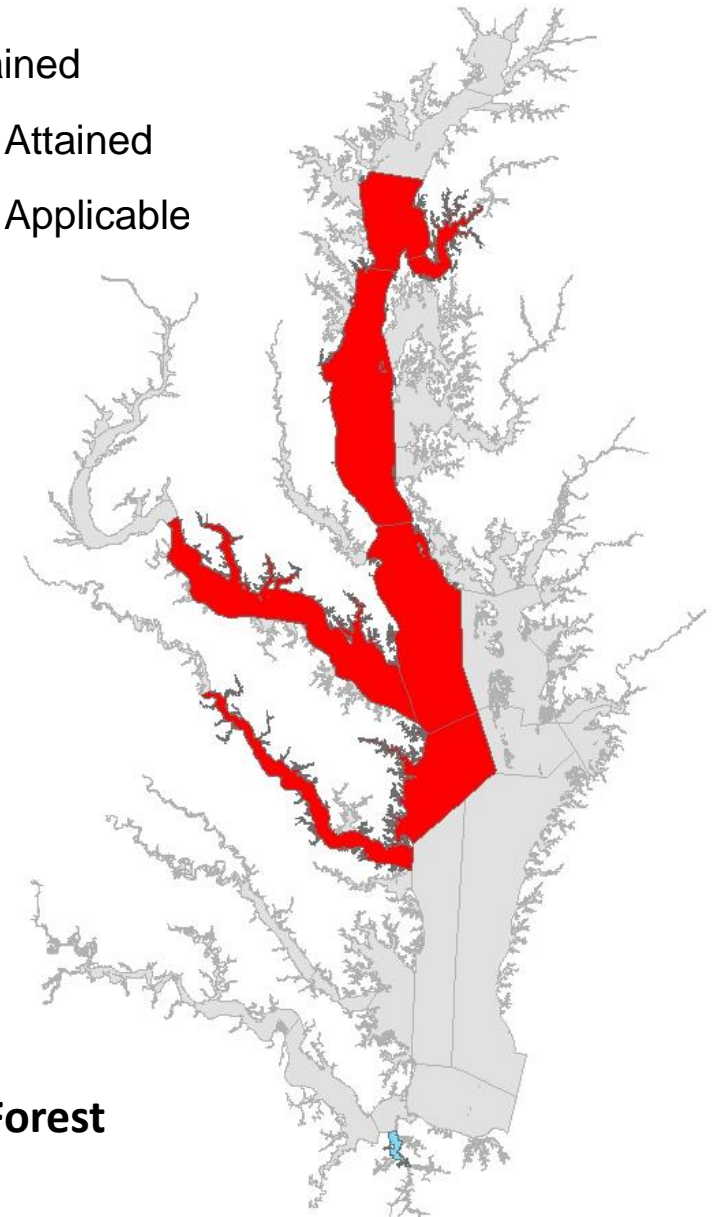


No Action	1985 Progress	1990 Progress	1993 Progress	2000 Progress	2010 Progress	2013 Progress	WIP+18%TN & +12%TP	WIP+6%TN & +4%TP	WIP2	WIP-6%TN & -8%TP	WIP-11%TN & -16%TP	E3	All Forest
404TN	347TN	338TN	337TN	317TN	266TN	253TN	224TN	205TN	195TN	185TN	174TN	133TN	40TN
41.7TP	30.4TP	27.7TP	23.7	21.9TP	16.9TP	15.9TP	14.8TP	14.4	13.7TP	13.0TP	11.9TP	8.6TP	3.9TP

Segments Attaining Oxygen Standards: Deep-Channel Use

Segments NOT in Attainment

- CB3MH
- CB4MH
- CB5MH_MD
- CB5MH_VA
- PATMH
- POTMH
- RPPMH
- CHSMH



2010 No
Action



E3



404 TN
41.7 TP

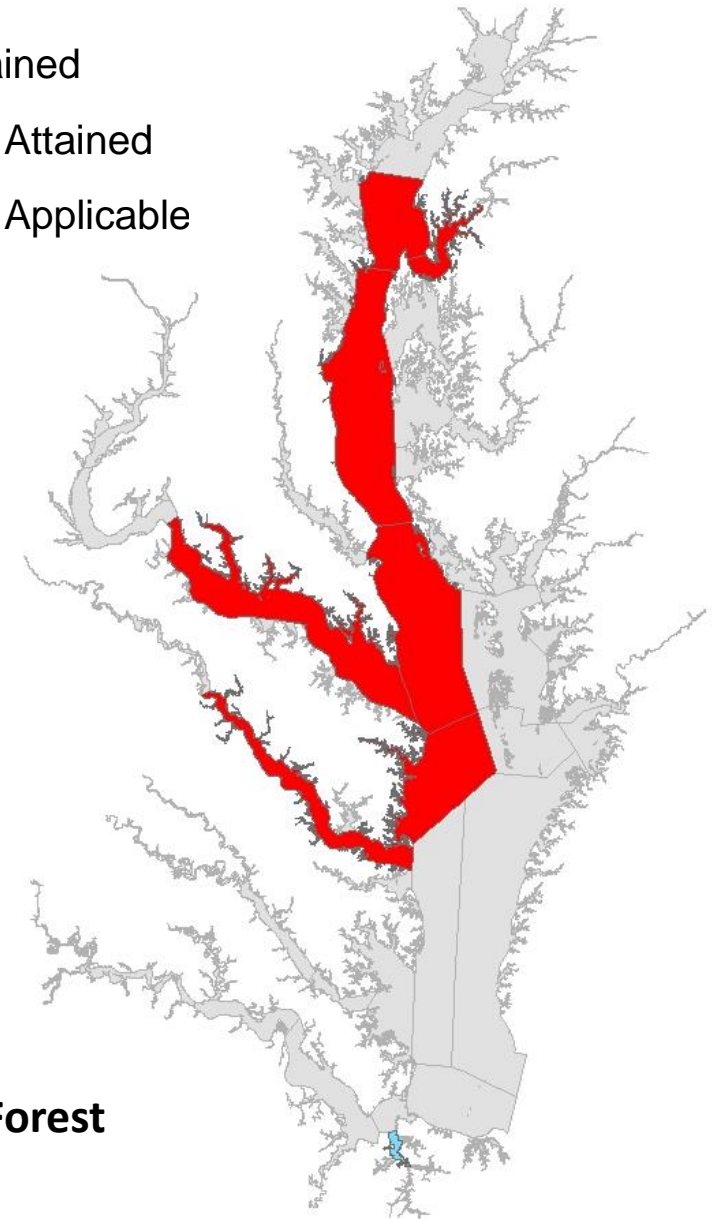
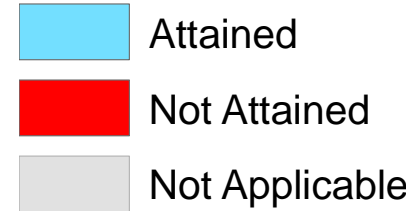
All Forest

2010 No Action

Segments Attaining Oxygen Standards: Deep-Channel Use

Segments NOT in Attainment

- CB3MH
- CB4MH
- CB5MH_MD
- CB5MH_VA
- PATMH
- POTMH
- RPPMH
- CHSMH



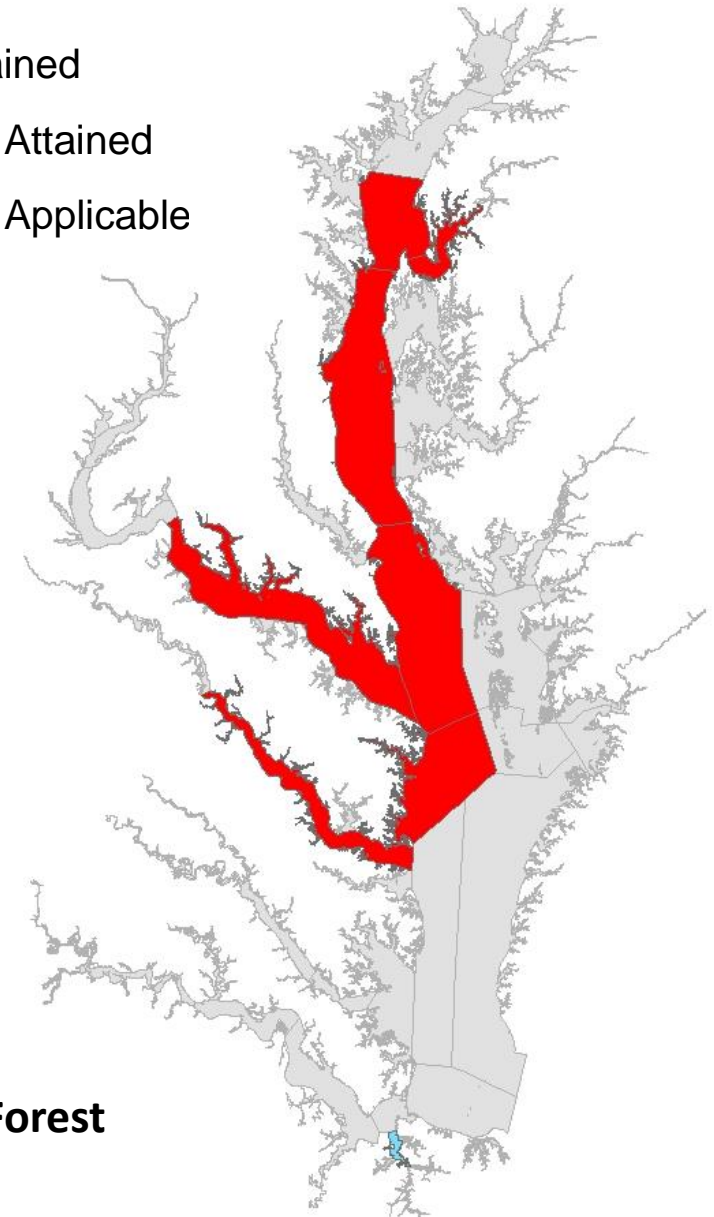
1985 Progress



Segments Attaining Oxygen Standards: Deep-Channel Use

Segments NOT in Attainment

- CB3MH
- CB4MH
- CB5MH_MD
- CB5MH_VA
- PATMH
- POTMH
- RPPMH
- CHSMH

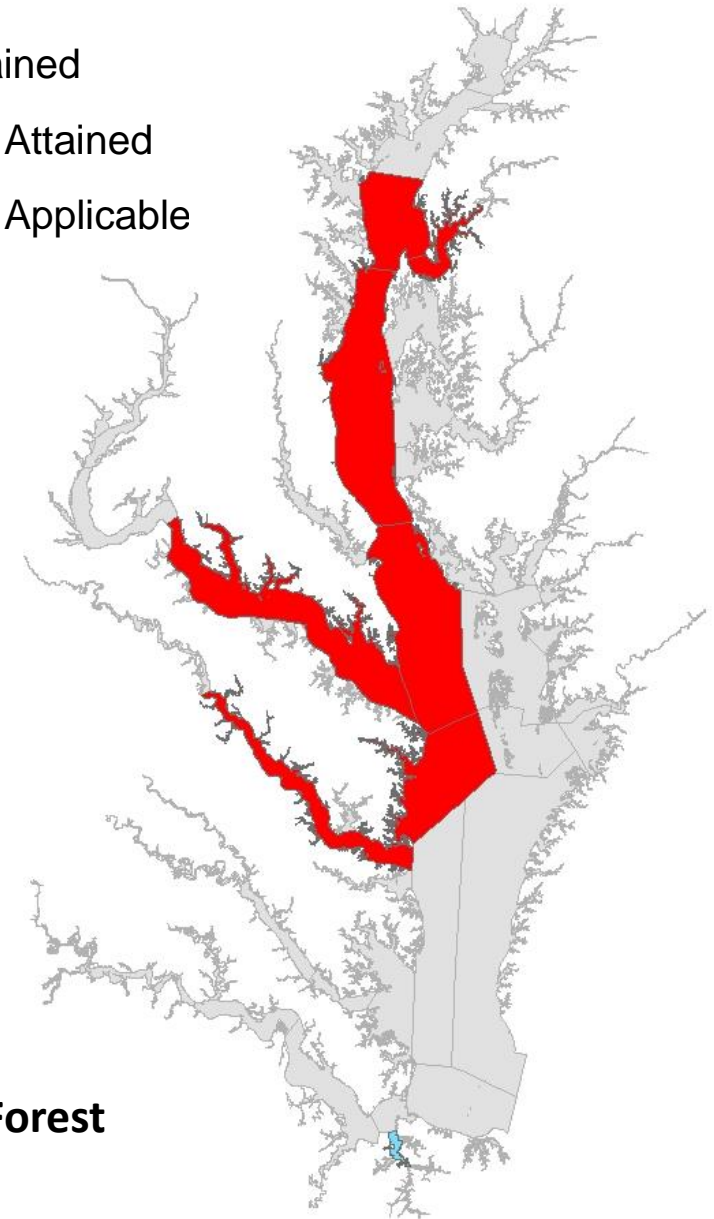


1990 Progress

Segments Attaining Oxygen Standards: Deep-Channel Use

Segments NOT in Attainment

- CB3MH
- CB4MH
- CB5MH_MD
- CB5MH_VA
- POTMH
- RPPMH
- CHSMH



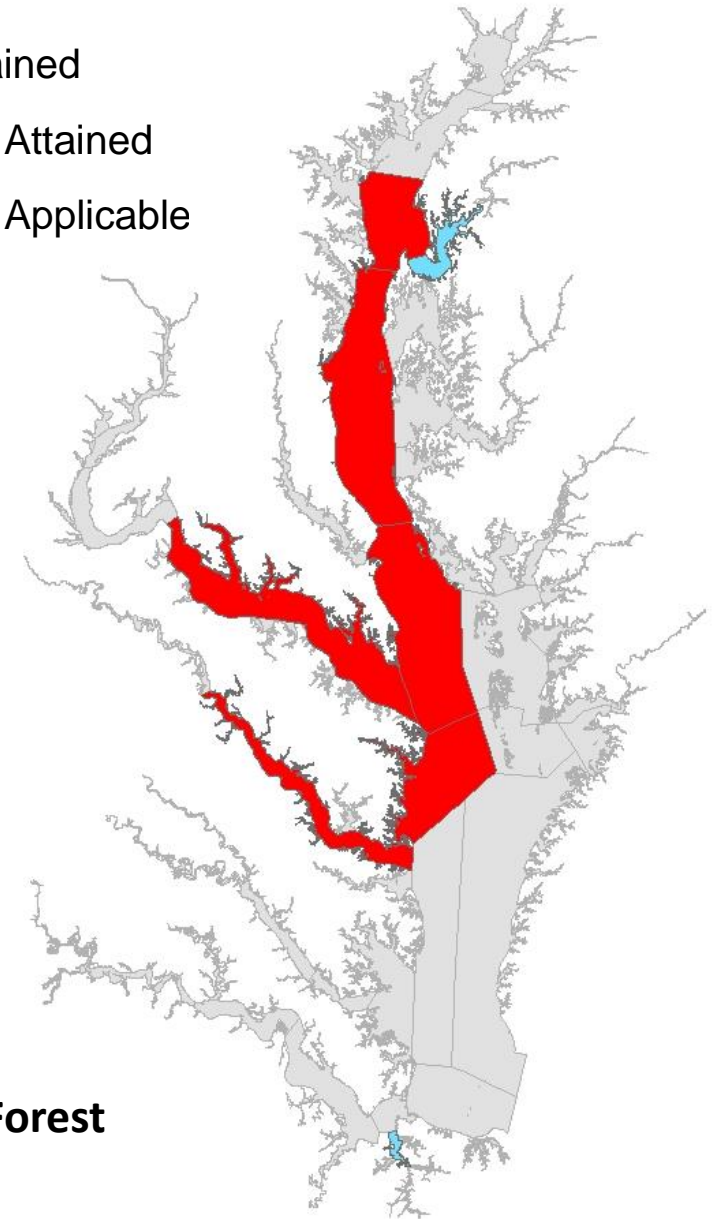
1993 Progress



Segments Attaining Oxygen Standards: Deep-Channel Use

Segments NOT in Attainment

- CB3MH
- CB4MH
- CB5MH_MD
- CHSMH
- POTMH
- RPPMH

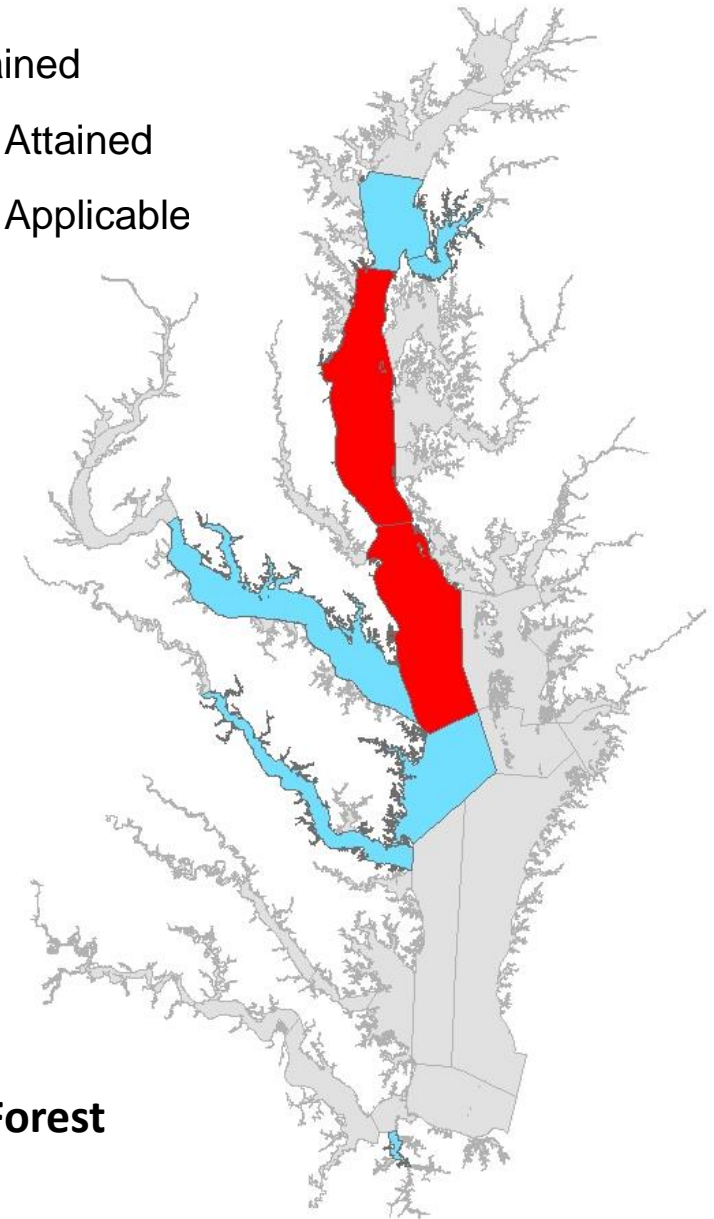


2000 Progress

Segments Attaining Oxygen Standards: Deep-Channel Use

Segments NOT in Attainment

- CB4MH
- CB5MH_MD

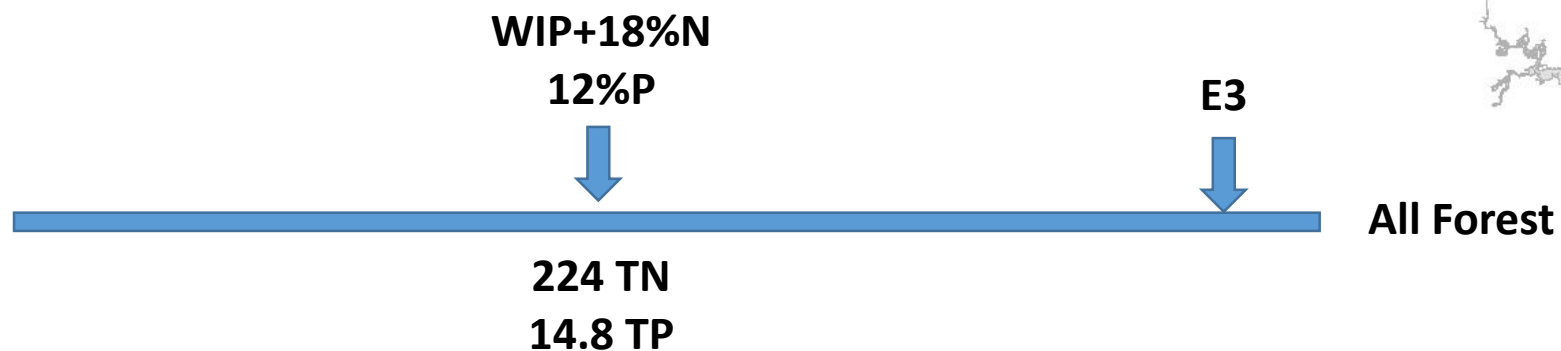
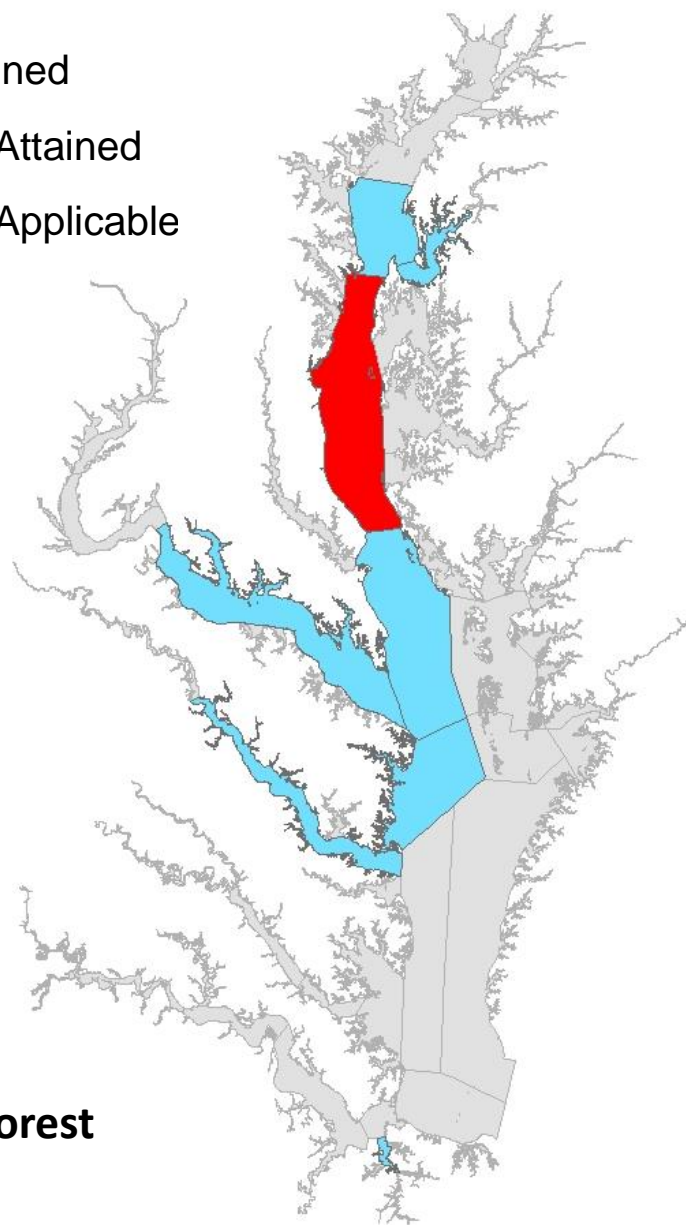


2013 Progress

Segments Attaining Oxygen Standards: Deep-Channel Use

Segments NOT in Attainment

- CB4MH

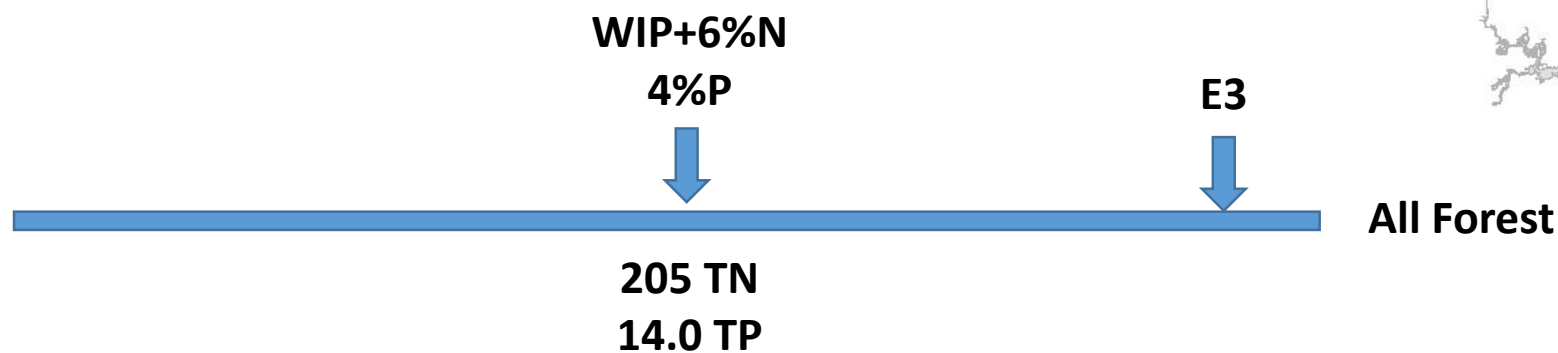
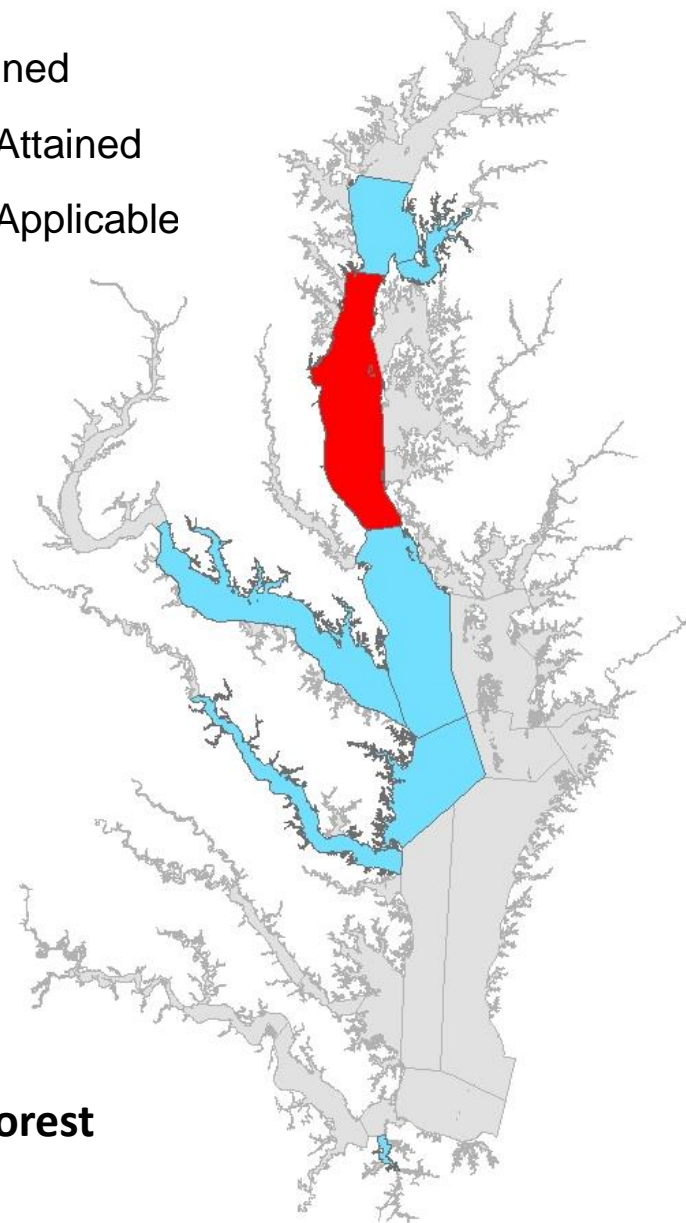


WIP+18% N12%P

Segments Attaining Oxygen Standards: Deep-Channel Use

Segments NOT in Attainment

- CB4MH

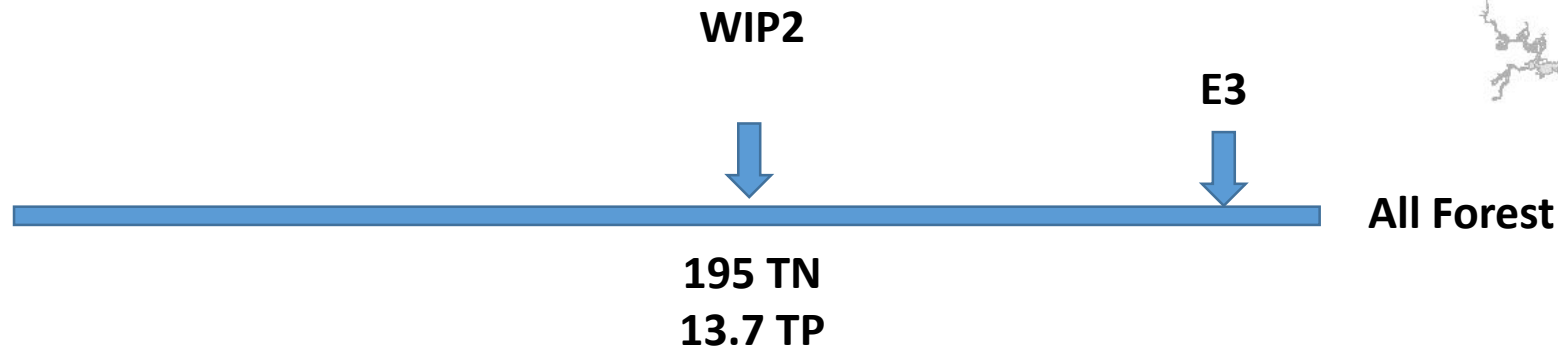
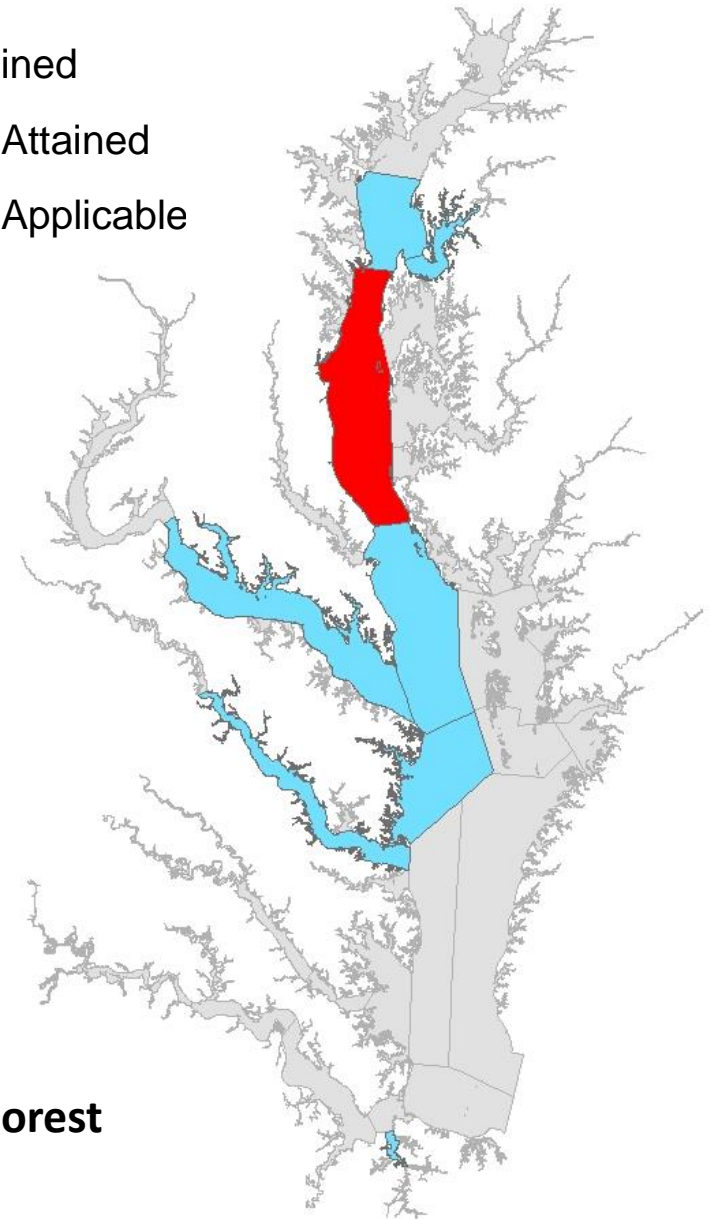


WIP+6% N4%P

Segments Attaining Oxygen Standards: Deep-Channel Use

Segments NOT in Attainment

- CB4MH

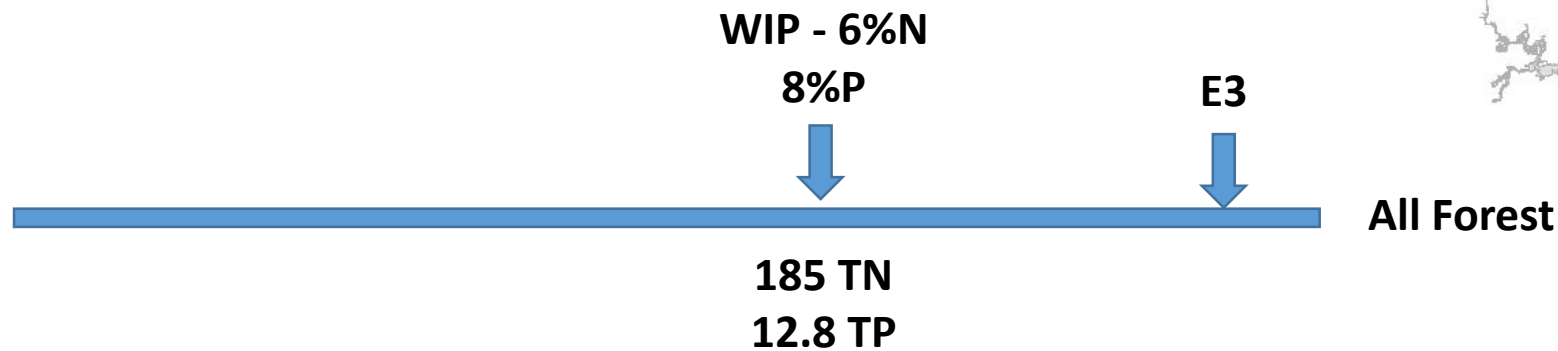
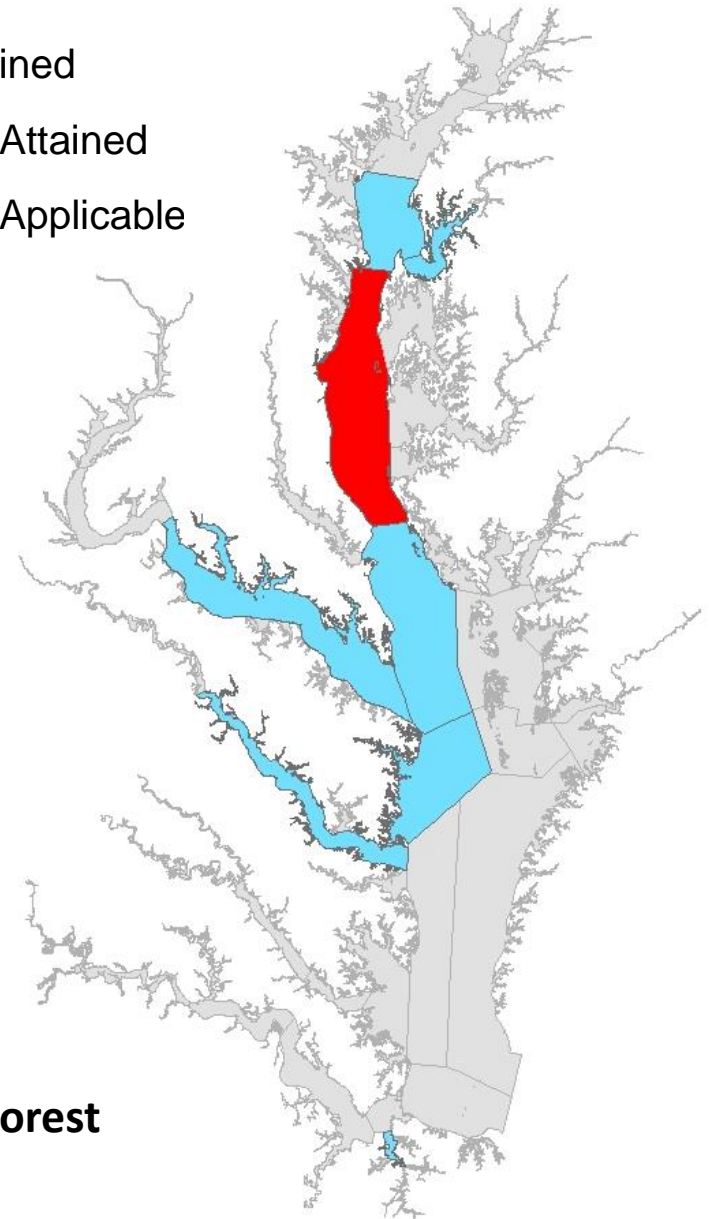
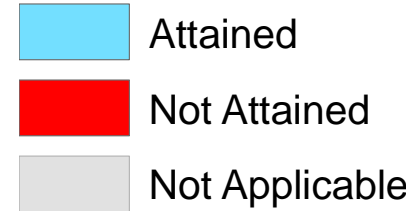


WIP2

Segments Attaining Oxygen Standards: Deep-Channel Use

Segments NOT in Attainment

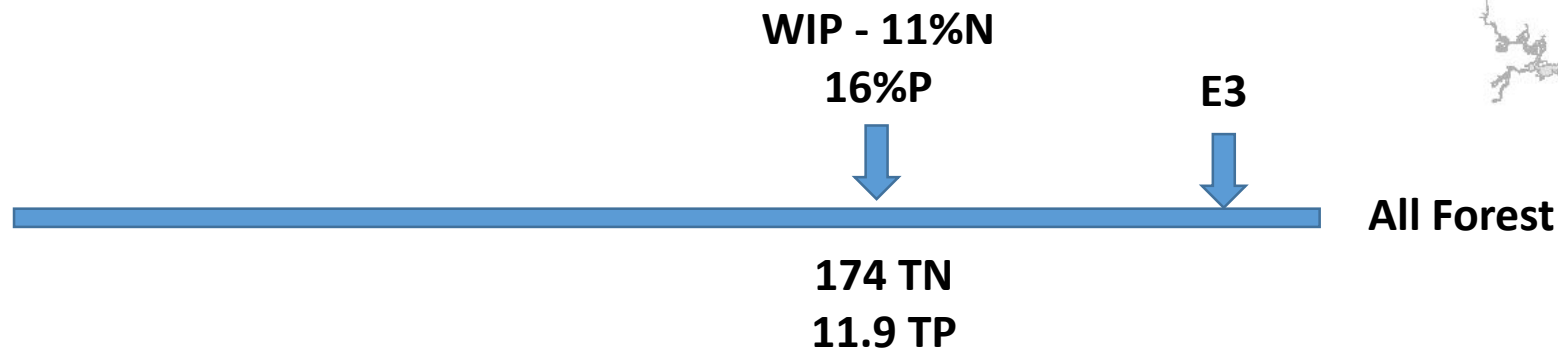
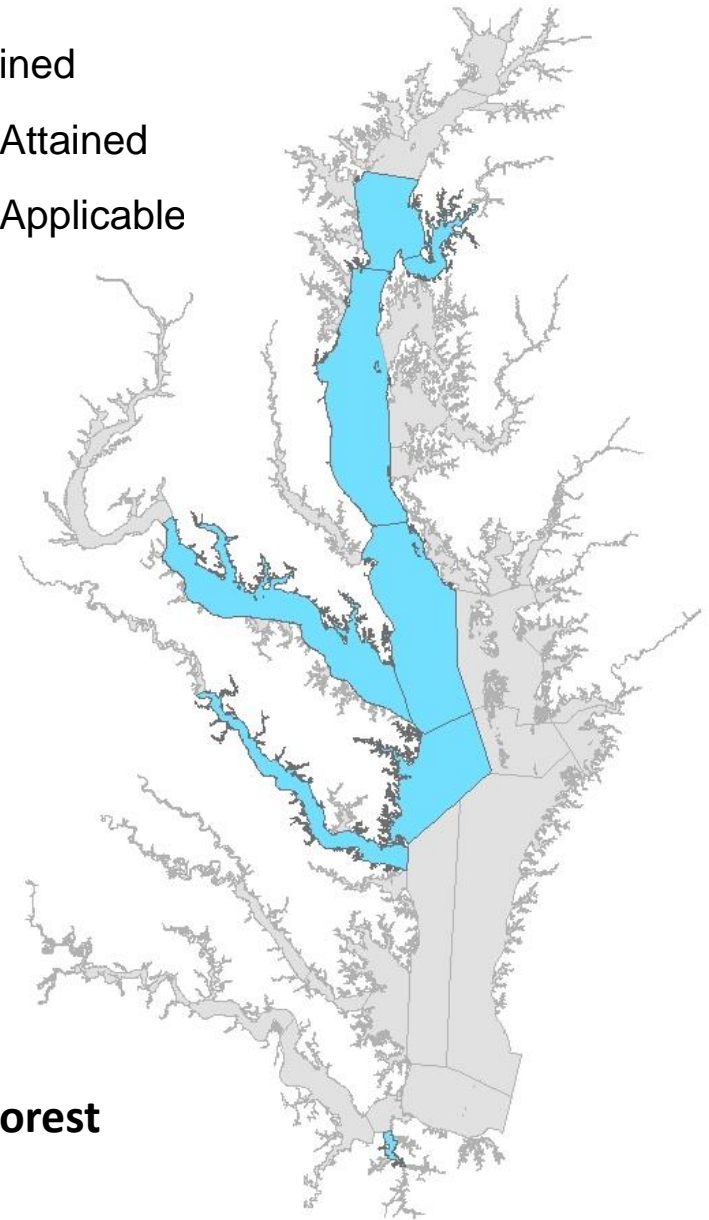
- CB4MH



WIP -6%N 8%P

Segments Attaining Oxygen Standards: Deep-Channel Use

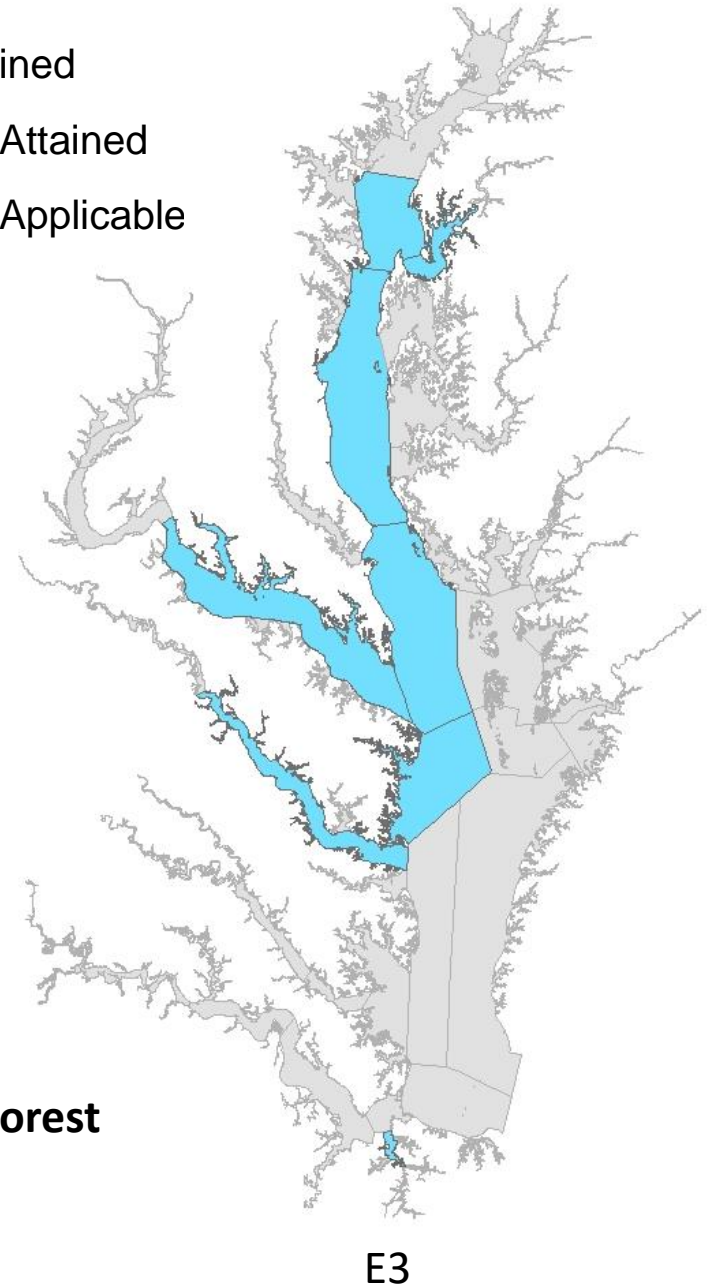
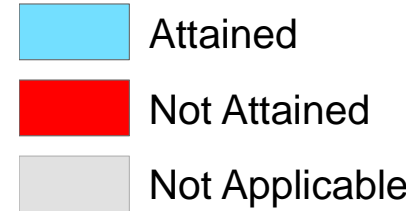
Segments NOT in Attainment



WIP -11%N 16%P

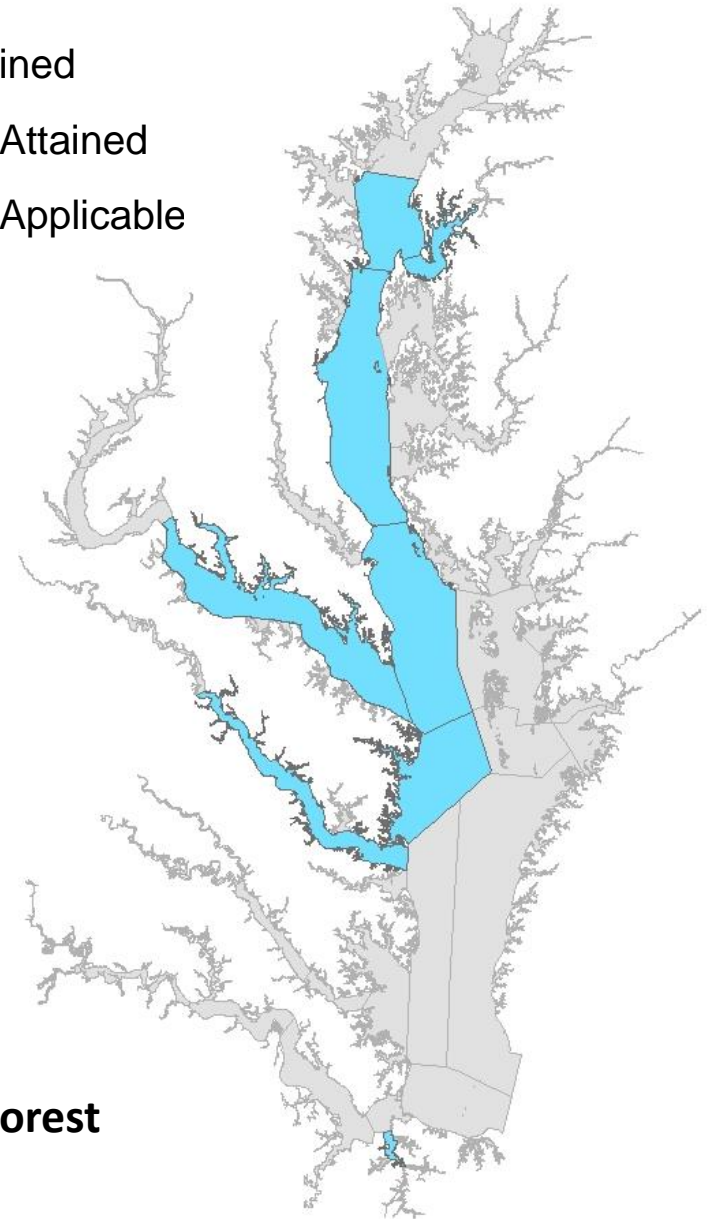
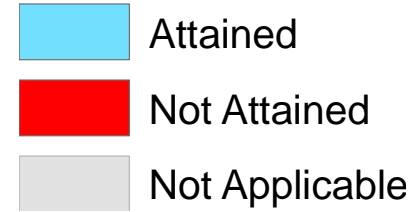
Segments Attaining Oxygen Standards: Deep-Channel Use

Segments NOT in Attainment



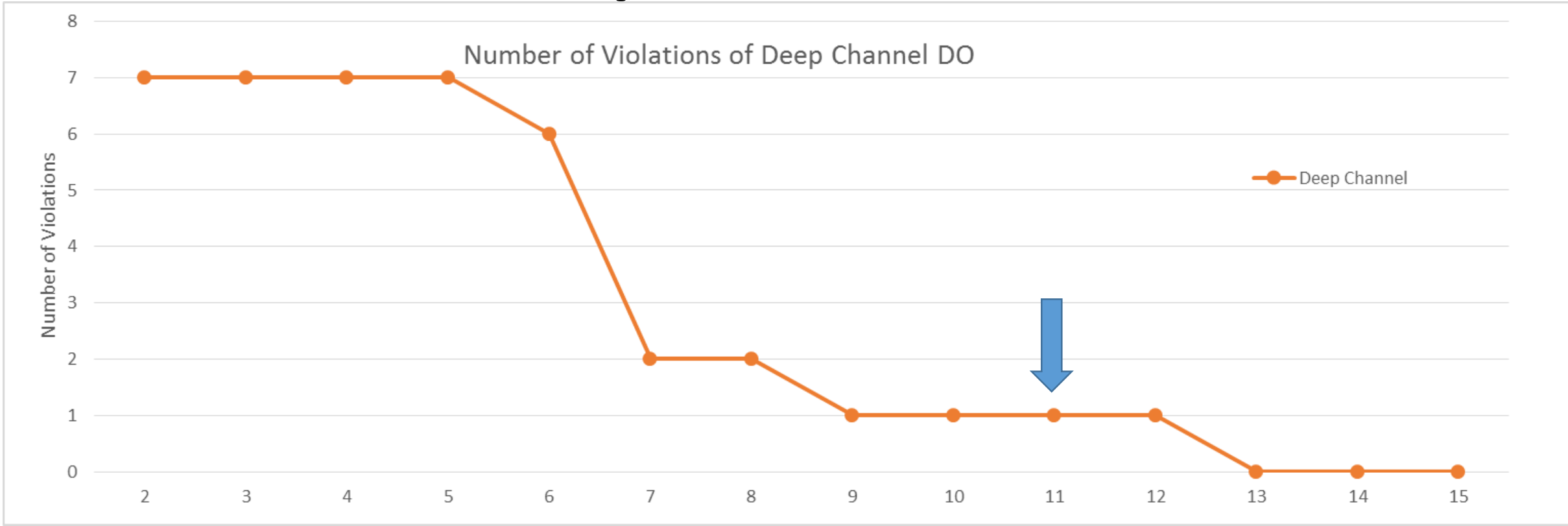
Segments Attaining Oxygen Standards: Deep-Channel Use

Segments NOT in Attainment



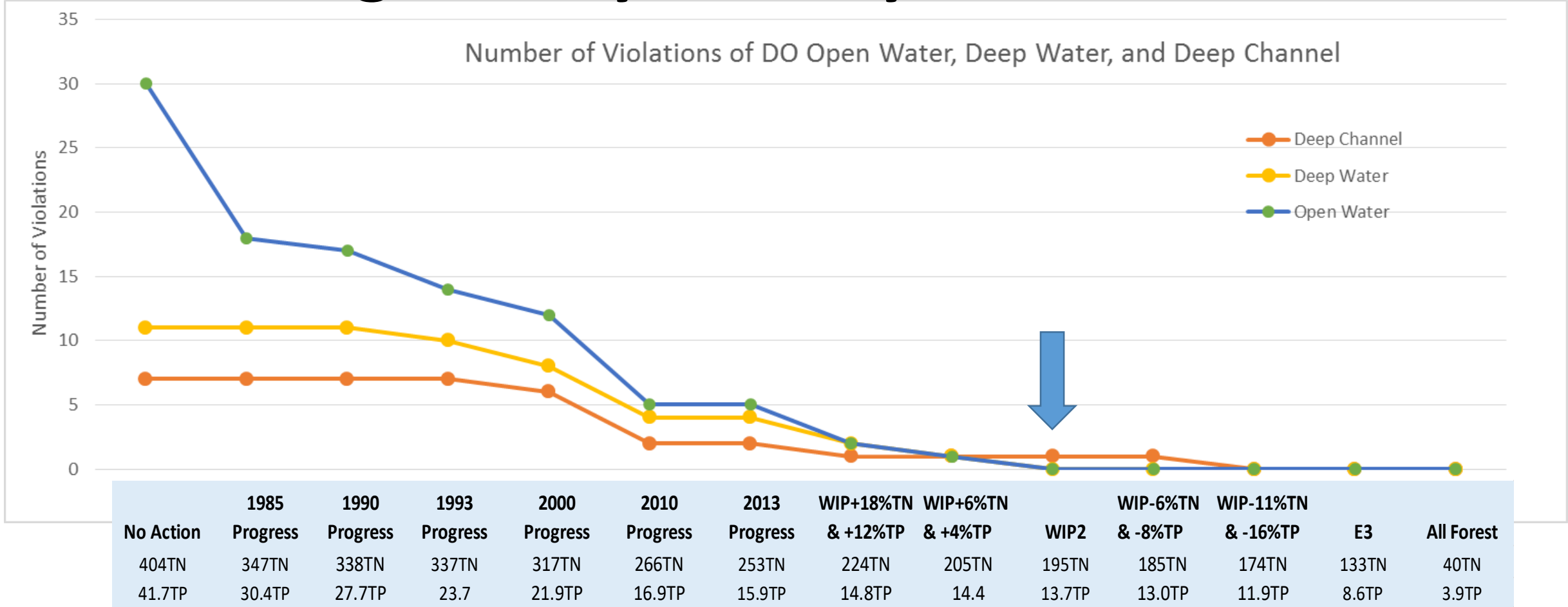
All Forest

Segments Attaining Oxygen Standards: Deep-Channel Use



No Action	1985 Progress	1990 Progress	1993 Progress	2000 Progress	2010 Progress	2013 Progress	WIP+18%TN & +12%TP	WIP+6%TN & +4%TP	WIP2	WIP-6%TN & -8%TP	WIP-11%TN & -16%TP	E3	All Forest
404TN	347TN	338TN	337TN	317TN	266TN	253TN	224TN	205TN	195TN	185TN	174TN	133TN	40TN
41.7TP	30.4TP	27.7TP	23.7	21.9TP	16.9TP	15.9TP	14.8TP	14.4	13.7TP	13.0TP	11.9TP	8.6TP	3.9TP

Determining the Bay's Ability to Absorb Pollutants



Rationale for Pollutant Loads Bay Can Absorb

- Clear monitoring-based evidence of reductions on volumes of low/no oxygen in deeper waters observed in Bay and tidal tributaries
- At 195 million lbs. nitrogen and 13.7 million lbs. phosphorus, we reach:
 - Loading levels where all segments' designated uses, except CB4 deep-channel, come into attainment
 - Point of diminishing returns for the increased level of reductions approaching E3

Diminishing Return for Additional Reductions

Proposed Path Forward

- Support Maryland updating their water quality standards regulations' existing restoration variances
 - Change CB4 deep-channel from 2 percent to 6 percent
 - Change CB4 deep-water from 7 percent to 5 percent
 - No change to the Eastern Bay restoration variance of 2 percent
 - Remove the lower Chester River deep-channel restoration variance of 16 percent
 - Remove the Patapsco River deep-water restoration variance of 7 percent

Proposed Path Forward

- **Agreement to a common set of Partnership communication messages**
 - Reflects application of an additional decade of new data and scientific understanding along with improved models
 - Approach followed is fully consistent with approach taken during development of the 2010 Bay TMDL
 - Fully consistent with Maryland's existing water quality standards regulations requirement for regular check-ins and modifications based on new data or assumptions incorporated into the Partnership's Chesapeake Bay water quality model

Day Two Requested Policy Decision

Approval of the Bay's assimilative capacity in terms of nitrogen, phosphorus, and sediment loads

Approval of the resultant necessary adjustments to Maryland's restoration variances

Approval of the Partnership's public communication messages

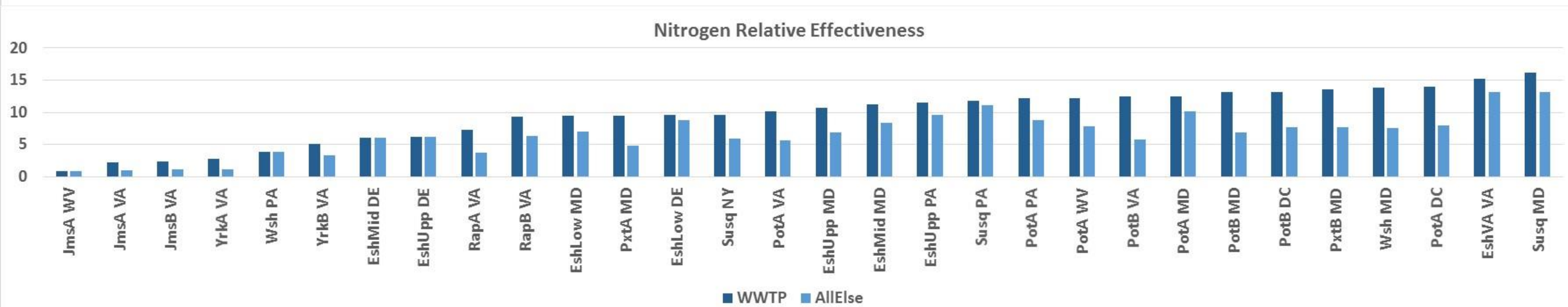
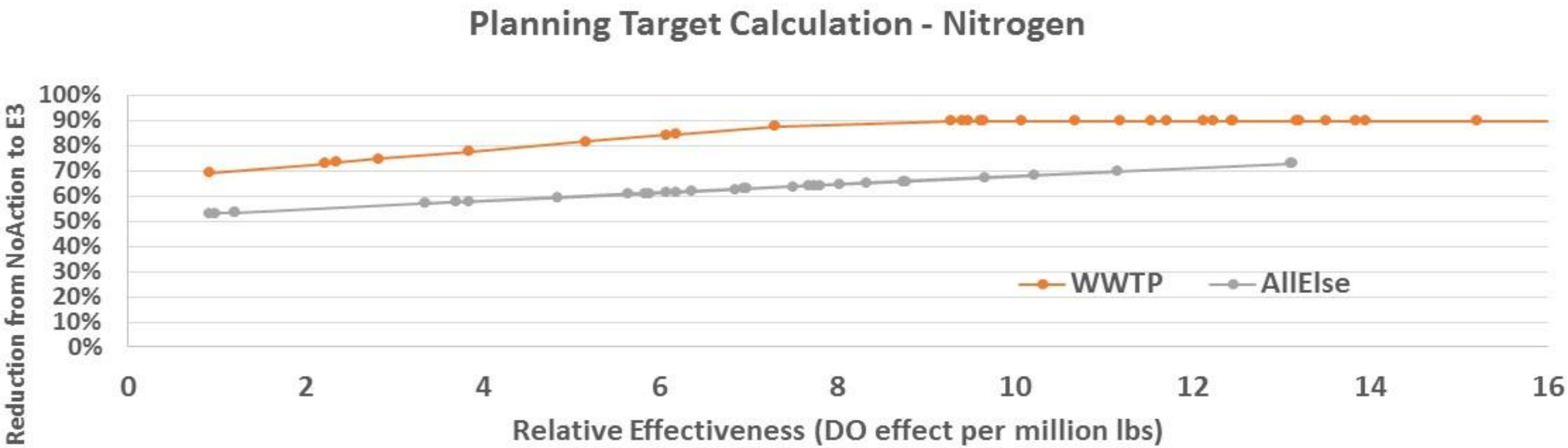
Proposed Draft Phase III Planning Targets

**Gary Shenk, USGS, CBP Phase 6 Watershed Model
Coordinator**

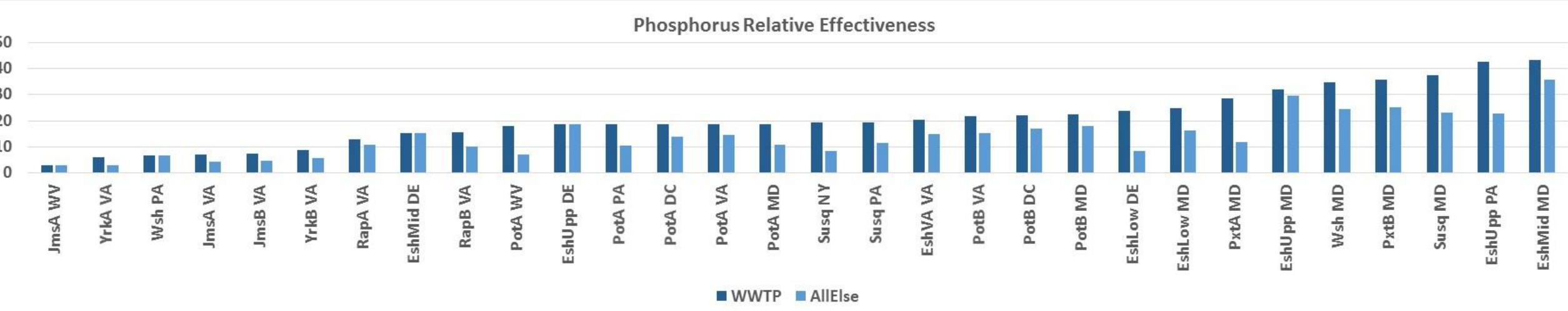
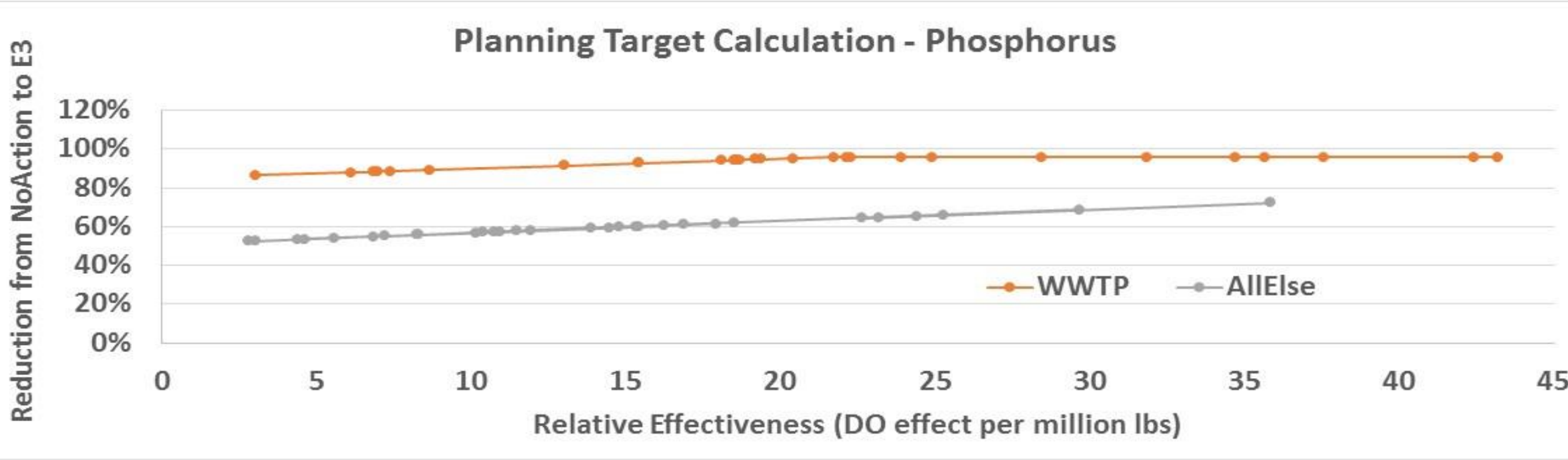
We Have All the Needed Components

- ✓ Agreed-to methodology
- ✓ No Action scenario
- ✓ E3 scenario
- ✓ Watershed and estuarine relative effectiveness
- ✓ (Proposed) assimilative capacity of the Bay
- ✓ Accounting for projected atmospheric deposition load reductions

Deriving the Draft Phase III Planning Targets: Nitrogen



Deriving the Draft Phase III Planning Targets: Phosphorus



Proposed Draft Phase III Planning Targets: Nitrogen

Jurisdiction	1985 Baseline	2013 Progress	Growth in Load to 2025	Conowingo Load Responsibility	Climate Change	2013 Progress +	Phase III Planning Target
NY	18.71	15.44					10.62
PA	122.41	99.28					72.99
MD	83.56	55.89					45.39
WV	8.73	8.06					6.36
DC	6.48	1.75					2.25
DE	6.97	6.59					4.66
VA	84.29	61.53					56.37
BasinWide	331.15	248.54					198.64

*Units = millions of pounds

Proposed Draft Phase III Planning Targets: Phosphorus

Jurisdiction	1985 Baseline	2013 Progress	Growth in Load to 2025	Conowingo Load Responsibility	Climate Change	2013 Progress +	Phase III Planning Target
NY	1.198	0.710					0.491
PA	6.282	3.749					3.012
MD	7.495	3.942					3.553
WV	0.902	0.617					0.493
DC	0.090	0.062					0.120
DE	0.225	0.116					0.116
VA	14.244	6.751					6.411
BasinWide	30.44	15.95					14.20

*Units = millions of pounds

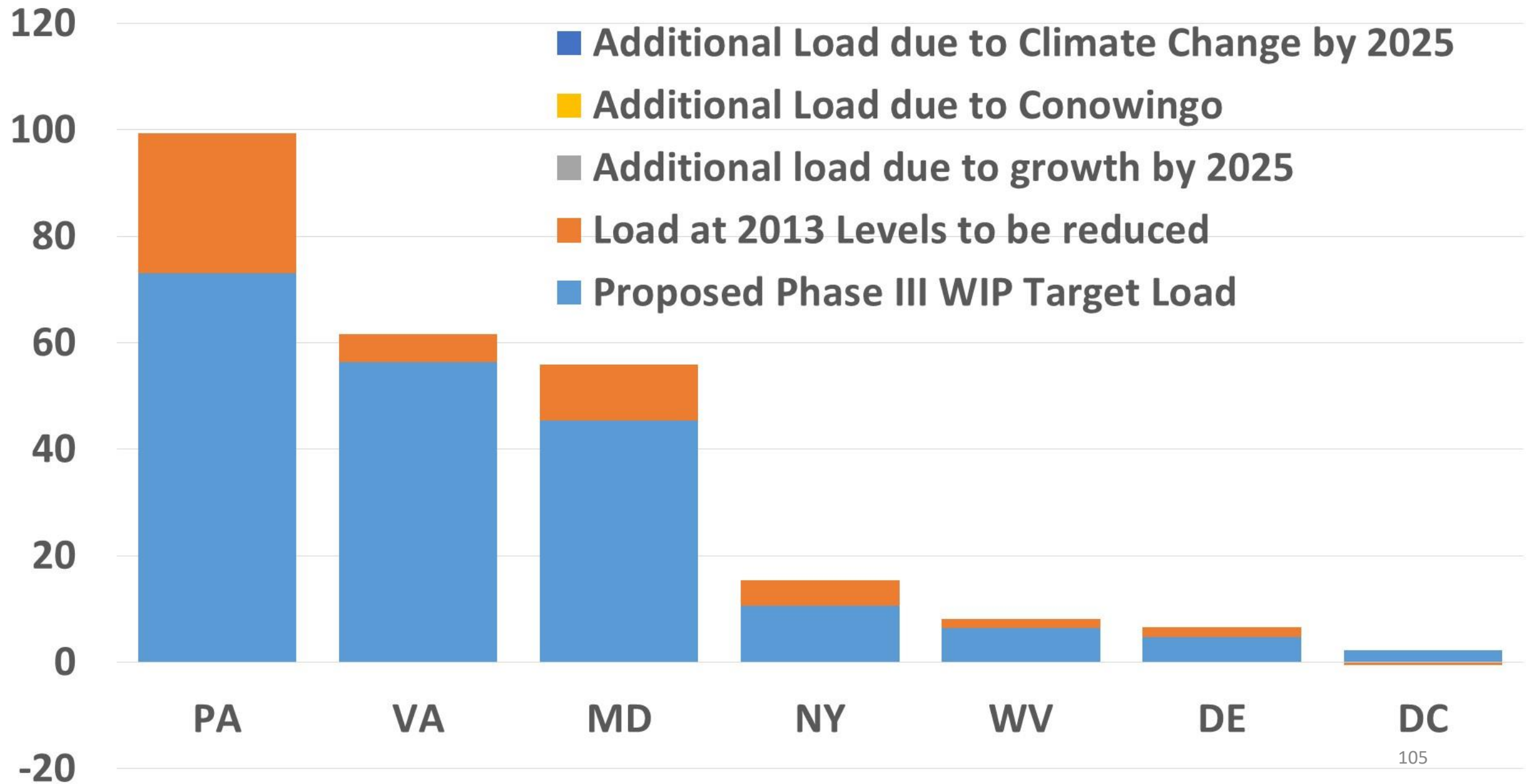
Proposed Draft Phase III Planning Targets: Nitrogen

Jurisdiction	1985 Baseline	2013 Progress			Special Case	With Special Cases	Phase III Planning Target
NY	18.71	15.44			1.00	11.62	10.62
PA	122.41	99.28			-0.58	72.41	72.99
MD	83.56	55.89			-0.31	45.08	45.39
WV	8.73	8.06			-0.03	6.33	6.36
DC	6.48	1.75			0.00	2.24	2.25
DE	6.97	6.59			-0.06	4.61	4.66
VA	84.29	61.53			-0.24	56.13	56.37
BasinWide	331.15	248.54			-0.22	198.41	198.64

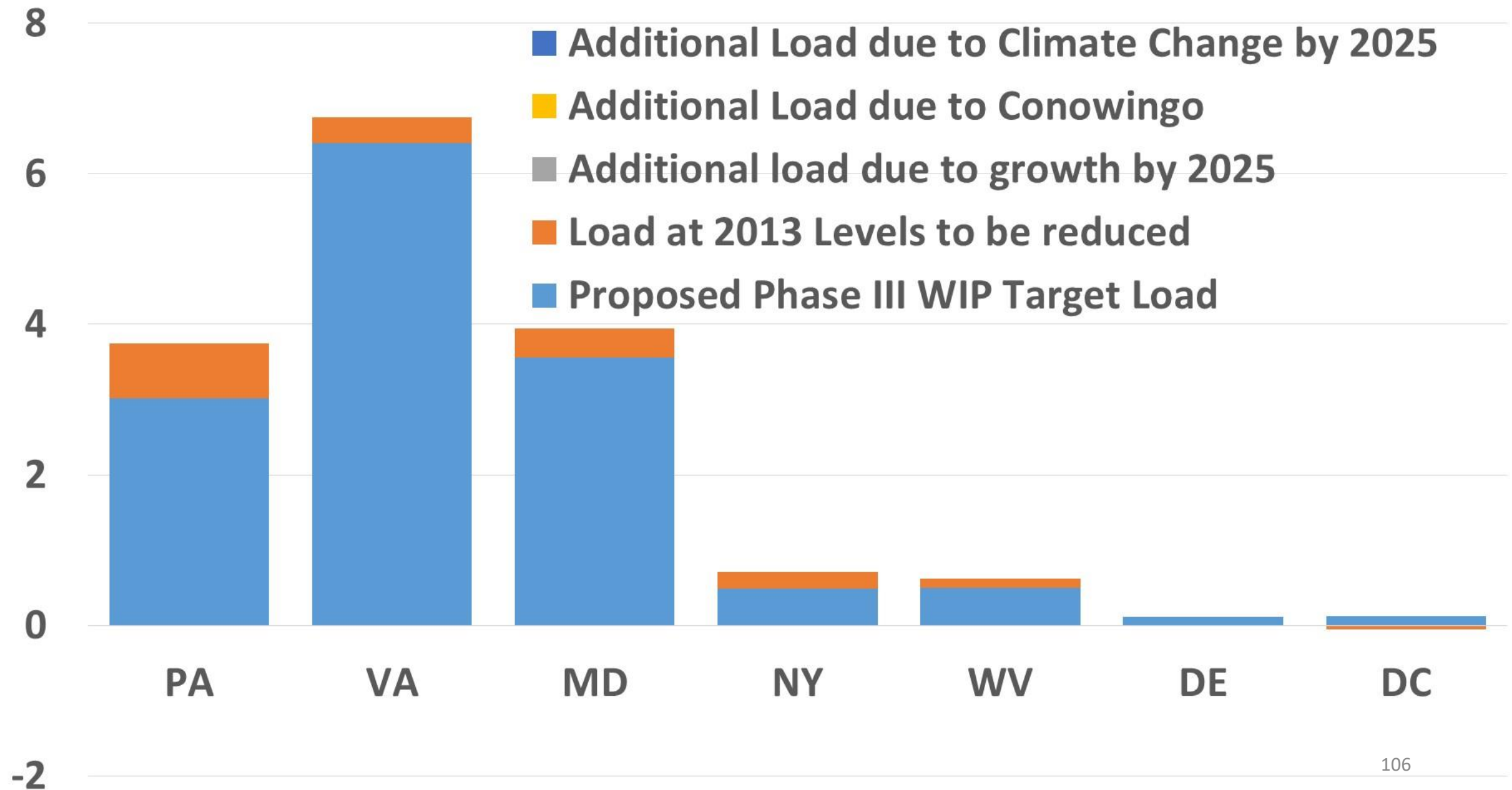
Proposed Draft Phase III Planning Targets: Phosphorus

Jurisdiction	1985 Baseline	2013 Progress			Special Case	With Special Cases	Phase III Planning Target
NY	1.198	0.710			0.100	0.591	0.491
PA	6.282	3.749			-0.101	2.911	3.012
MD	7.495	3.942			-0.081	3.472	3.553
WV	0.902	0.617			0.200	0.693	0.493
DC	0.090	0.062			-0.001	0.120	0.120
DE	0.225	0.116			-0.004	0.112	0.116
VA	14.244	6.751			-0.138	6.273	6.411
BasinWide	30.436	15.947			-0.025	14.17	14.20

Proposed Draft Nitrogen Targets

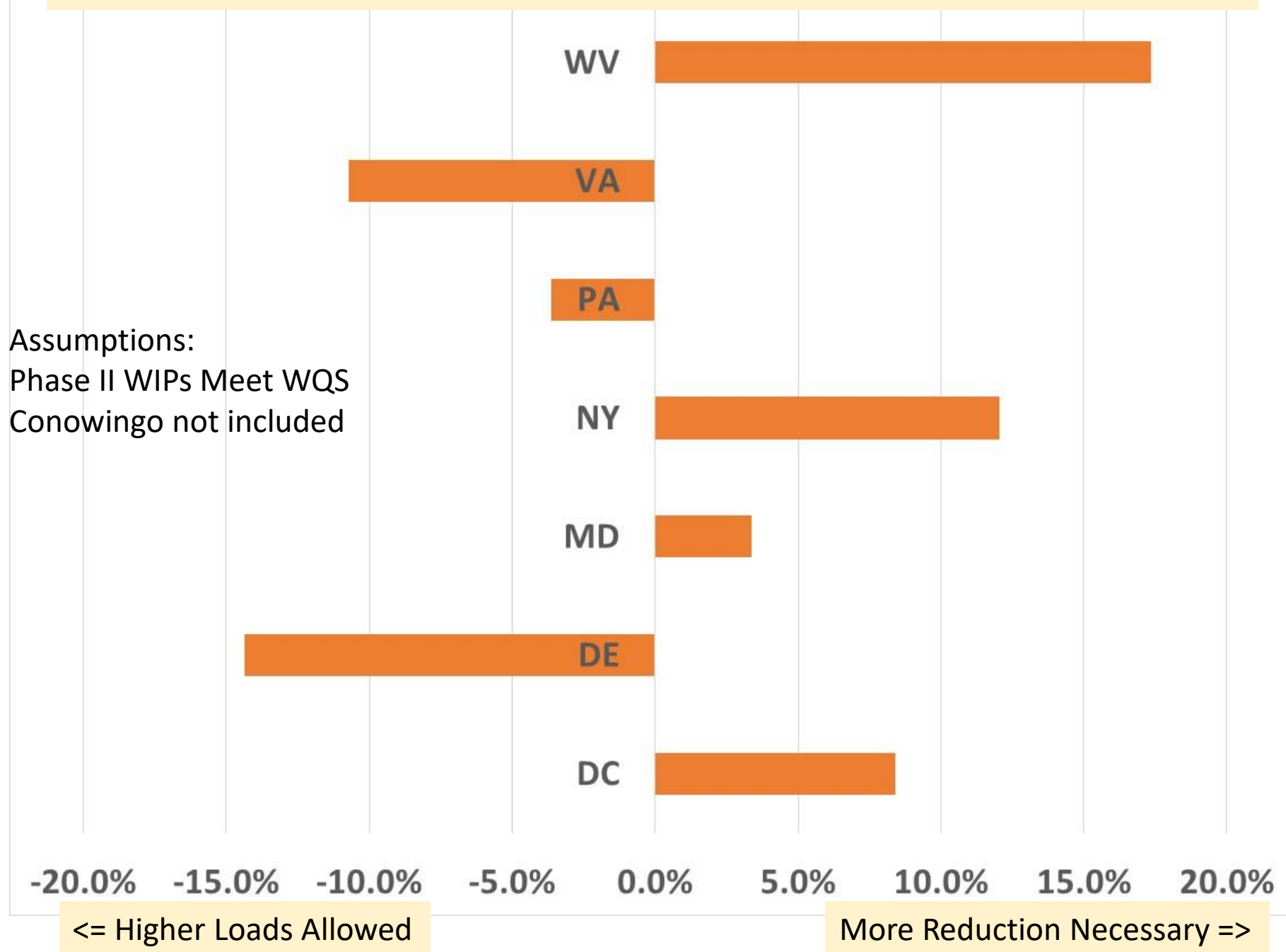


Proposed Draft Phosphorus Targets



Load Reduction of Nitrogen and Phosphorus Beyond Jurisdictions' Phase II WIP Loads

Assumptions:
Phase II WIPs Meet WQS
Conowingo not included



Jurisdiction-Specific Proposed Draft Phase III WIP Planning Targets

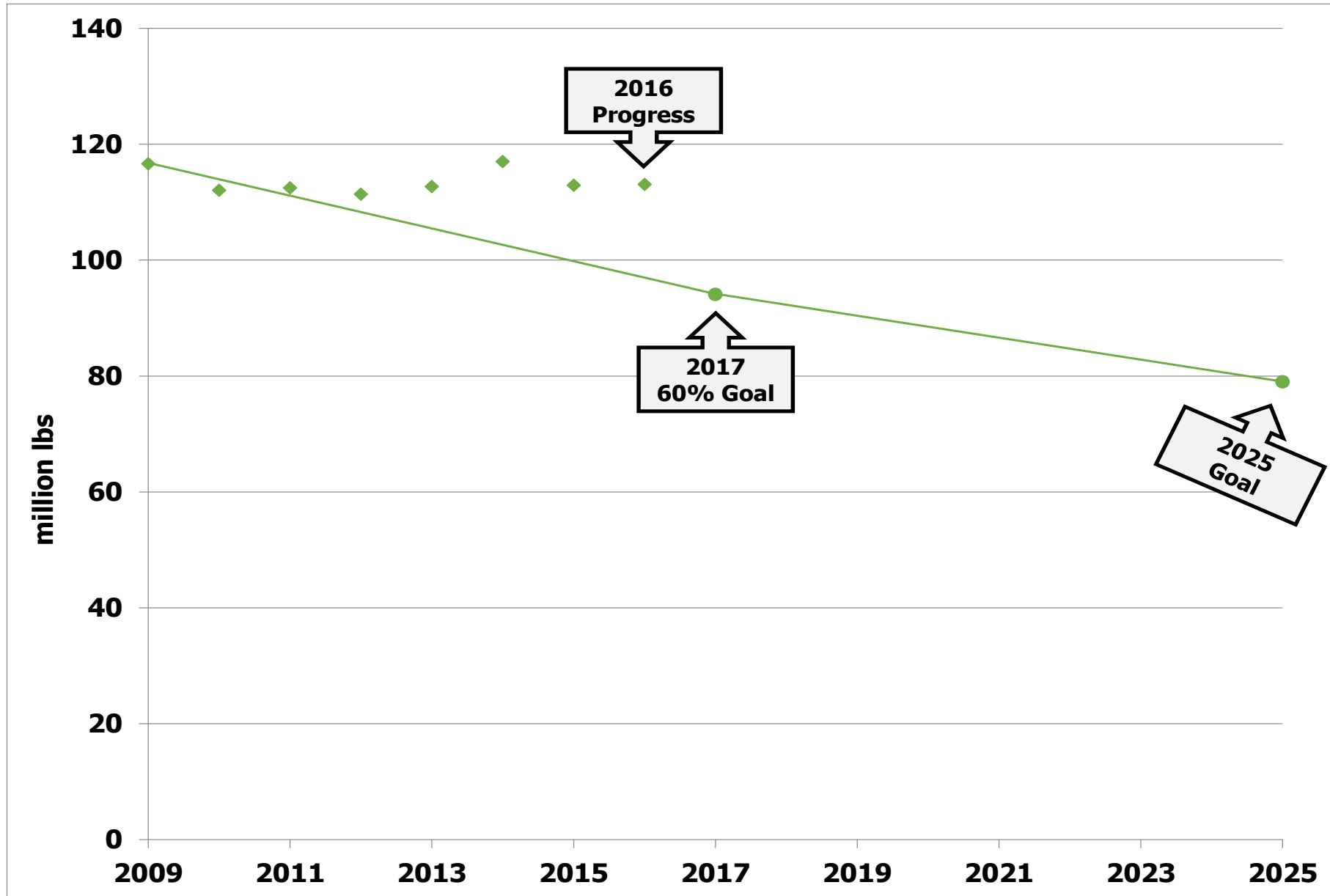
**Teresa Koon, WV DEP CBP Water Quality Goal
Implementation Team Vice Chair
and
WQGIT Jurisdictional Representations**

PA Draft Phase III WIP Planning Targets + Reference Loads

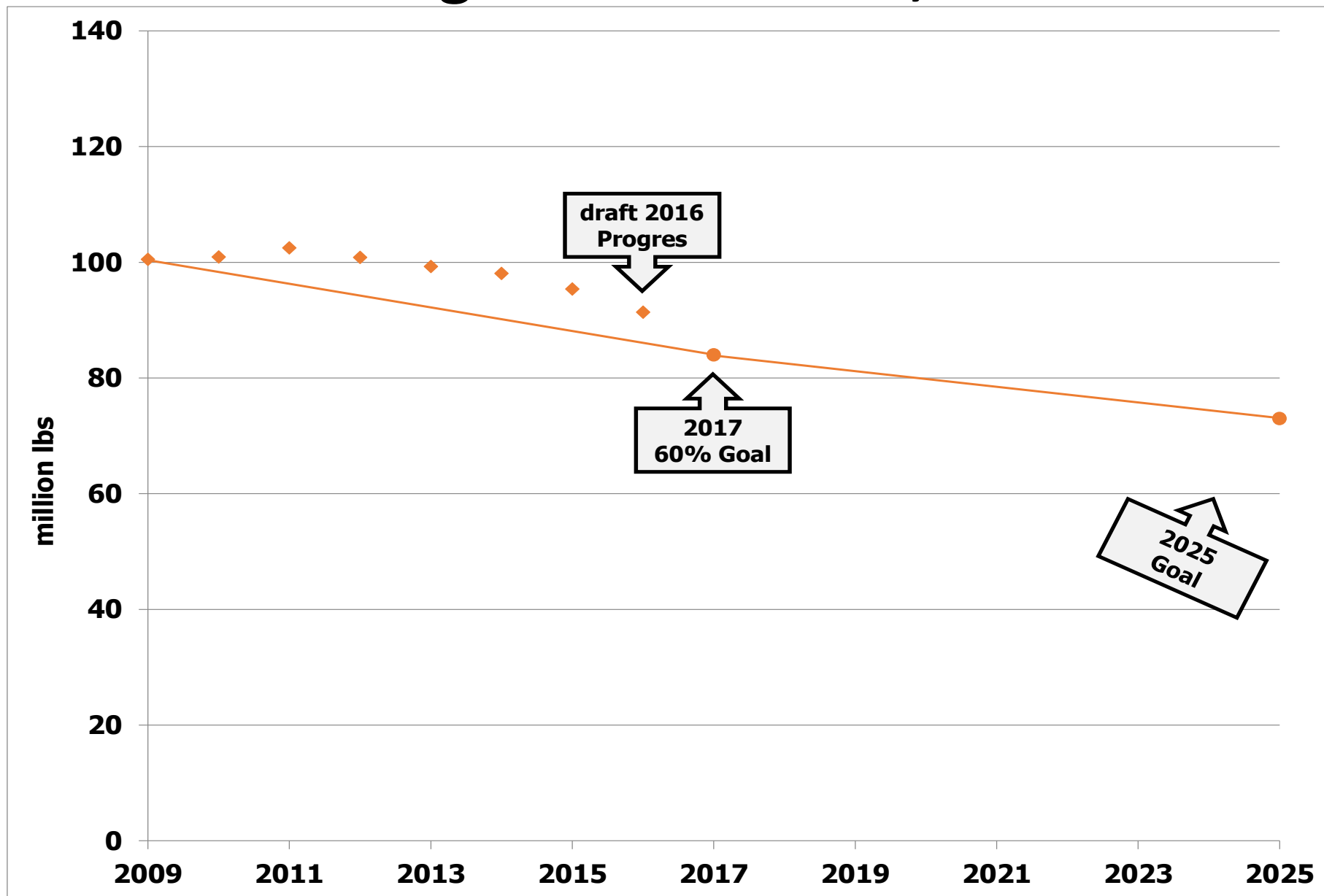
Nitrogen Load					
	No-Action (M lbs)	E3 (M lbs)	2013 Progress (M lbs)	Phase II WIP (reference) (M lbs)	Draft Phase III WIP Planning Target (M lbs)
PA Eastern Shore	0.81	0.29	0.63	0.43	0.46
PA Potomac	10.39	3.96	8.11	5.39	5.96
PA Susquehanna	125.57	47.42	90.51	63.99	66.55
PA Western Shore	0.04	0.01	0.03	0.02	0.02
PA Total	136.82	51.69	99.28	69.83	72.99

Phosphorus Load					
	No-Action (M lbs)	E3 (M lbs)	2013 Progress (M lbs)	Phase II WIP (reference) (M lbs)	Draft Phase III WIP Planning Target (M lbs)
PA Eastern Shore	0.045	0.016	0.027	0.020	0.025
PA Potomac	0.640	0.185	0.398	0.317	0.332
PA Susquehanna	6.628	1.478	3.323	2.803	2.654
PA Western Shore	0.002	0.000	0.001	0.001	0.001
PA Total	7.315	1.679	3.749	3.140	3.012

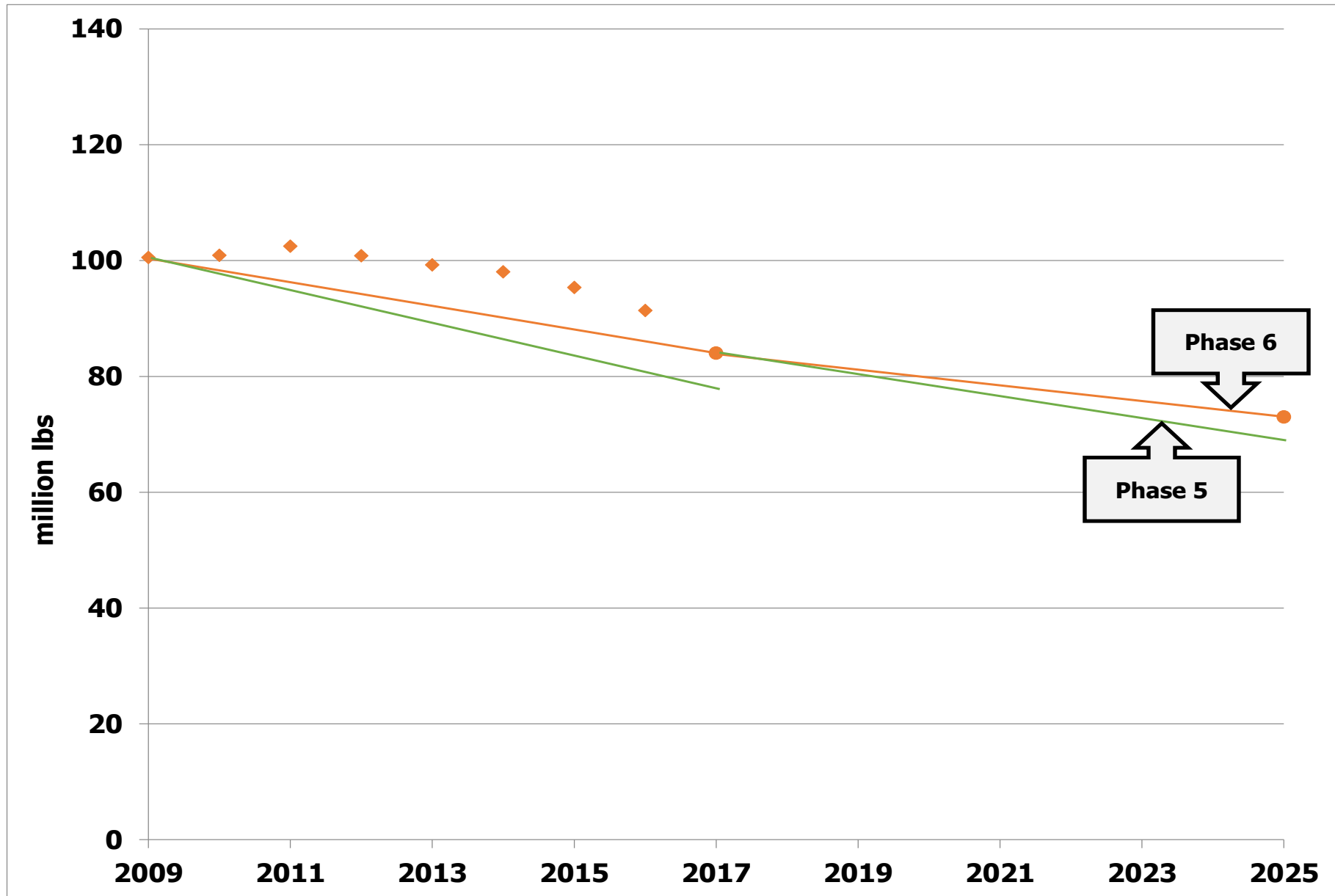
PA Nitrogen Loads-Goals, Phase 5.3.2



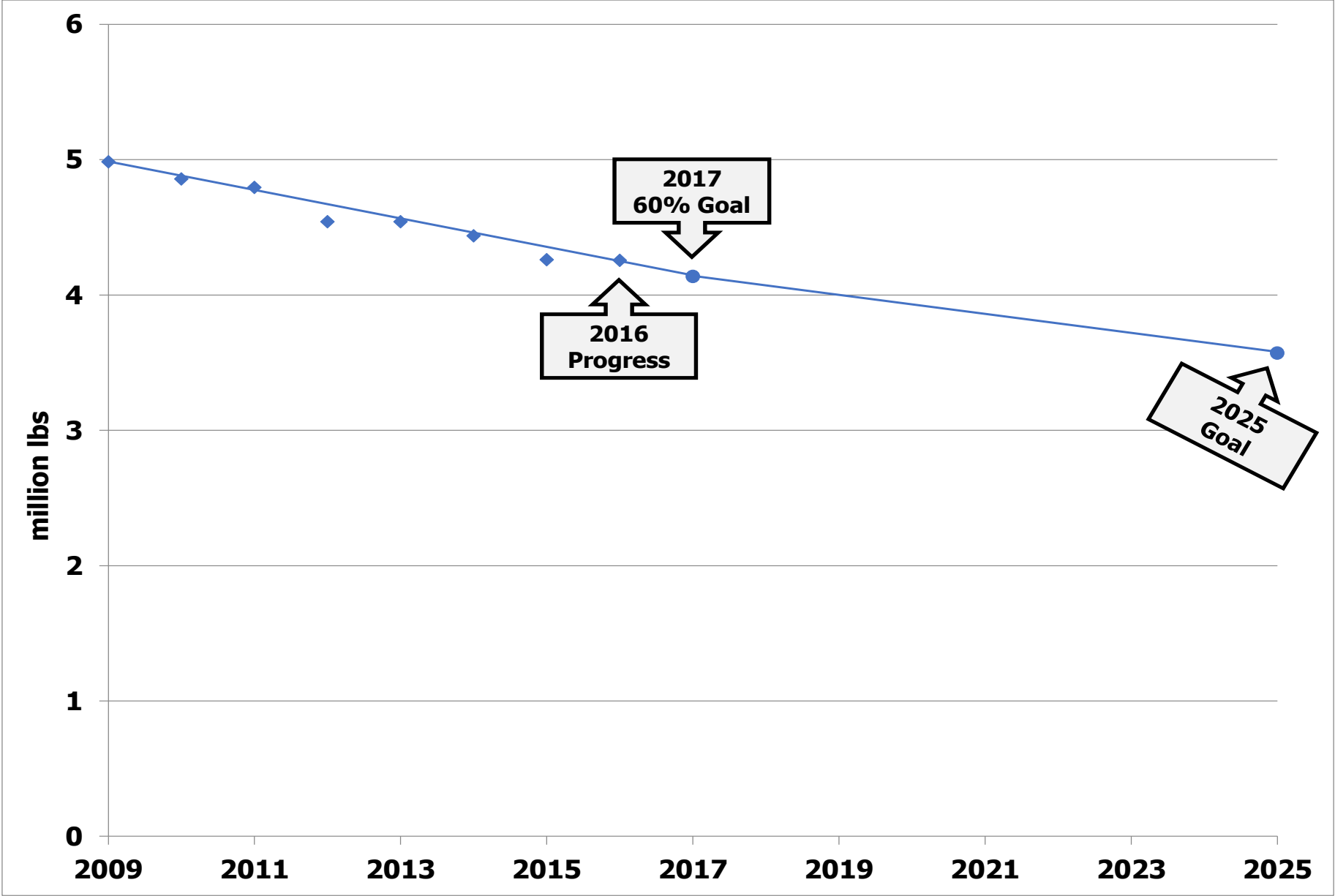
PA Nitrogen Loads-Goals, Phase 6



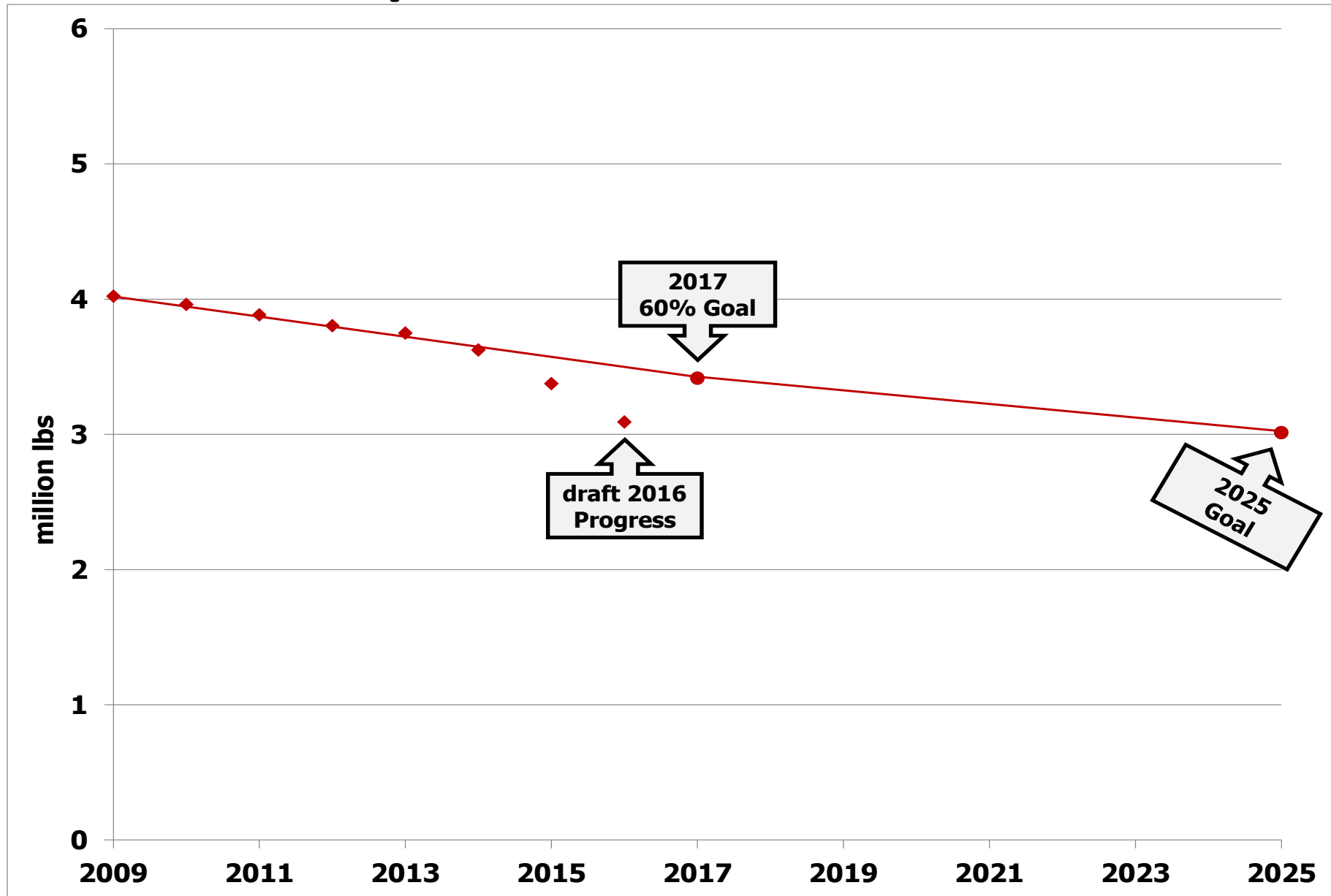
PA Nitrogen Change in LOE



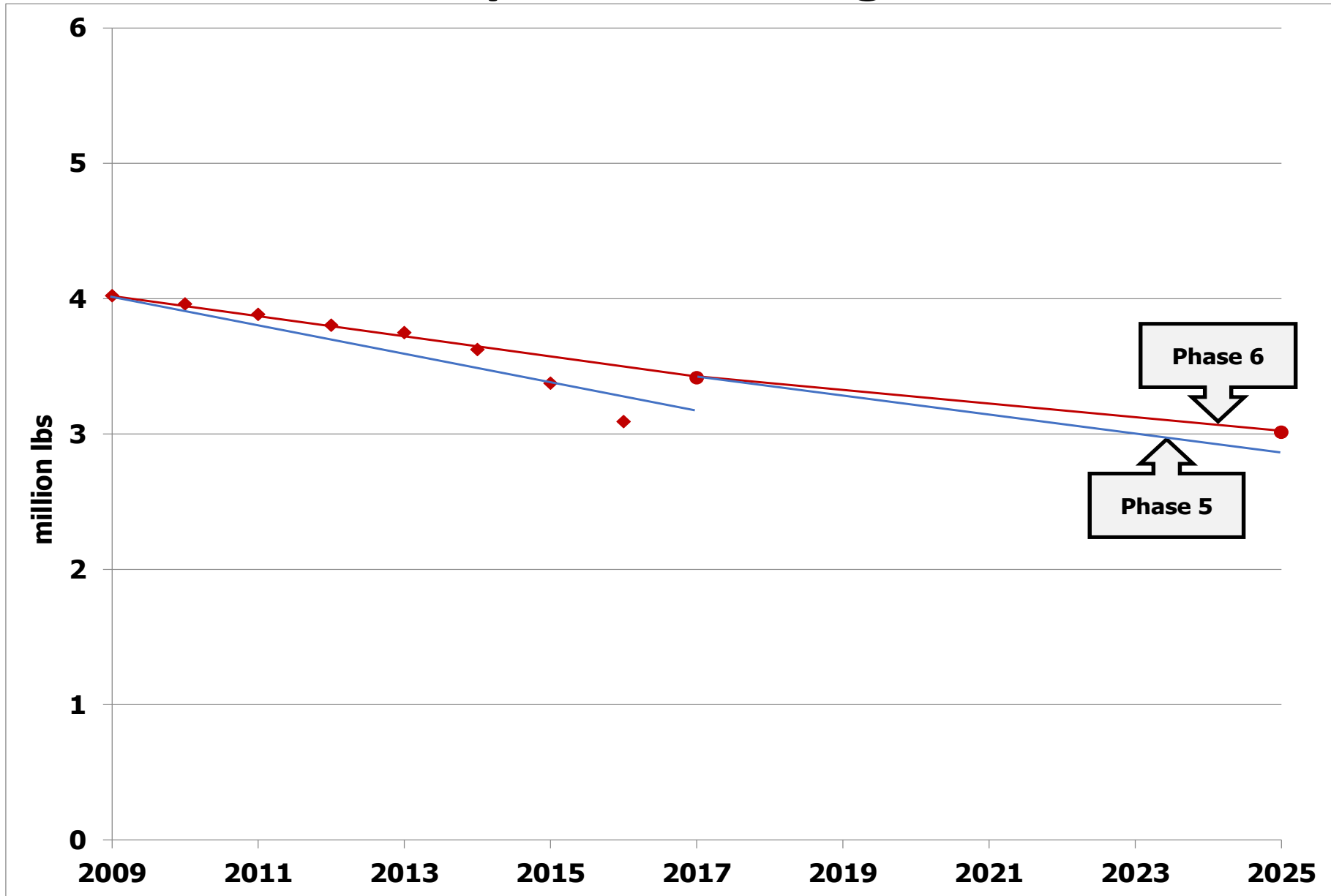
PA Phosphorus Loads-Goals, Phase 5.3.2



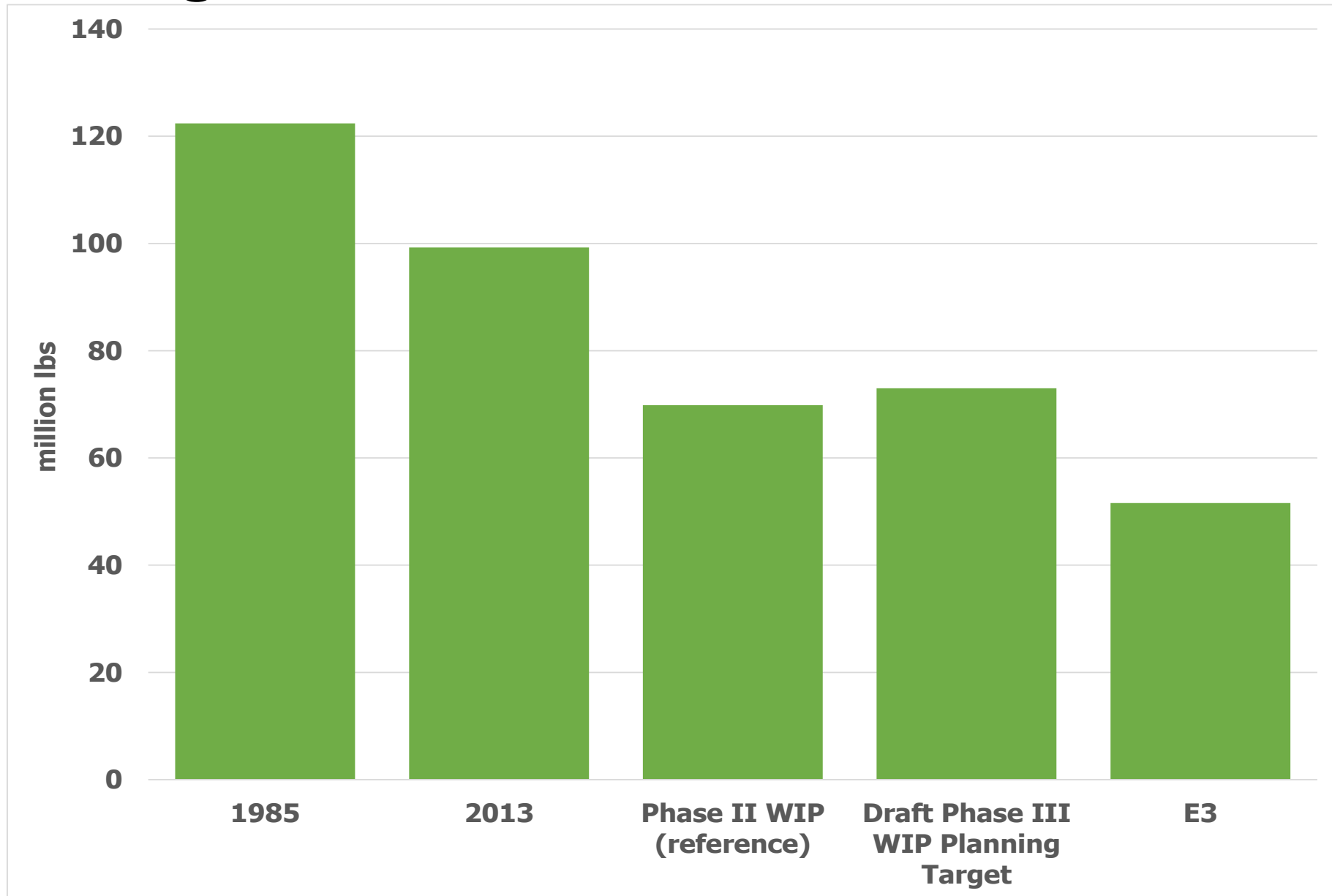
PA Phosphorus Loads-Goals, Phase 6



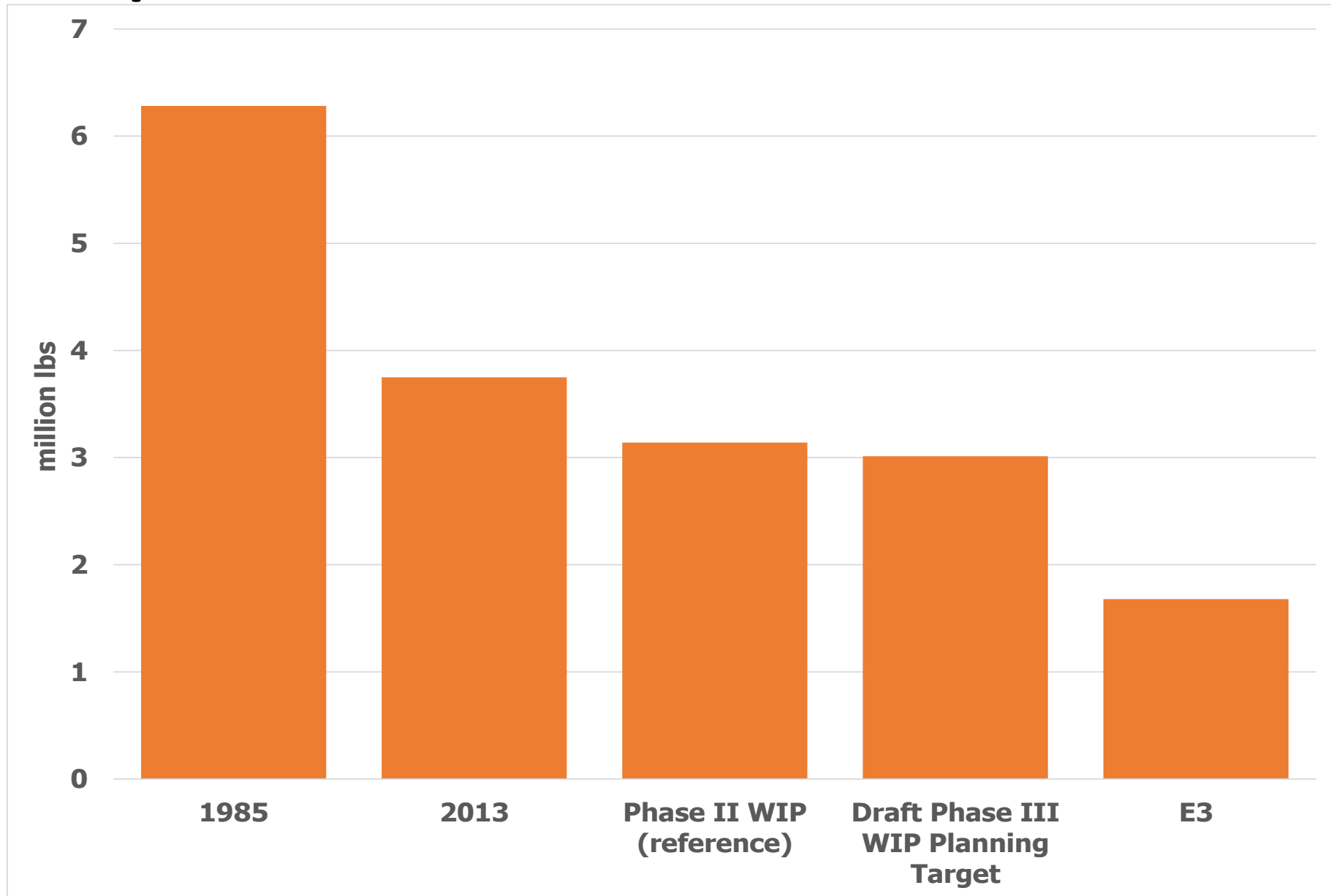
PA Phosphorus Change in LOE



PA Nitrogen Loads, Reference Scenarios, and Target

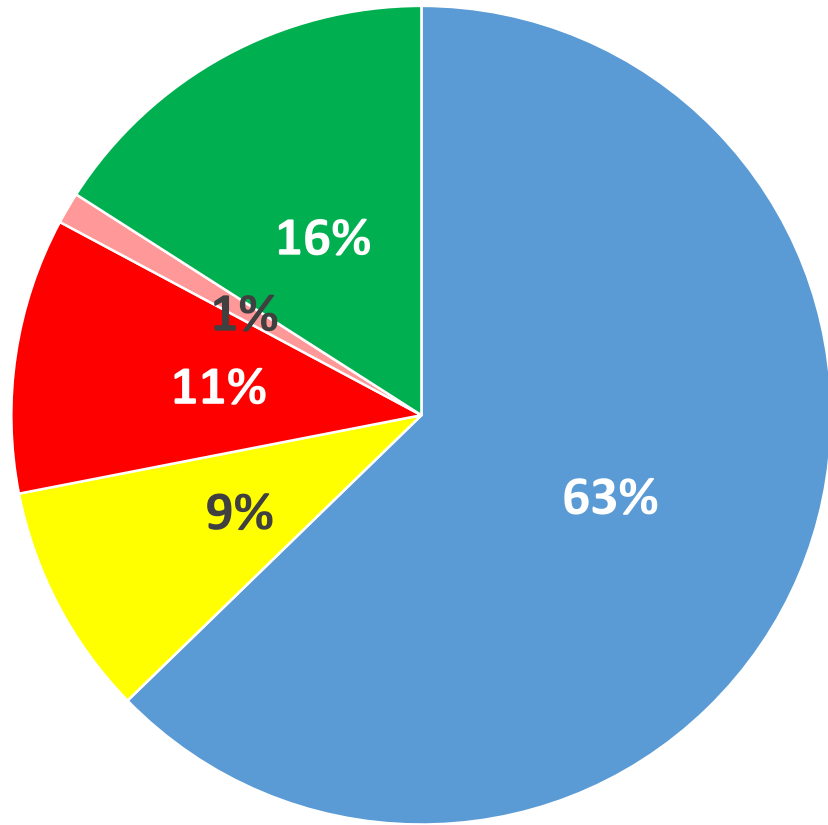


PA Phosphorus Loads, Reference Scenarios, and Target

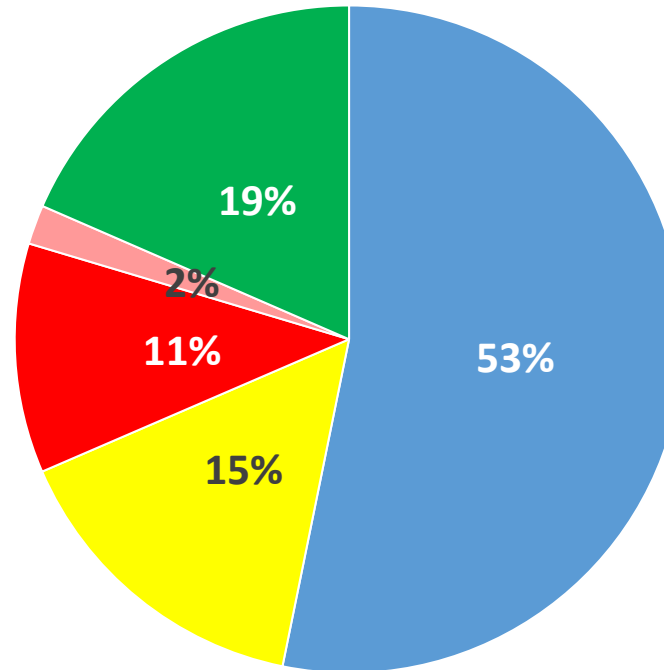


PA Nitrogen Loads and Target

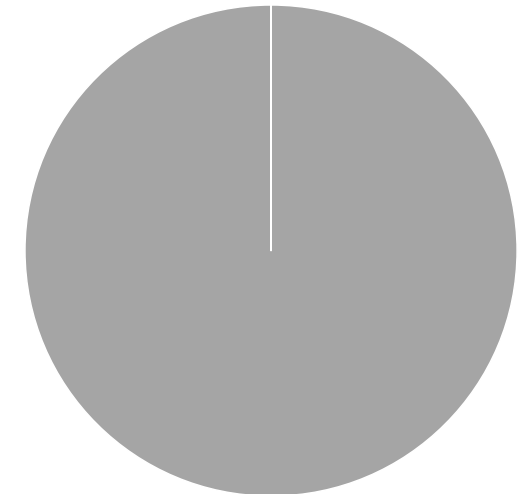
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1985



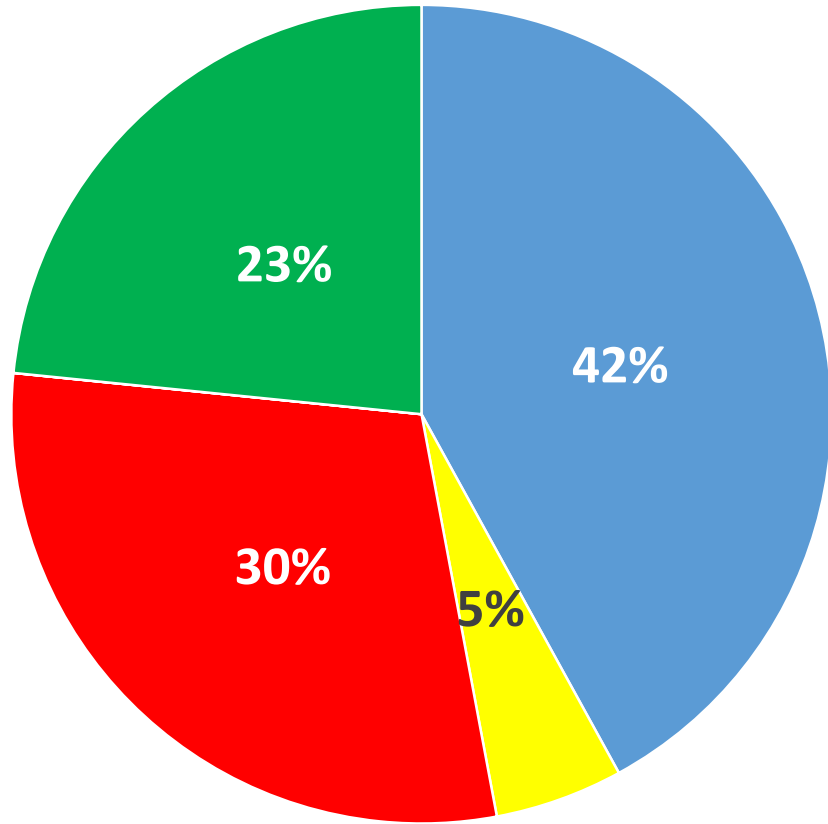
2013



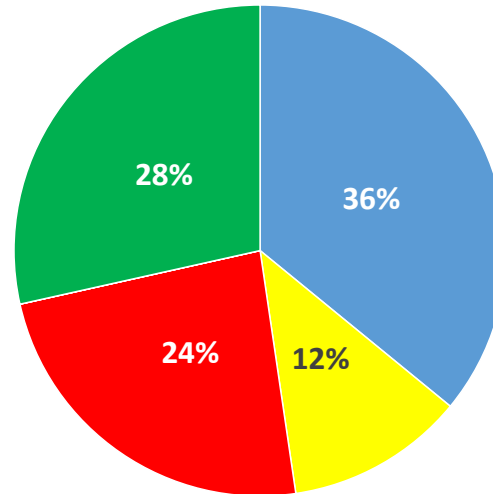
**Draft Phase III WIP
Planning Target**

PA Phosphorus Loads and Target

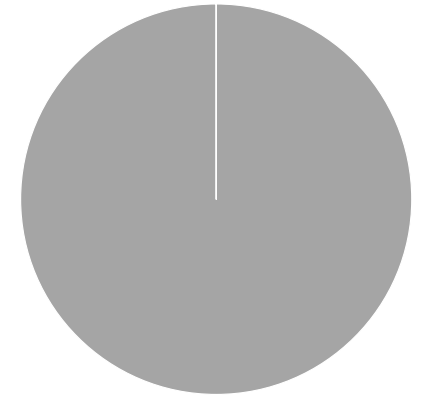
■ Agriculture ■ Developed ■ Wastewater ■ Natural



1985



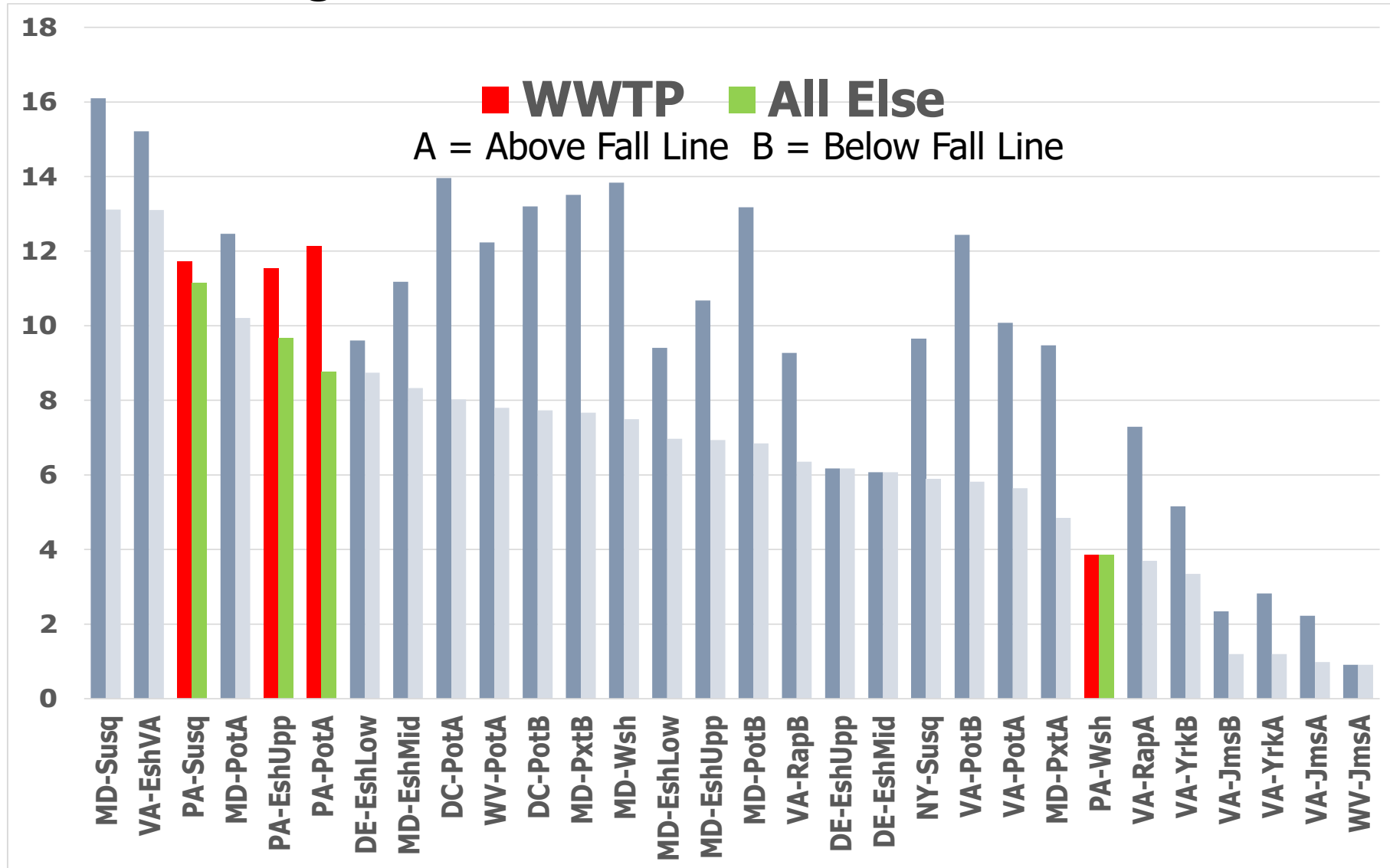
2013



**Draft Phase III WIP
Planning Target**

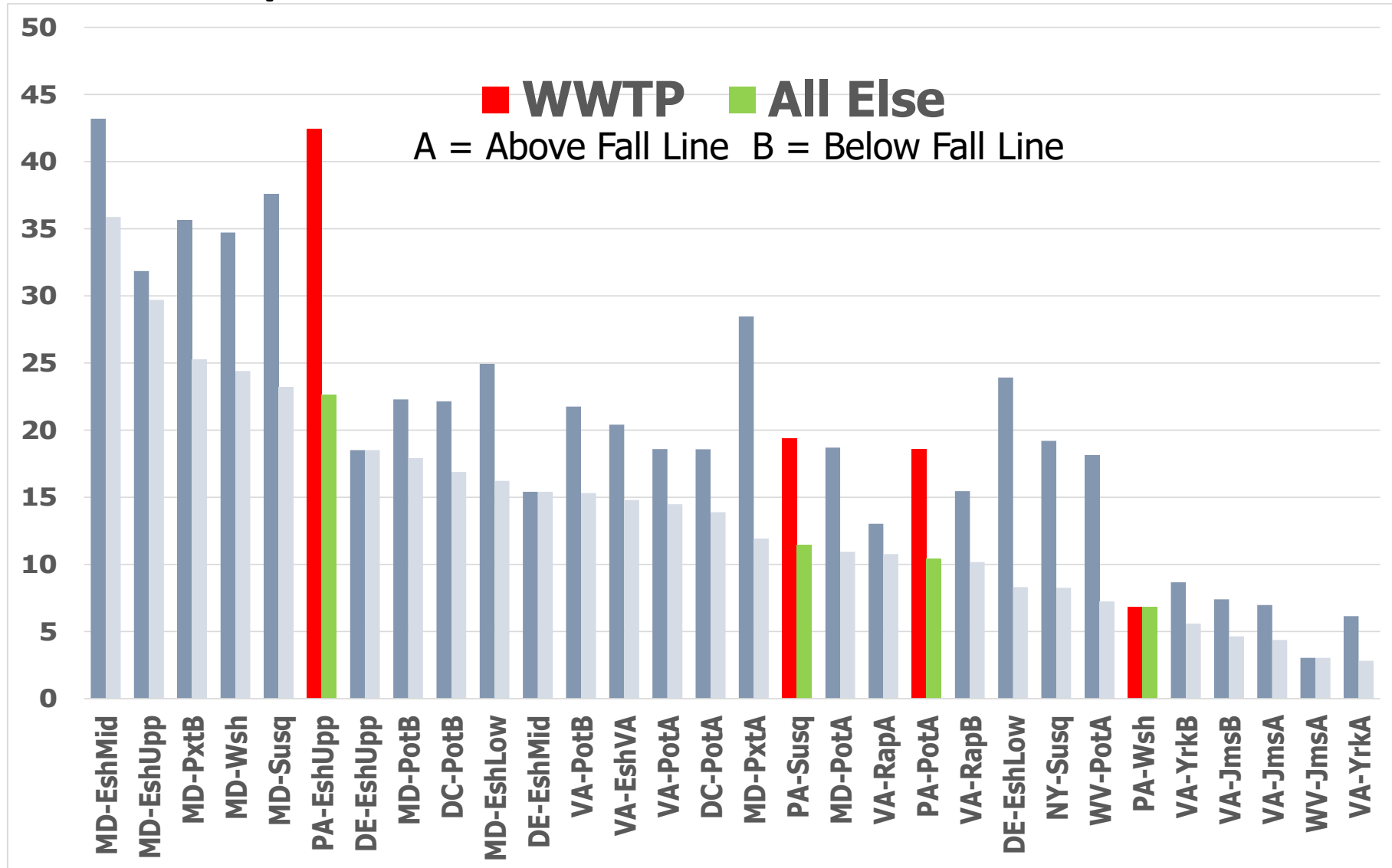
Nitrogen Relative Effectiveness

Effect of Nitrogen Load Reduction on WQ Standard Attainment



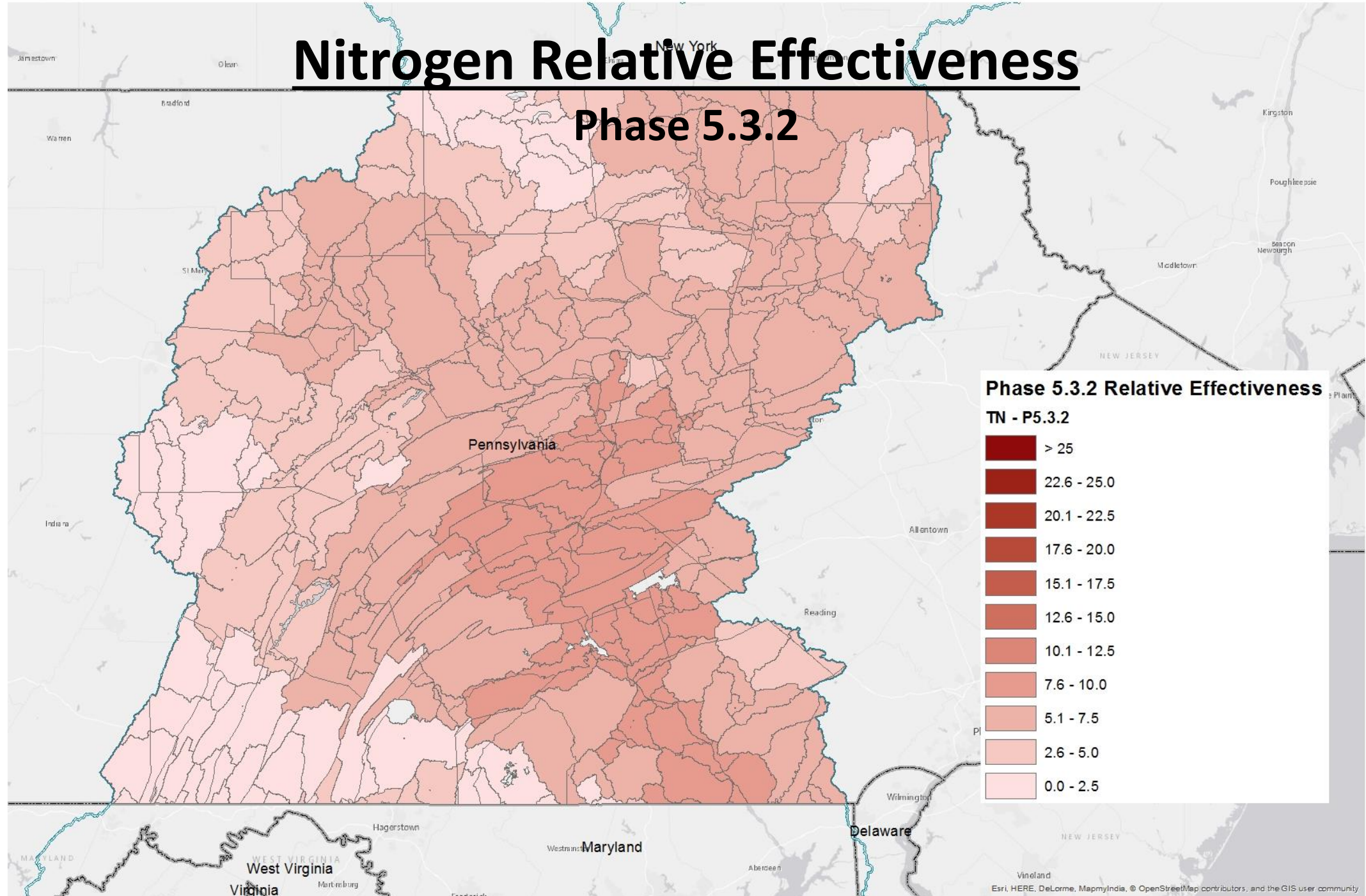
Phosphorus Relative Effectiveness

Effect of Phosphorus Load Reduction on WQ Standard Attainment



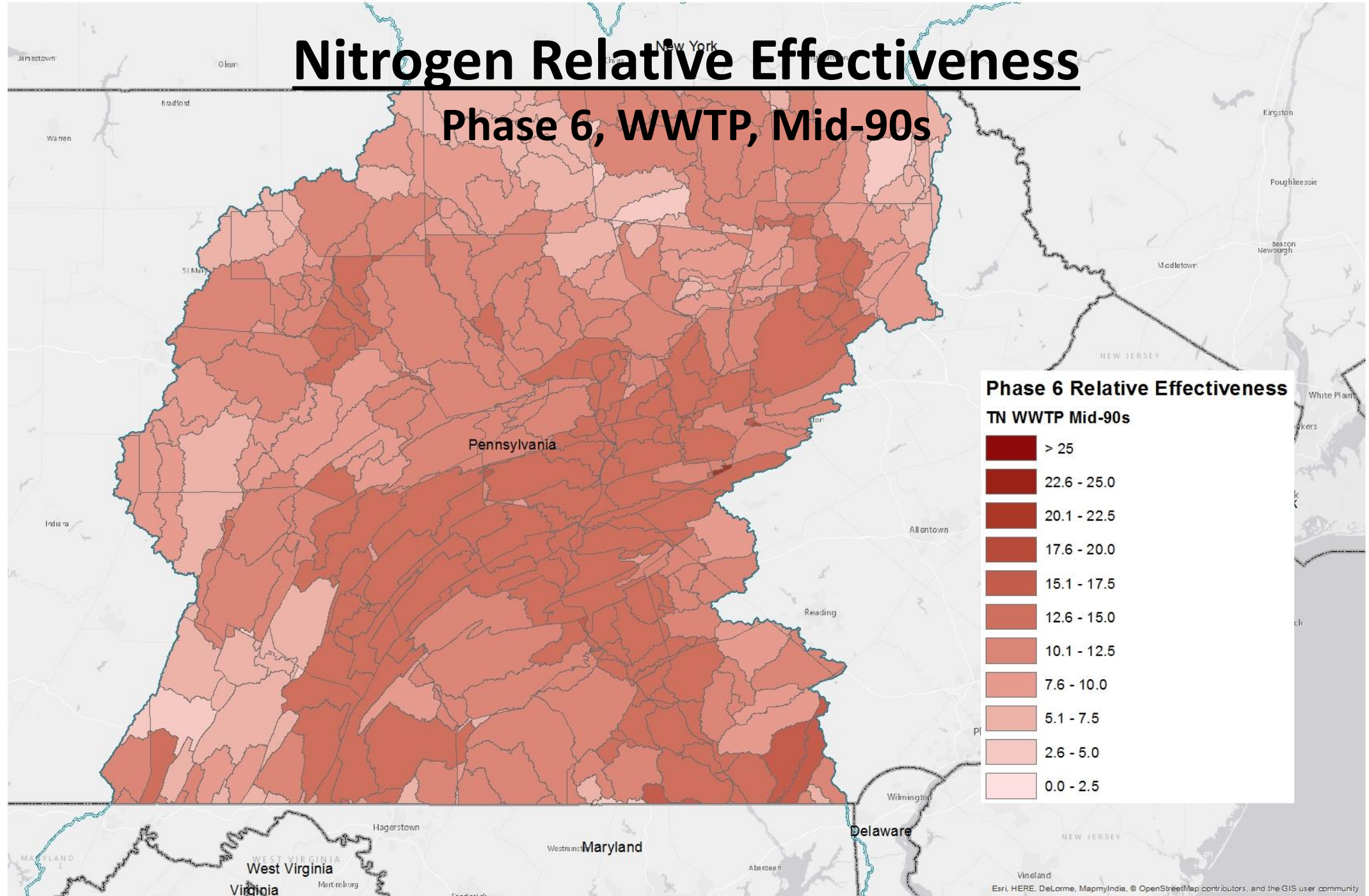
Nitrogen Relative Effectiveness

Phase 5.3.2



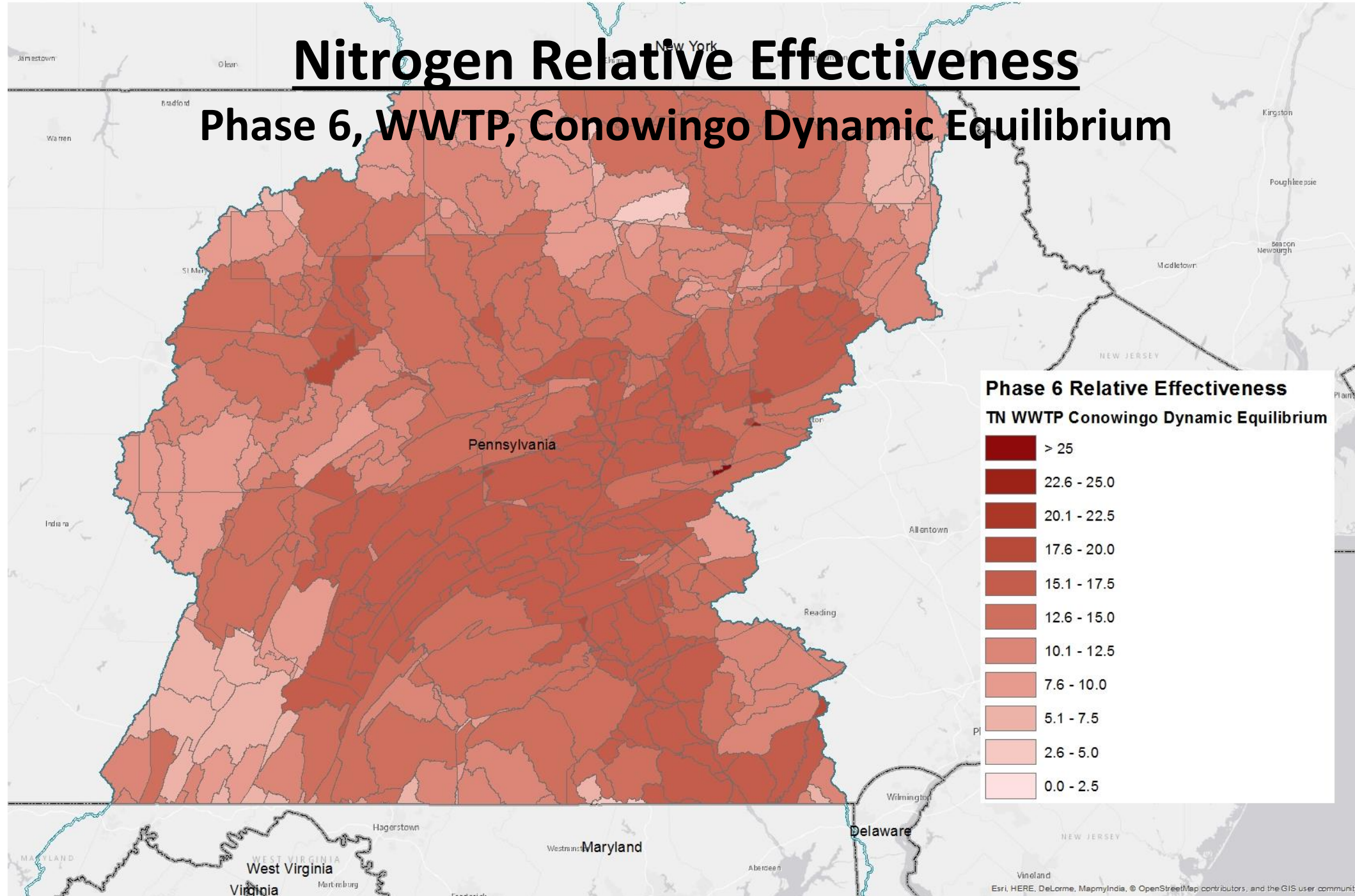
Nitrogen Relative Effectiveness

Phase 6, WWTP, Mid-90s



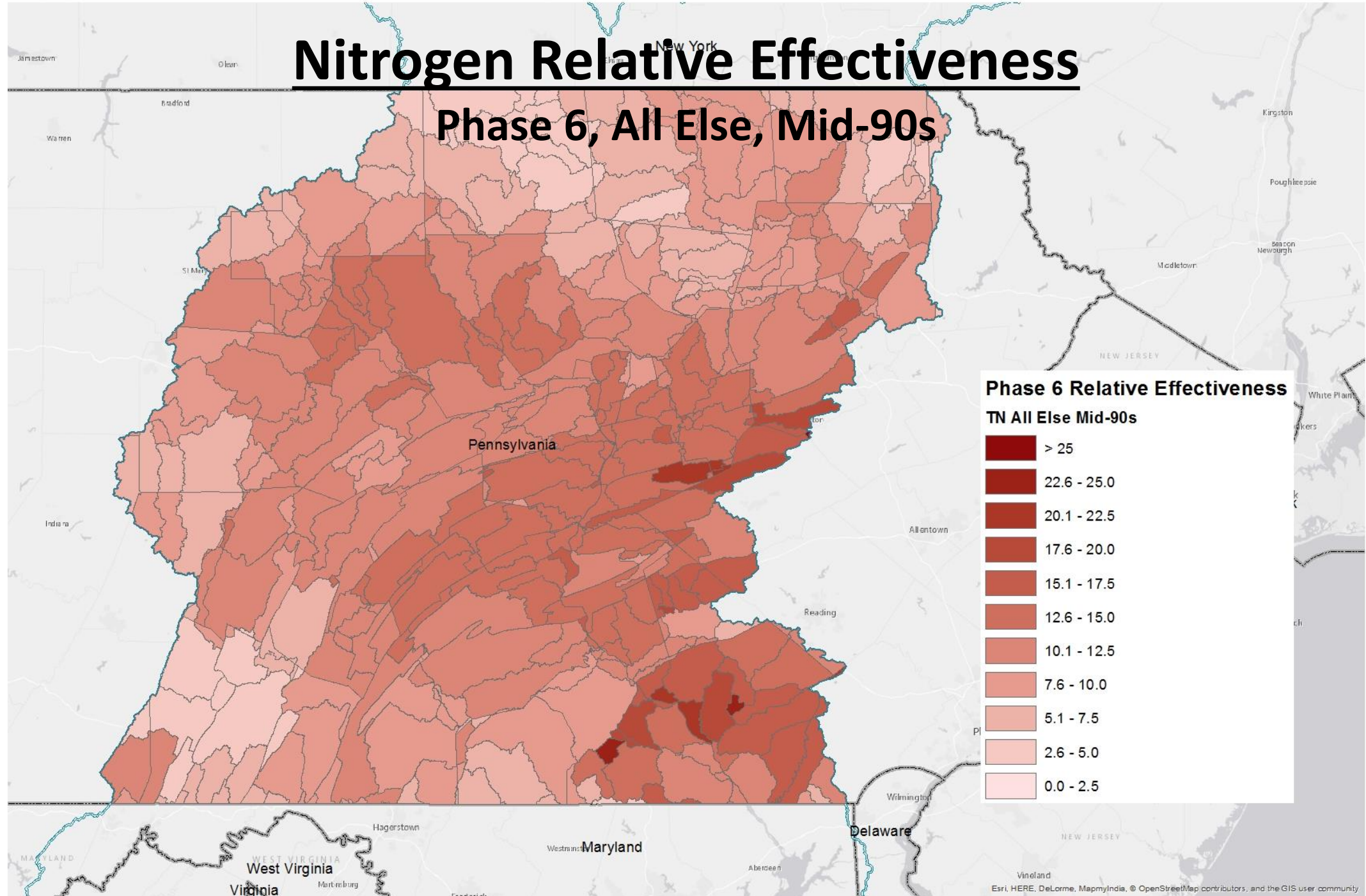
Nitrogen Relative Effectiveness

Phase 6, WWTP, Conowingo Dynamic Equilibrium



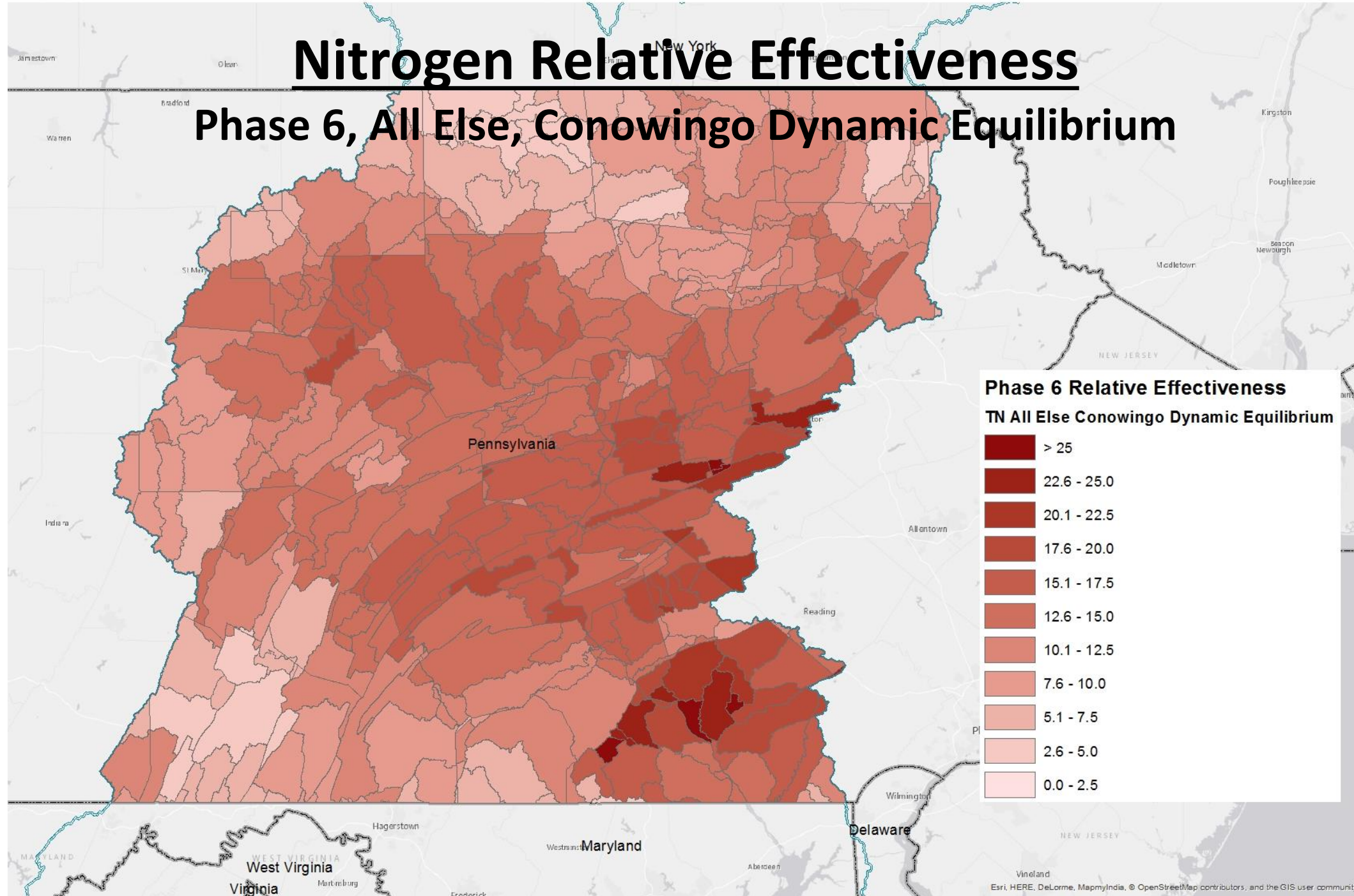
Nitrogen Relative Effectiveness

Phase 6, All Else, Mid-90s



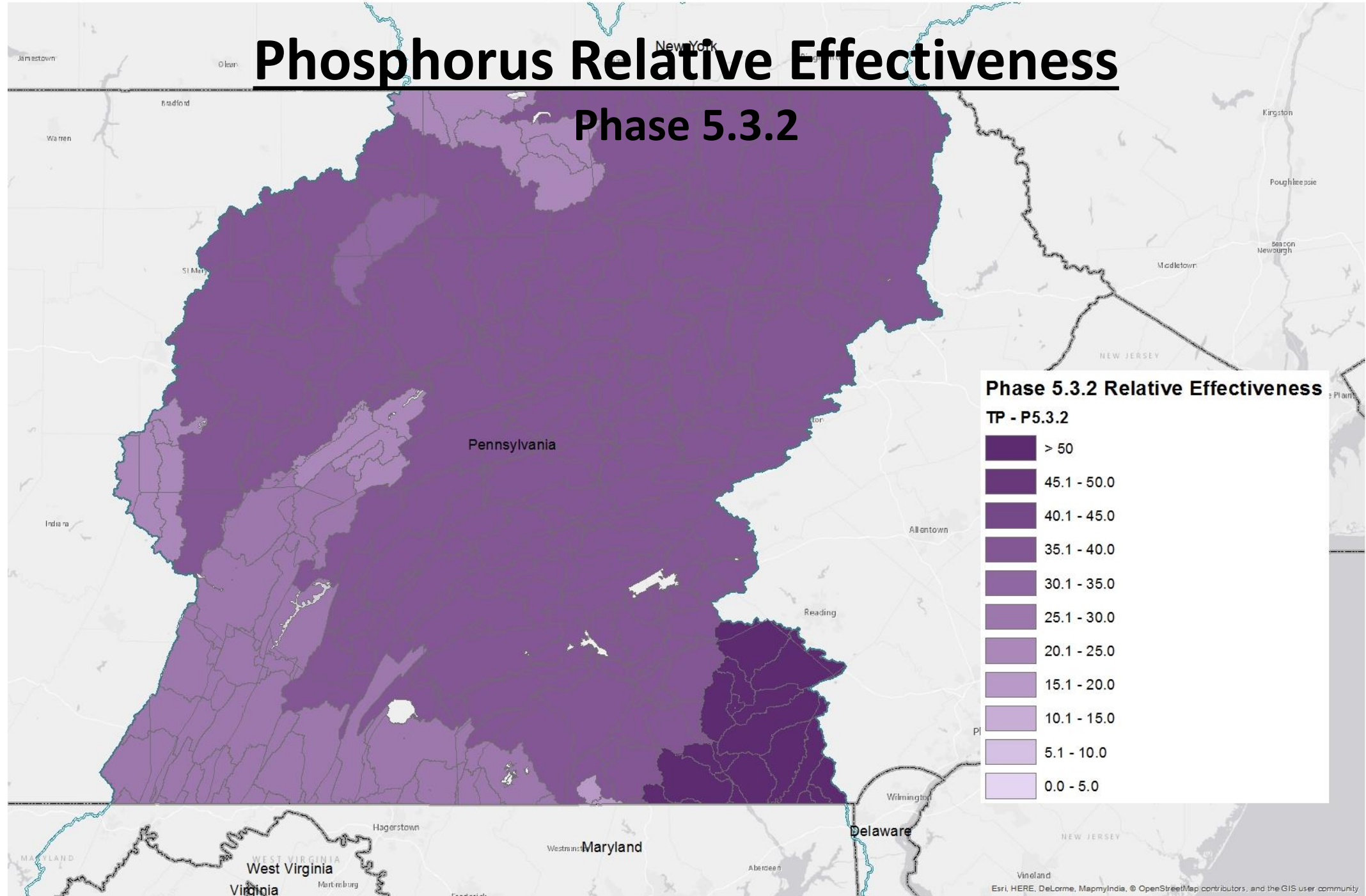
Nitrogen Relative Effectiveness

Phase 6, All Else, Conowingo Dynamic Equilibrium



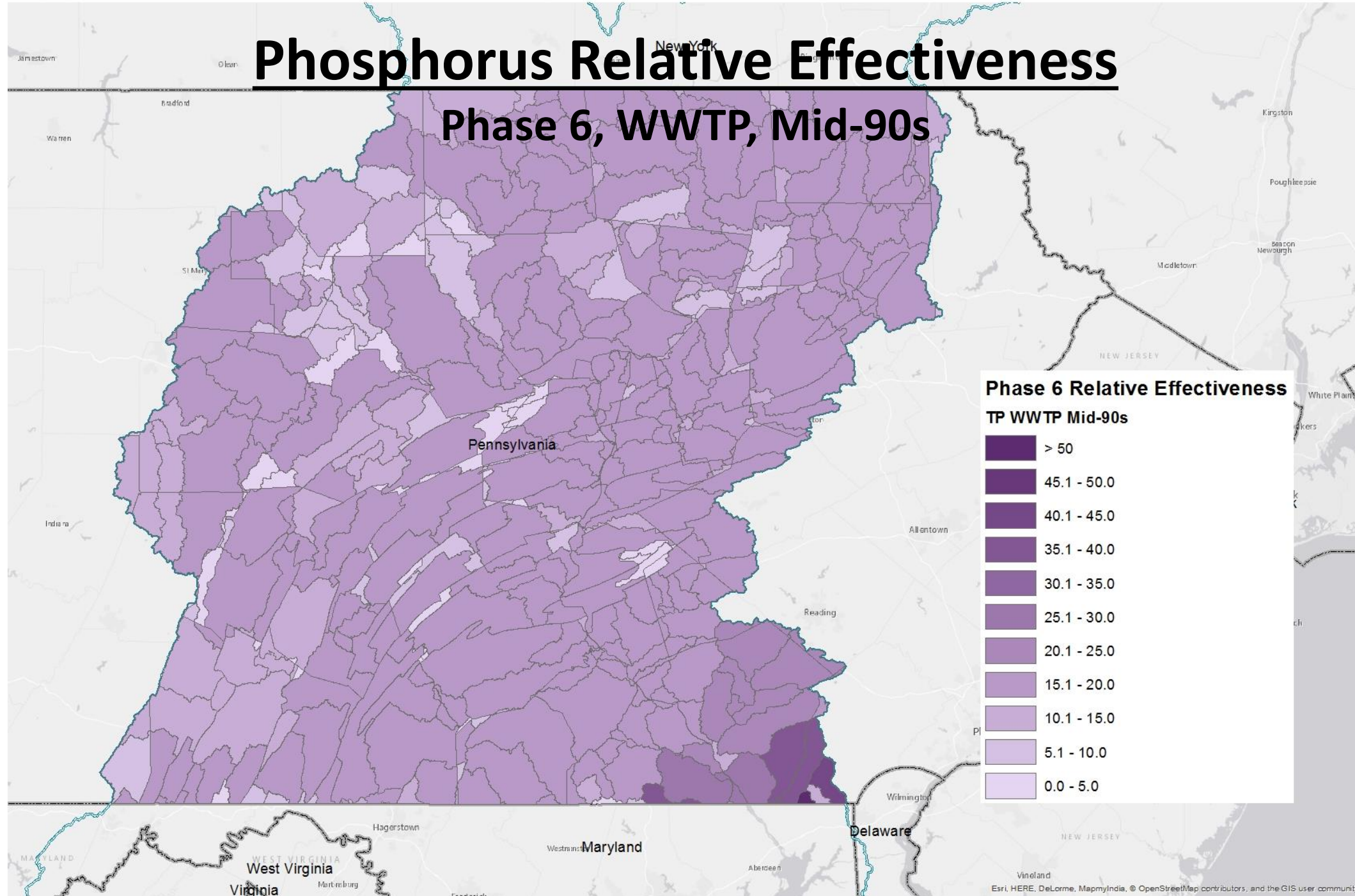
Phosphorus Relative Effectiveness

Phase 5.3.2



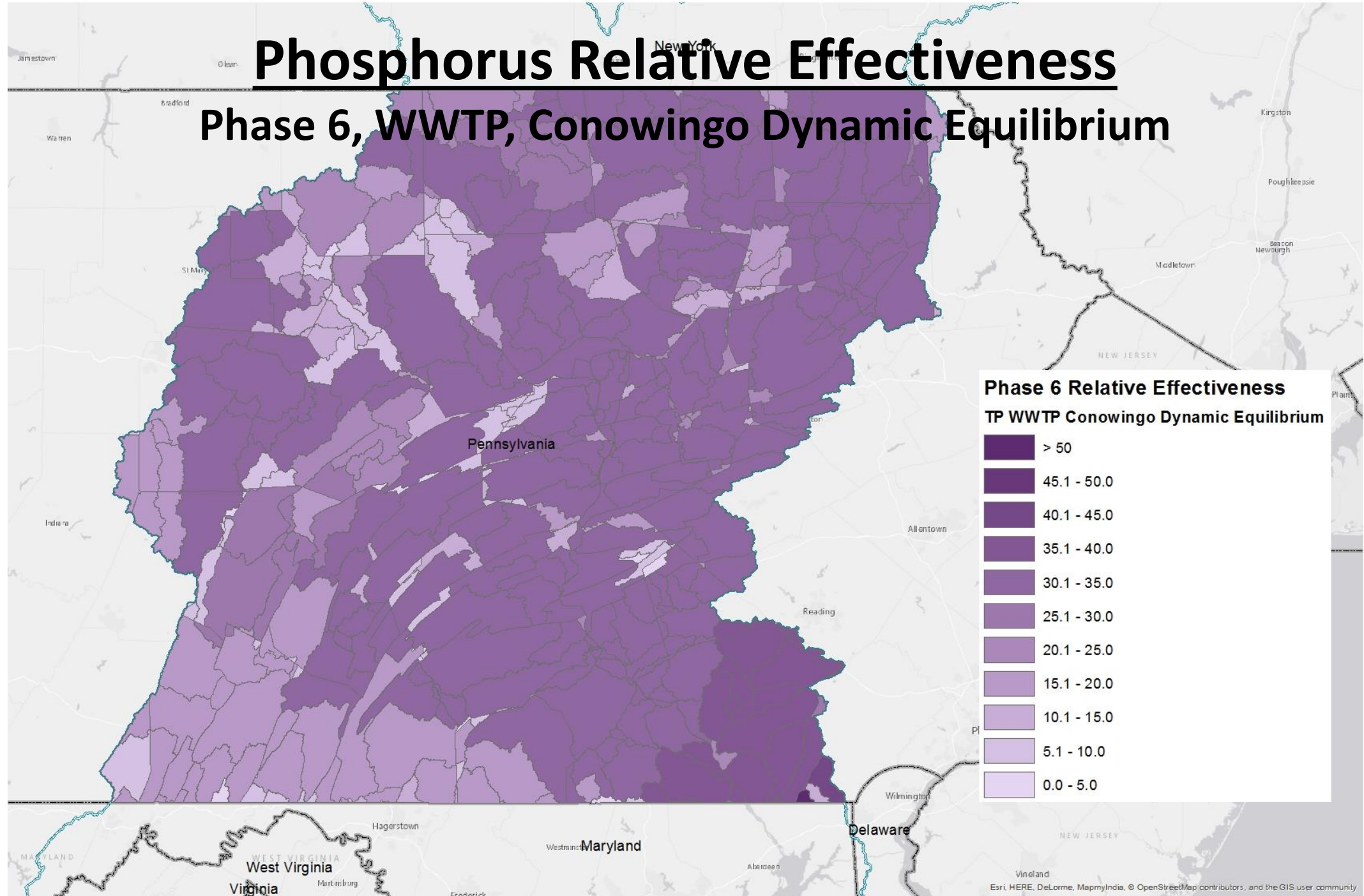
Phosphorus Relative Effectiveness

Phase 6, WWTP, Mid-90s



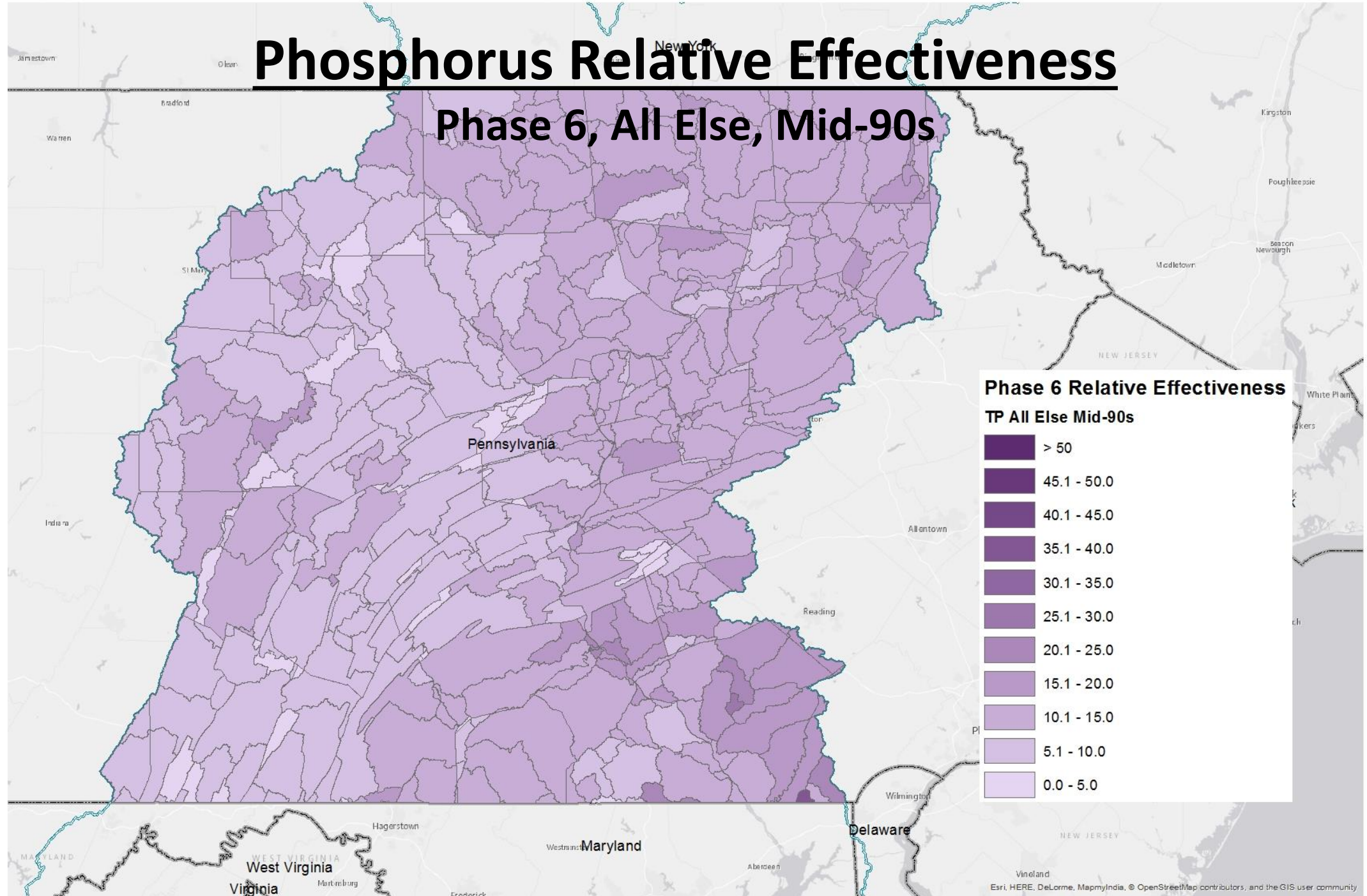
Phosphorus Relative Effectiveness

Phase 6, WWTP, Conowingo Dynamic Equilibrium



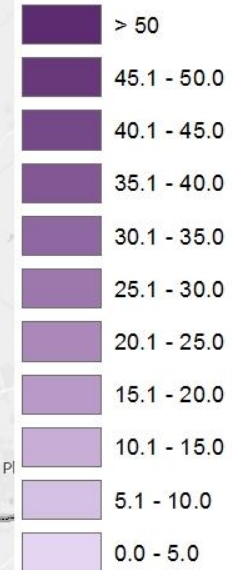
Phosphorus Relative Effectiveness

Phase 6, All Else, Mid-90s



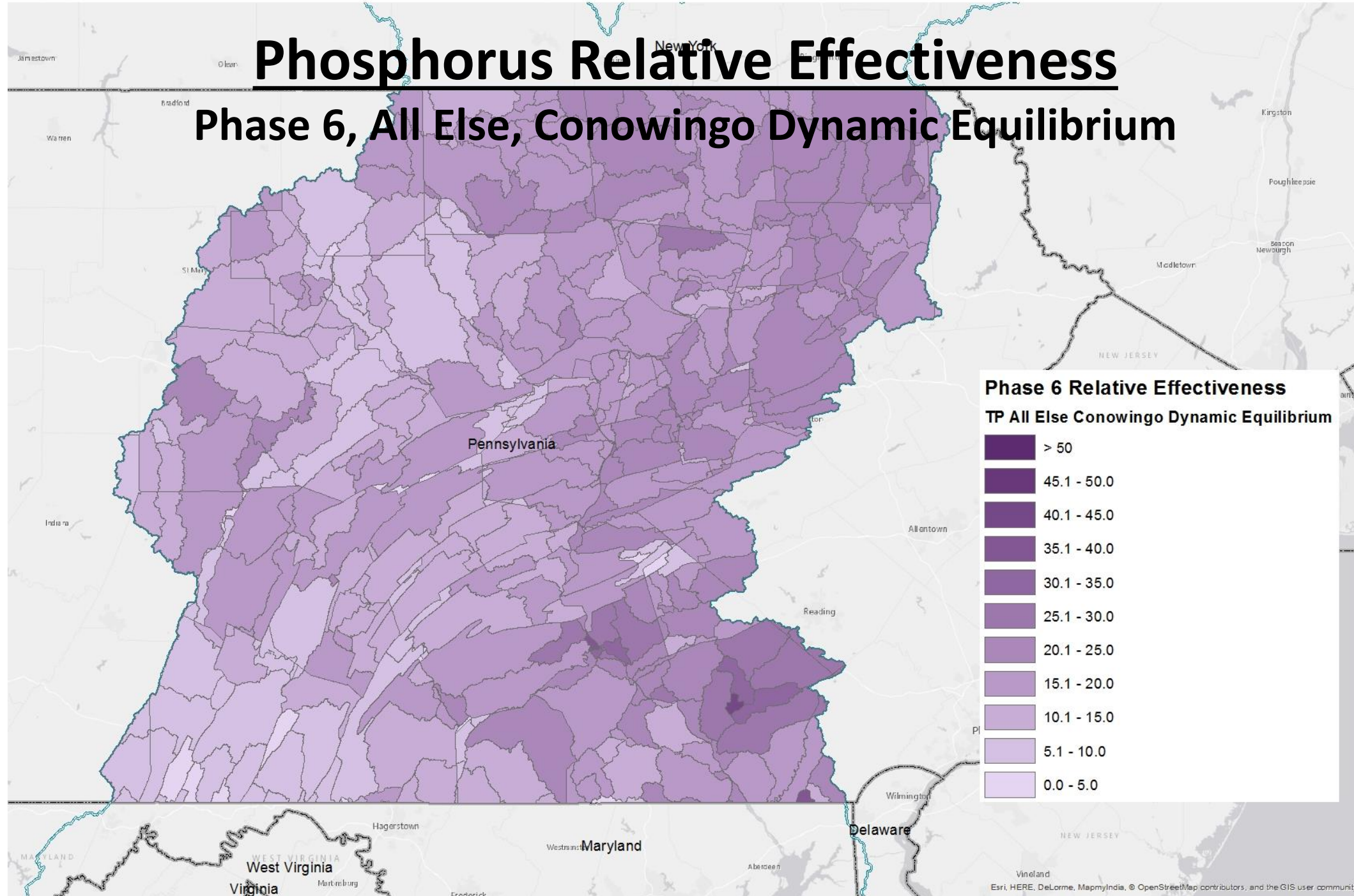
Phase 6 Relative Effectiveness

TP All Else Mid-90s



Phosphorus Relative Effectiveness

Phase 6, All Else, Conowingo Dynamic Equilibrium

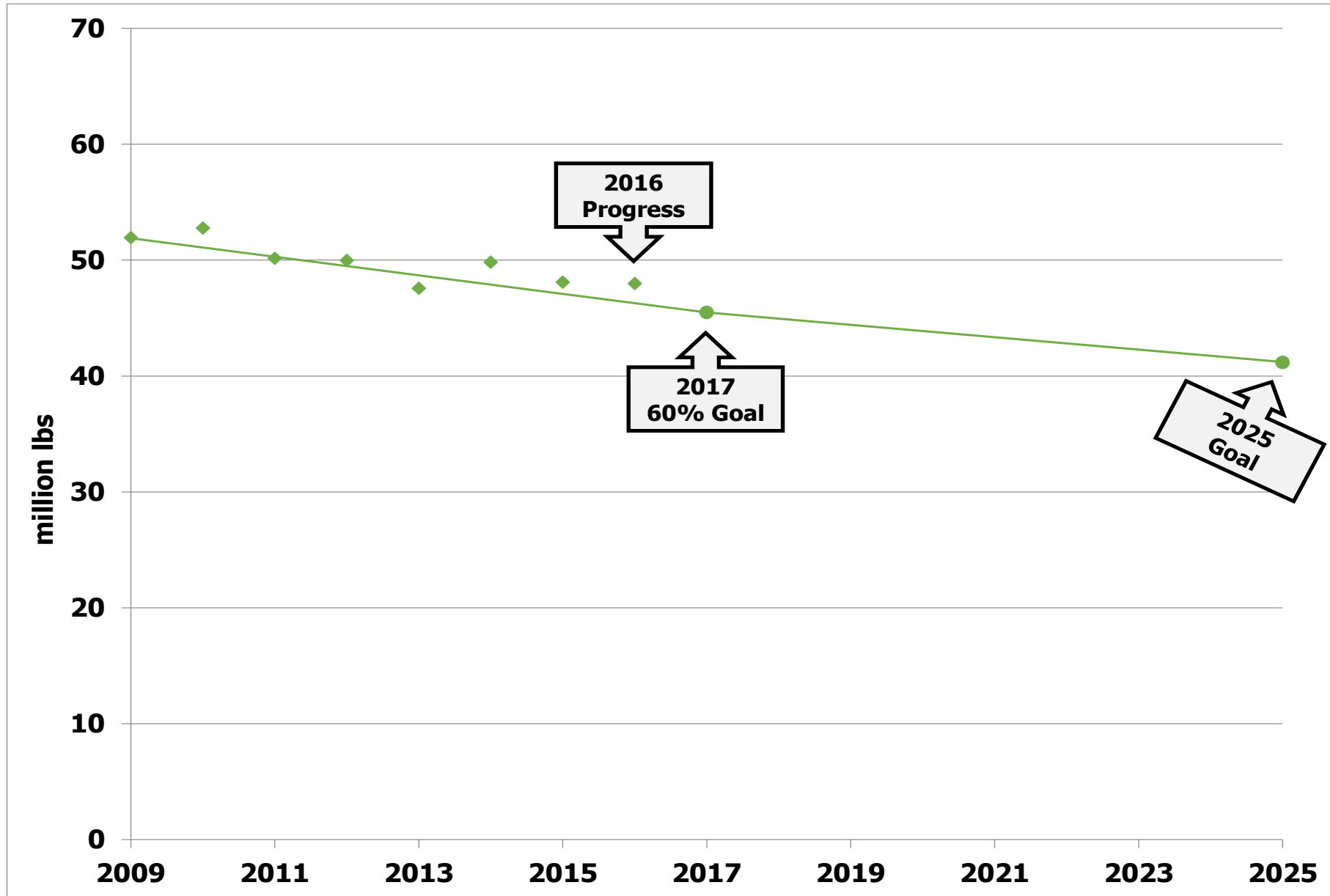


MD Draft Phase III WIP Planning Targets + Reference Loads

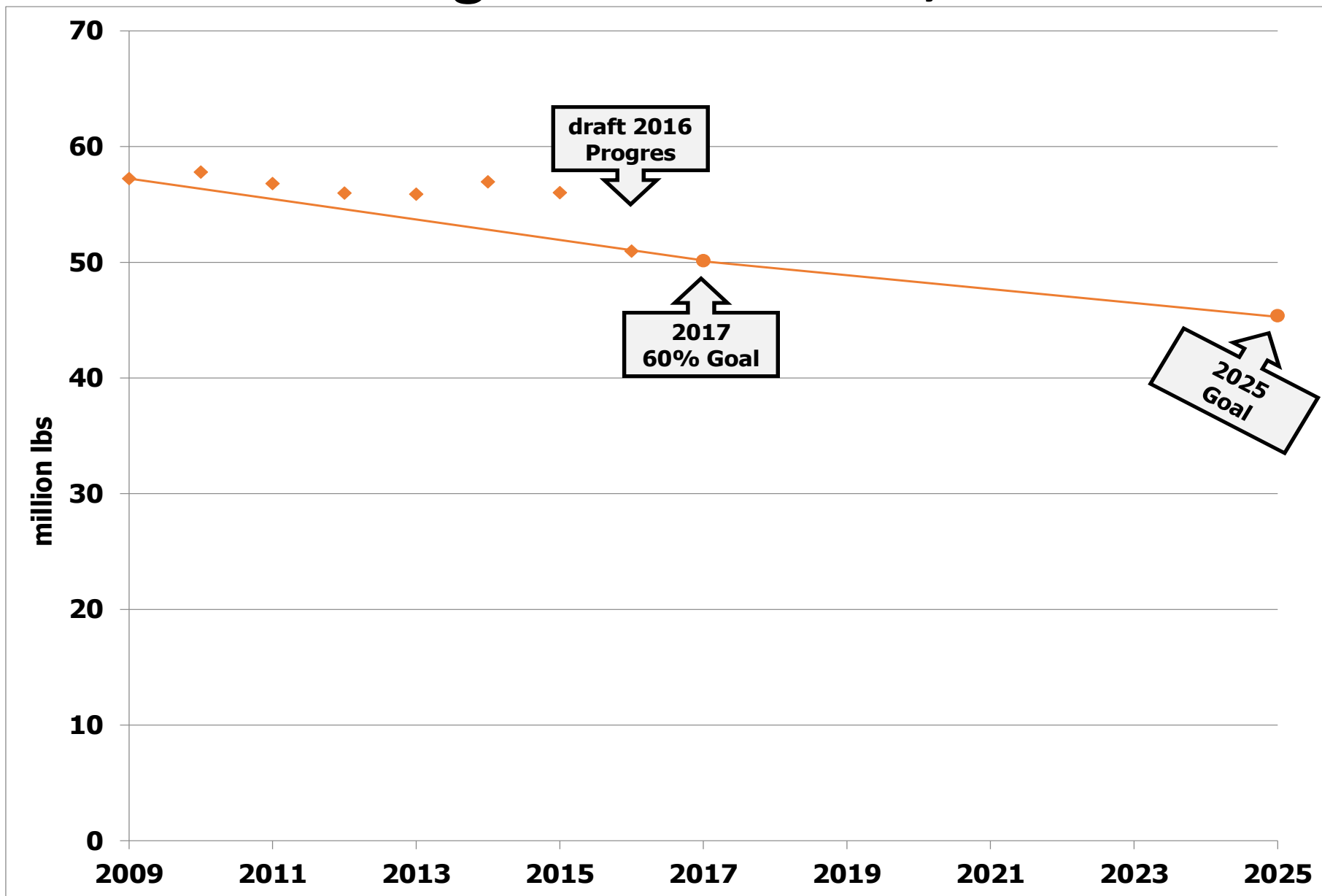
Nitrogen Load					
	No-Action (M lbs)	E3 (M lbs)	2013 Progress (M lbs)	Phase II WIP (reference) (M lbs)	Draft Phase III WIP Planning Target (M lbs)
MD Eastern Shore	27.84	8.85	18.60	15.48	15.13
MD Patuxent	7.47	2.19	3.46	3.34	3.21
MD Potomac	35.84	10.53	17.19	17.12	15.29
MD Susquehanna	2.15	0.82	1.78	1.44	1.17
MD Western Shore	37.44	6.58	14.86	9.91	10.58
MD Total	110.74	28.96	55.89	47.29	45.39

Phosphorus Load					
	No-Action (M lbs)	E3 (M lbs)	2013 Progress (M lbs)	Phase II WIP (reference) (M lbs)	Draft Phase III WIP Planning Target (M lbs)
MD Eastern Shore	2.206	0.904	1.301	1.198	1.226
MD Patuxent	1.155	0.168	0.302	0.282	0.290
MD Potomac	4.077	0.624	0.985	1.039	1.066
MD Susquehanna	0.086	0.031	0.063	0.051	0.050
MD Western Shore	4.088	0.695	1.291	1.015	0.922
MD Total	11.612	2.422	3.942	3.585	3.553

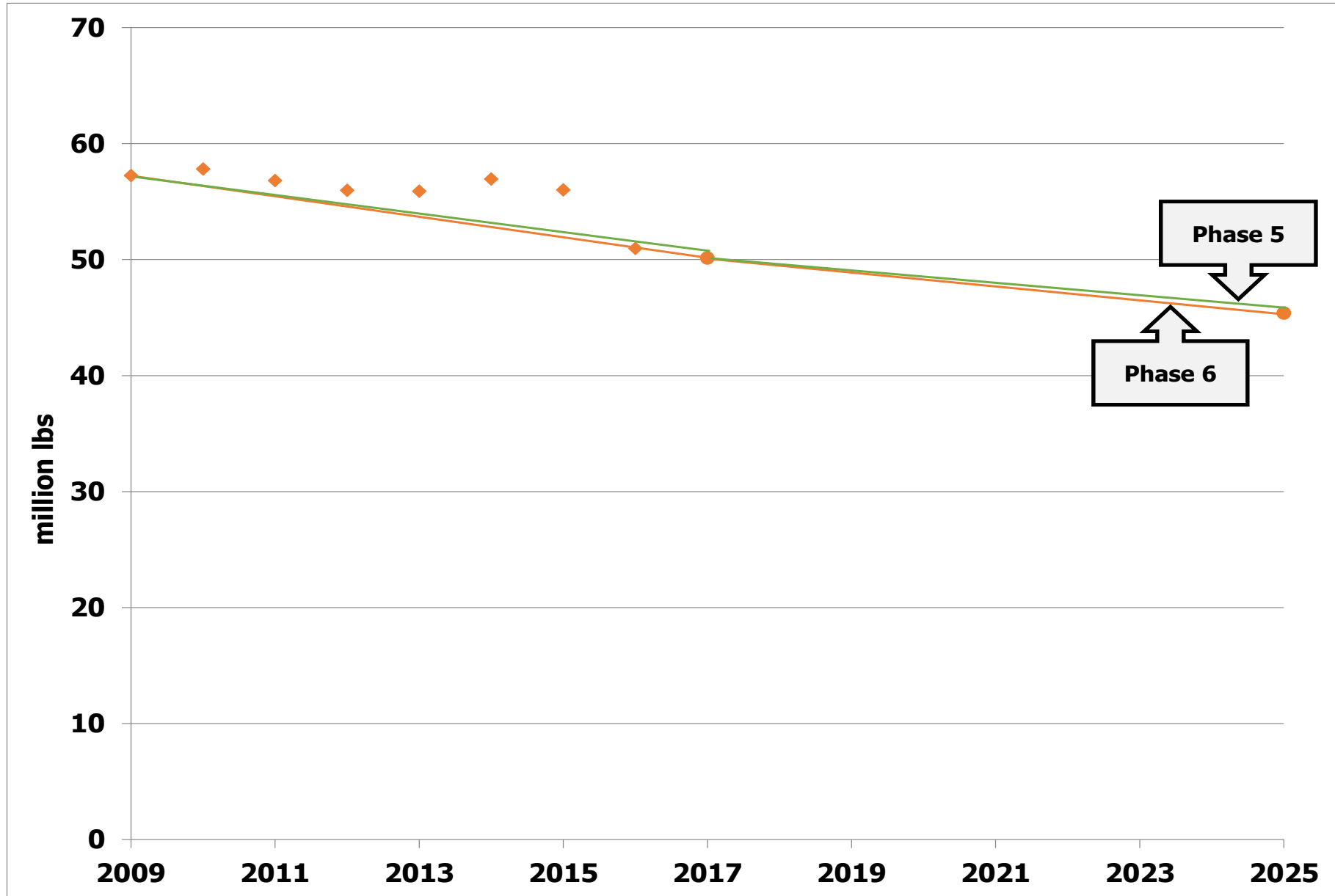
MD Nitrogen Loads-Goals, Phase 5.3.2



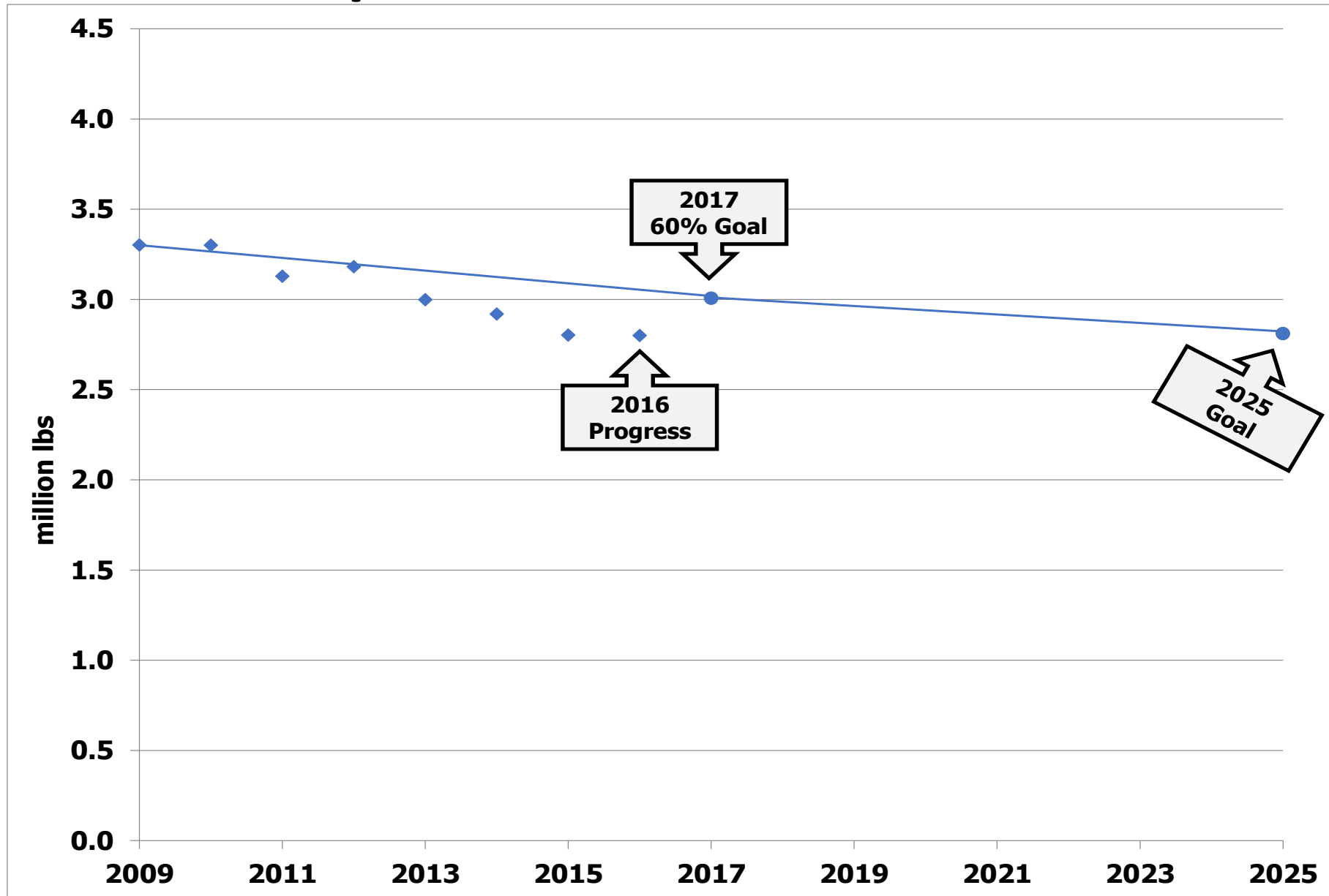
MD Nitrogen Loads-Goals, Phase 6



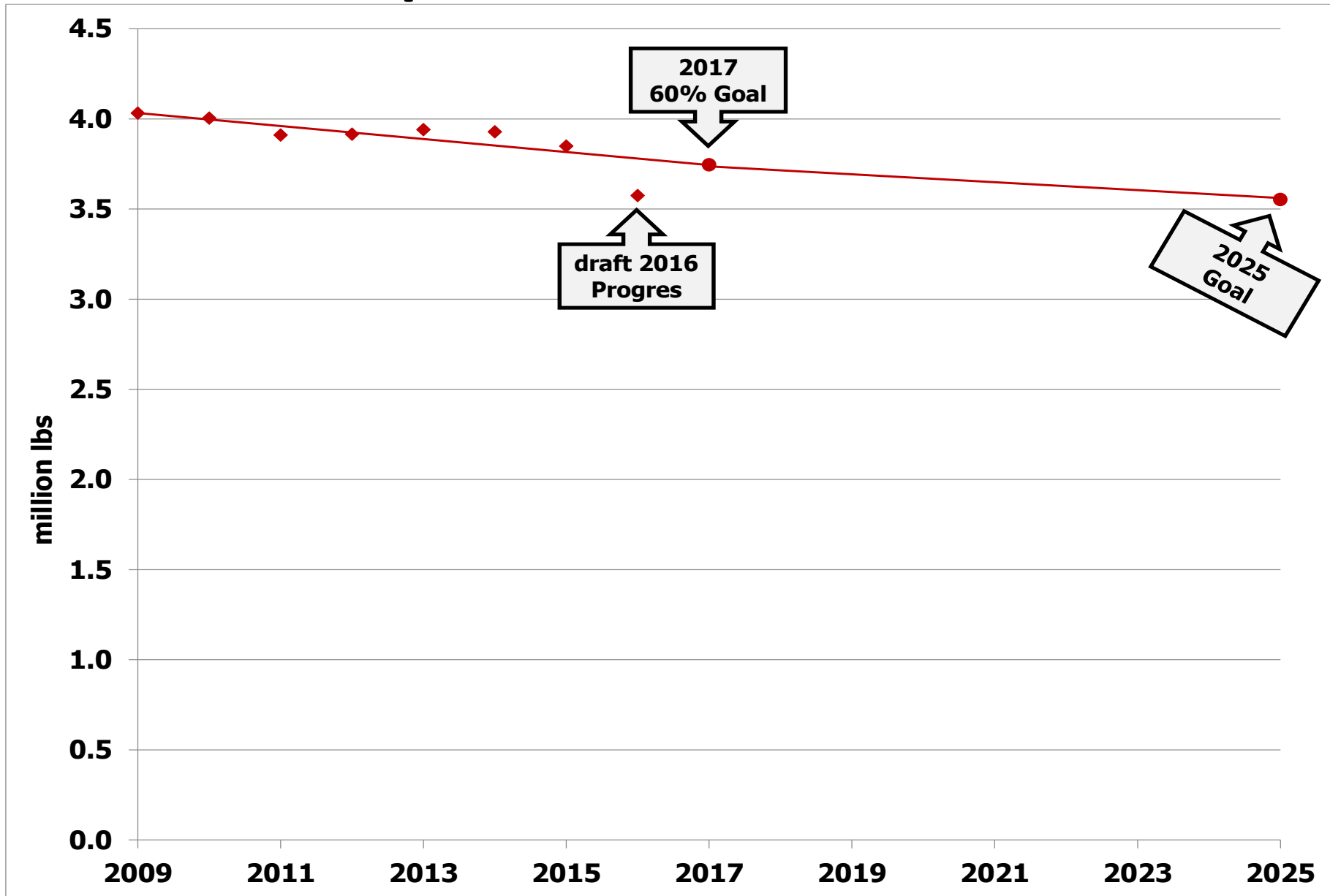
MD Nitrogen Change in LOE



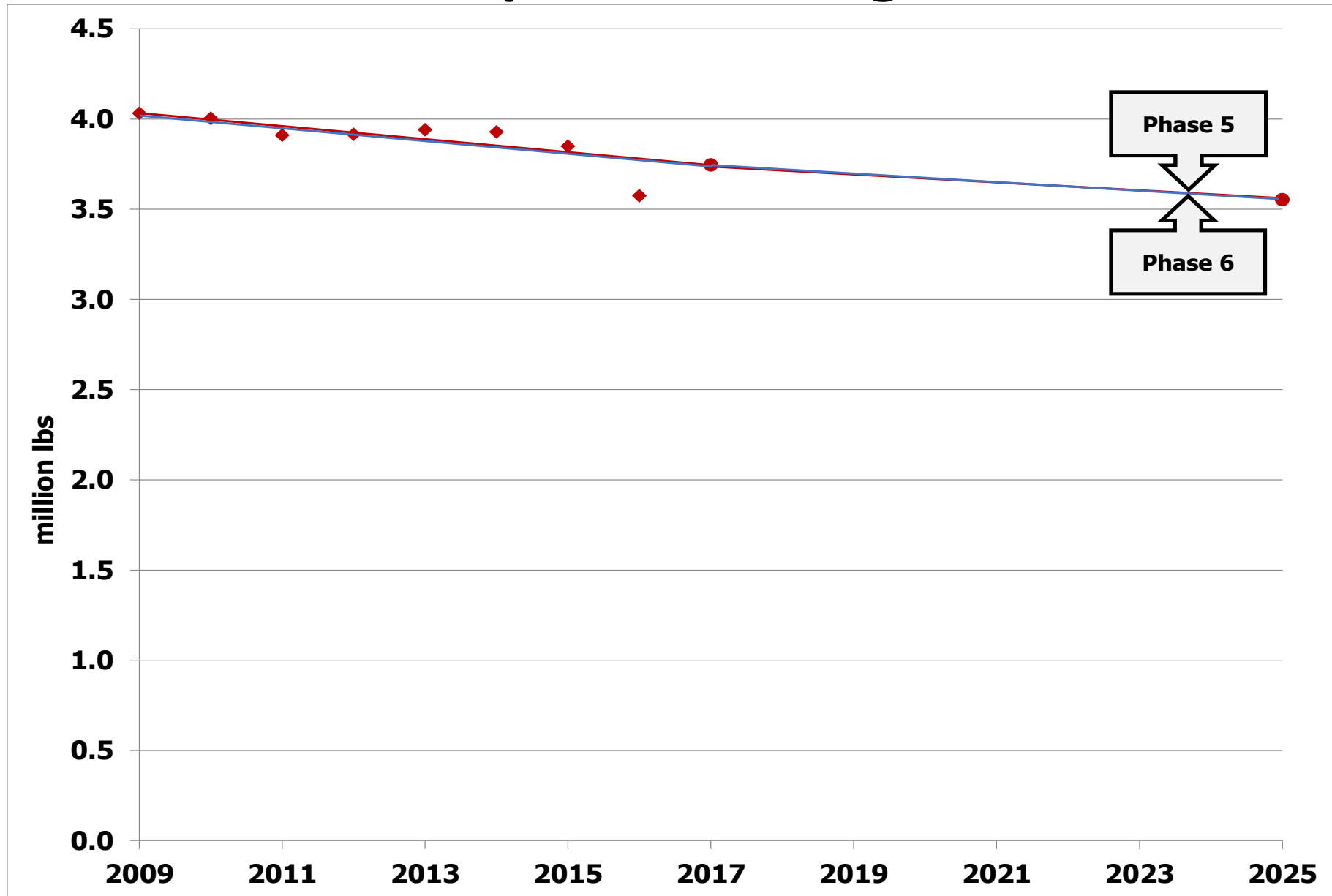
MD Phosphorus Loads-Goals, Phase 5.3.2



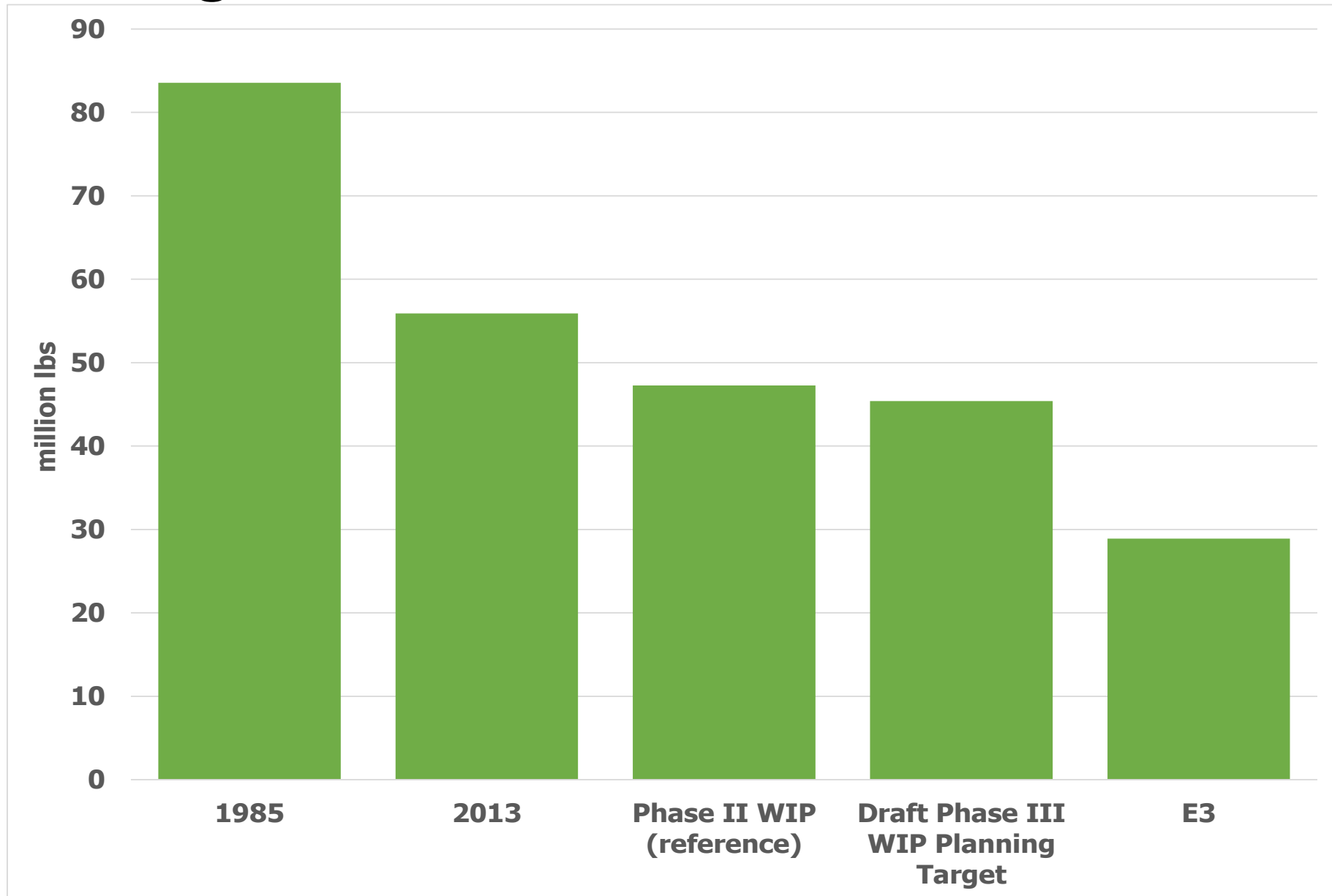
MD Phosphorus Loads-Goals, Phase 6



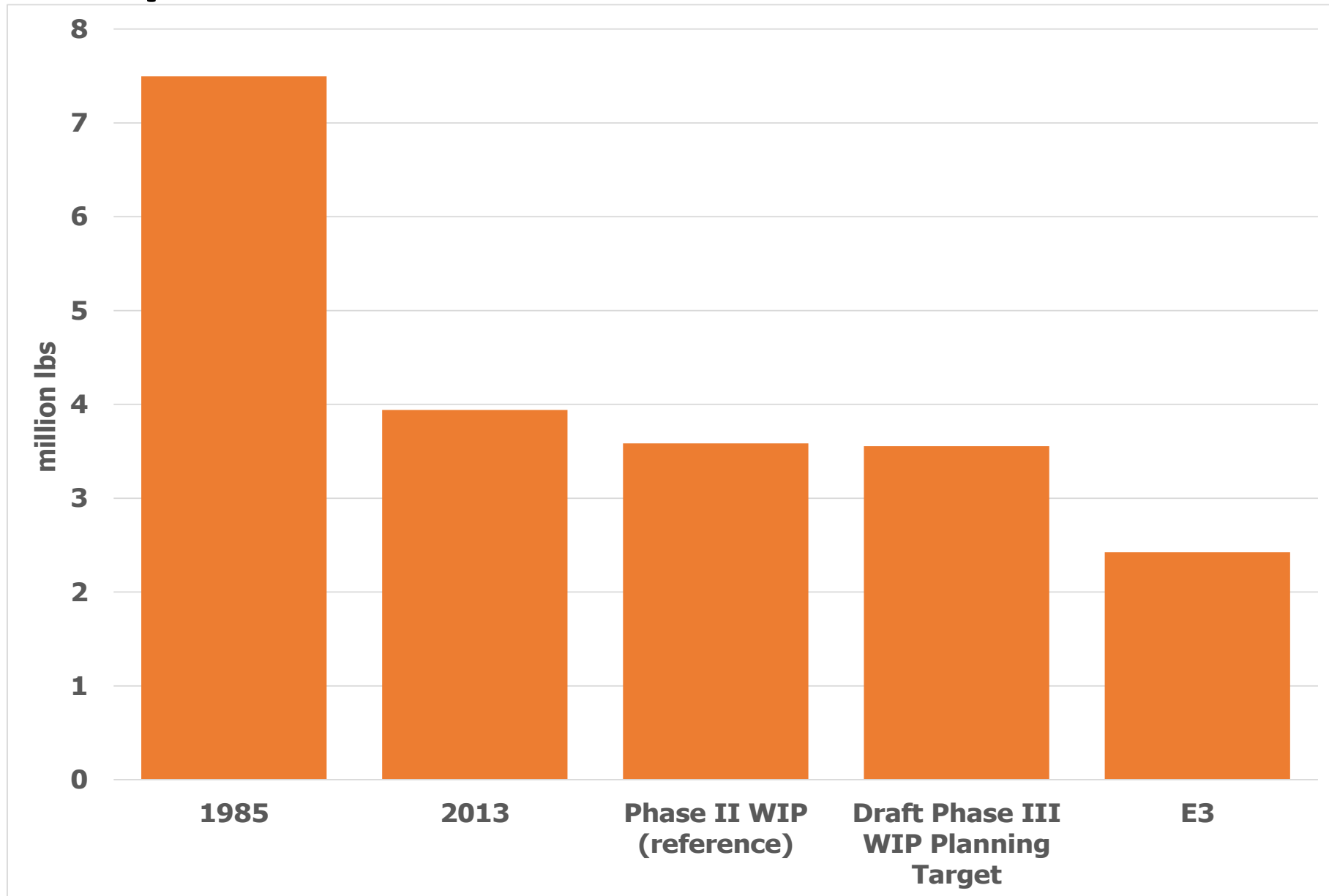
MD Phosphorus Change in LOE



MD Nitrogen Loads, Reference Scenarios, and Target

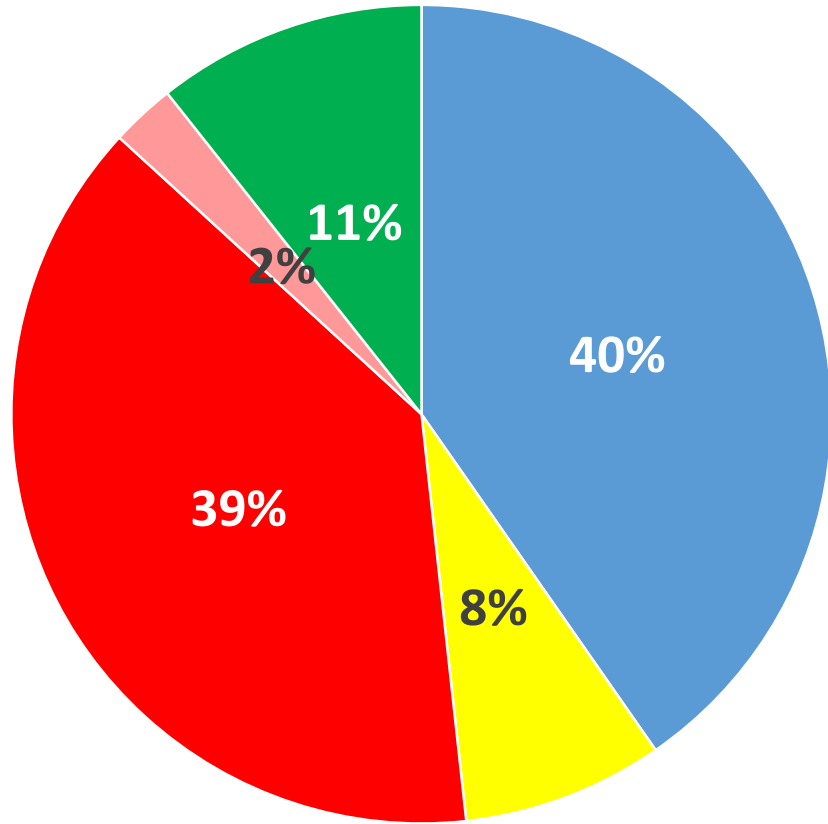


MD Phosphorus Loads, Reference Scenarios, and Target

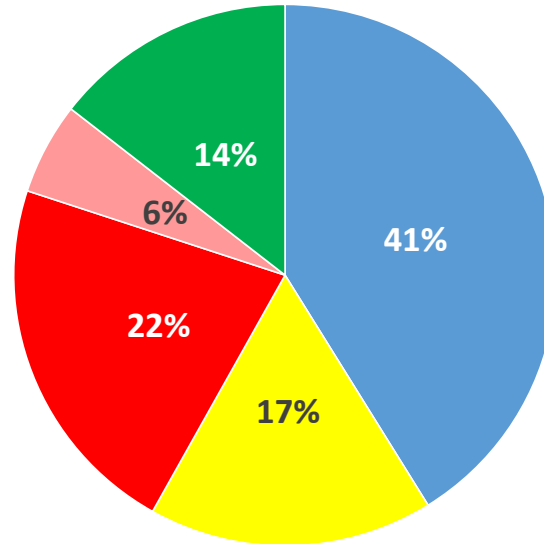


MD Nitrogen Loads and Target

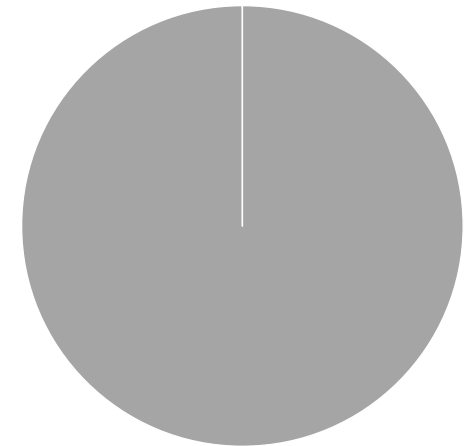
■ Agriculture ■ Developed ■ Wastewater ■ Septic ■ Natural



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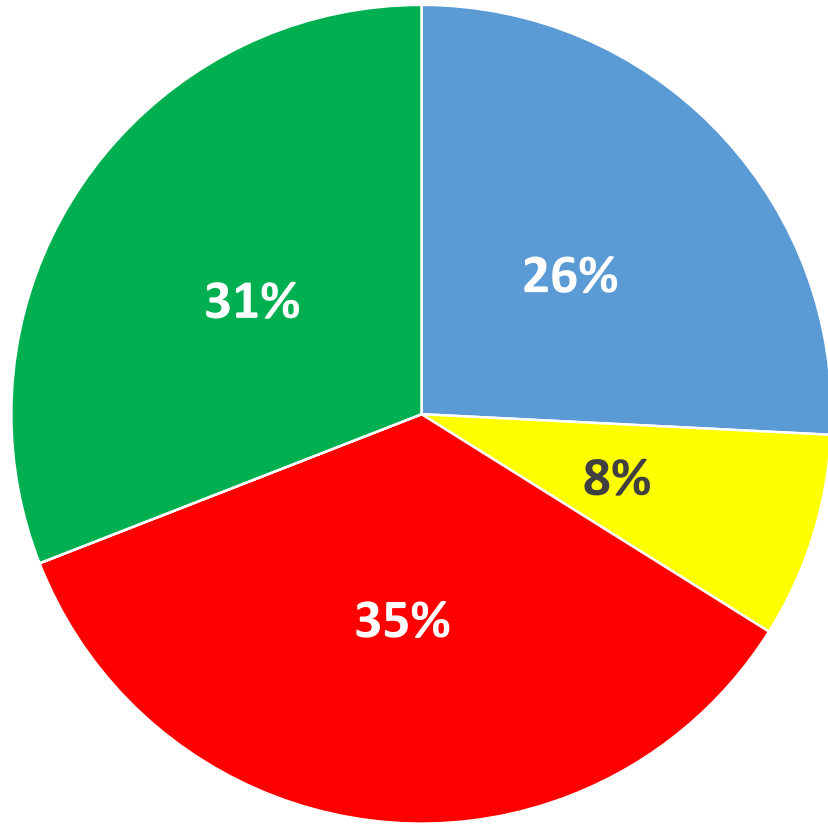
2013



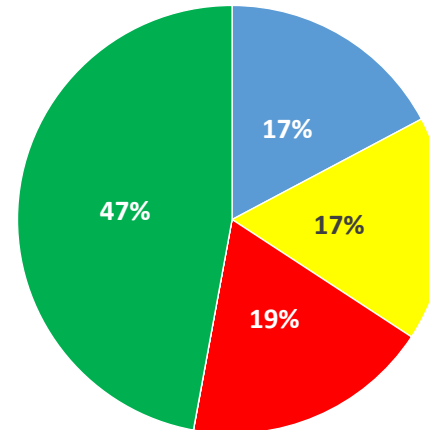
**Draft Phase III WIP
Planning Target**

MD Phosphorus Loads and Target

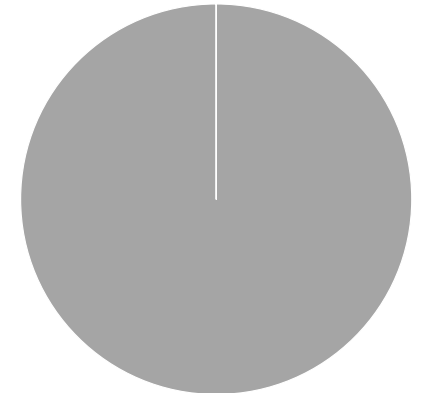
■ Agriculture ■ Developed ■ Wastewater ■ Natural



1985



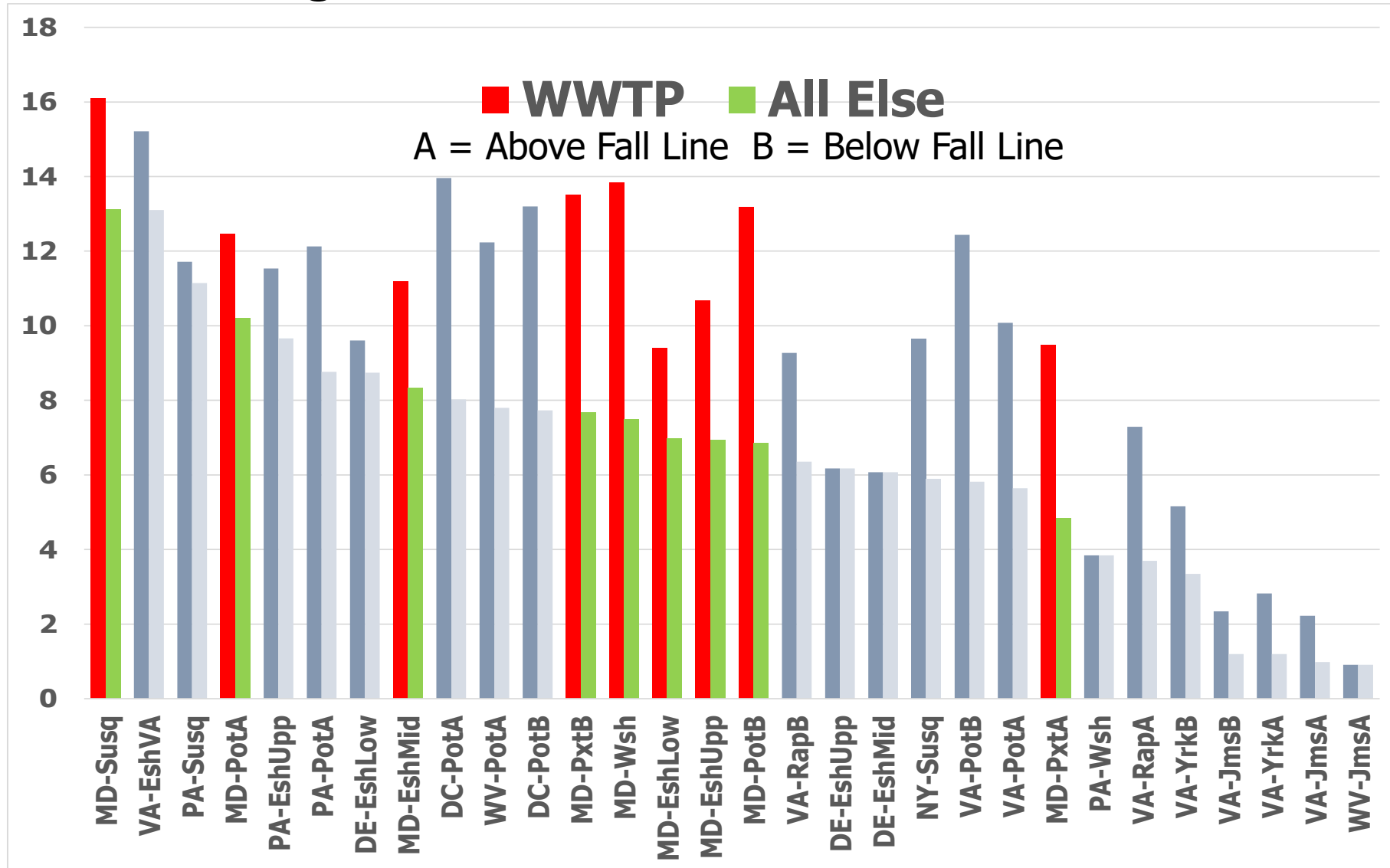
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**Draft Phase III WIP
Planning Target**

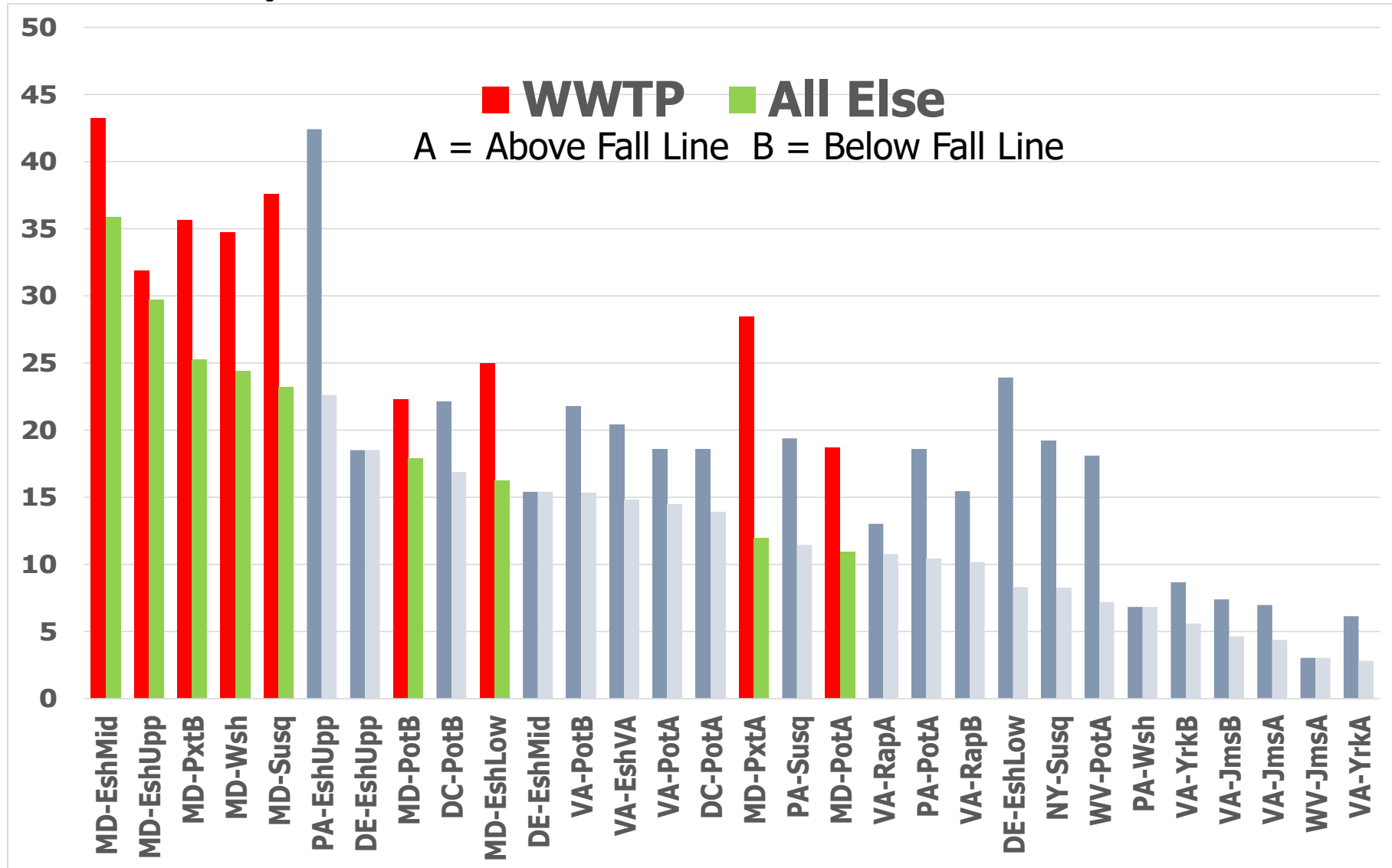
Nitrogen Relative Effectiveness

Effect of Nitrogen Load Reduction on WQ Standard Attainment



Phosphorus Relative Effectiveness

Effect of Phosphorus Load Reduction on WQ Standard Attainment

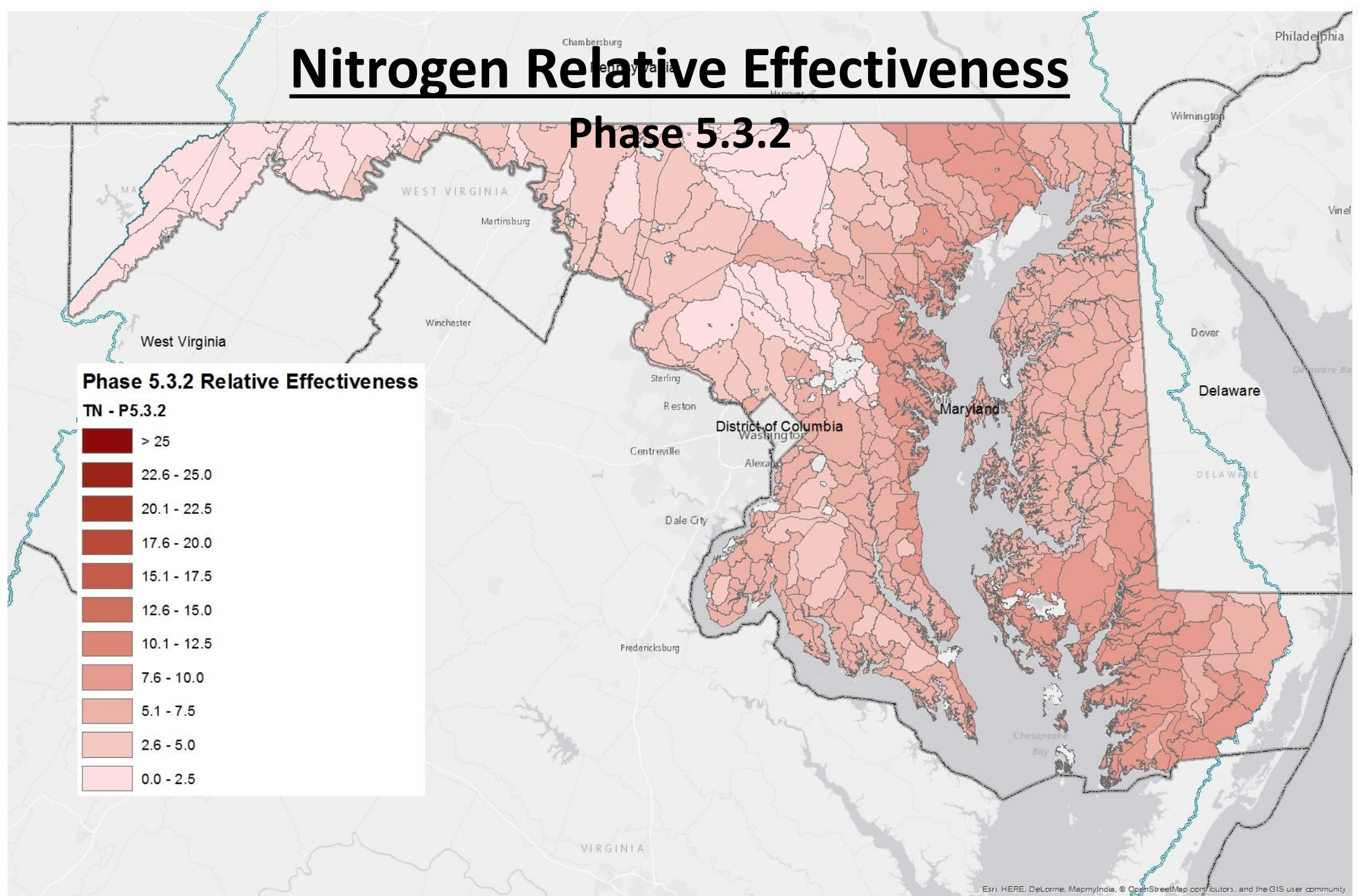
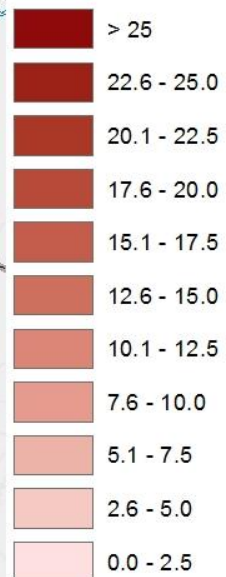


Nitrogen Relative Effectiveness

Phase 5.3.2

Phase 5.3.2 Relative Effectiveness

TN - P5.3.2

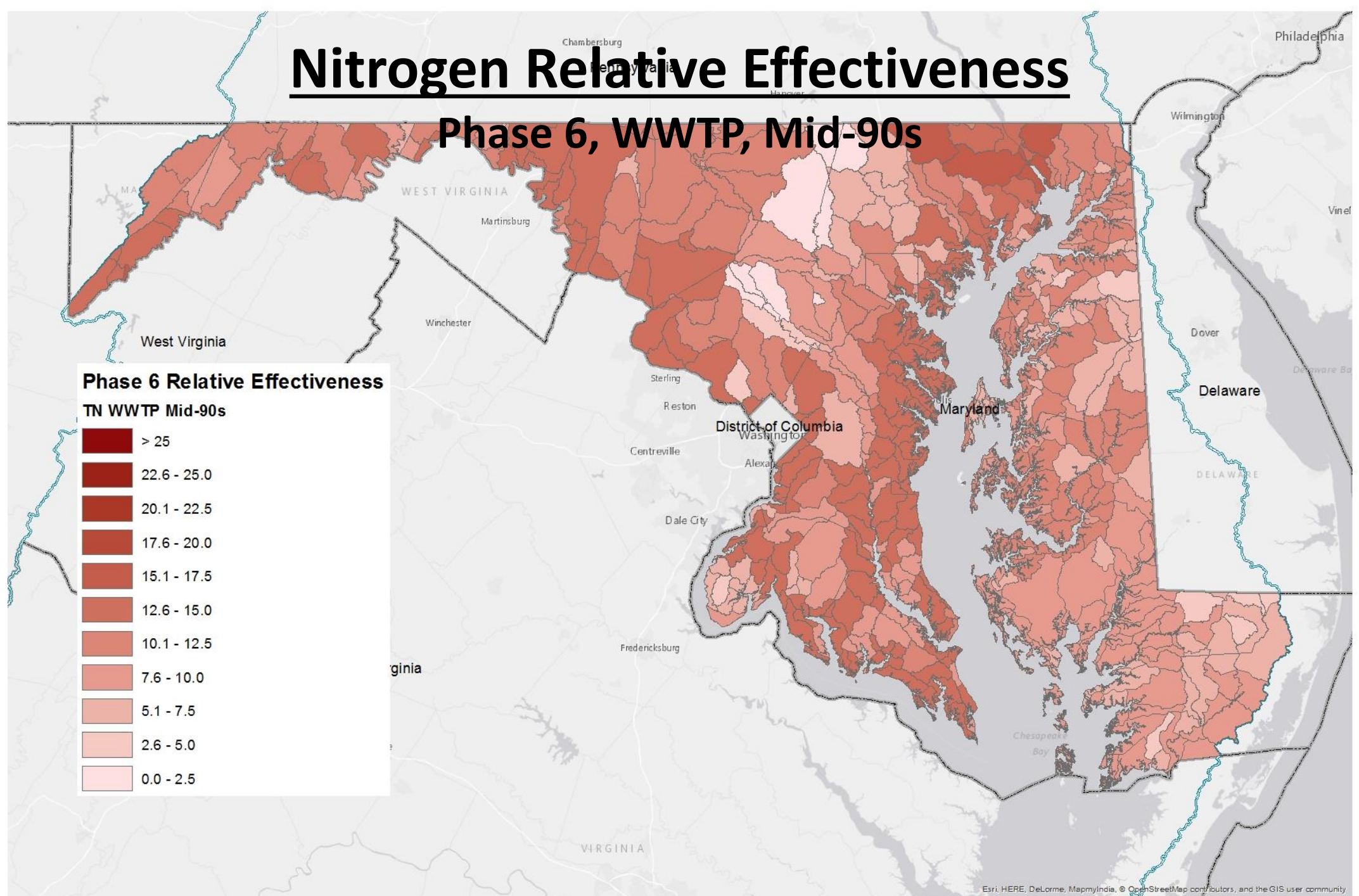
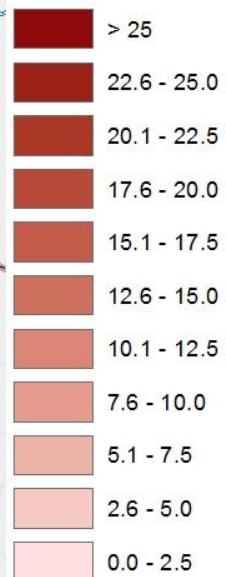


Nitrogen Relative Effectiveness

Phase 6, WWTP, Mid-90s

Phase 6 Relative Effectiveness

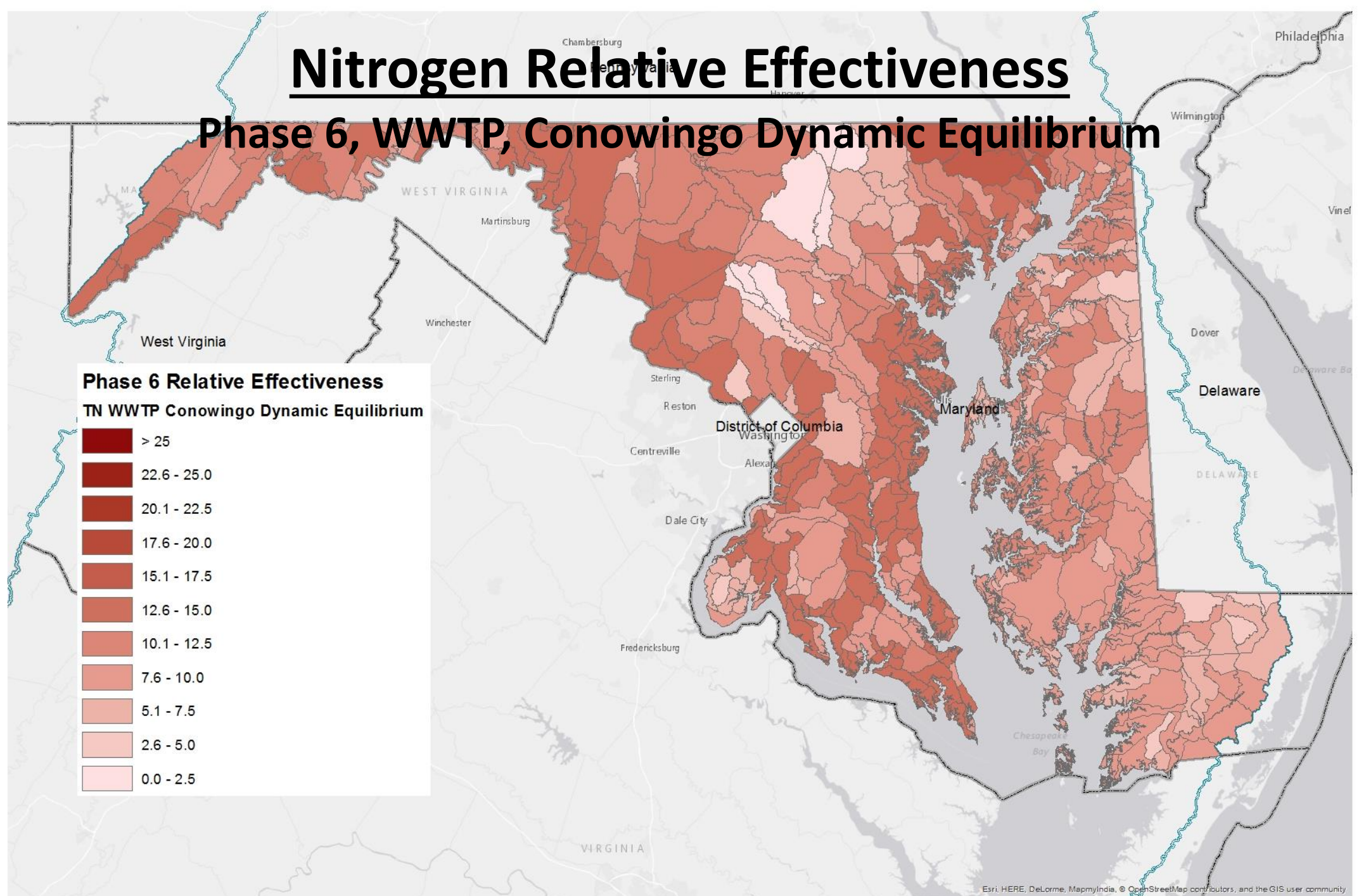
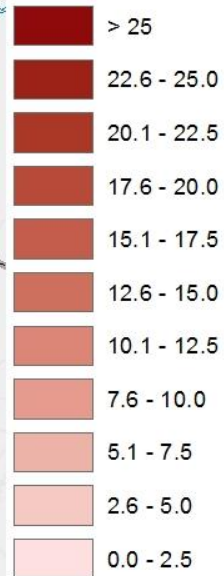
TN WWTP Mid-90s



Nitrogen Relative Effectiveness

Phase 6, WWTP, Conowingo Dynamic Equilibrium

Phase 6 Relative Effectiveness
TN WWTP Conowingo Dynamic Equilibrium

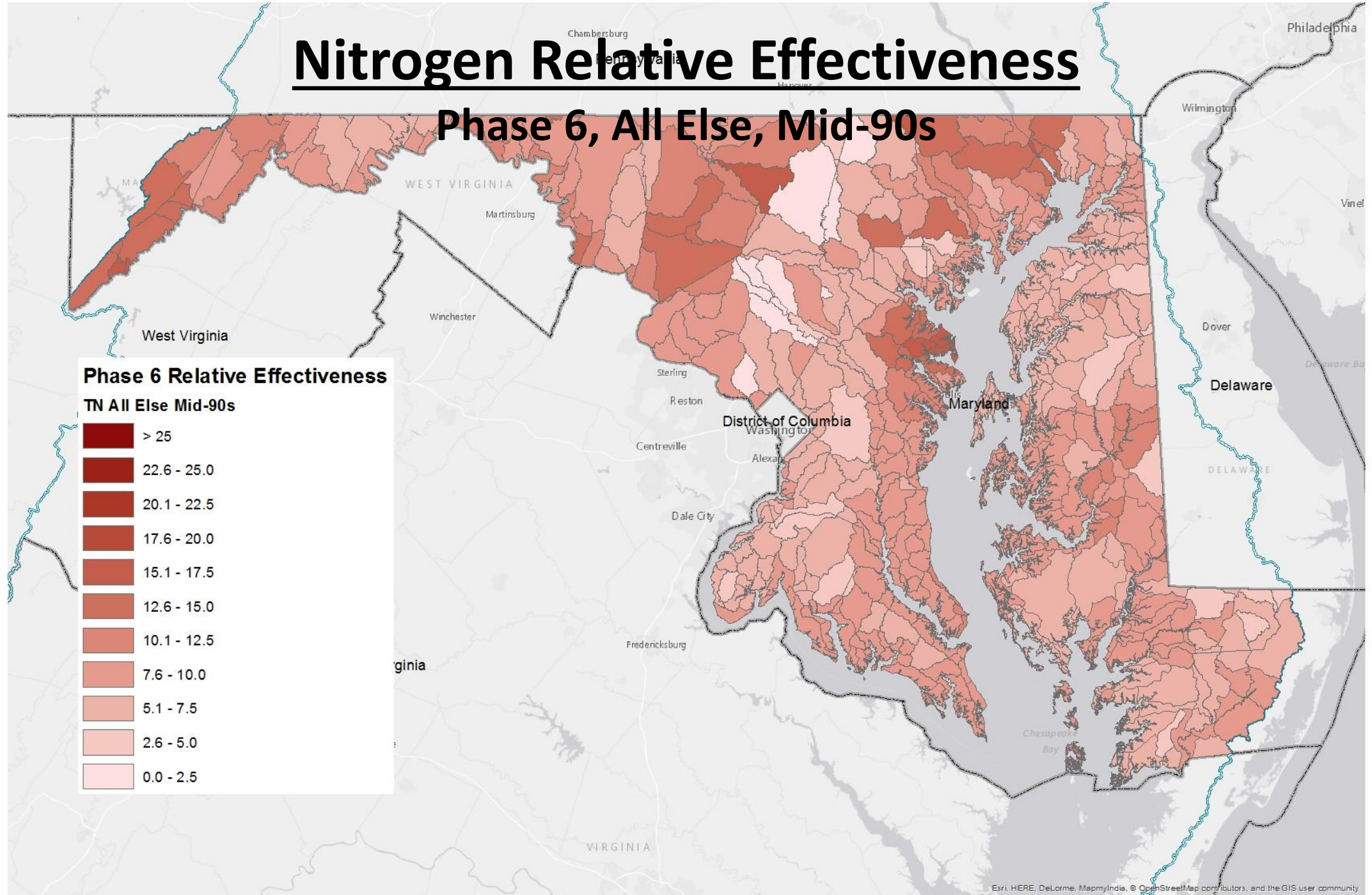
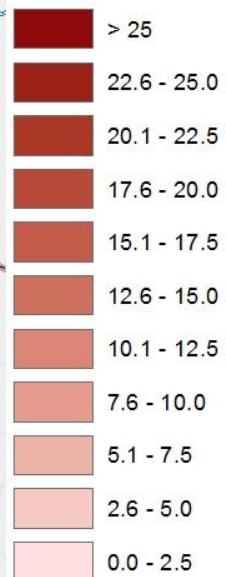


Nitrogen Relative Effectiveness

Phase 6, All Else, Mid-90s

Phase 6 Relative Effectiveness

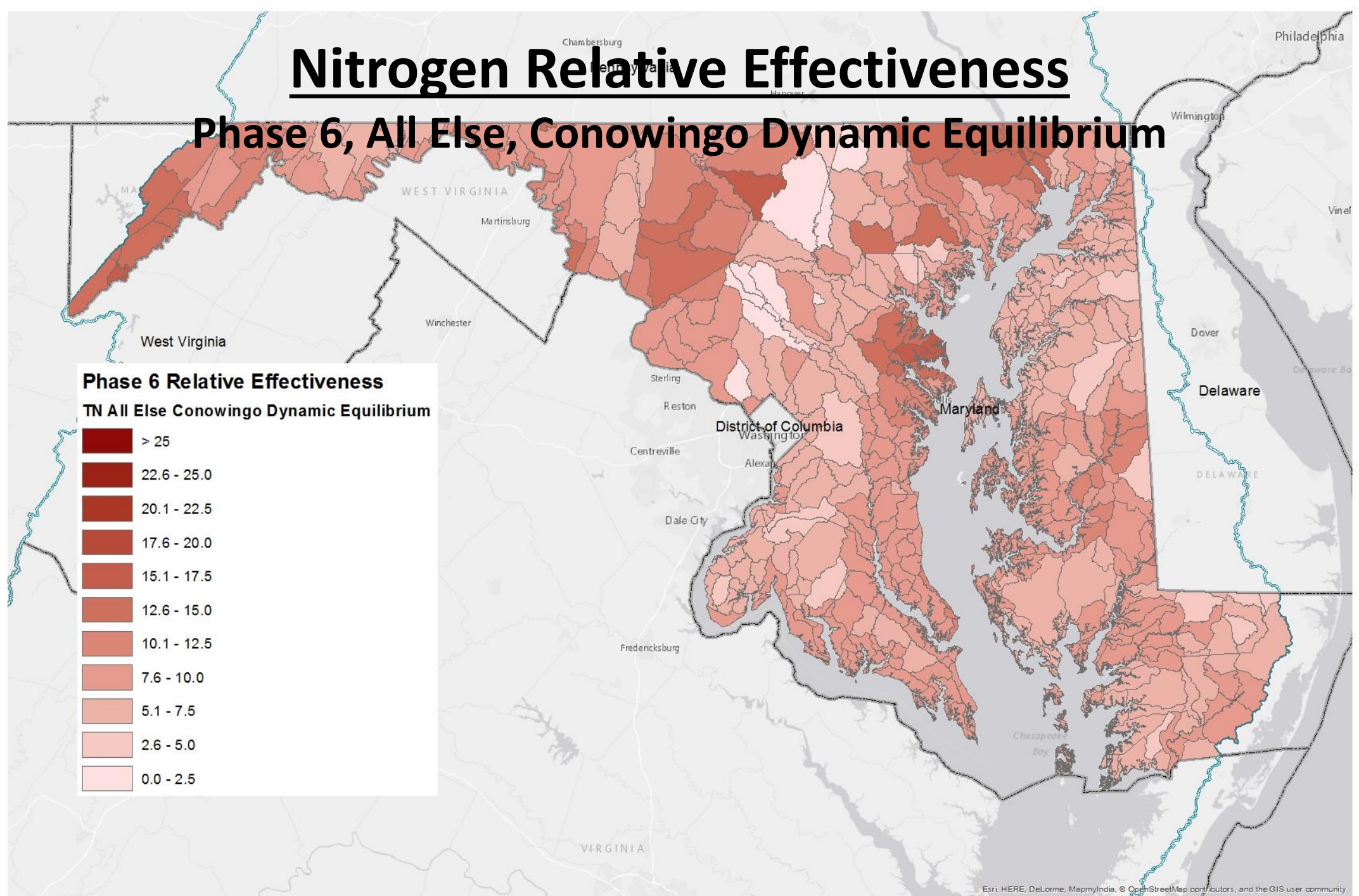
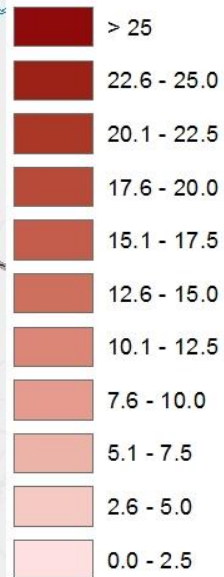
TN All Else Mid-90s



Nitrogen Relative Effectiveness

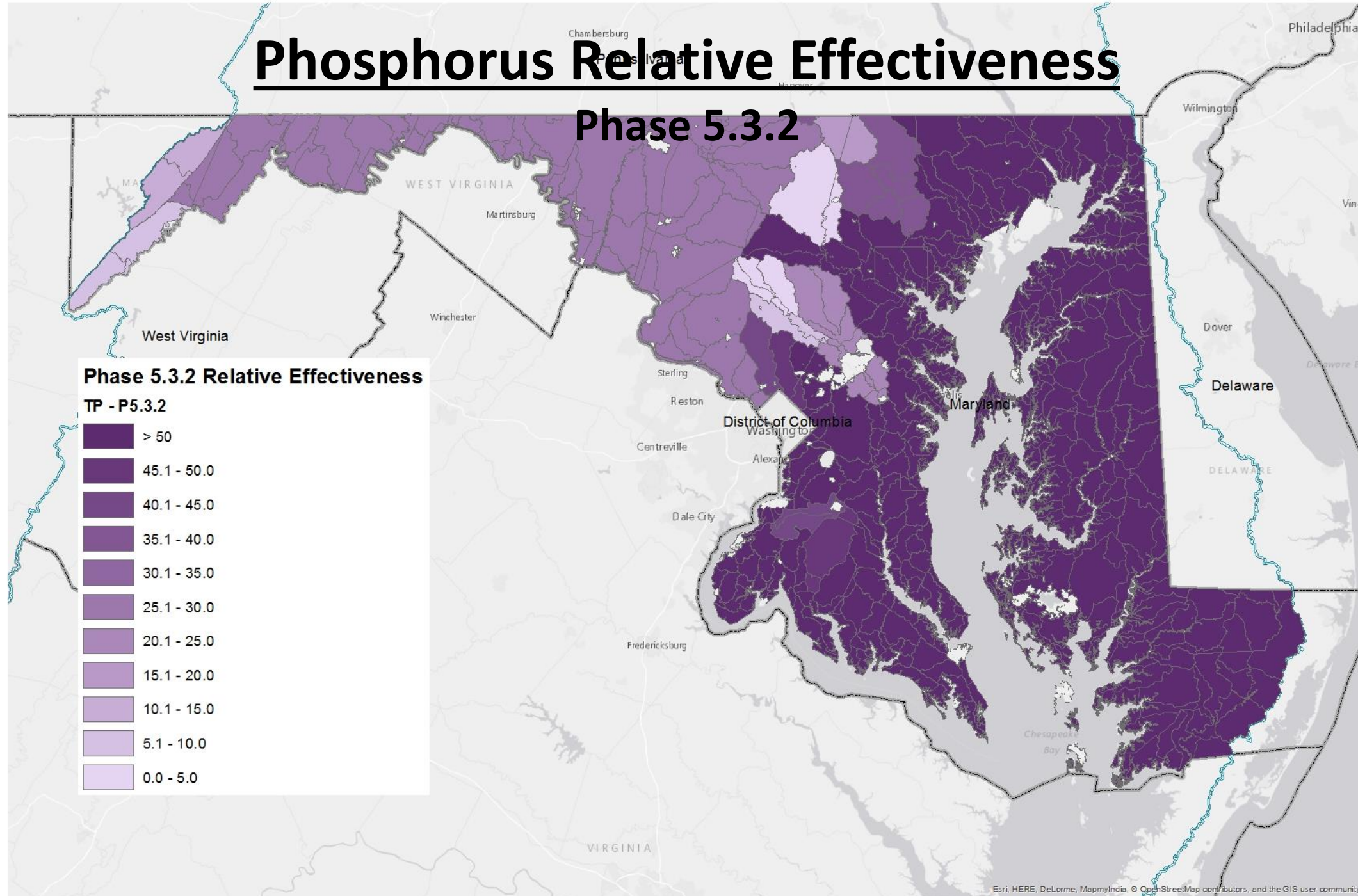
Phase 6, All Else, Conowingo Dynamic Equilibrium

Phase 6 Relative Effectiveness
TN All Else Conowingo Dynamic Equilibrium



Phosphorus Relative Effectiveness

Phase 5.3.2

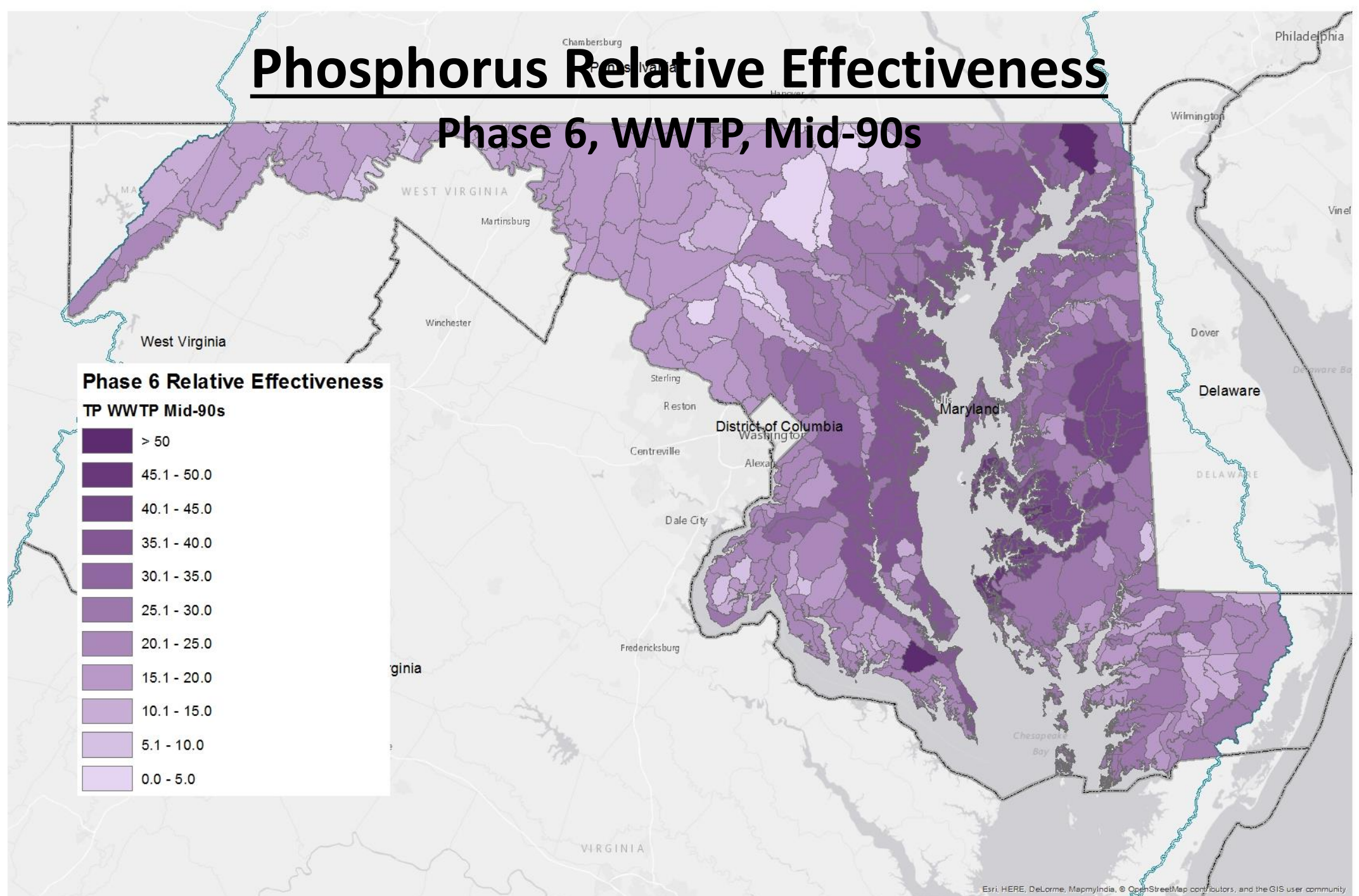
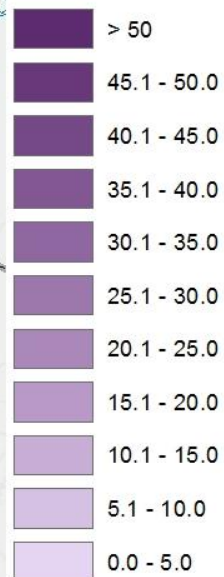


Phosphorus Relative Effectiveness

Phase 6, WWTP, Mid-90s

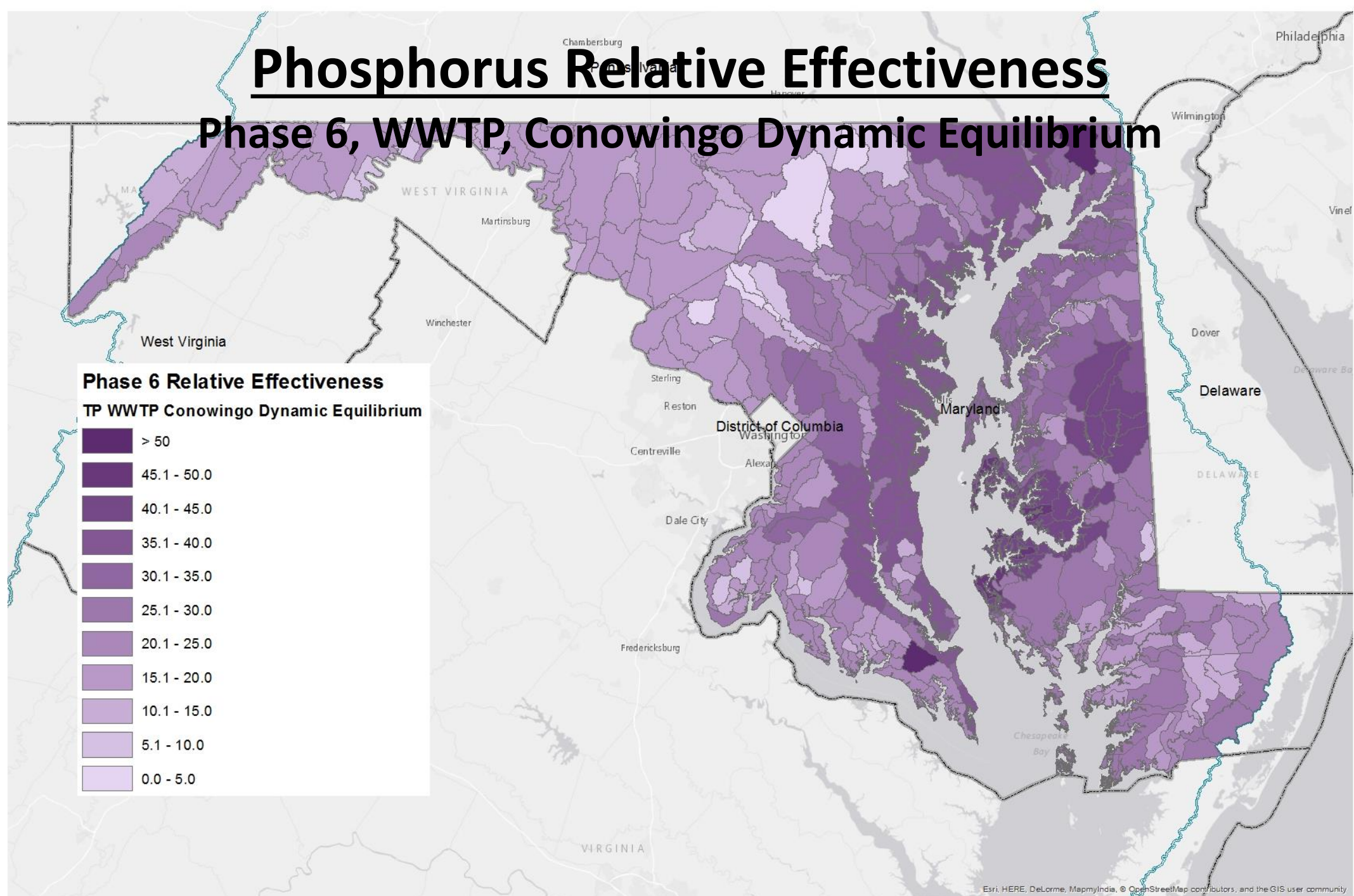
Phase 6 Relative Effectiveness

TP WWTP Mid-90s



Phosphorus Relative Effectiveness

Phase 6, WWTP, Conowingo Dynamic Equilibrium

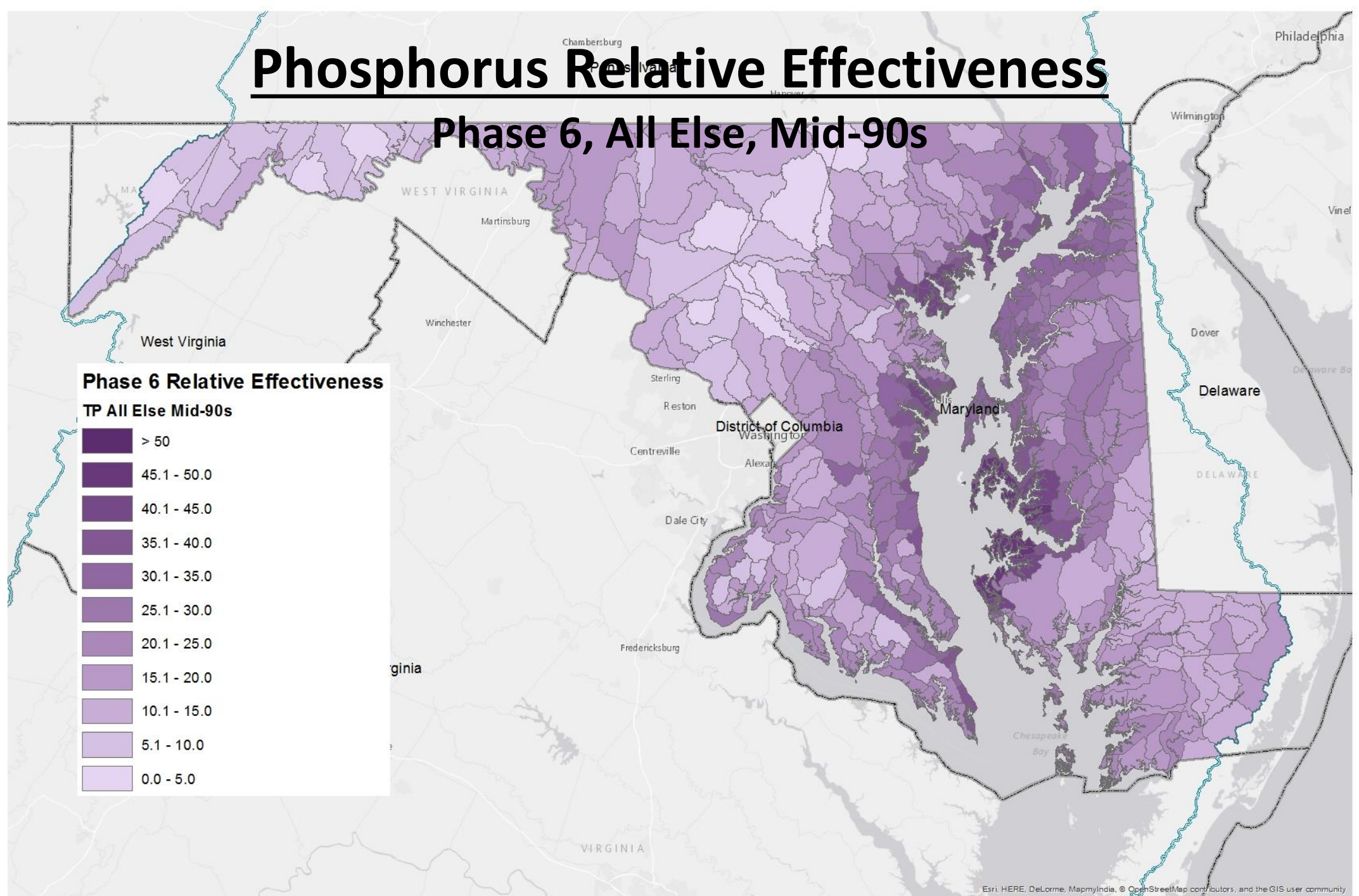
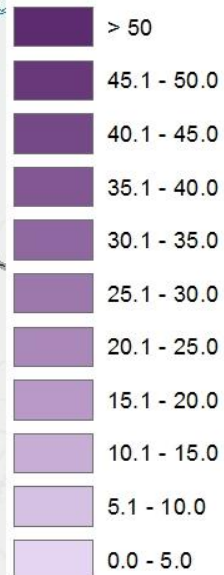


Phosphorus Relative Effectiveness

Phase 6, All Else, Mid-90s

Phase 6 Relative Effectiveness

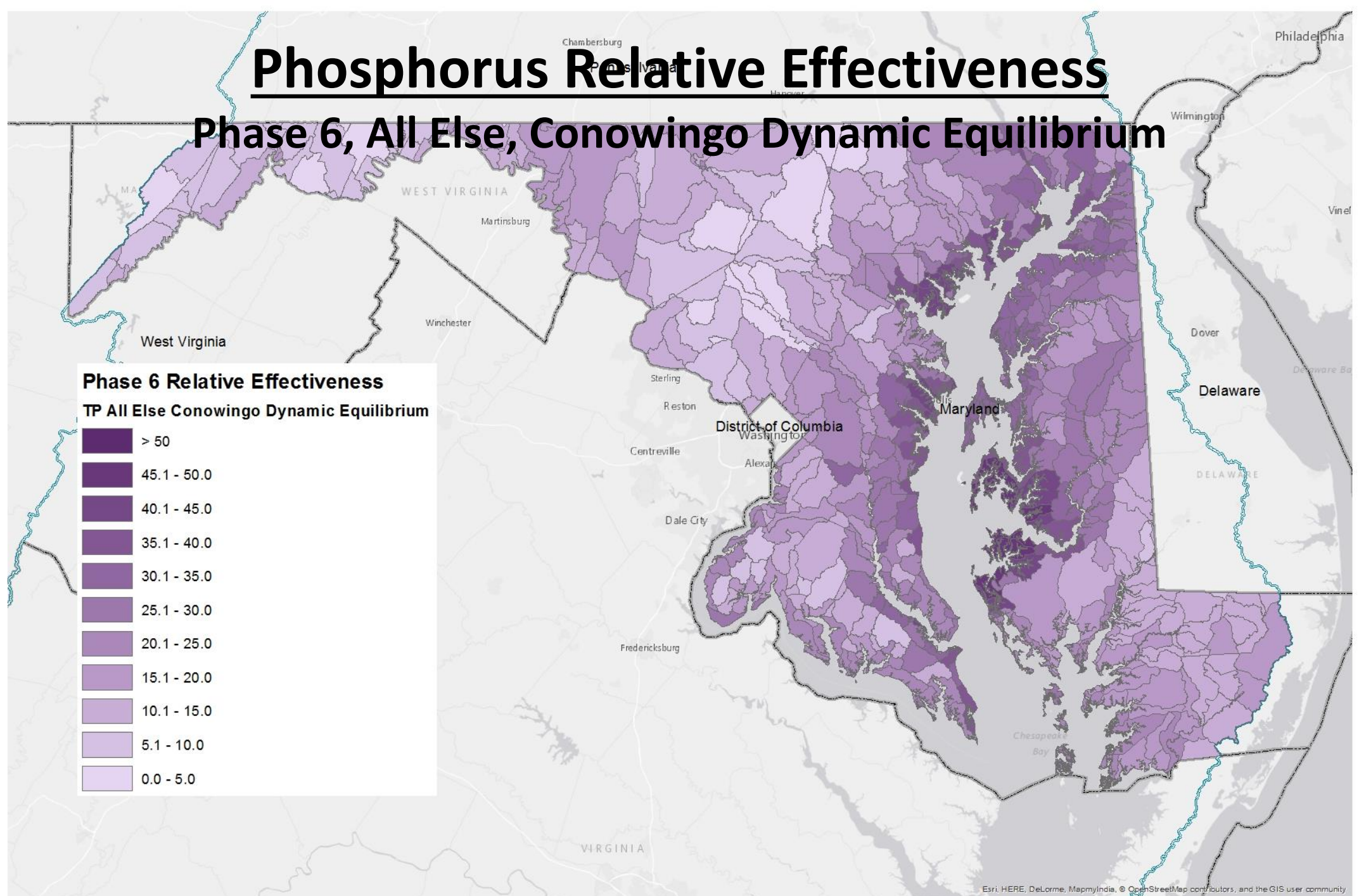
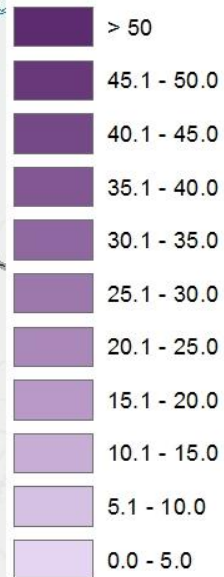
TP All Else Mid-90s



Phosphorus Relative Effectiveness

Phase 6, All Else, Conowingo Dynamic Equilibrium

Phase 6 Relative Effectiveness
TP All Else Conowingo Dynamic Equilibrium

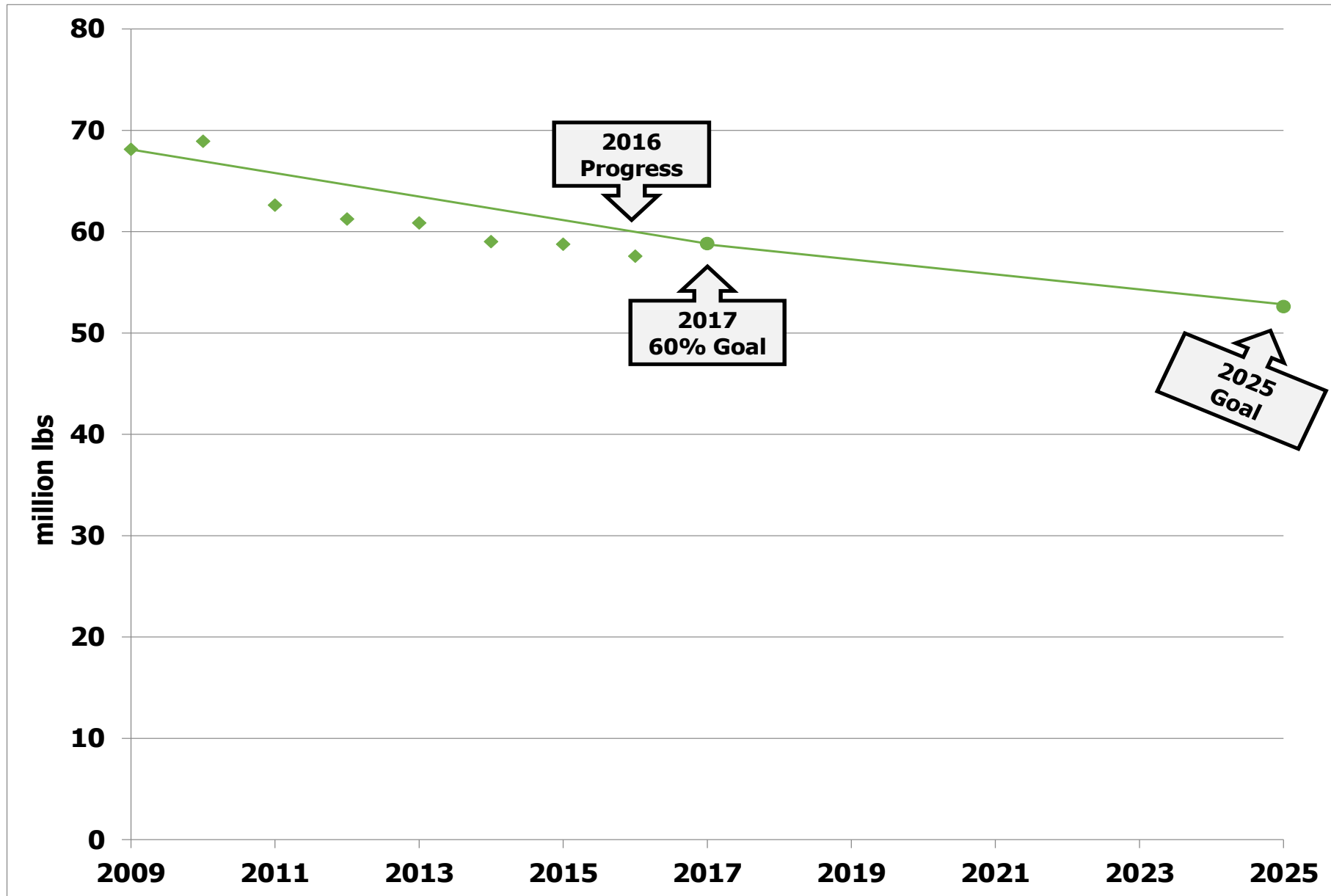


VA Draft Phase III WIP Planning Targets + Reference Loads

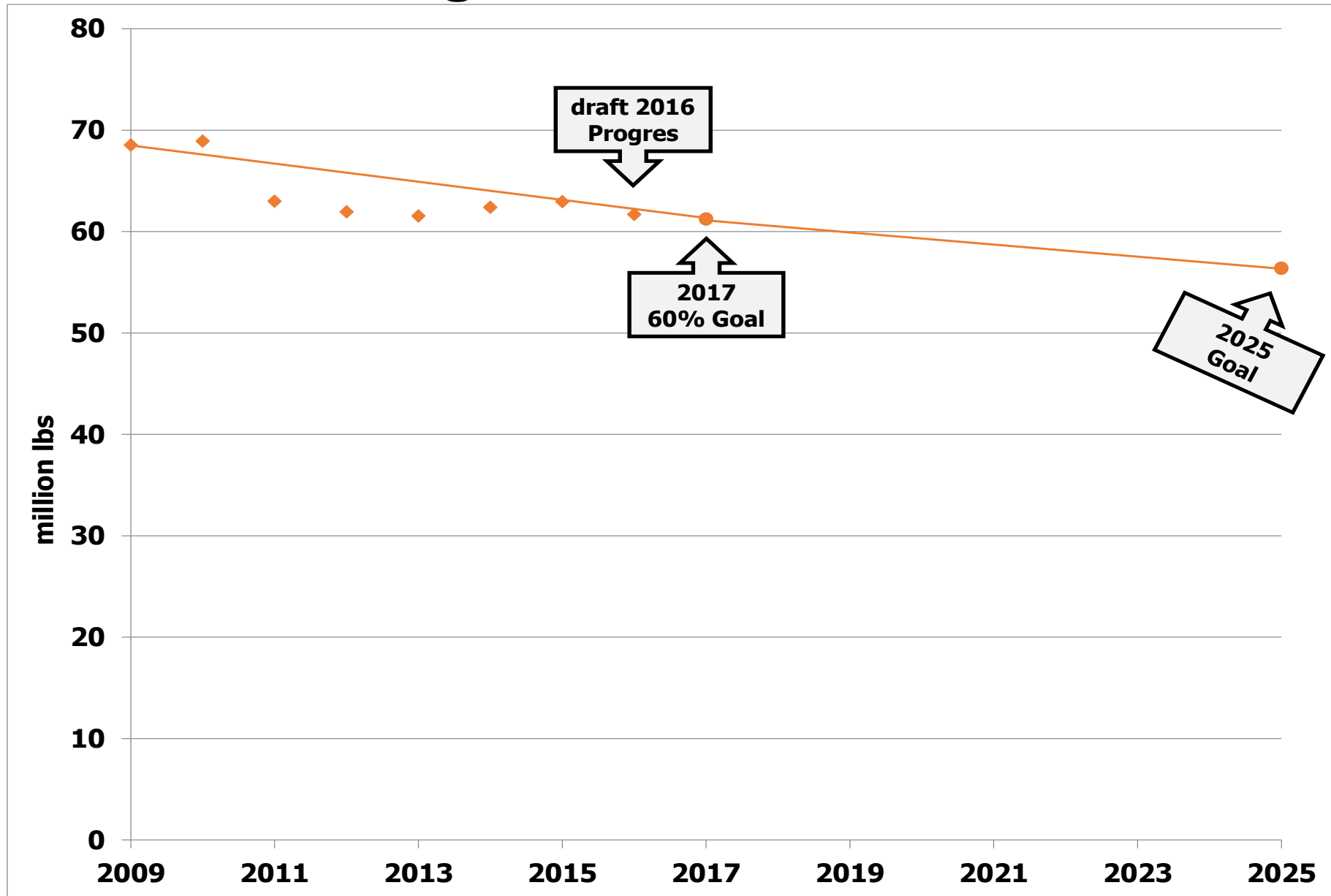
Nitrogen Load					
	No-Action (M lbs)	E3 (M lbs)	2013 Progress (M lbs)	Phase II WIP (reference) (M lbs)	Draft Phase III WIP Planning Target (M lbs)
VA Eastern Shore	2.99	0.96	2.29	1.55	1.45
VA James	51.58	15.22	26.86	22.07	26.33
VA Potomac	36.81	10.76	17.57	15.38	16.09
VA Rappahannock	11.57	4.84	8.37	6.84	6.93
VA York	9.01	3.78	6.43	5.63	5.58
VA Total	111.96	35.56	61.53	51.47	56.37

Phosphorus Load					
	No-Action (M lbs)	E3 (M lbs)	2013 Progress (M lbs)	Phase II WIP (reference) (M lbs)	Draft Phase III WIP Planning Target (M lbs)
VA Eastern Shore	0.272	0.124	0.180	0.156	0.161
VA James	10.029	1.424	2.781	2.302	2.829
VA Potomac	6.117	1.141	2.204	1.780	1.991
VA Rappahannock	1.548	0.612	0.999	0.863	0.878
VA York	1.132	0.374	0.587	0.565	0.551
VA Total	19.099	3.674	6.751	5.666	6.411

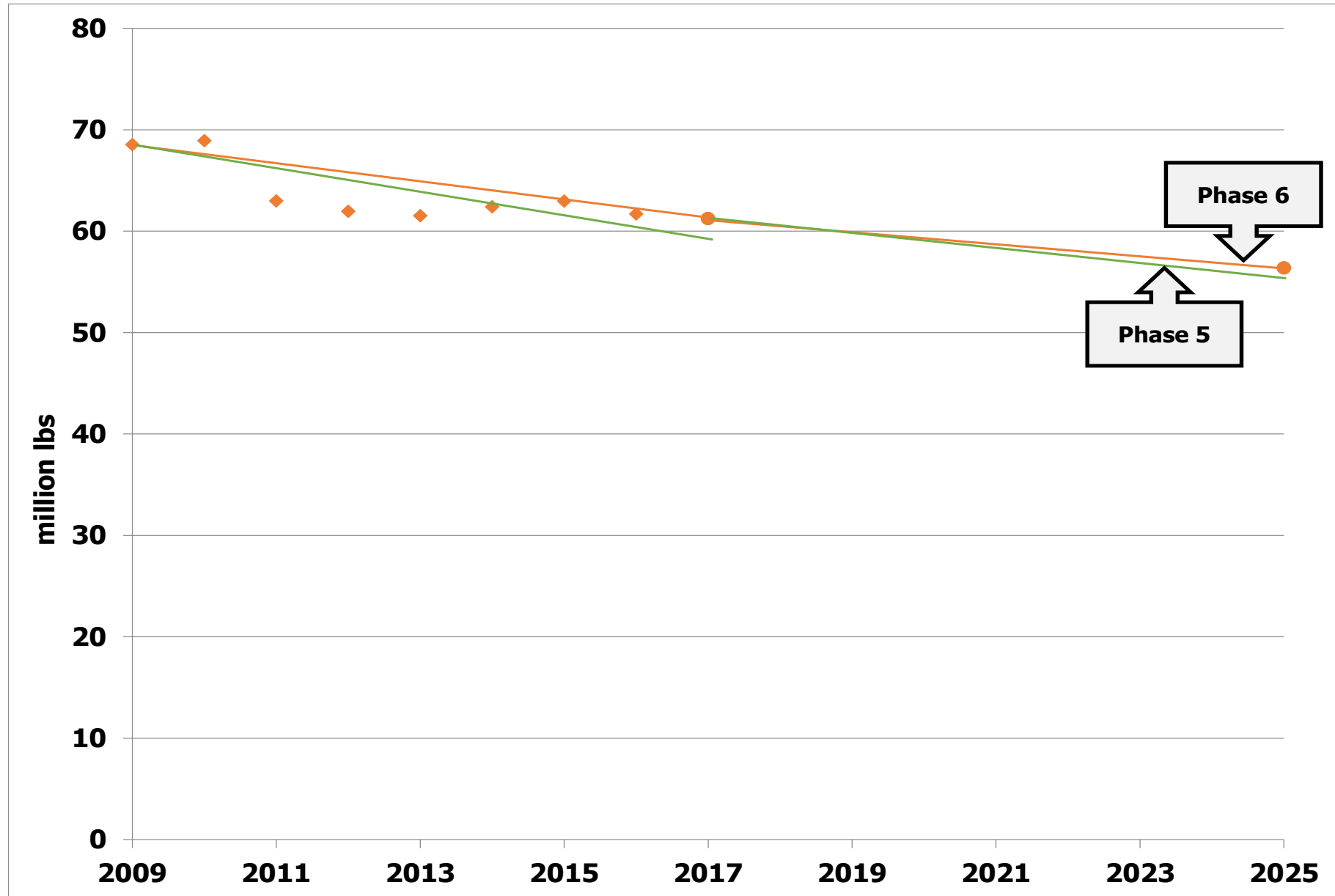
VA Nitrogen Loads-Goals, Phase 5.3.2



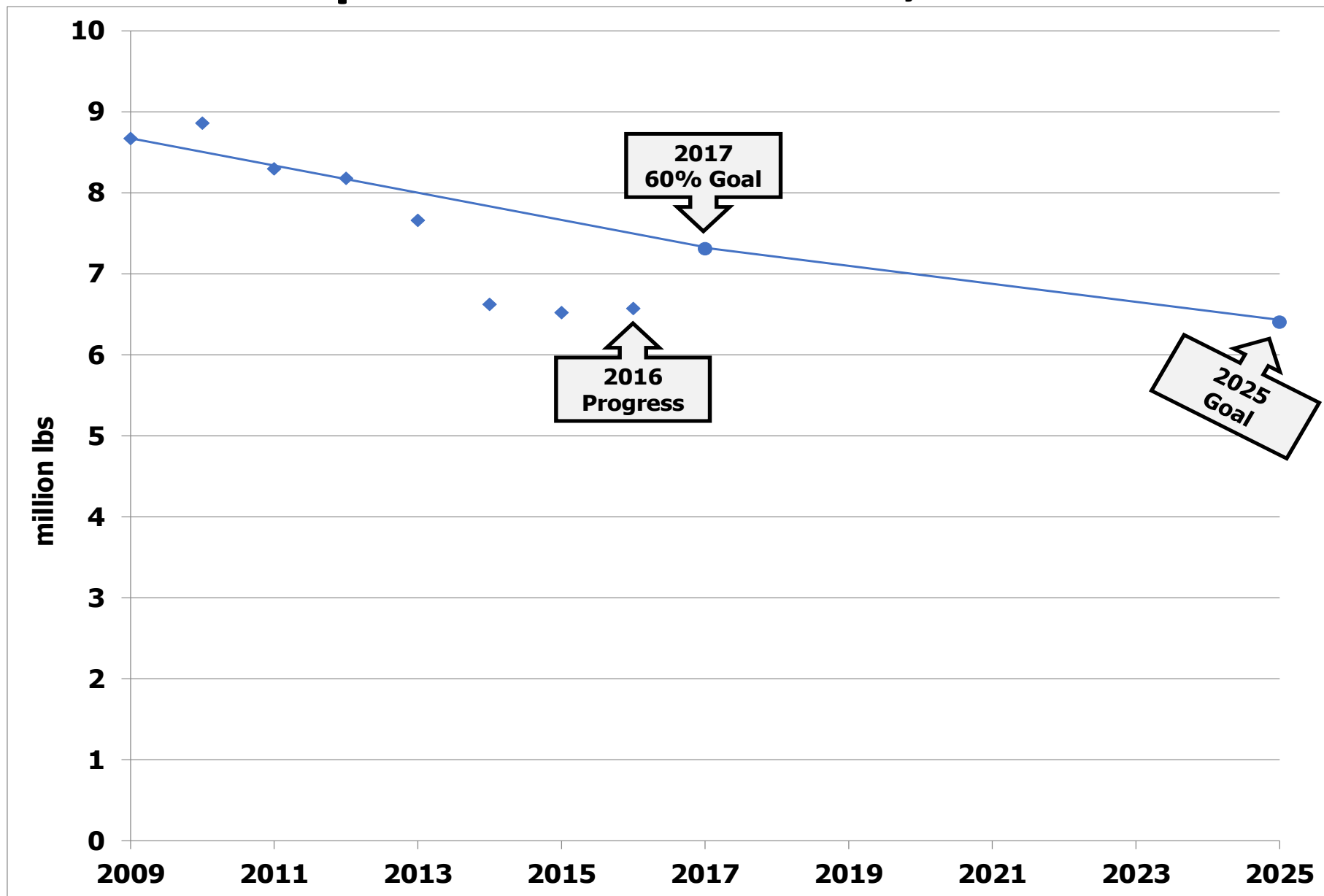
VA Nitrogen Loads-Goals, Phase 6



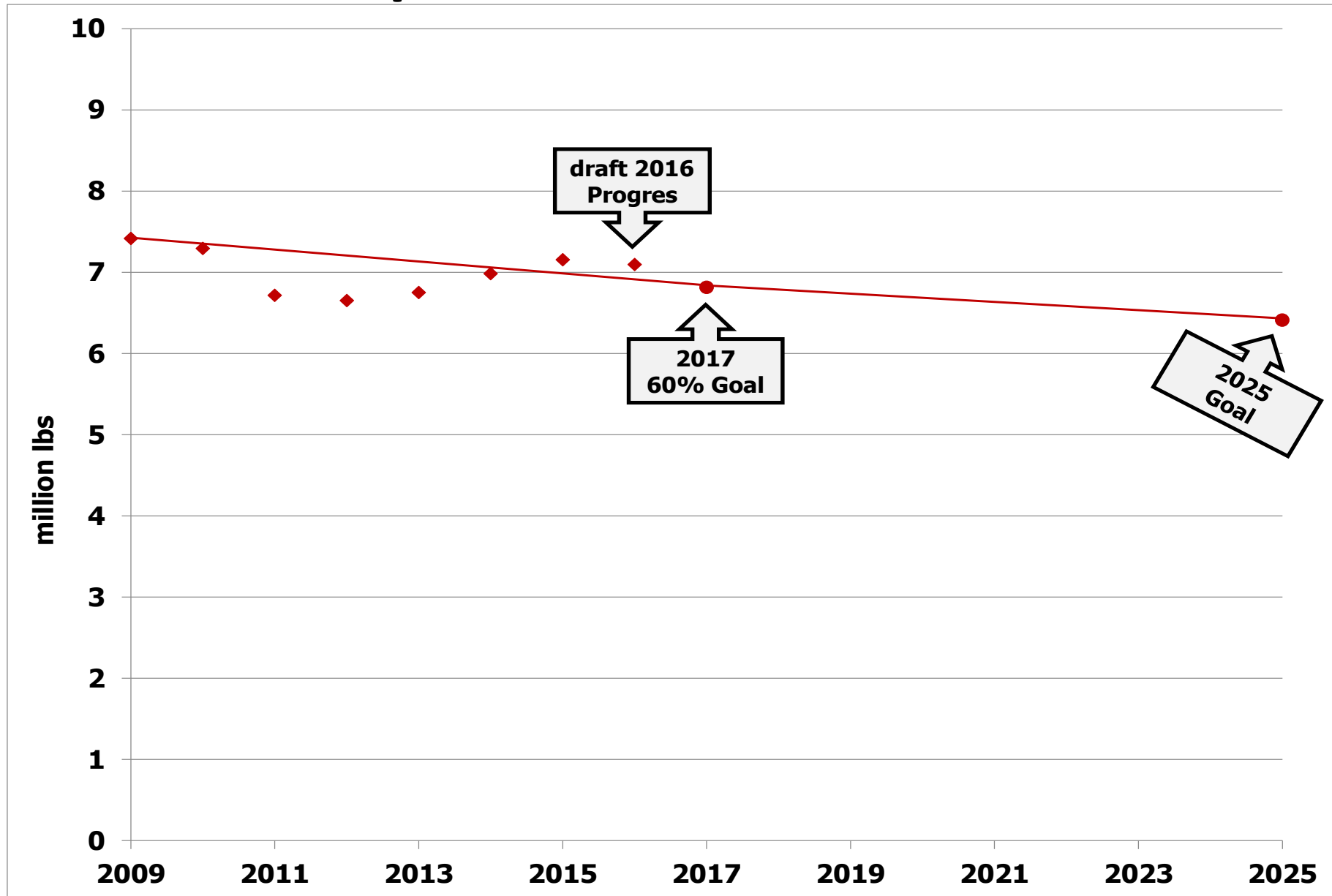
VA Nitrogen Change in LOE



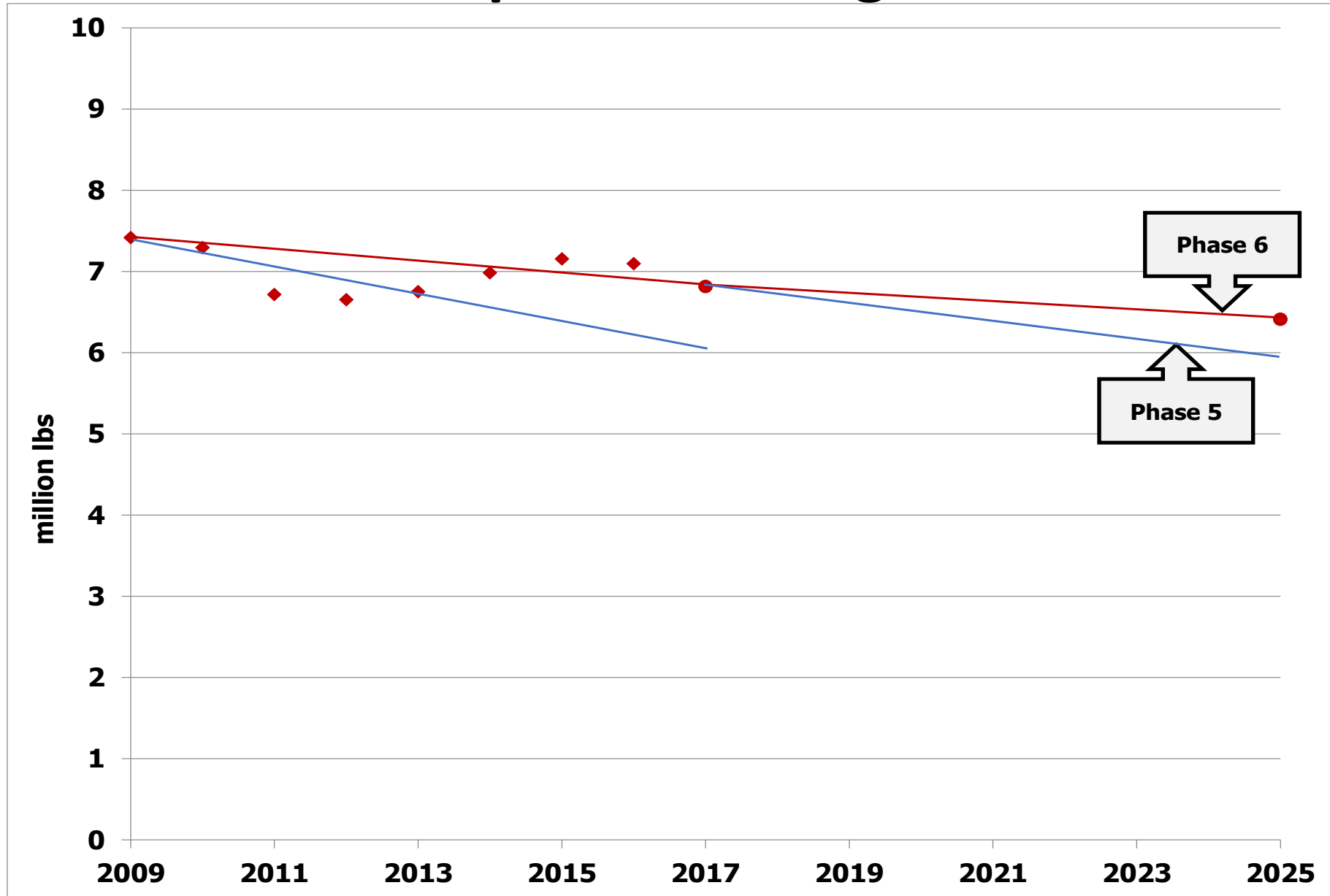
VA Phosphorus Loads-Goals, Phase 5.3.2



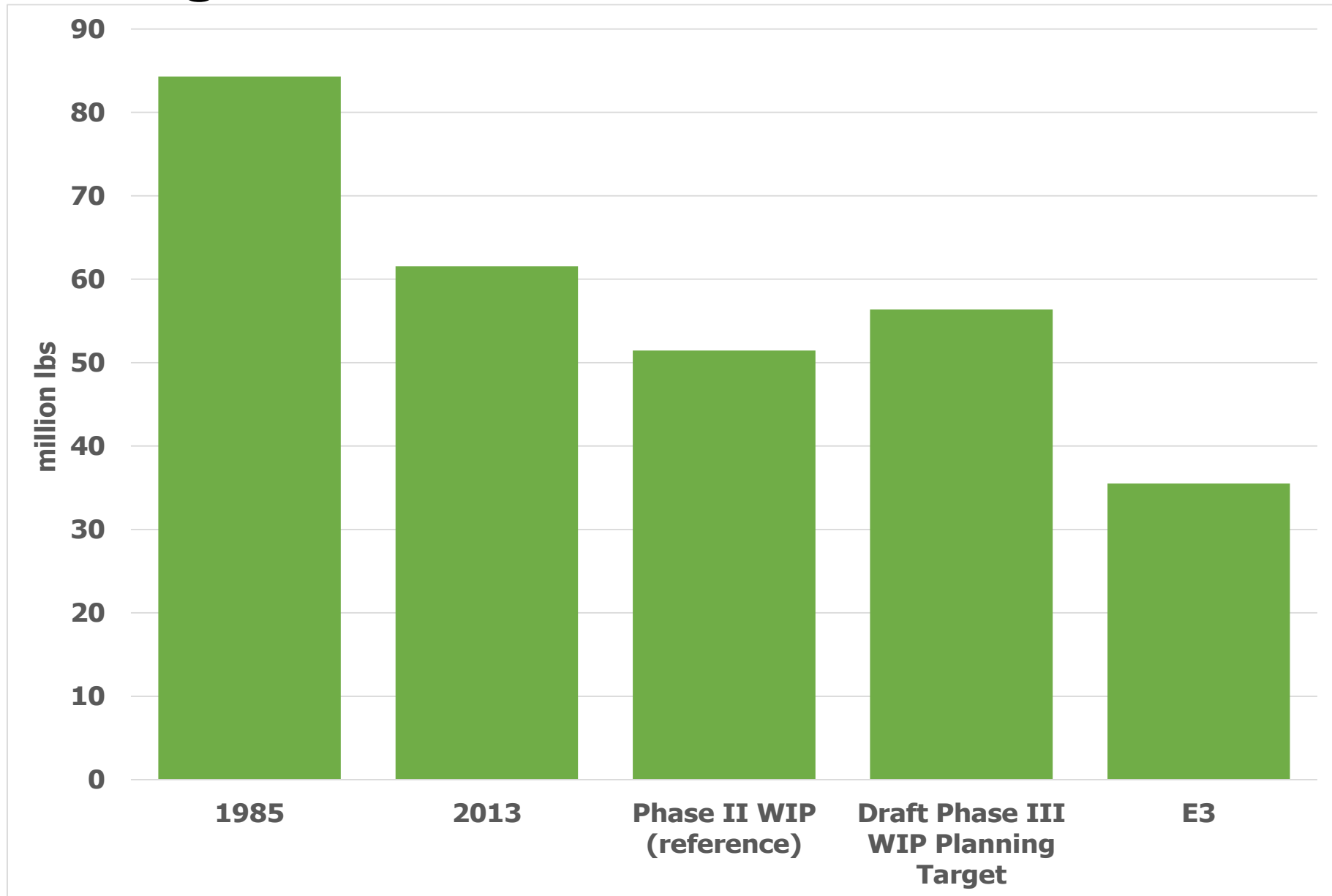
VA Phosphorus Loads-Goals, Phase 6



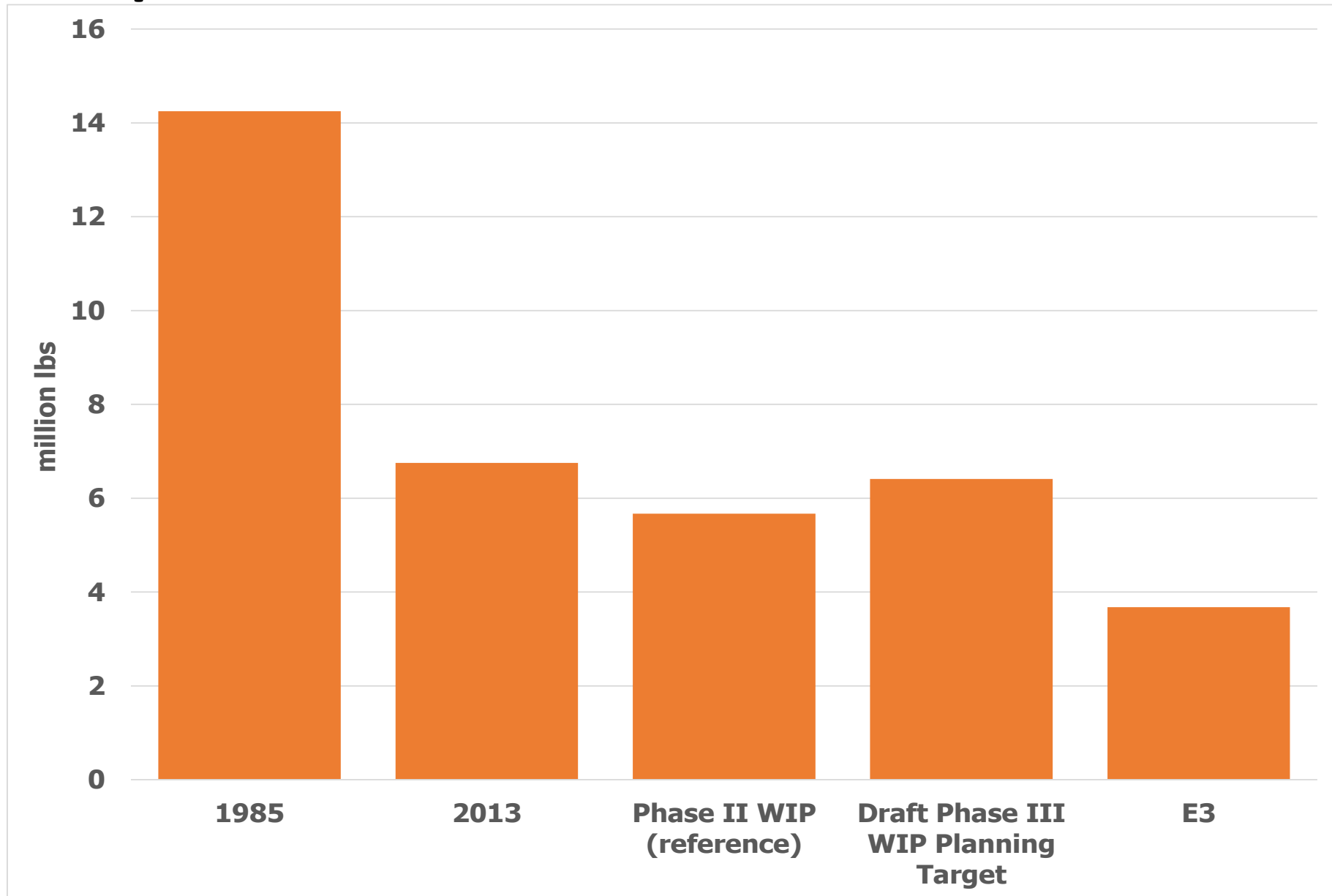
VA Phosphorus Change in LOE



VA Nitrogen Loads, Reference Scenarios, and Target

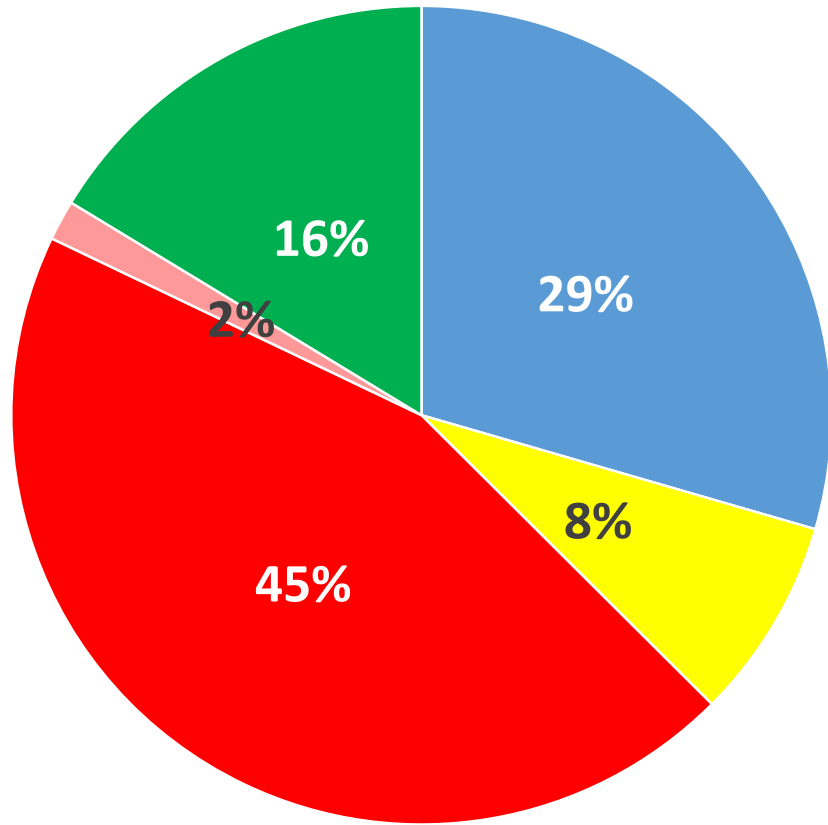


VA Phosphorus Loads, Reference Scenarios, and Target

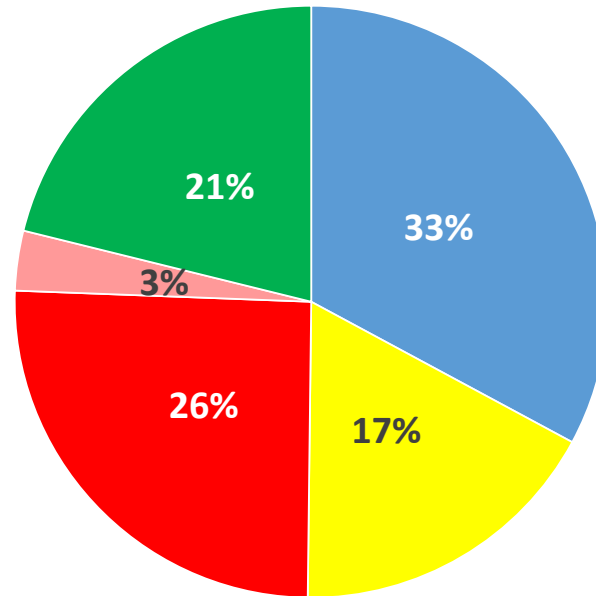


VA Nitrogen Loads and Target

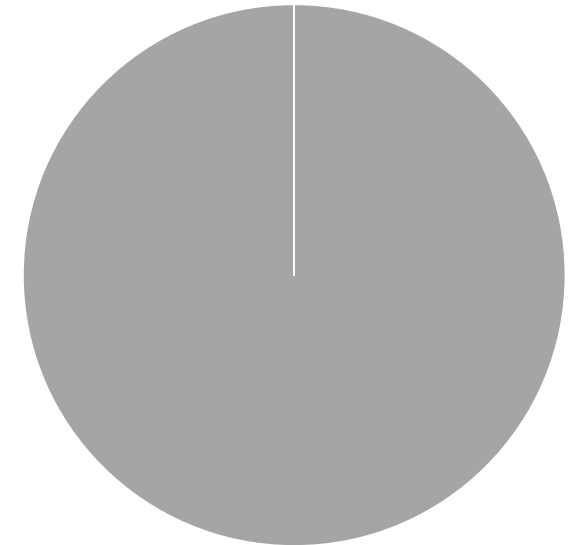
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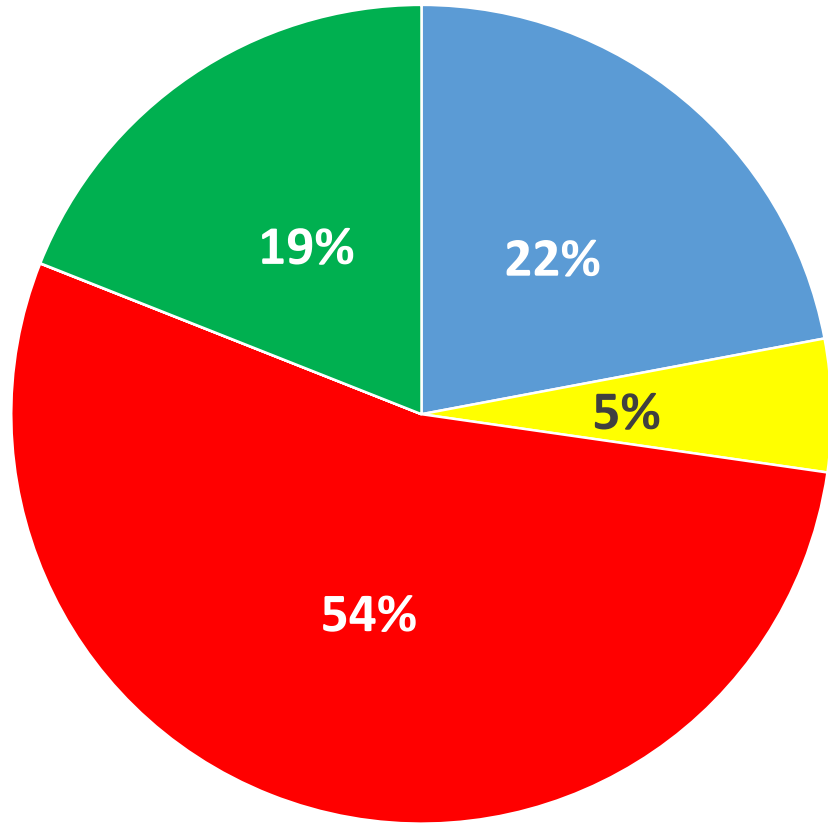
2013



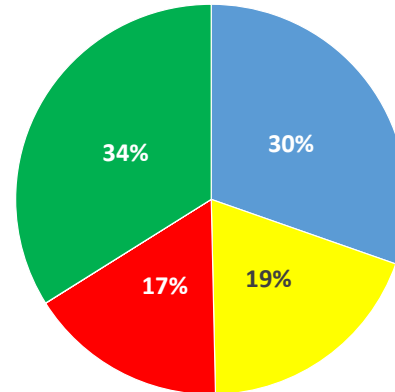
**Draft Phase III WIP
Planning Target**

VA Phosphorus Loads and Target

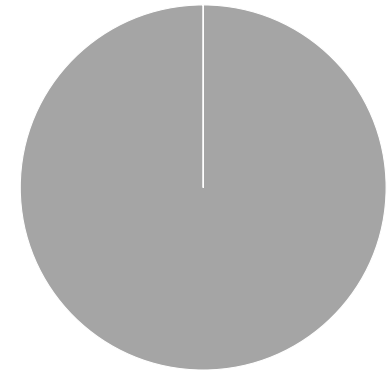
■ Agriculture ■ Developed ■ Wastewater ■ Natural



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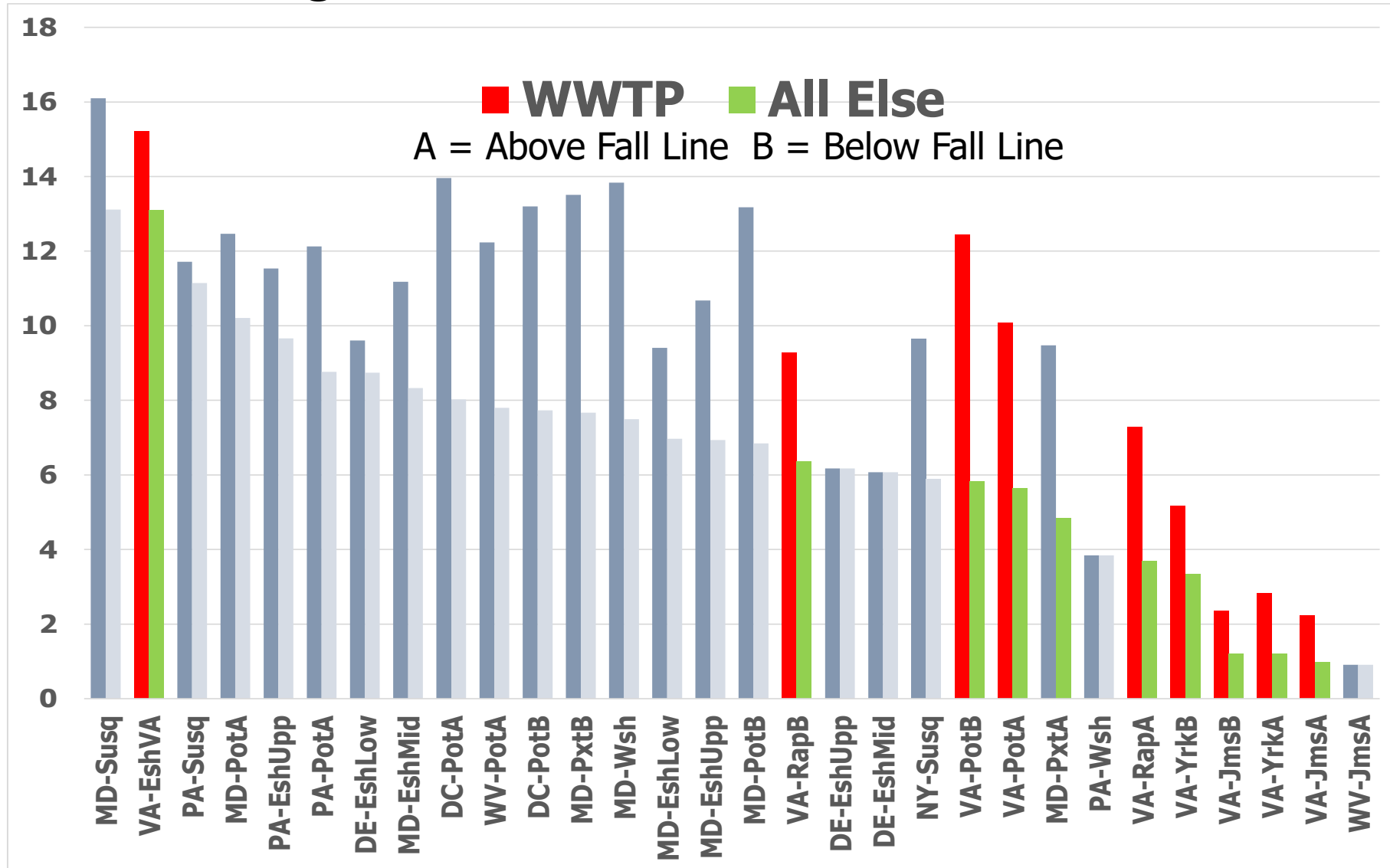
2013



**Draft Phase III WIP
Planning Target**

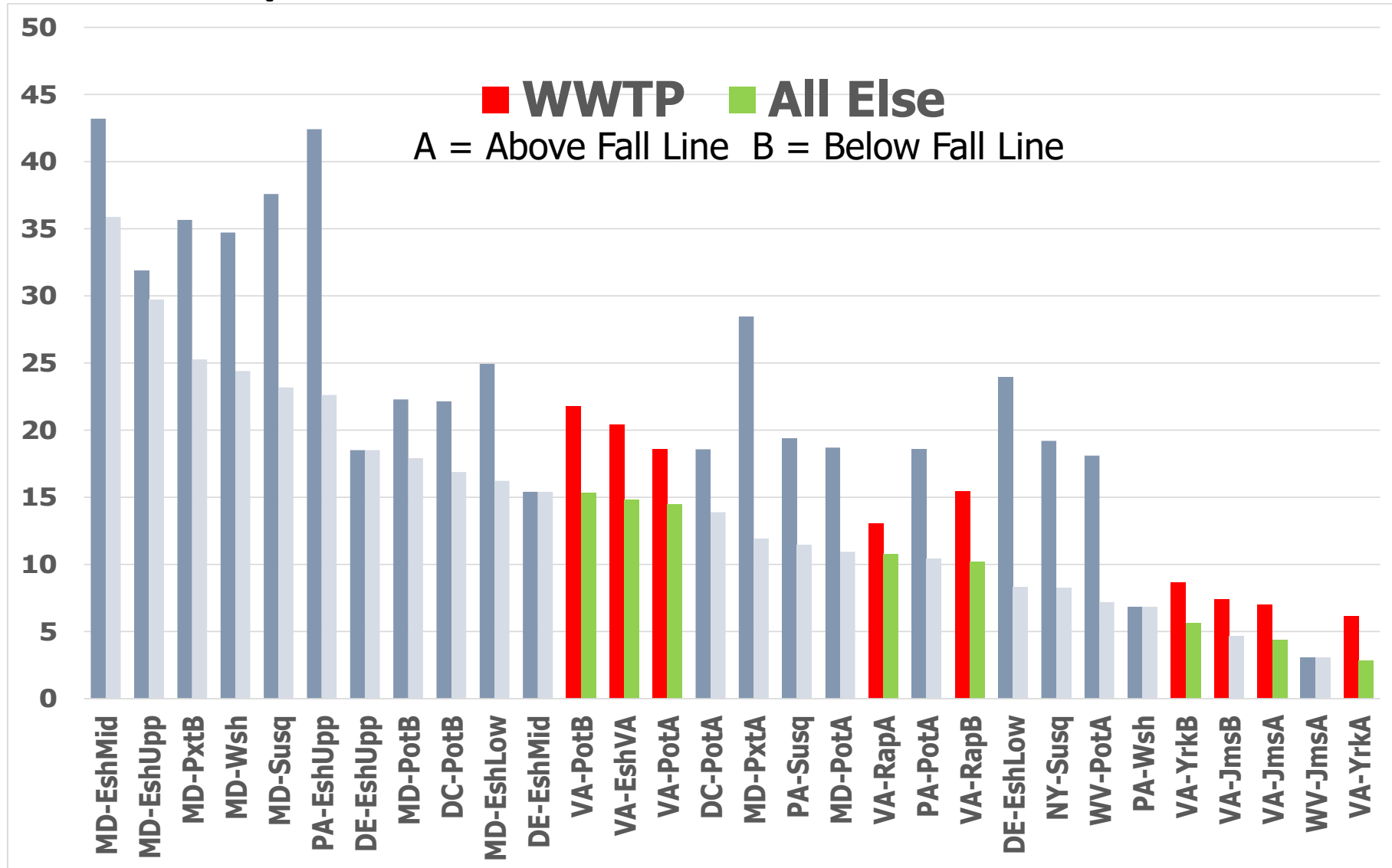
Nitrogen Relative Effectiveness

Effect of Nitrogen Load Reduction on WQ Standard Attainment



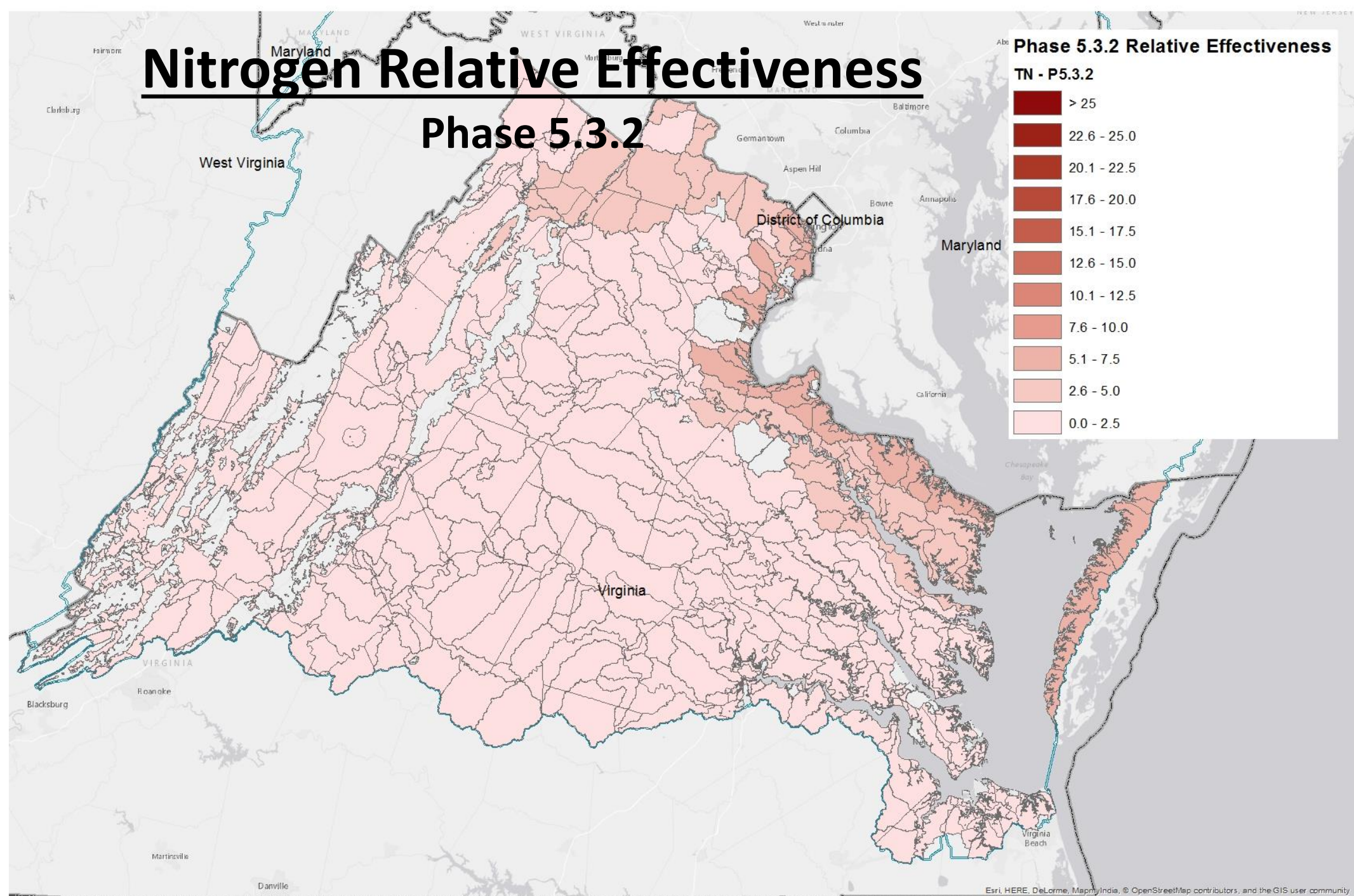
Phosphorus Relative Effectiveness

Effect of Phosphorus Load Reduction on WQ Standard Attainment



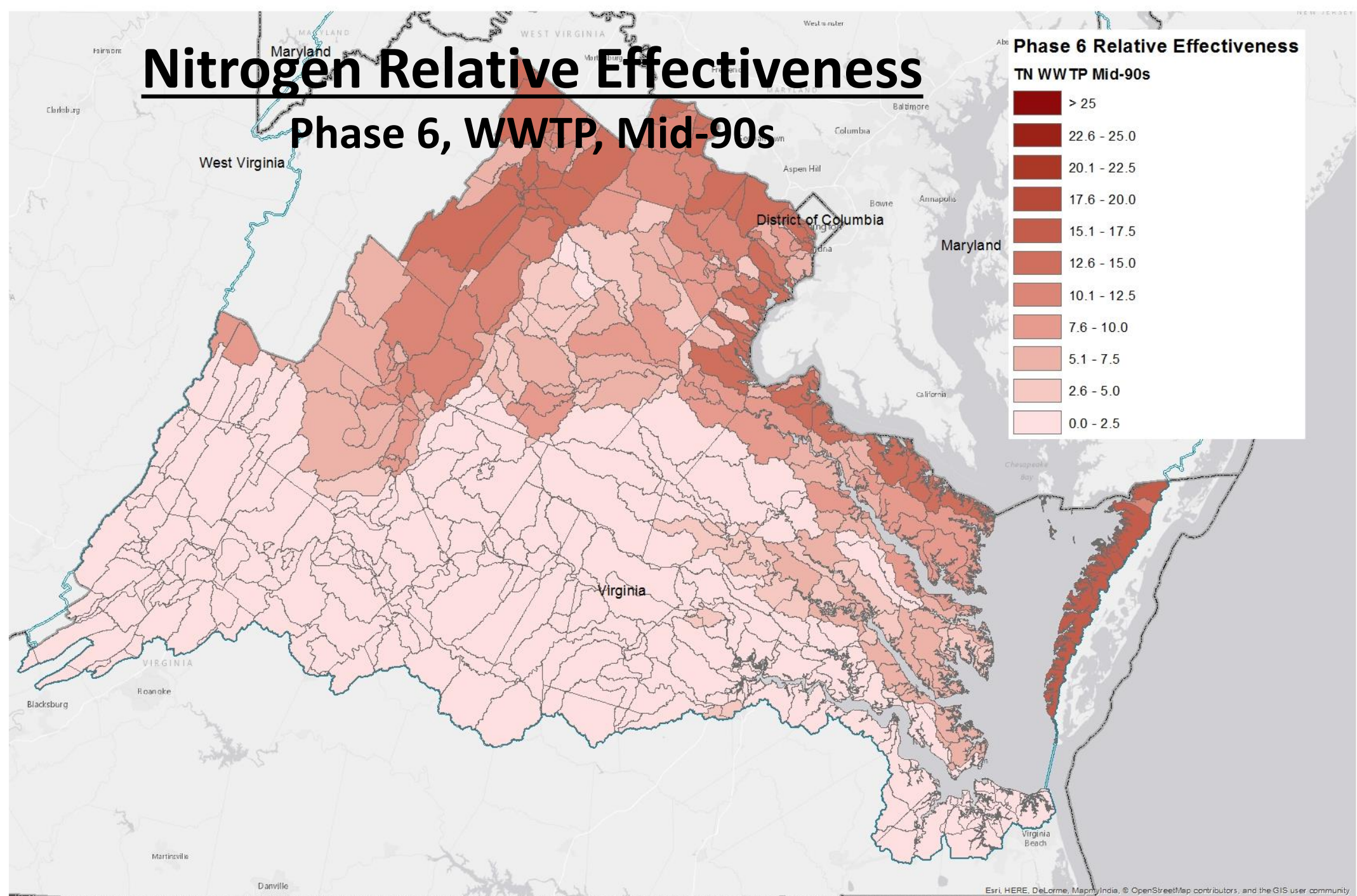
Nitrogen Relative Effectiveness

Phase 5.3.2



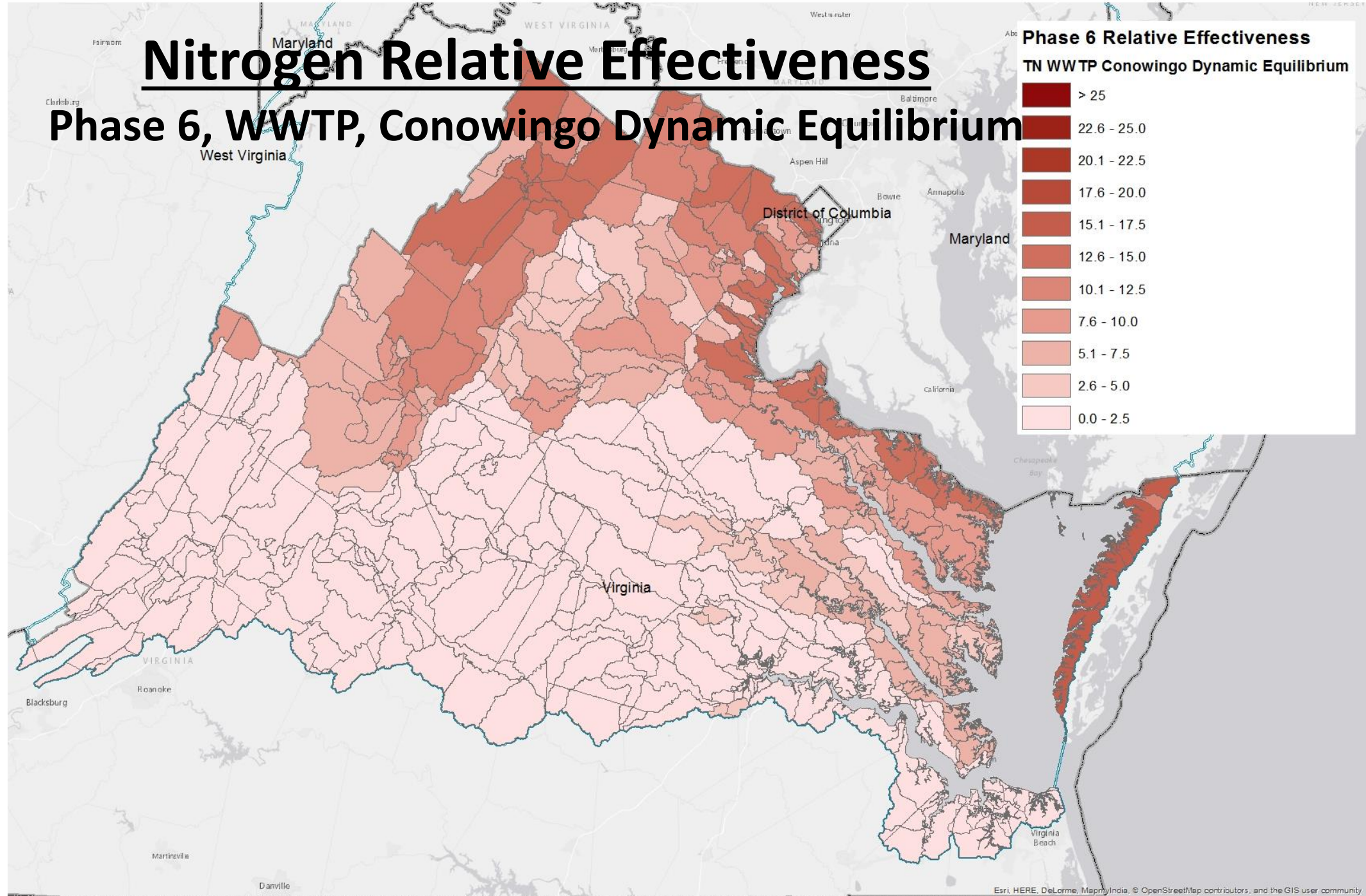
Nitrogen Relative Effectiveness

Phase 6, WWTP, Mid-90s



Nitrogen Relative Effectiveness

Phase 6, WWTP, Conowingo Dynamic Equilibrium

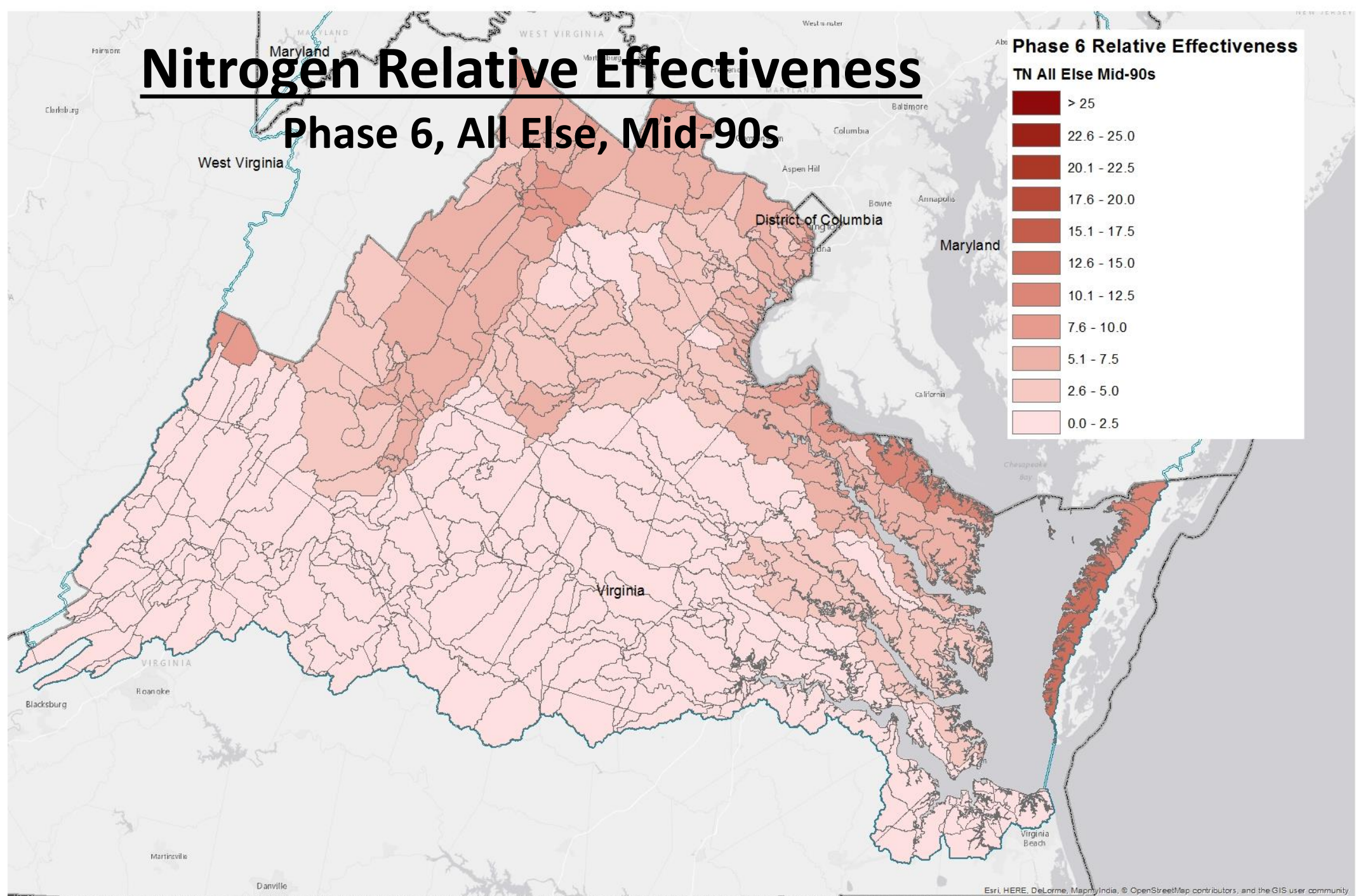
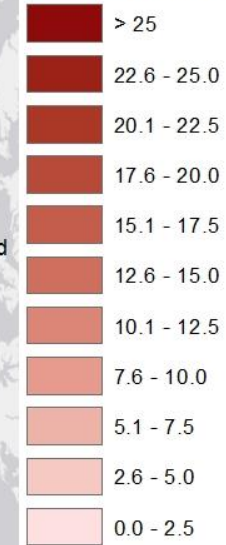


Nitrogen Relative Effectiveness

Phase 6, All Else, Mid-90s

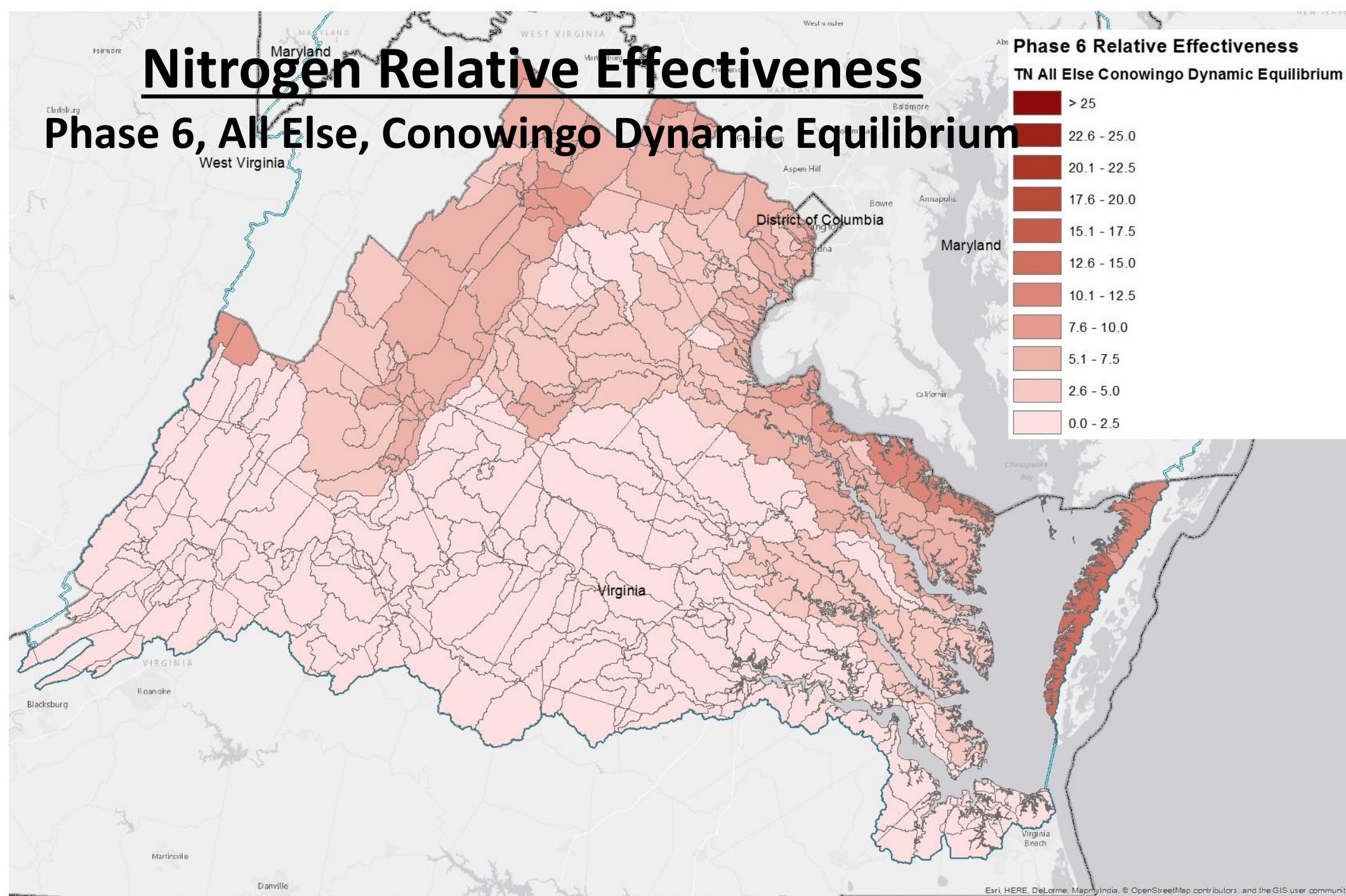
Phase 6 Relative Effectiveness

TN All Else Mid-90s



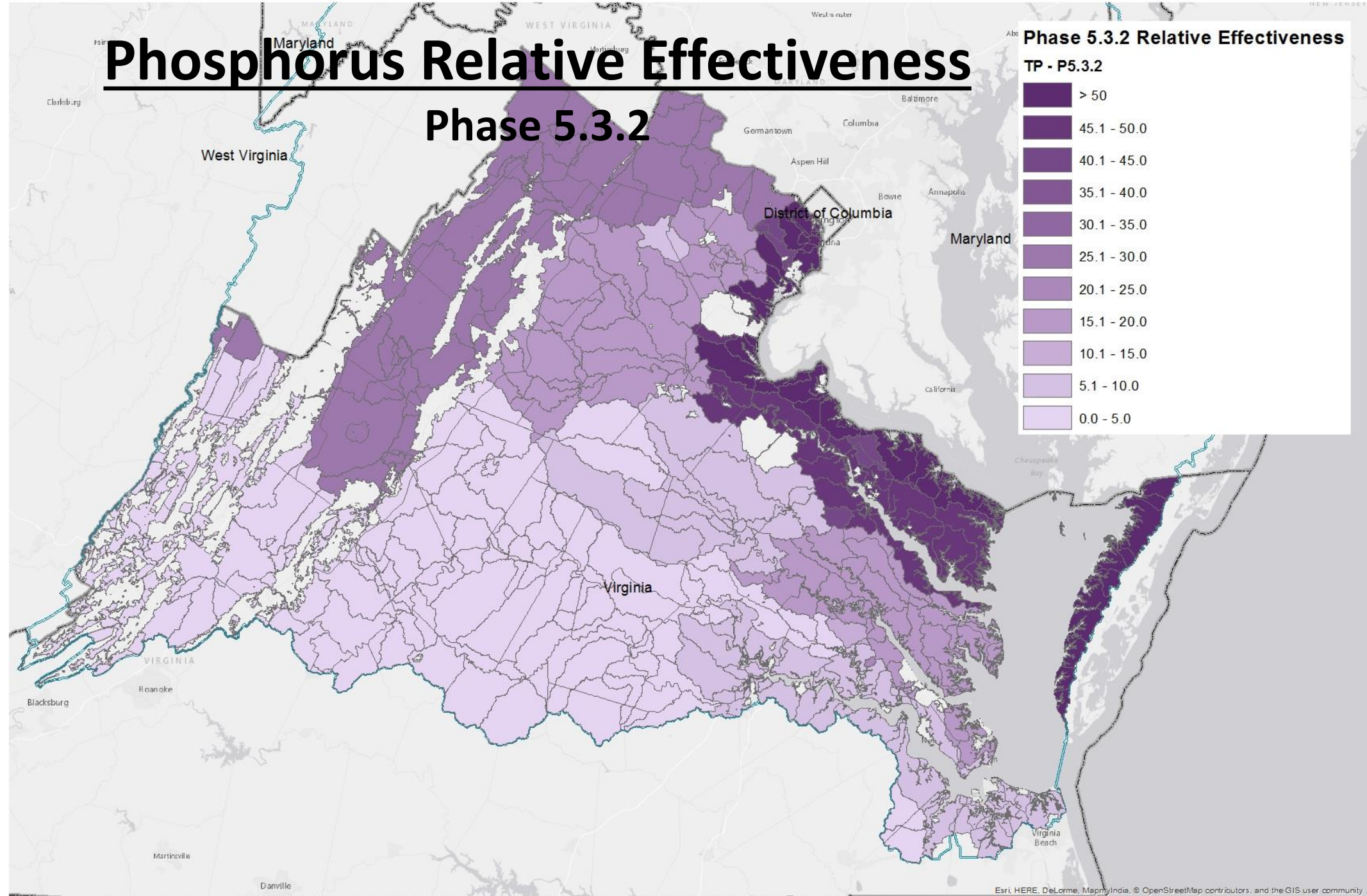
Nitrogen Relative Effectiveness

Phase 6, All Else, Conowingo Dynamic Equilibrium



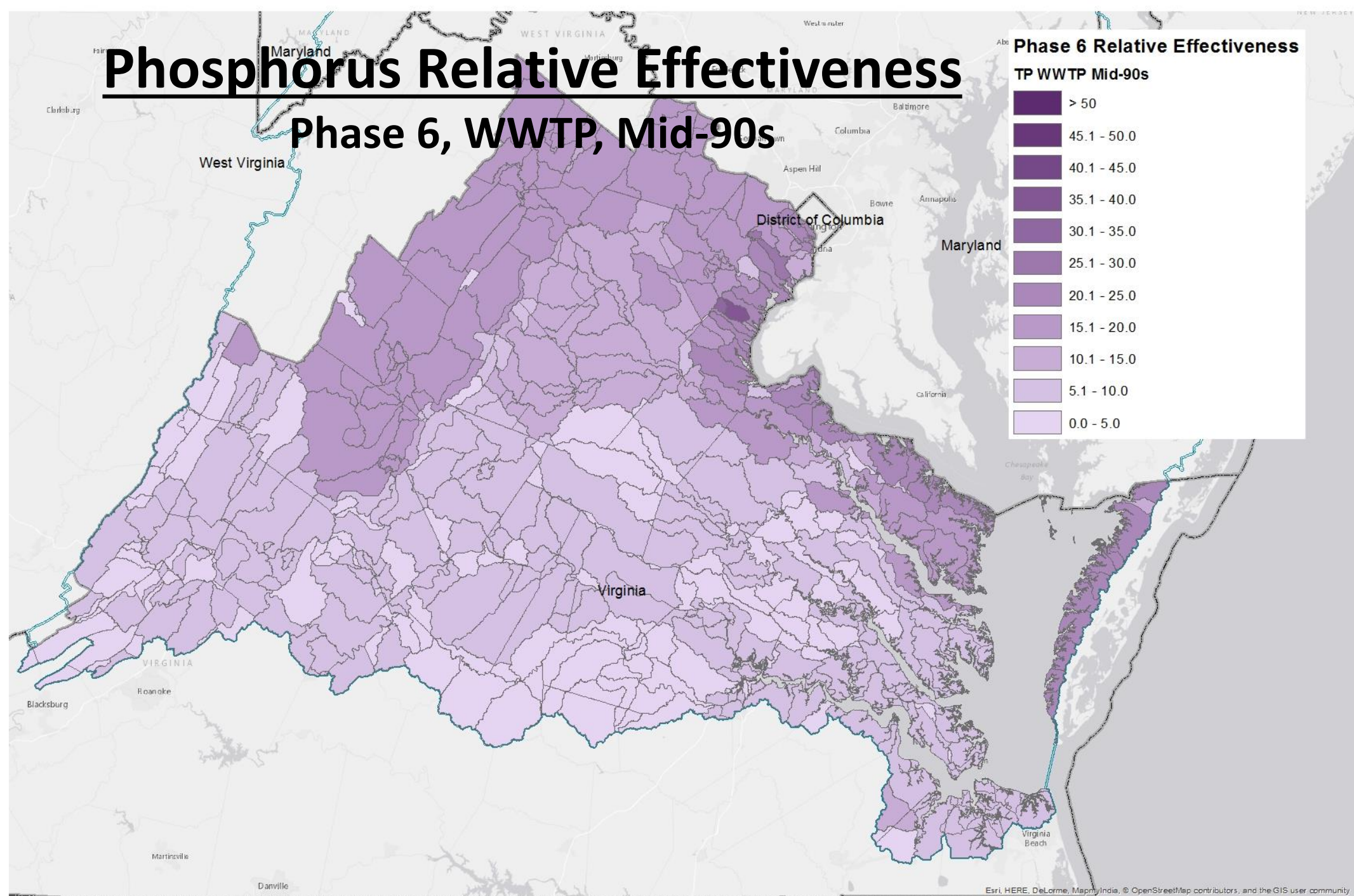
Phosphorus Relative Effectiveness

Phase 5.3.2



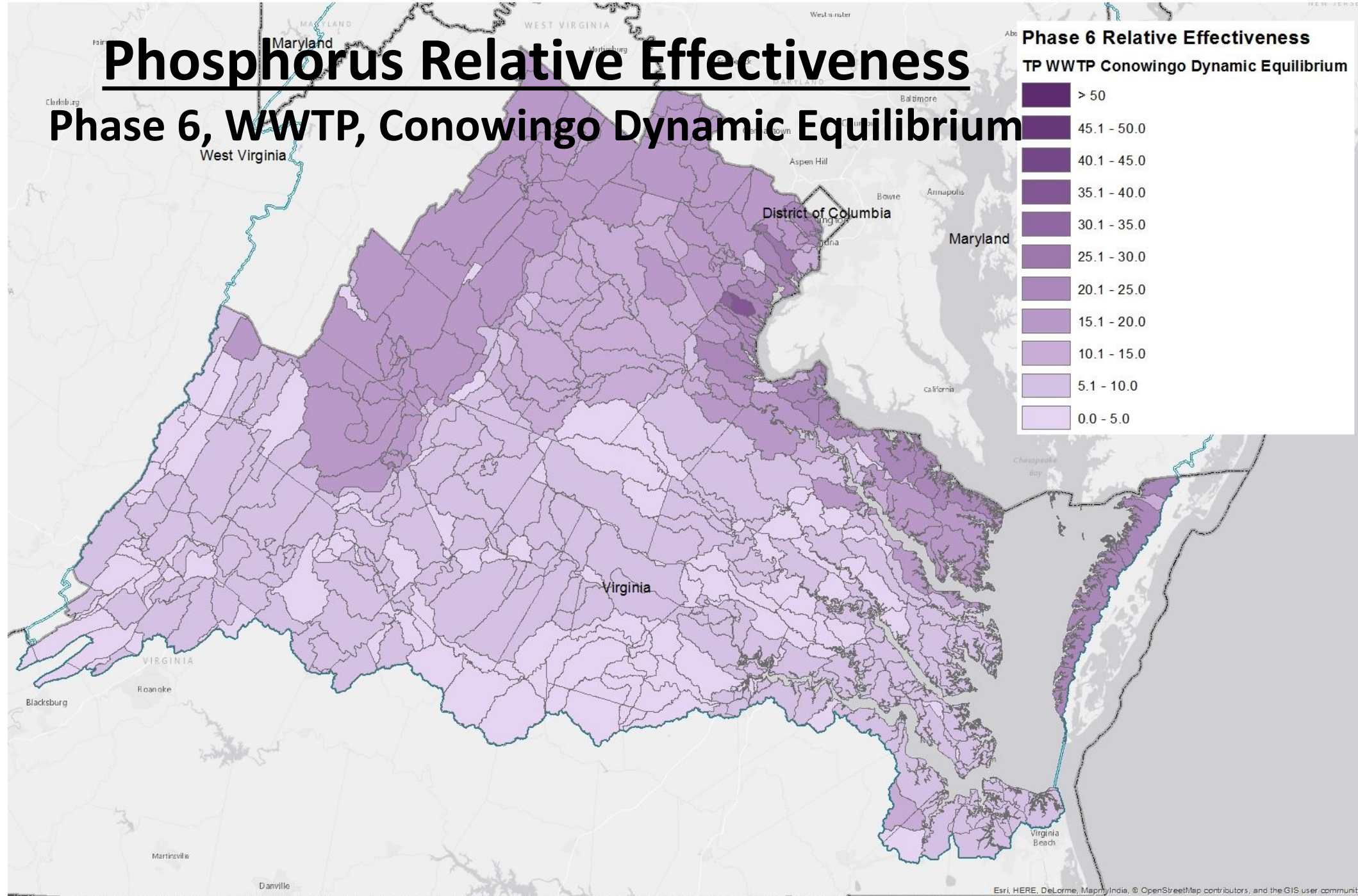
Phosphorus Relative Effectiveness

Phase 6, WWTP, Mid-90s



Phosphorus Relative Effectiveness

Phase 6, WWTP, Conowingo Dynamic Equilibrium

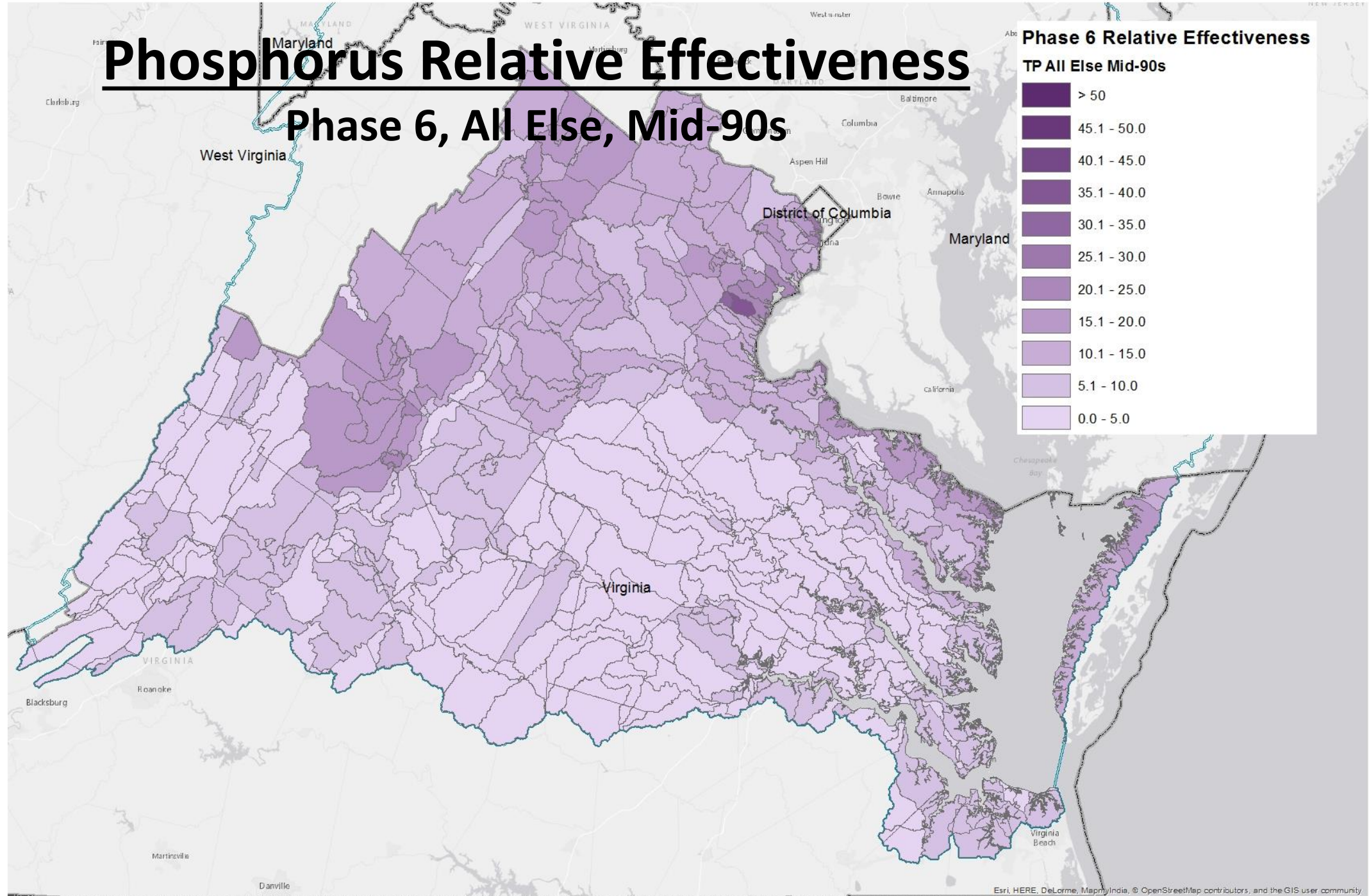
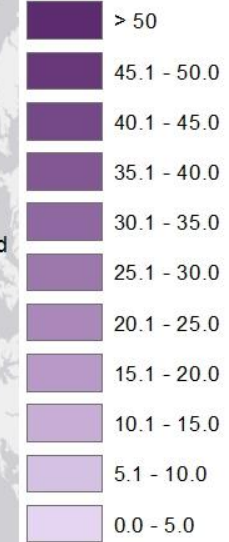


Phosphorus Relative Effectiveness

Phase 6, All Else, Mid-90s

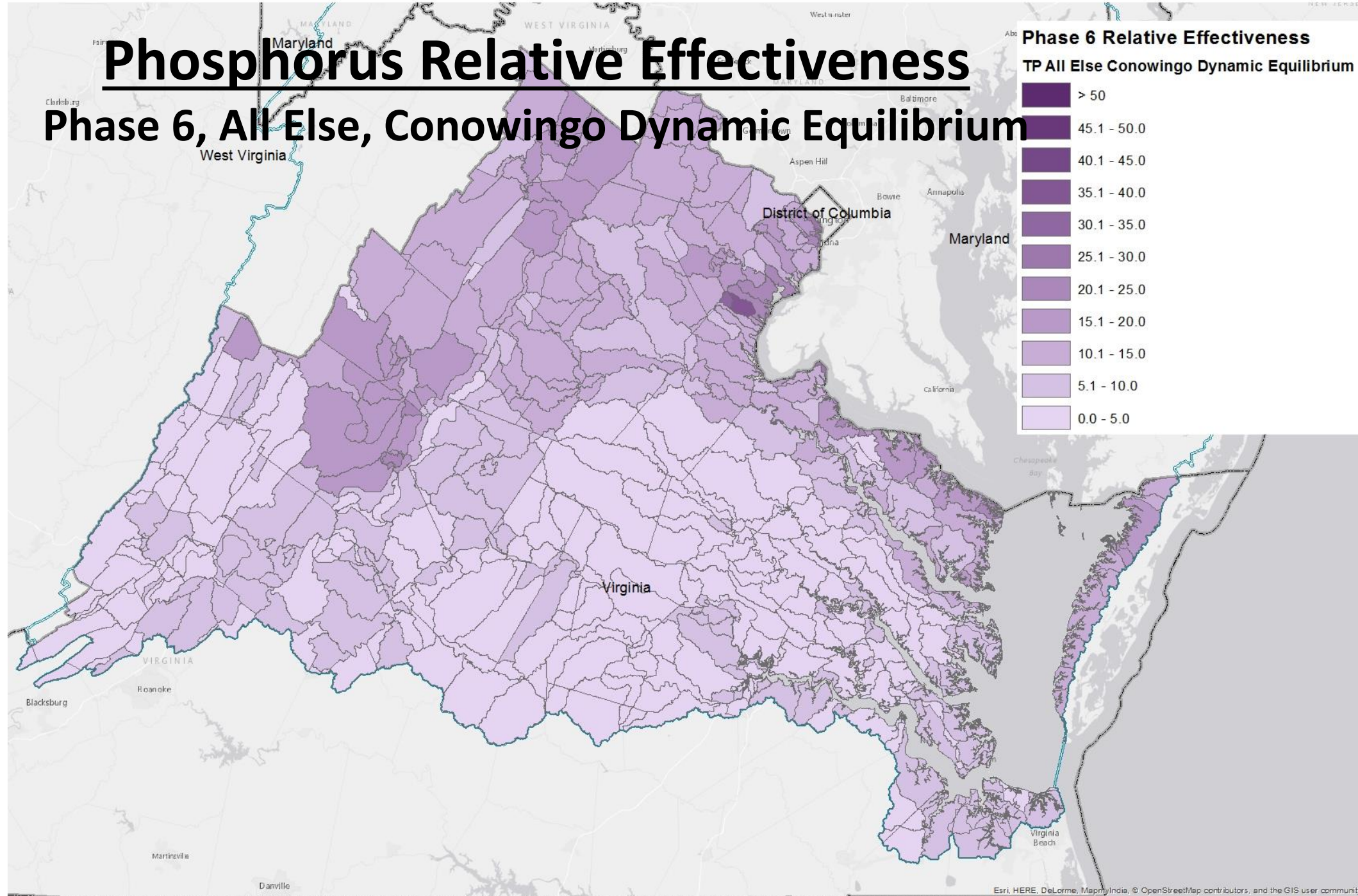
Phase 6 Relative Effectiveness

TP All Else Mid-90s



Phosphorus Relative Effectiveness

Phase 6, All Else, Conowingo Dynamic Equilibrium

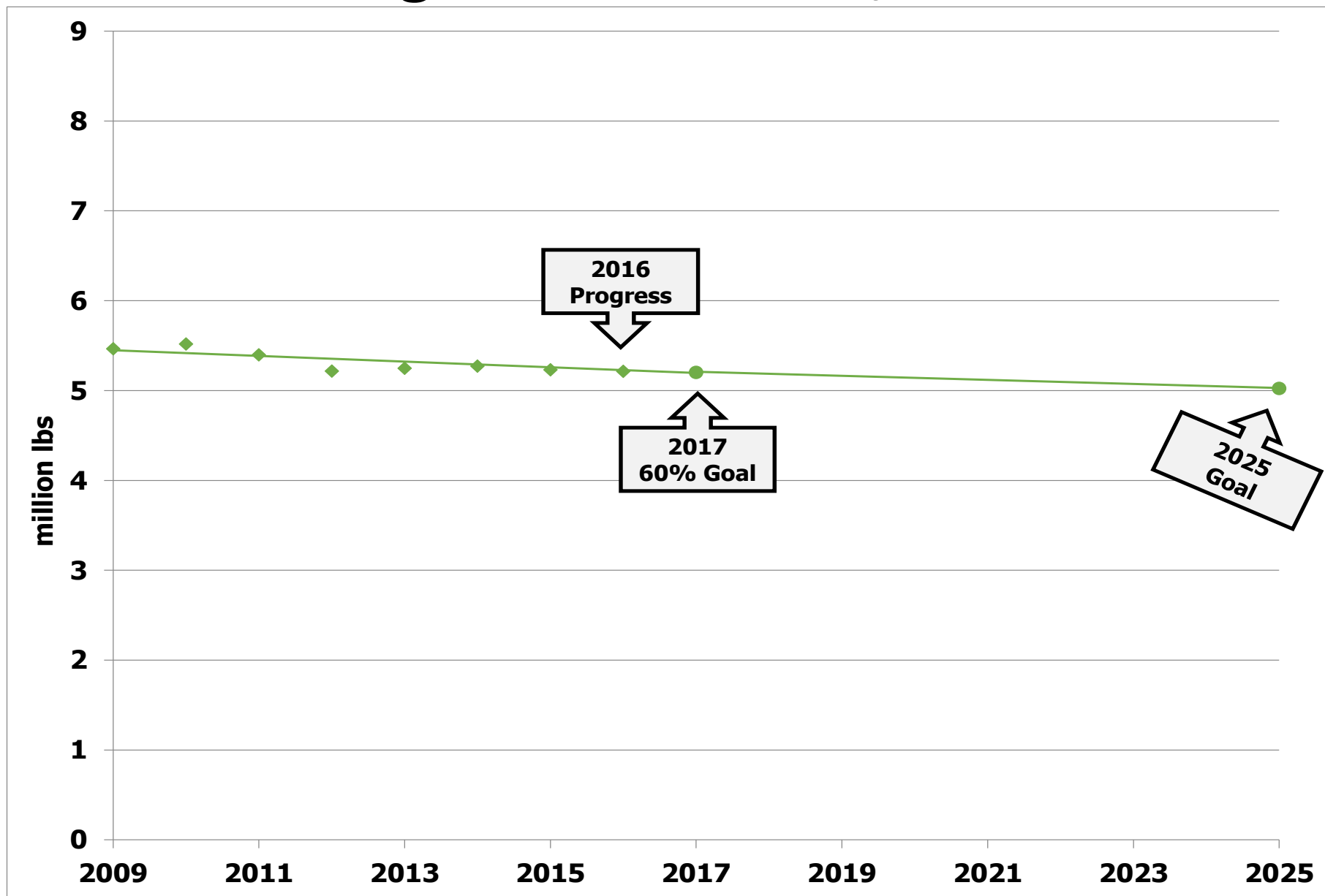


WV Draft Phase III WIP Planning Targets + Reference Loads

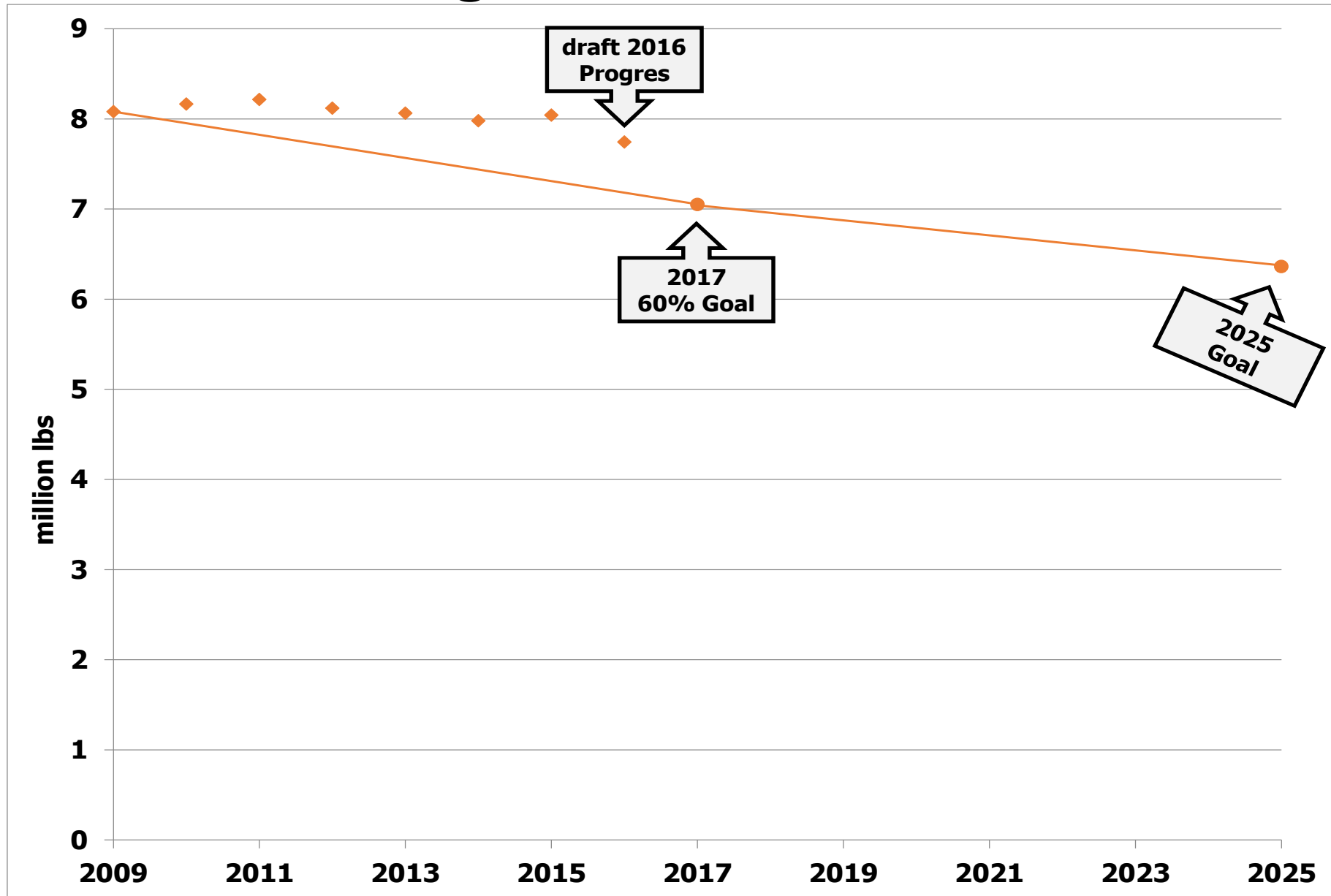
Nitrogen Load					
	No-Action (M lbs)	E3 (M lbs)	2013 Progress (M lbs)	Phase II WIP (reference) (M lbs)	Draft Phase III WIP Planning Target (M lbs)
WV James	0.05	0.04	0.05	0.05	0.04
WV Potomac	9.79	4.93	8.01	7.78	6.32
WV Total	9.84	4.96	8.06	7.82	6.36

Phosphorus Load					
	No-Action (M lbs)	E3 (M lbs)	2013 Progress (M lbs)	Phase II WIP (reference) (M lbs)	Draft Phase III WIP Planning Target (M lbs)
WV James	0.005	0.004	0.005	0.005	0.005
WV Potomac	0.974	0.301	0.612	0.511	0.489
WV Total	0.980	0.305	0.617	0.516	0.493

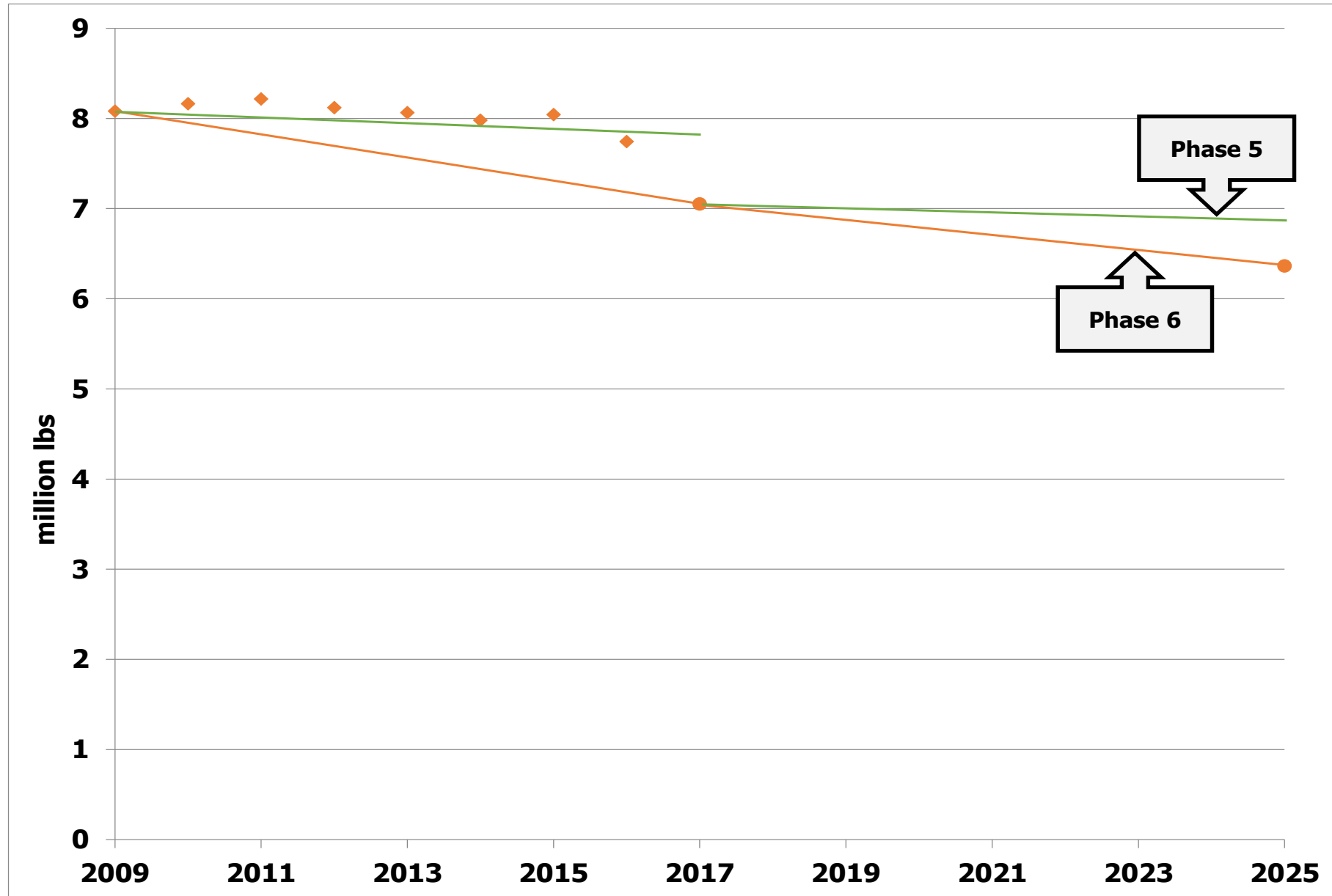
WV Nitrogen Loads-Goals, Phase 5.3.2



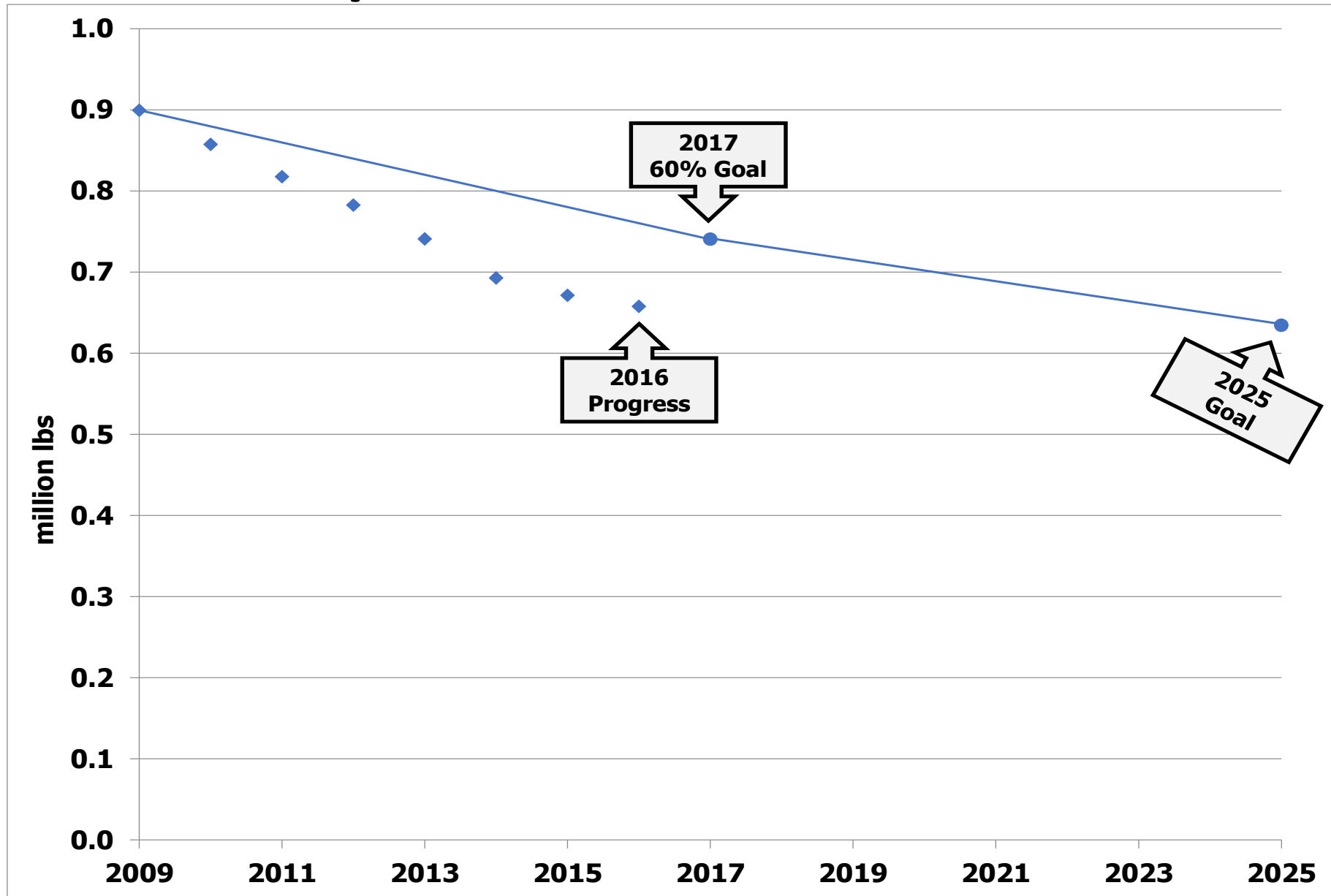
WV Nitrogen Loads-Goals, Phase 6



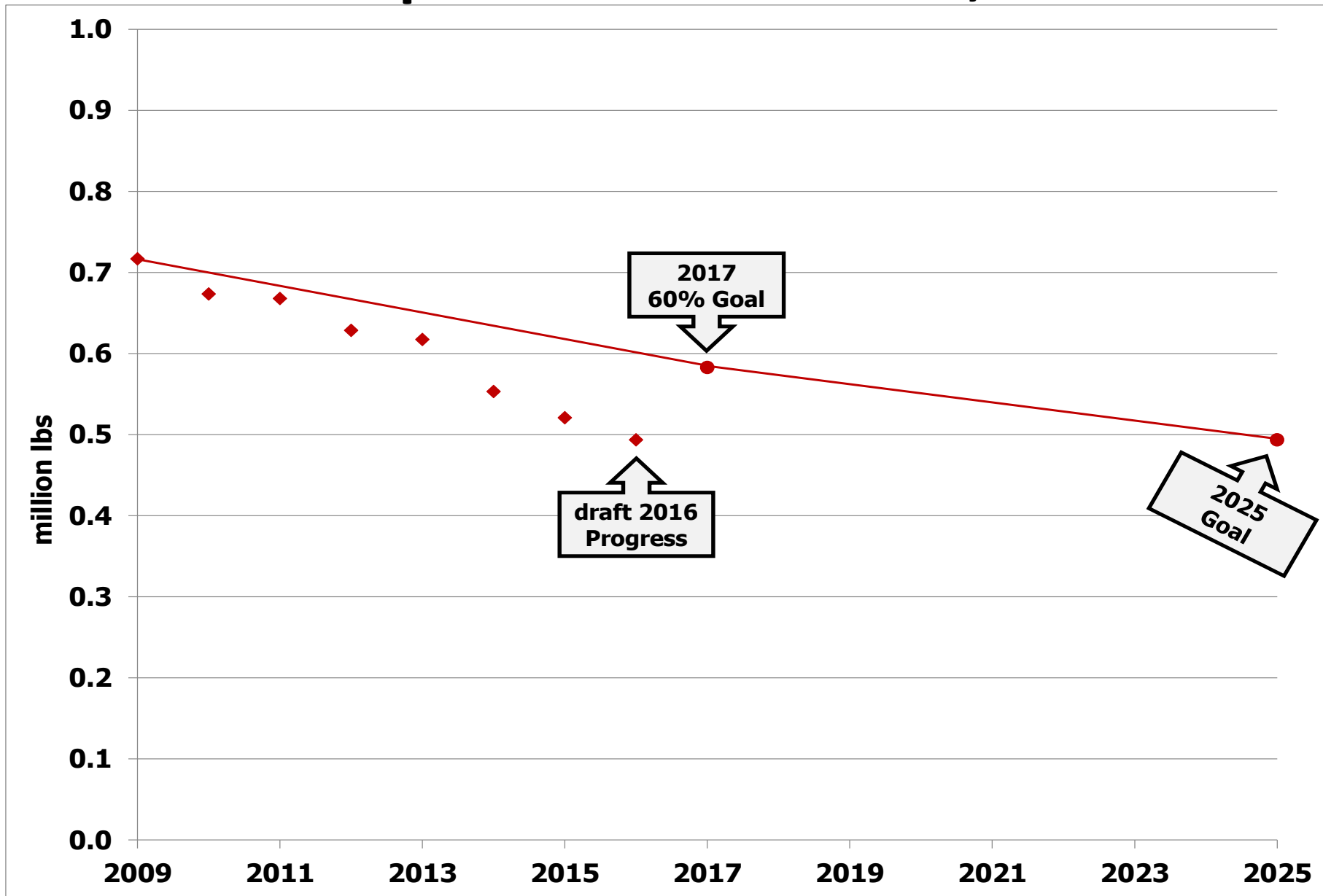
WV Nitrogen Change in LOE



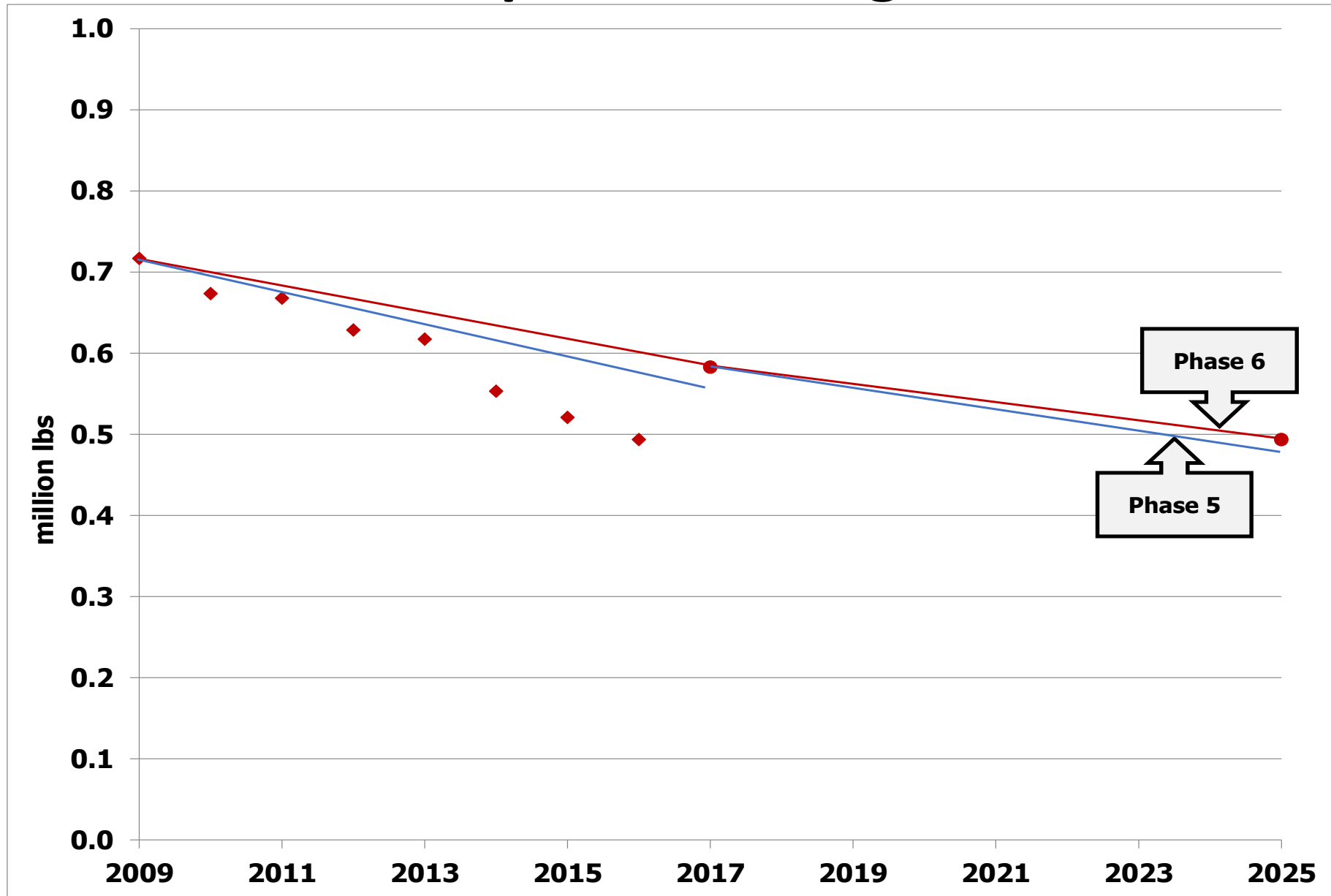
WV Phosphorus Loads-Goals, Phase 5.3.2



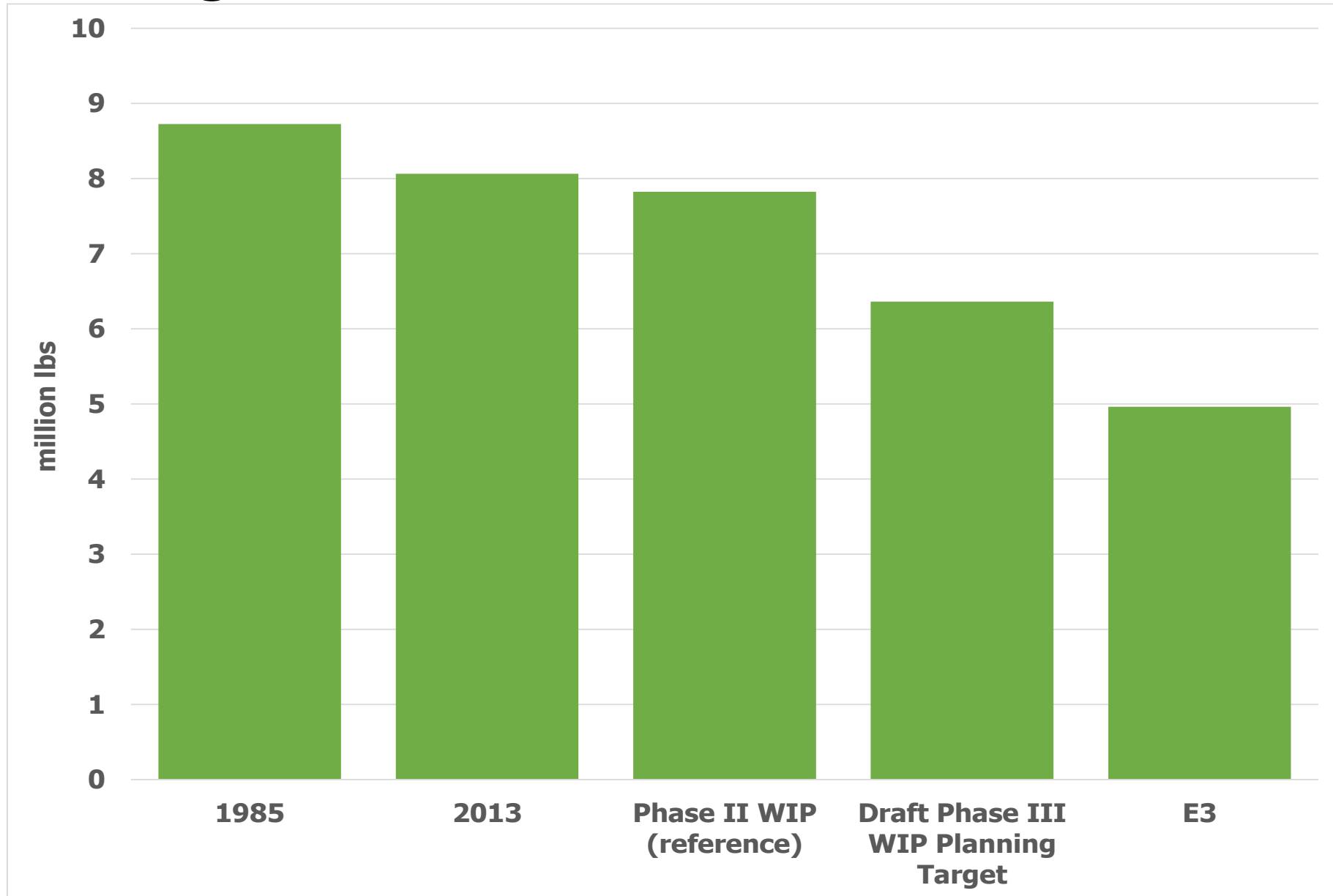
WV Phosphorus Loads-Goals, Phase 6



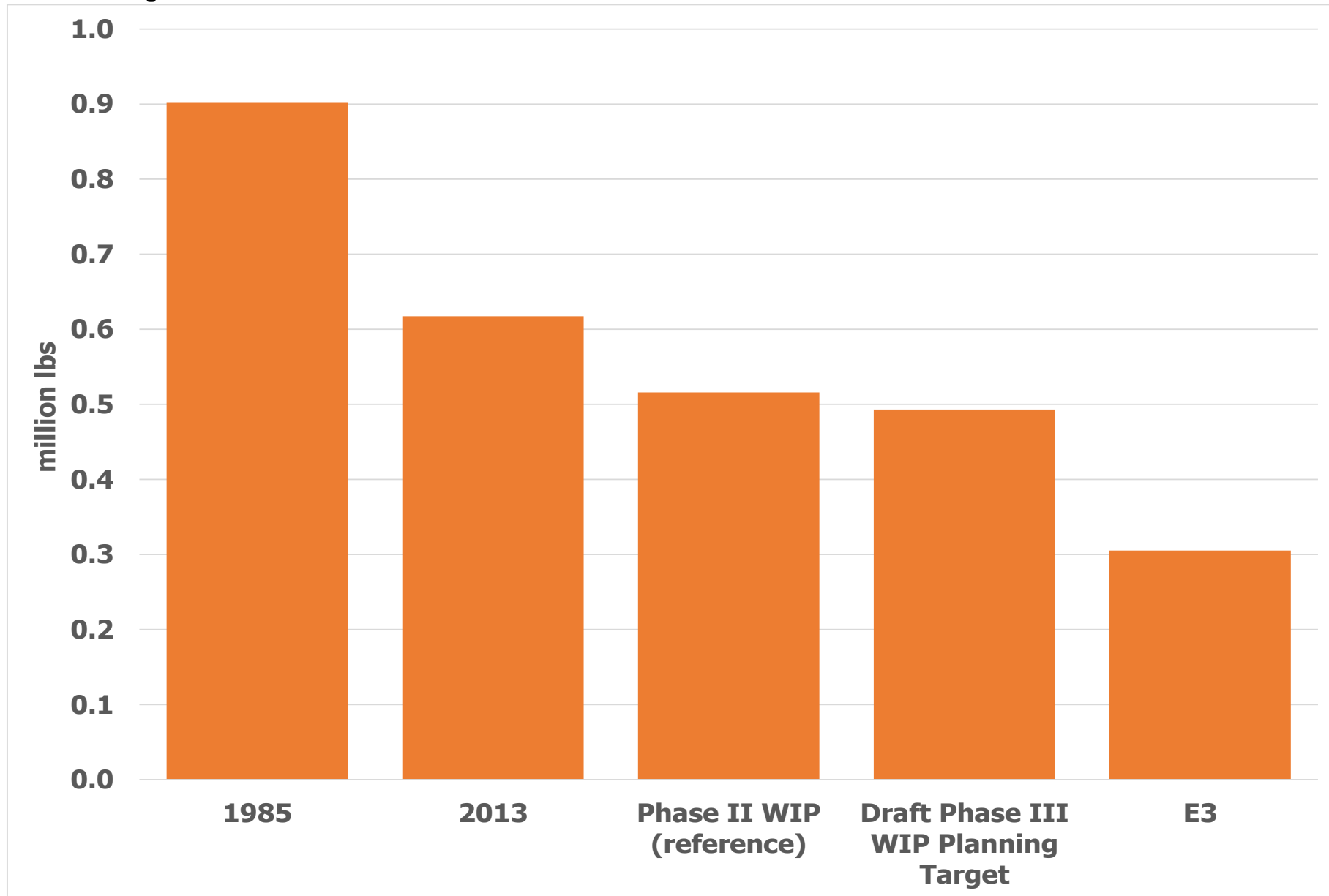
WV Phosphorus Change in LOE



WV Nitrogen Loads, Reference Scenarios, and Target

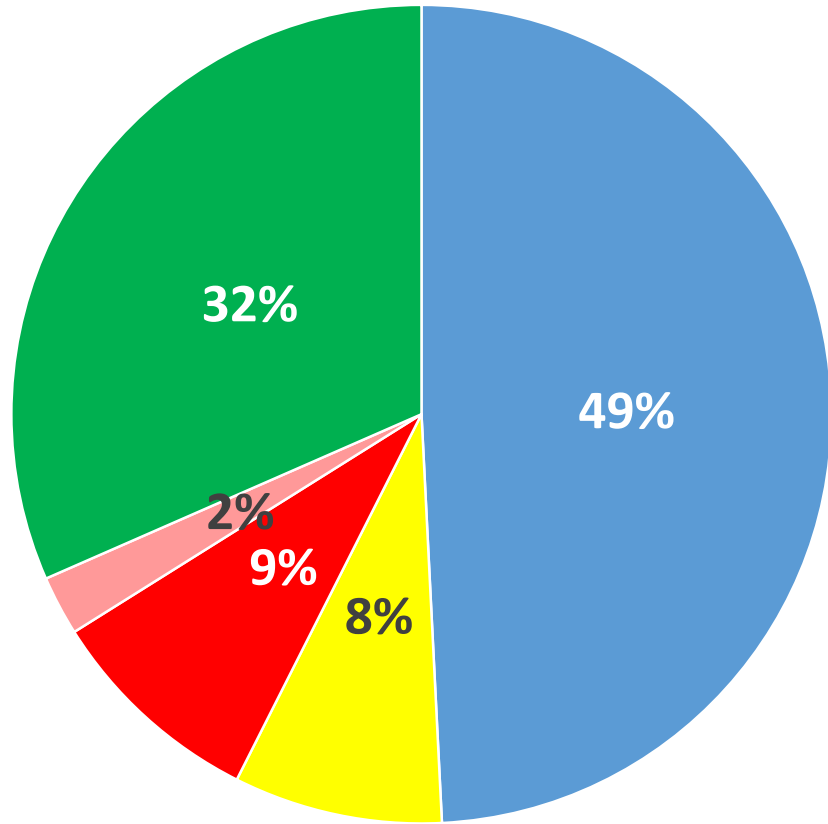


WV Phosphorus Loads, Reference Scenarios, and Target

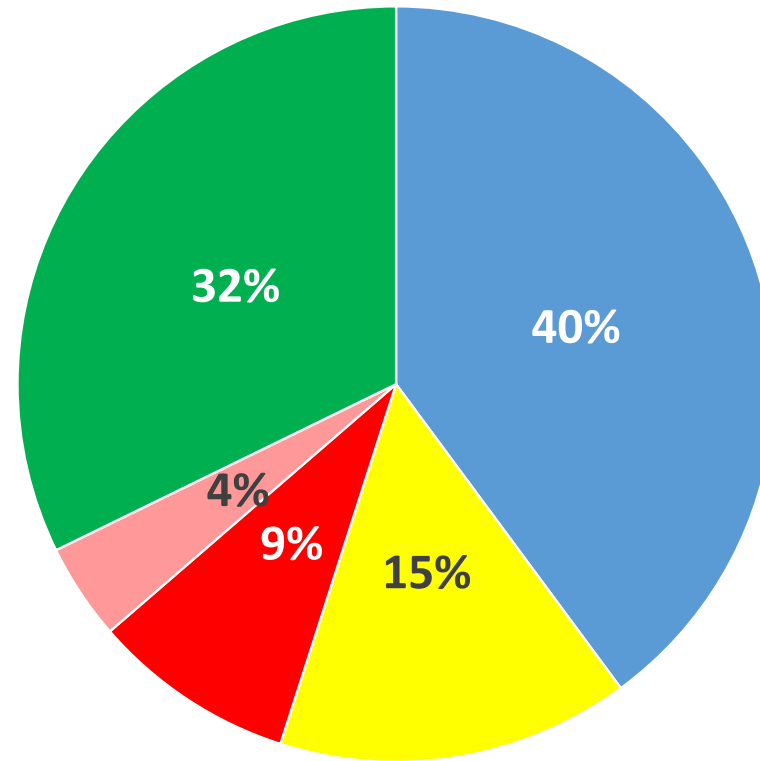


WV Nitrogen Loads and Target

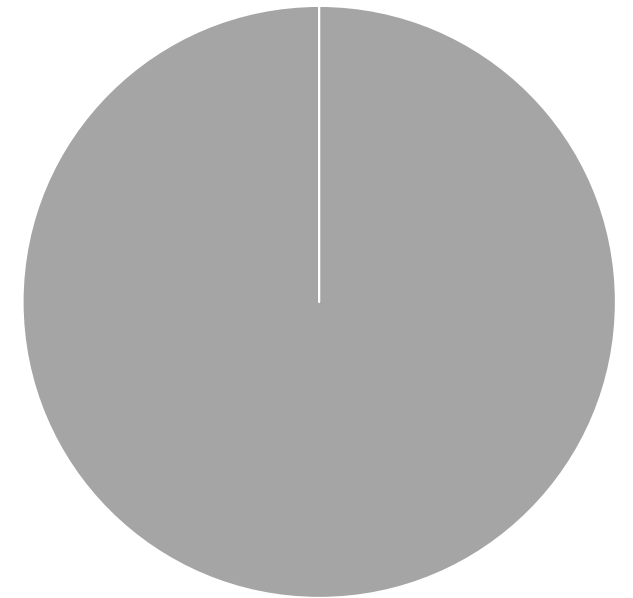
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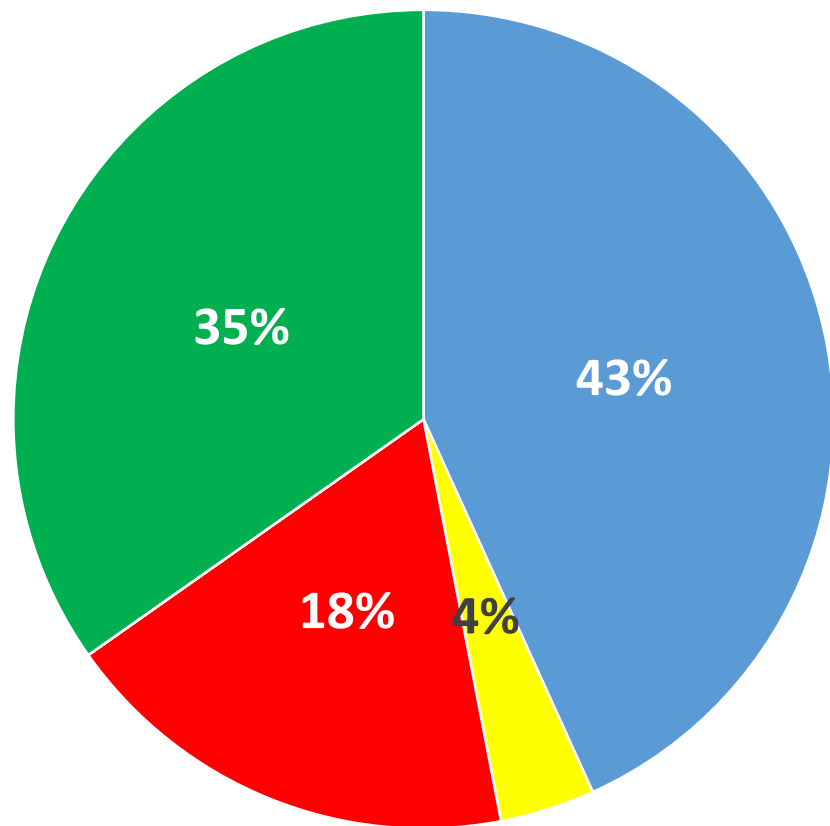
2013



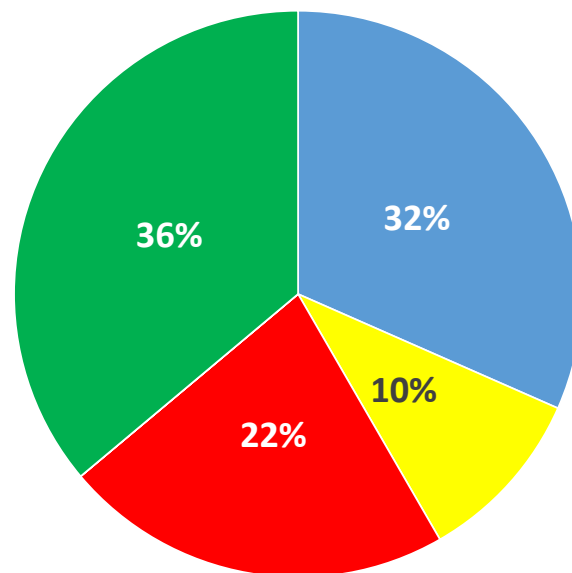
**Draft Phase III WIP
Planning Target**

WV Phosphorus Loads and Target

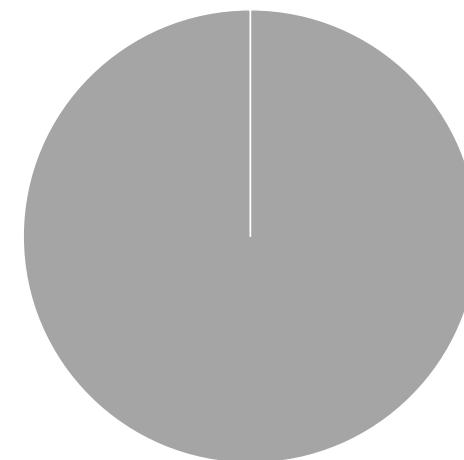
■ Agriculture ■ Developed ■ Wastewater ■ Natural



1985



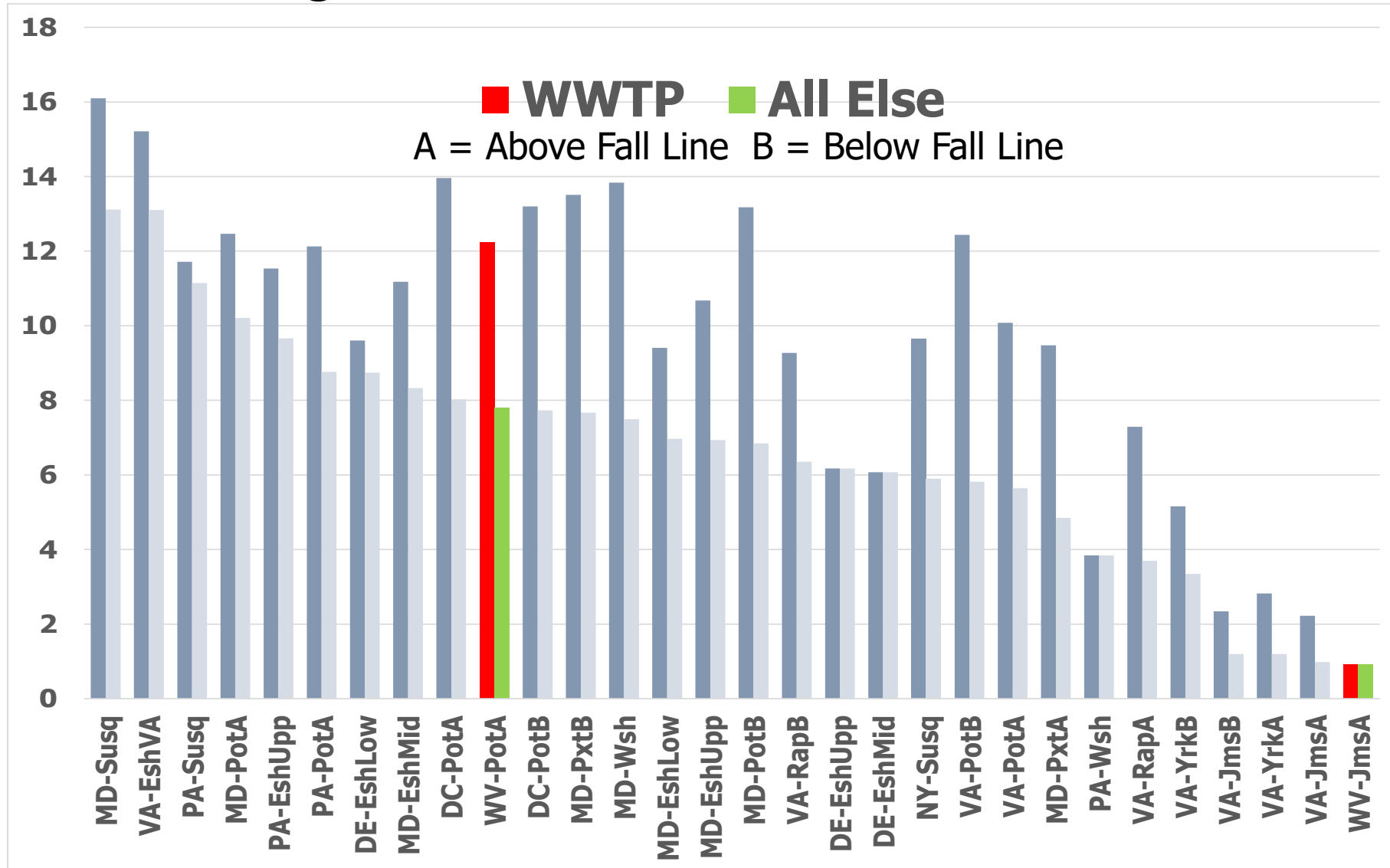
2013



**Draft Phase III WIP
Planning Target**

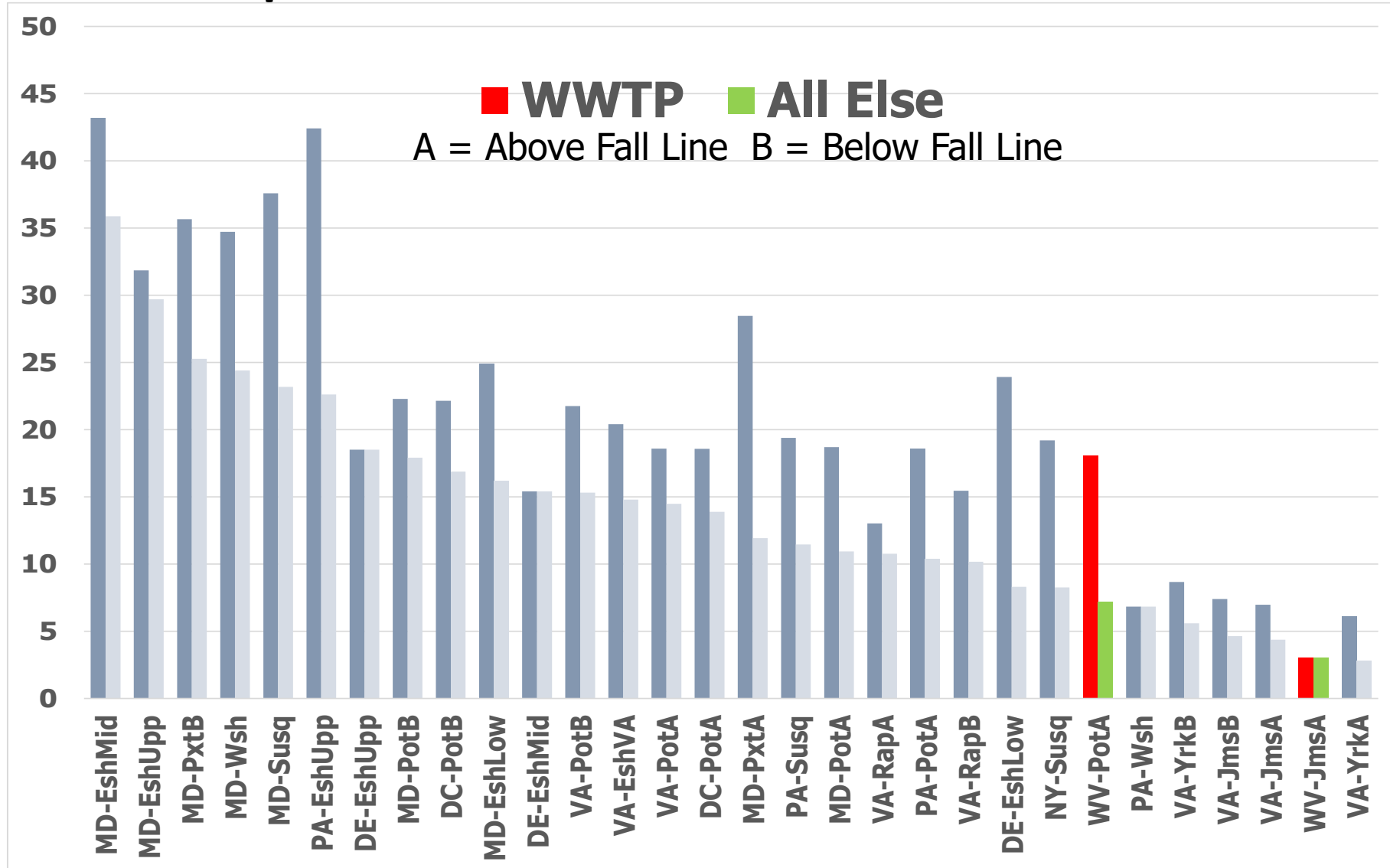
Nitrogen Relative Effectiveness

Effect of Nitrogen Load Reduction on WQ Standard Attainment



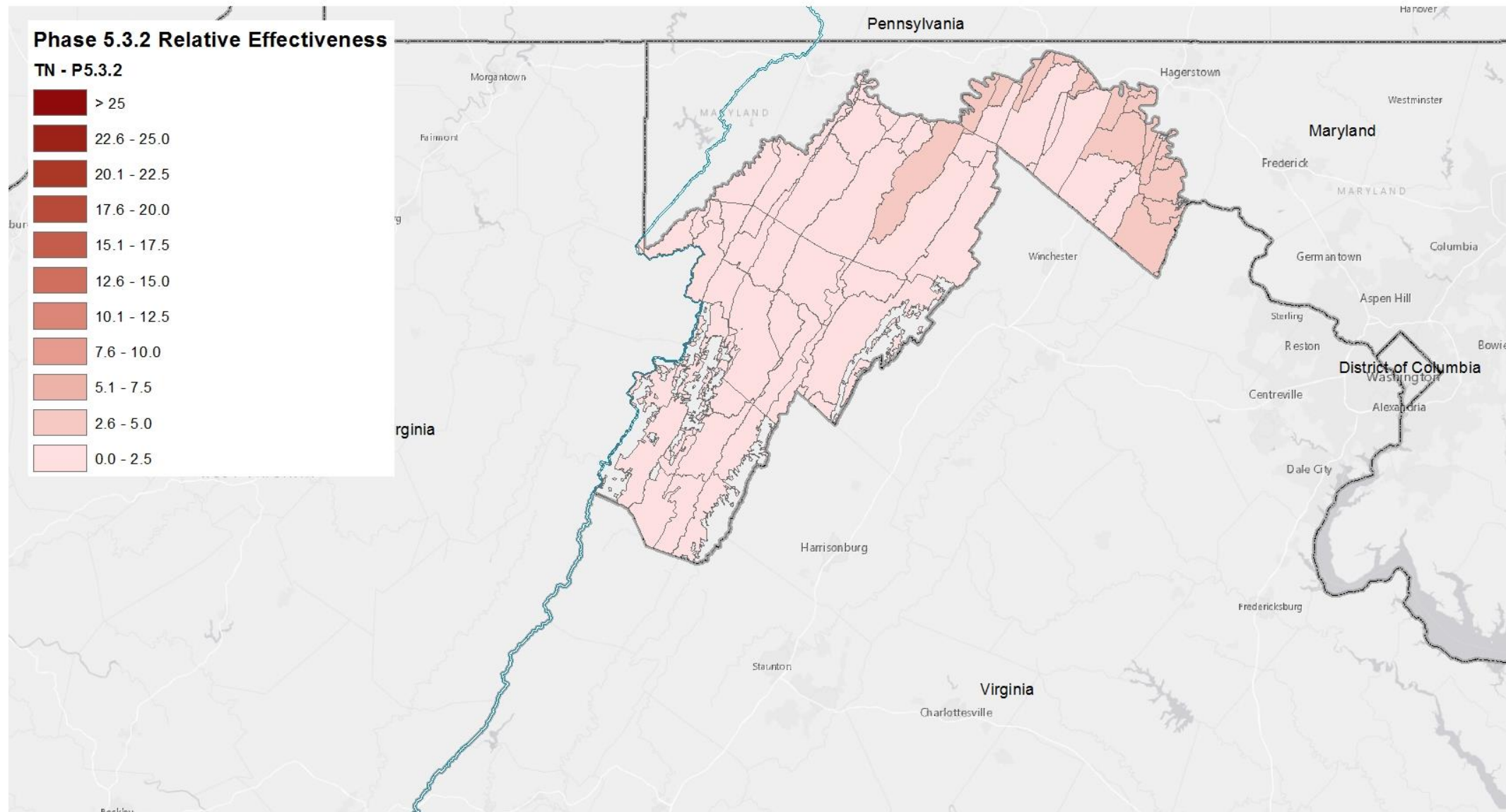
Phosphorus Relative Effectiveness

Effect of Phosphorus Load Reduction on WQ Standard Attainment



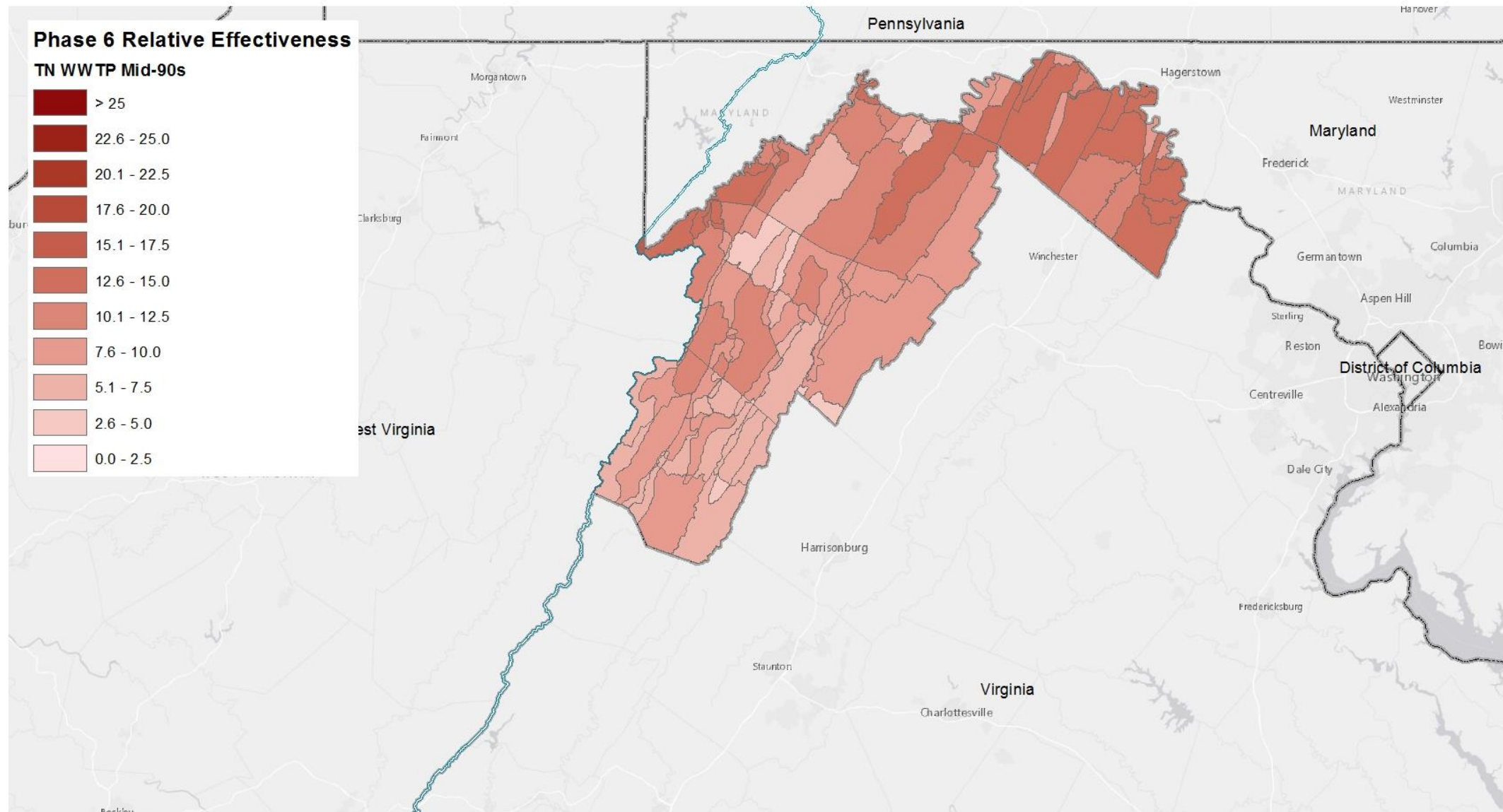
Nitrogen Relative Effectiveness

Phase 5.3.2



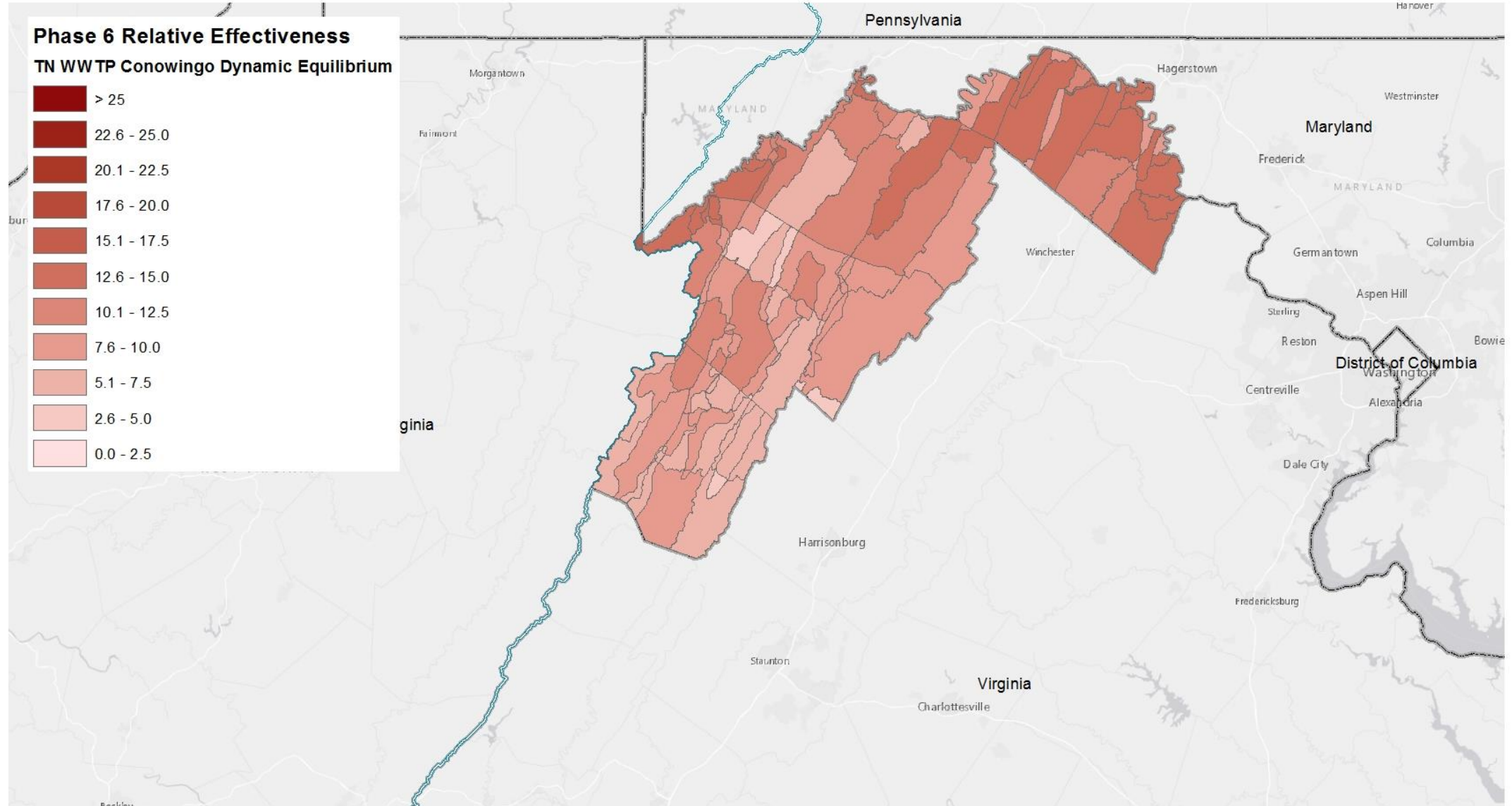
Nitrogen Relative Effectiveness

Phase 6, WWTP, Mid-90s



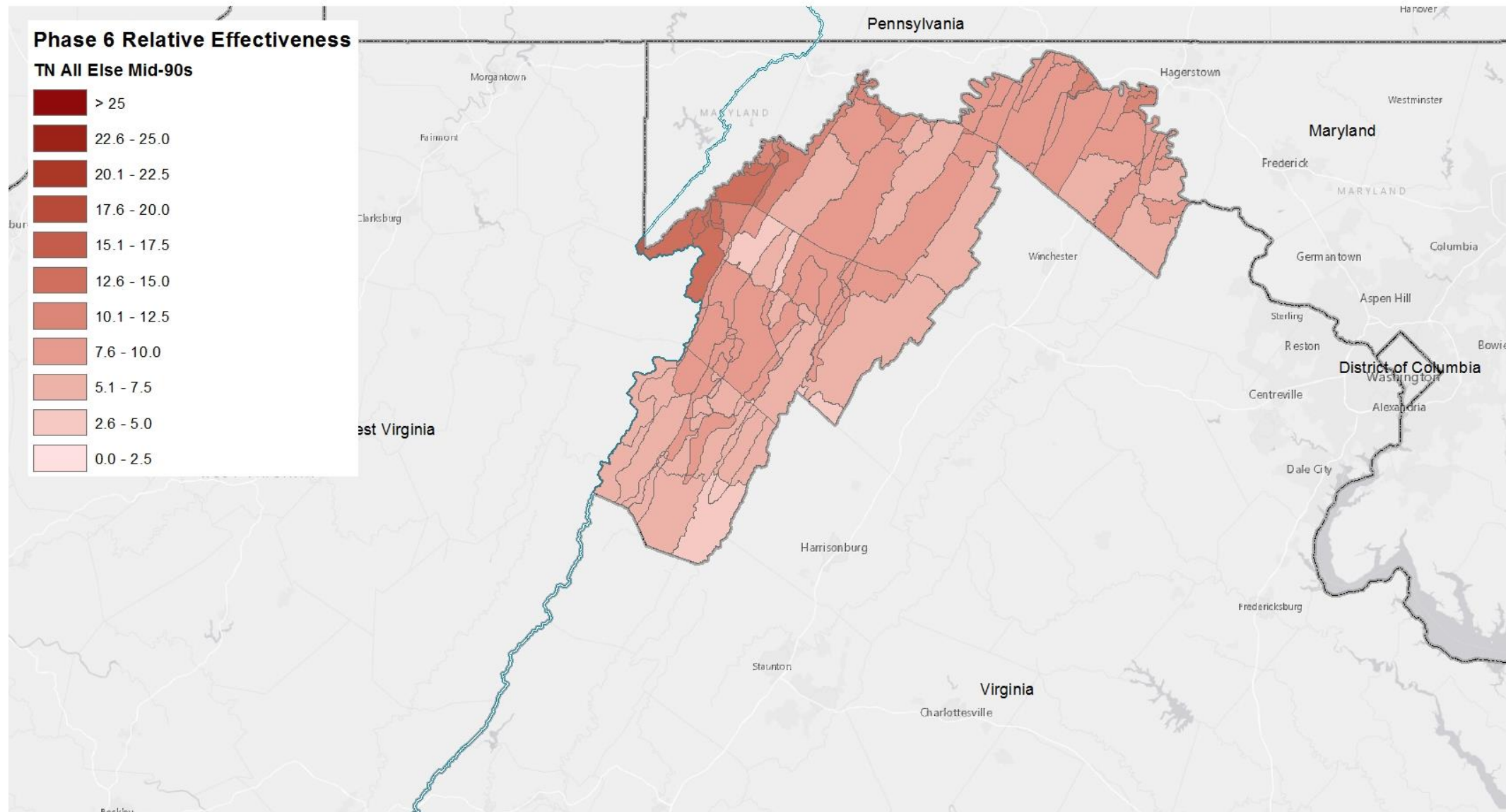
Nitrogen Relative Effectiveness

Phase 6, WWTP, Conowingo Dynamic Equilibrium



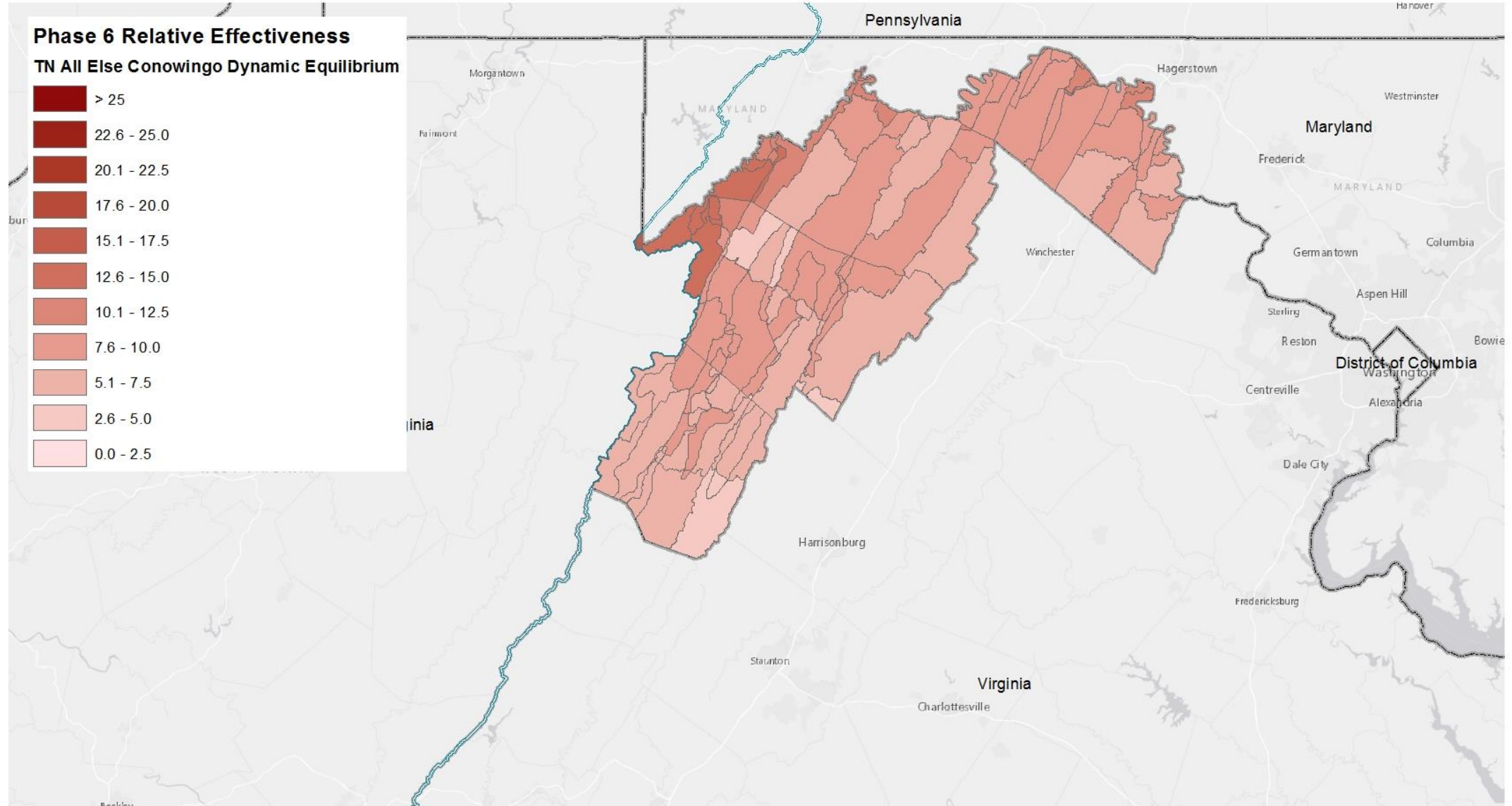
Nitrogen Relative Effectiveness

Phase 6, All Else, Mid-90s



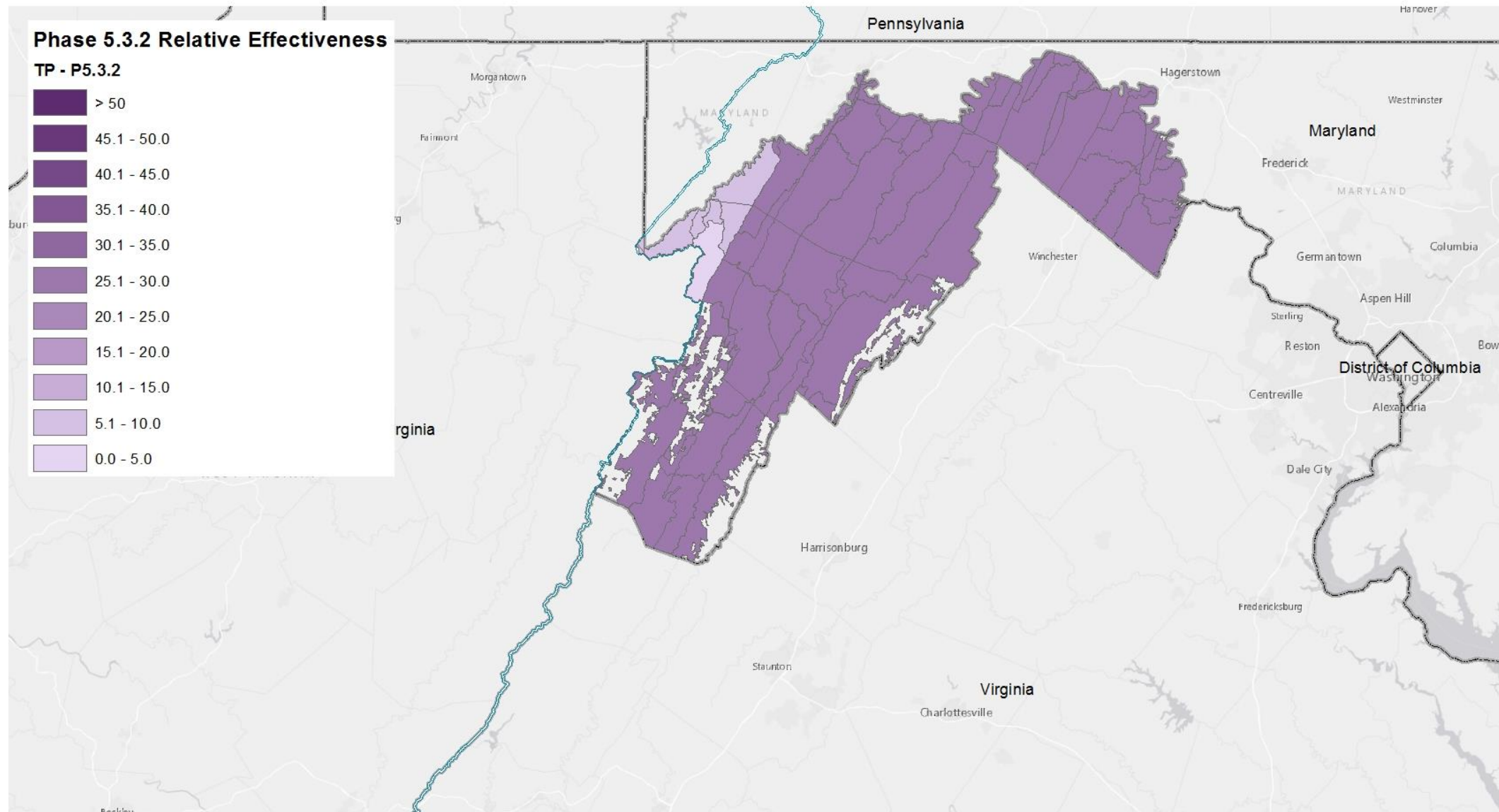
Nitrogen Relative Effectiveness

Phase 6, All Else, Conowingo Dynamic Equilibrium



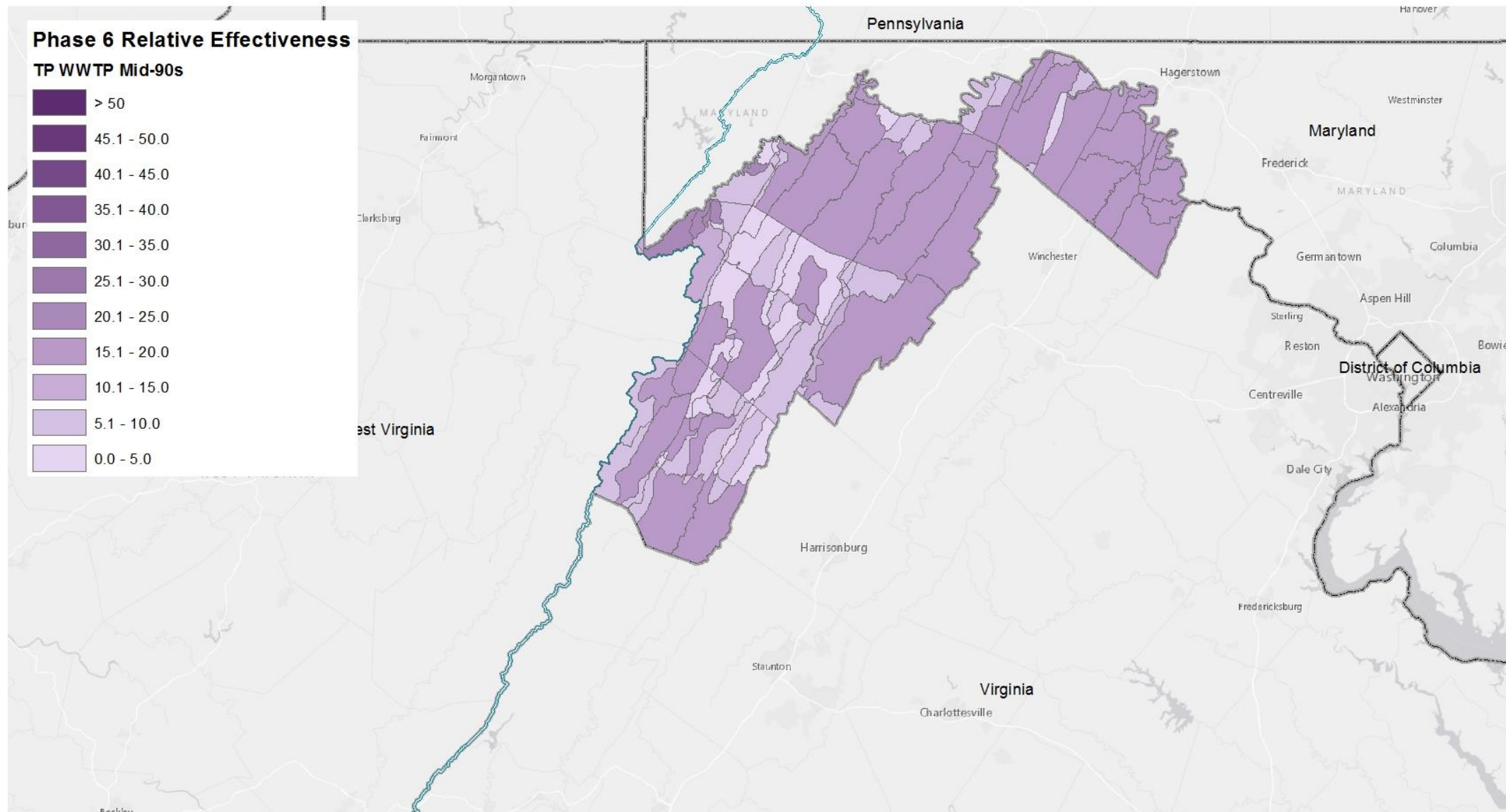
Phosphorus Relative Effectiveness

Phase 5.3.2



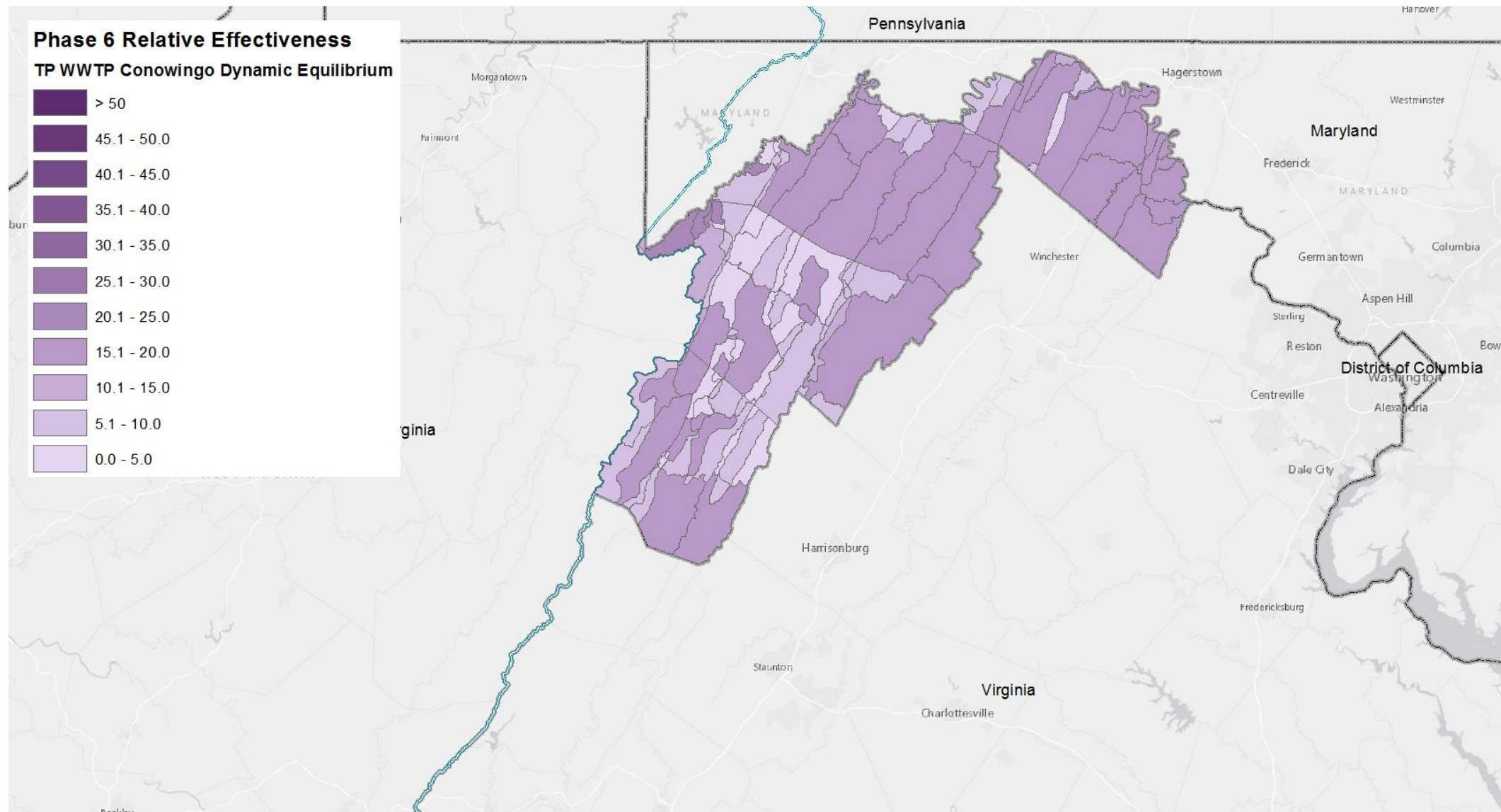
Phosphorus Relative Effectiveness

Phase 6, WWTP, Mid-90s



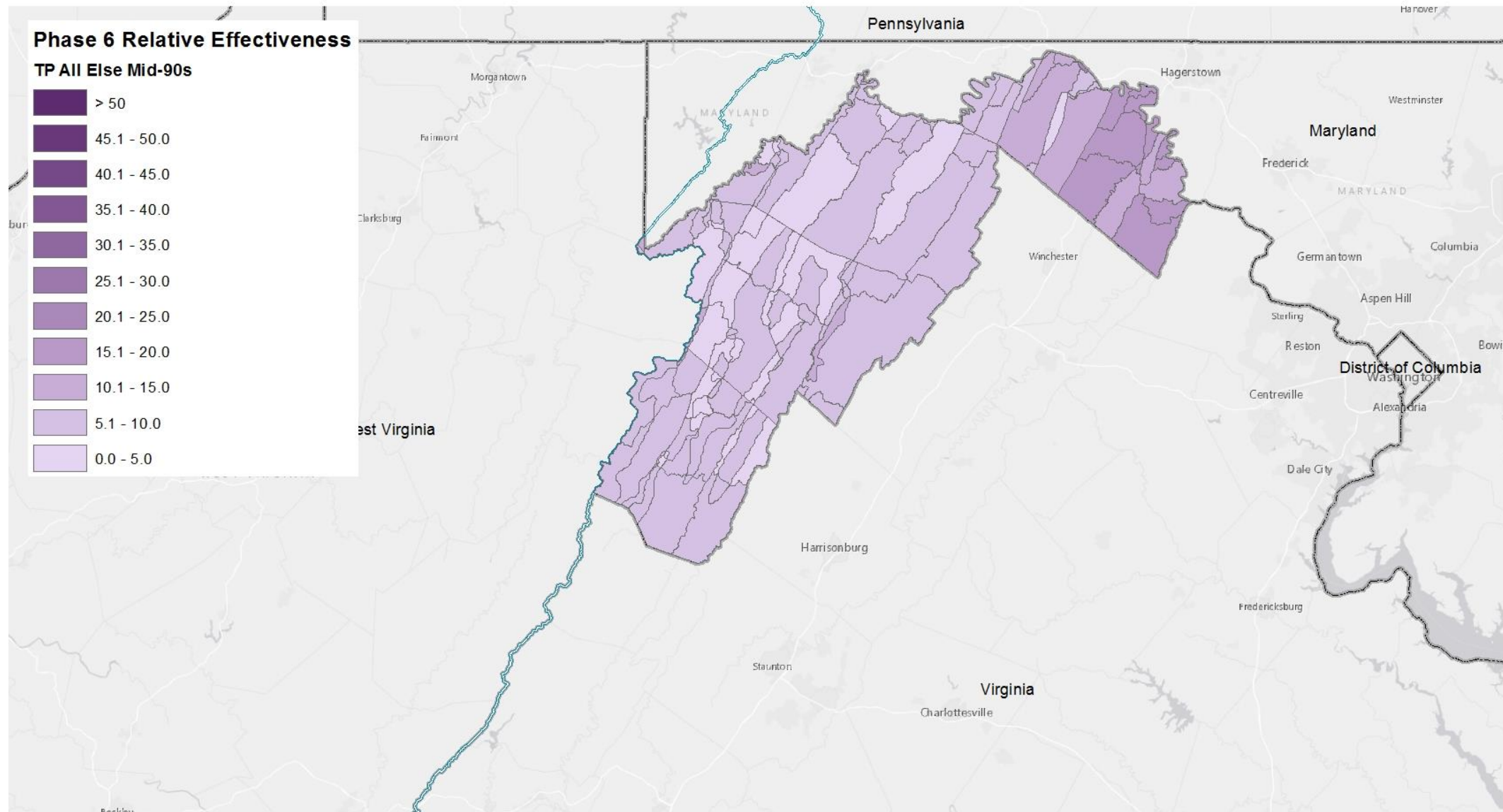
Phosphorus Relative Effectiveness

Phase 6, WWTP, Conowingo Dynamic Equilibrium



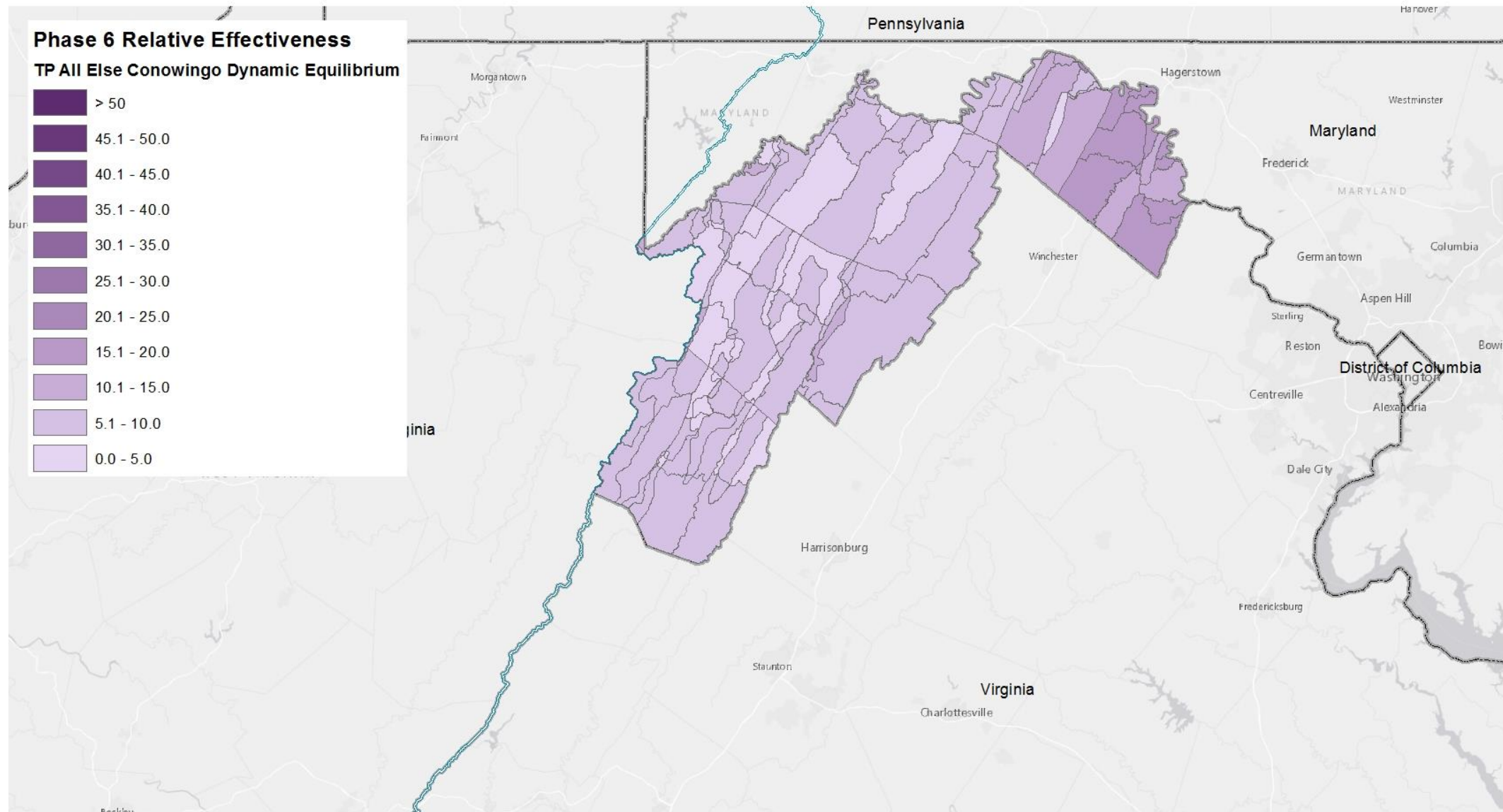
Phosphorus Relative Effectiveness

Phase 6, All Else, Mid-90s



Phosphorus Relative Effectiveness

Phase 6, All Else, Conowingo Dynamic Equilibrium



DE Draft Phase III WIP Planning Targets + Reference Loads

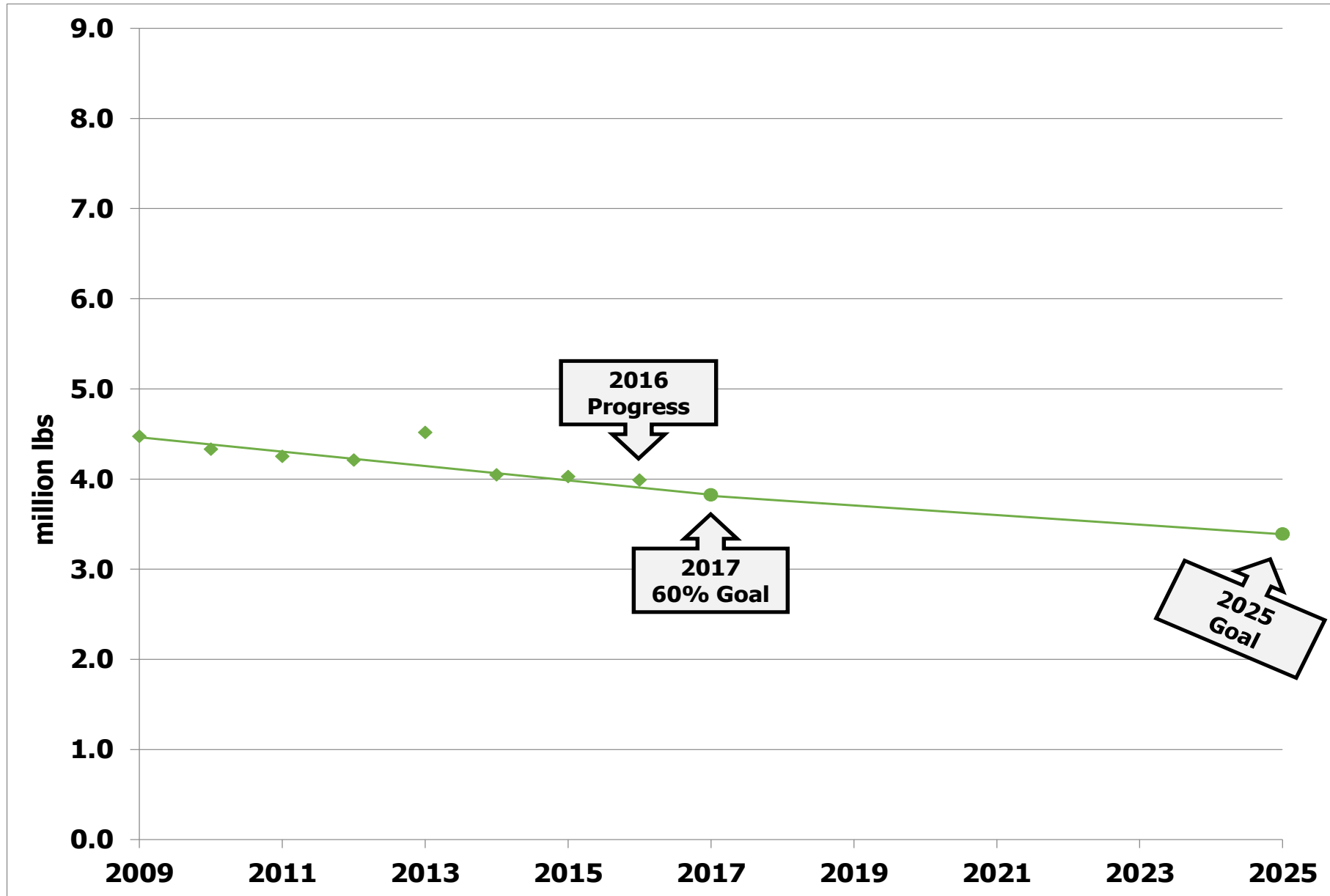
Nitrogen Load

	No-Action (M lbs)	E3 (M lbs)	2013 Progress (M lbs)	Phase II WIP (reference) (M lbs)	Draft Phase III WIP Planning Target (M lbs)
DE Eastern Shore	8.60	2.59	6.59	4.11	4.66

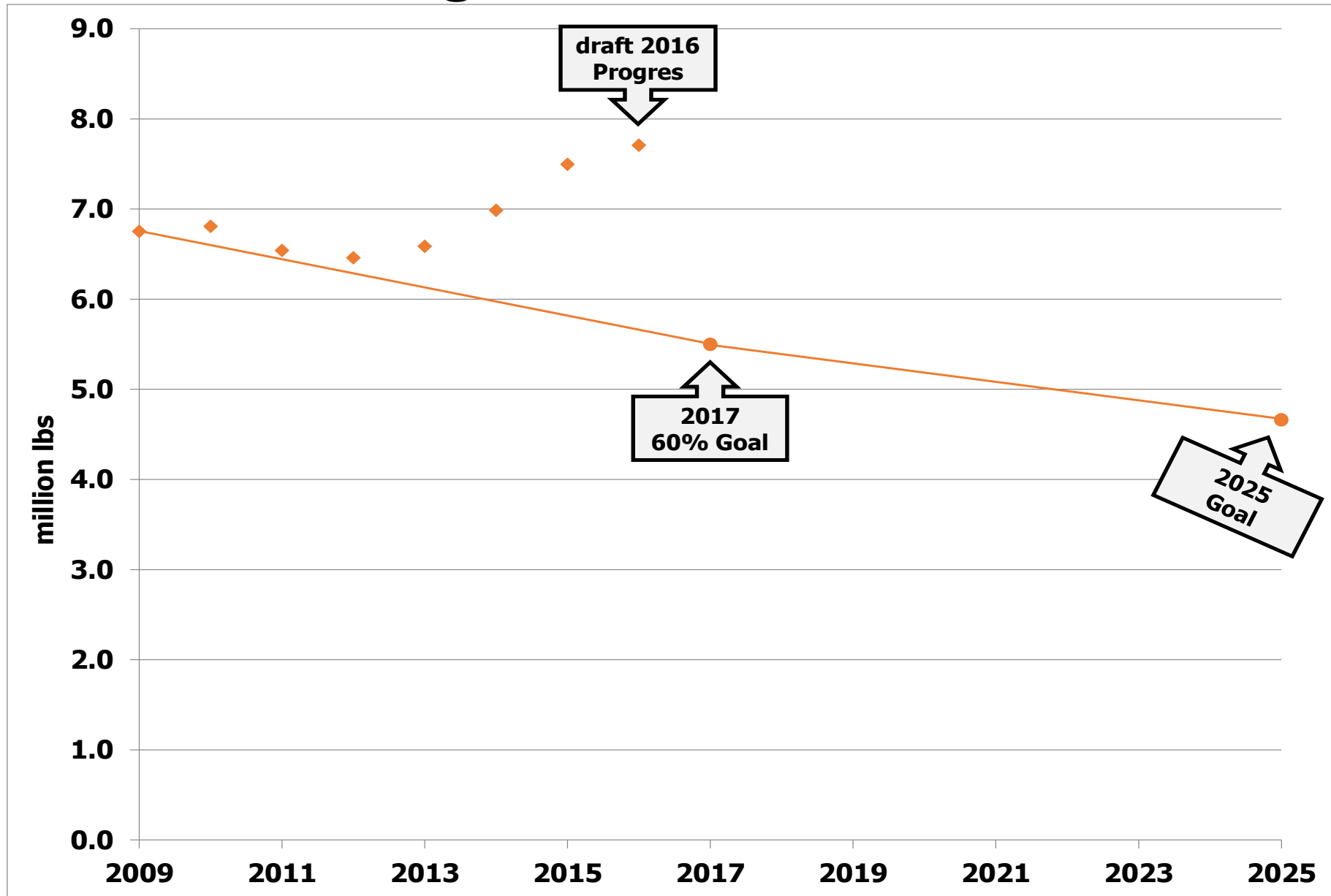
Phosphorus Load

	No-Action (M lbs)	E3 (M lbs)	2013 Progress (M lbs)	Phase II WIP (reference) (M lbs)	Draft Phase III WIP Planning Target (M lbs)
DE Eastern Shore	0.207	0.064	0.116	0.086	0.116

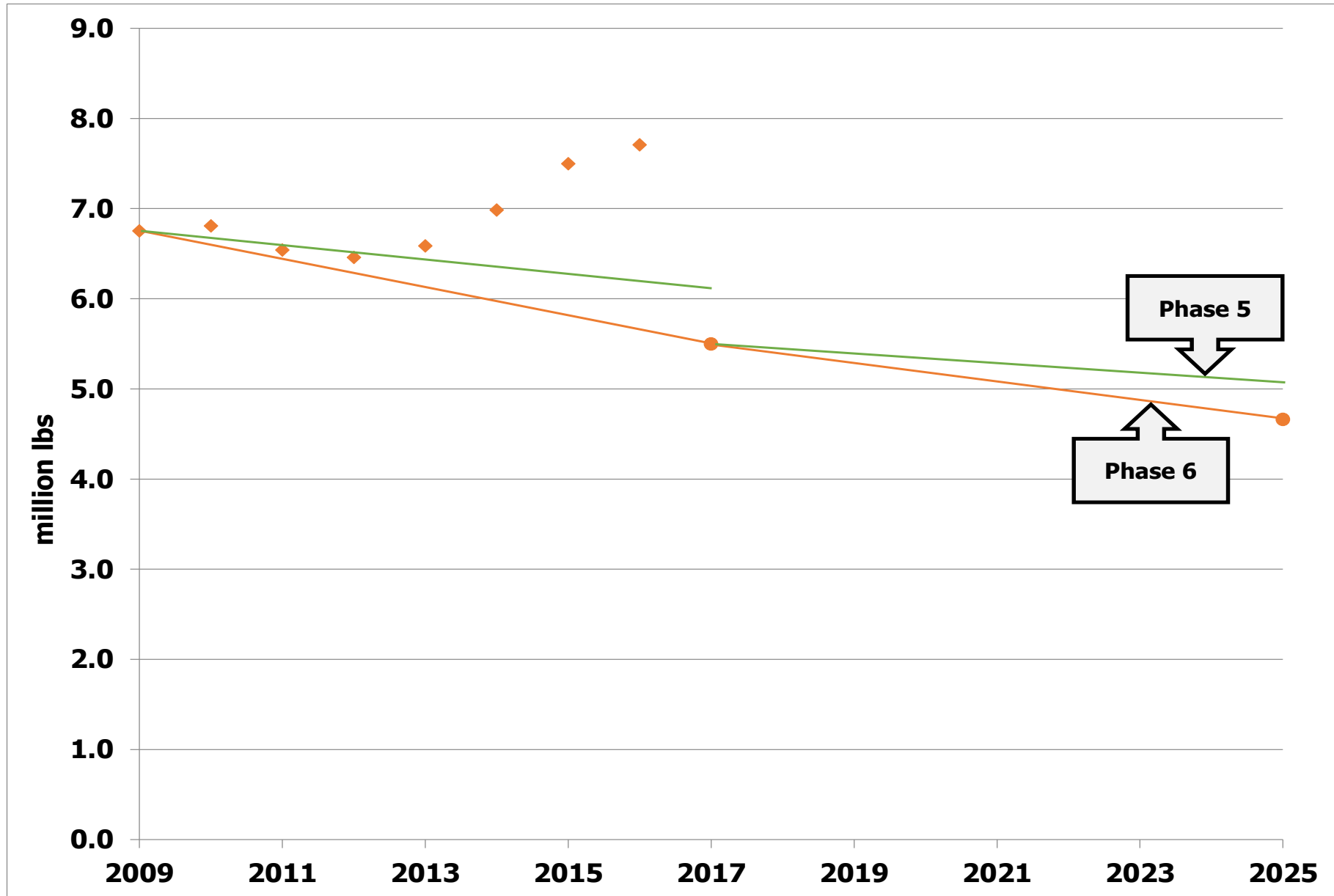
DE Nitrogen Loads-Goals, Phase 5.3.2



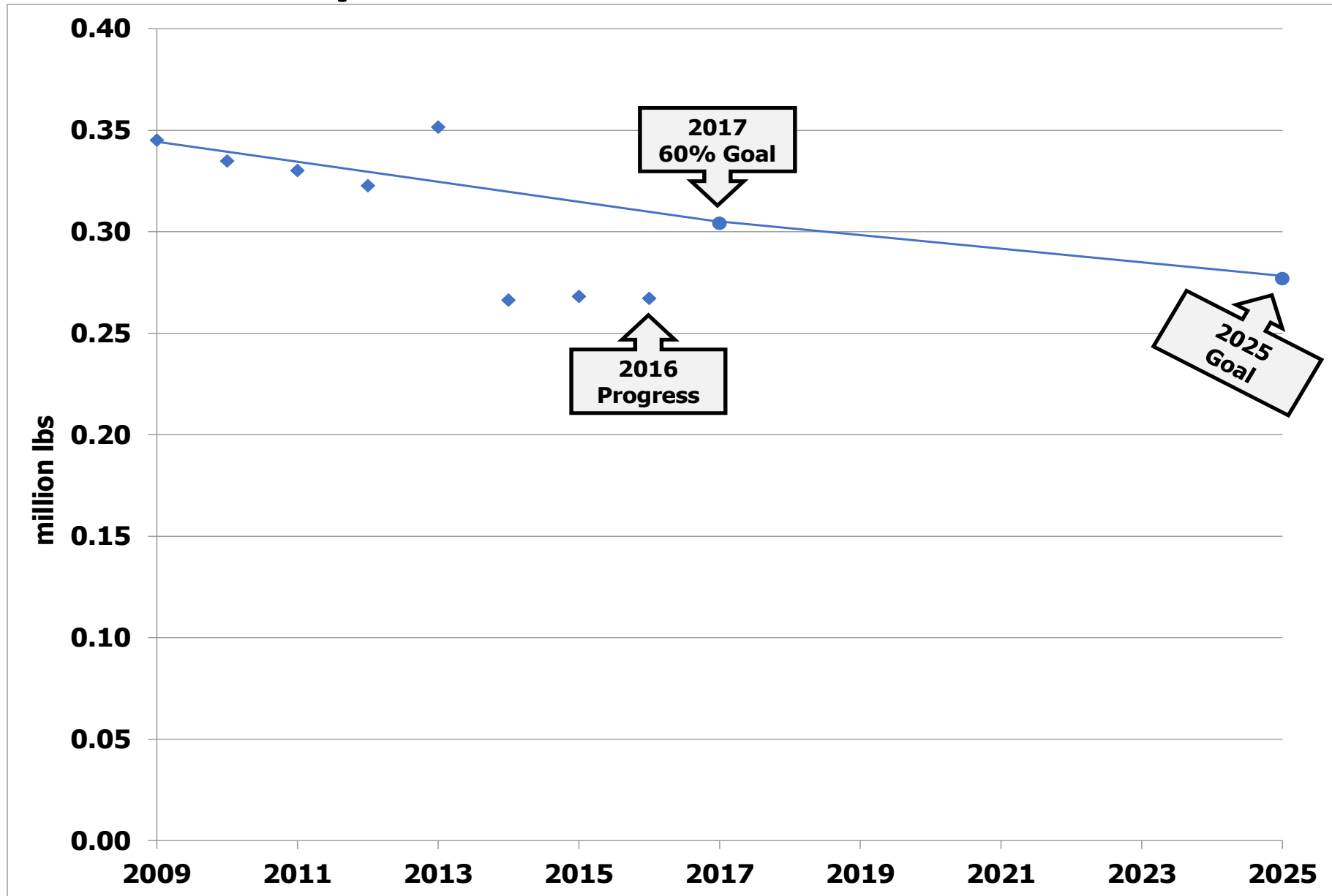
DE Nitrogen Loads-Goals, Phase 6



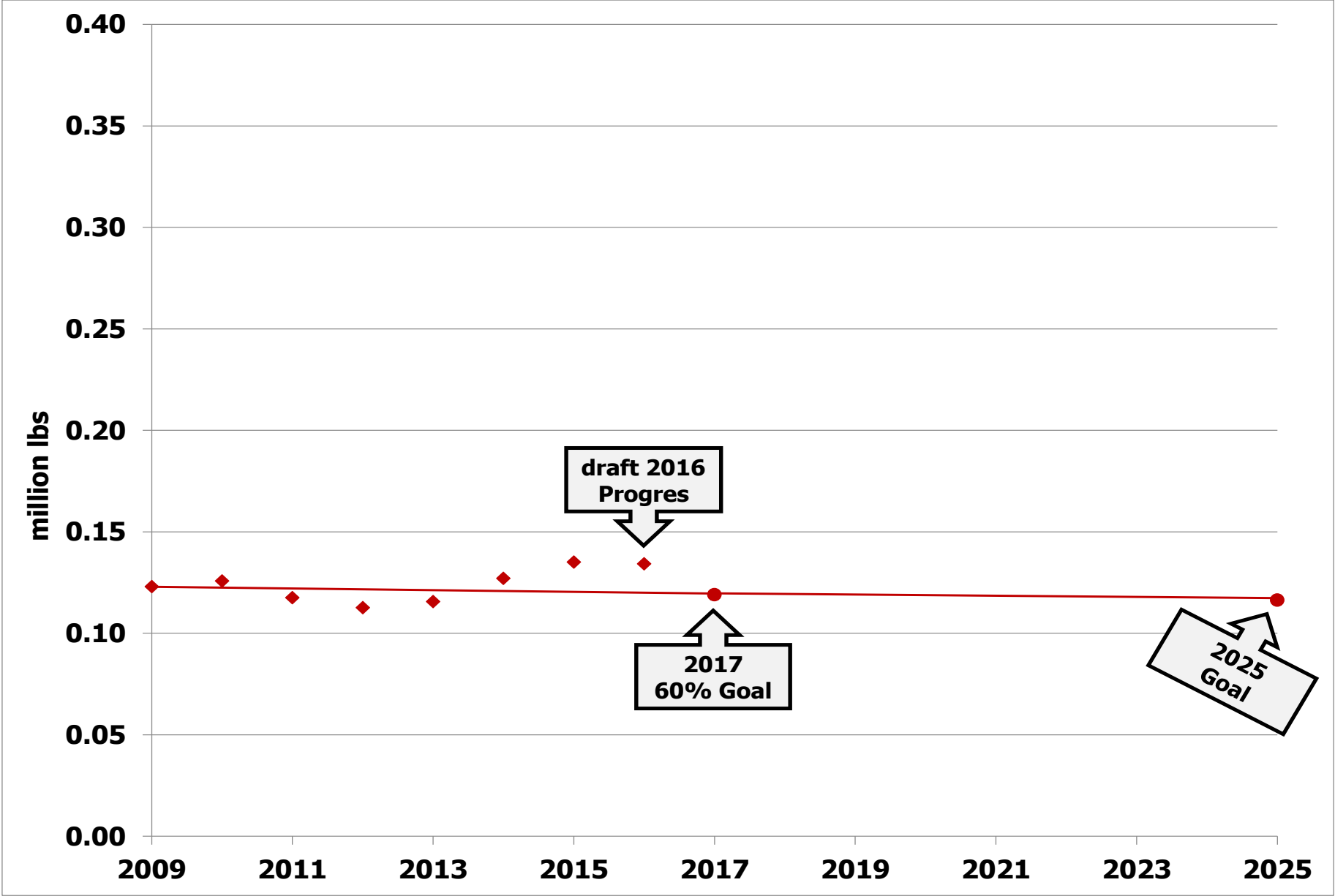
DE Nitrogen Change in LOE



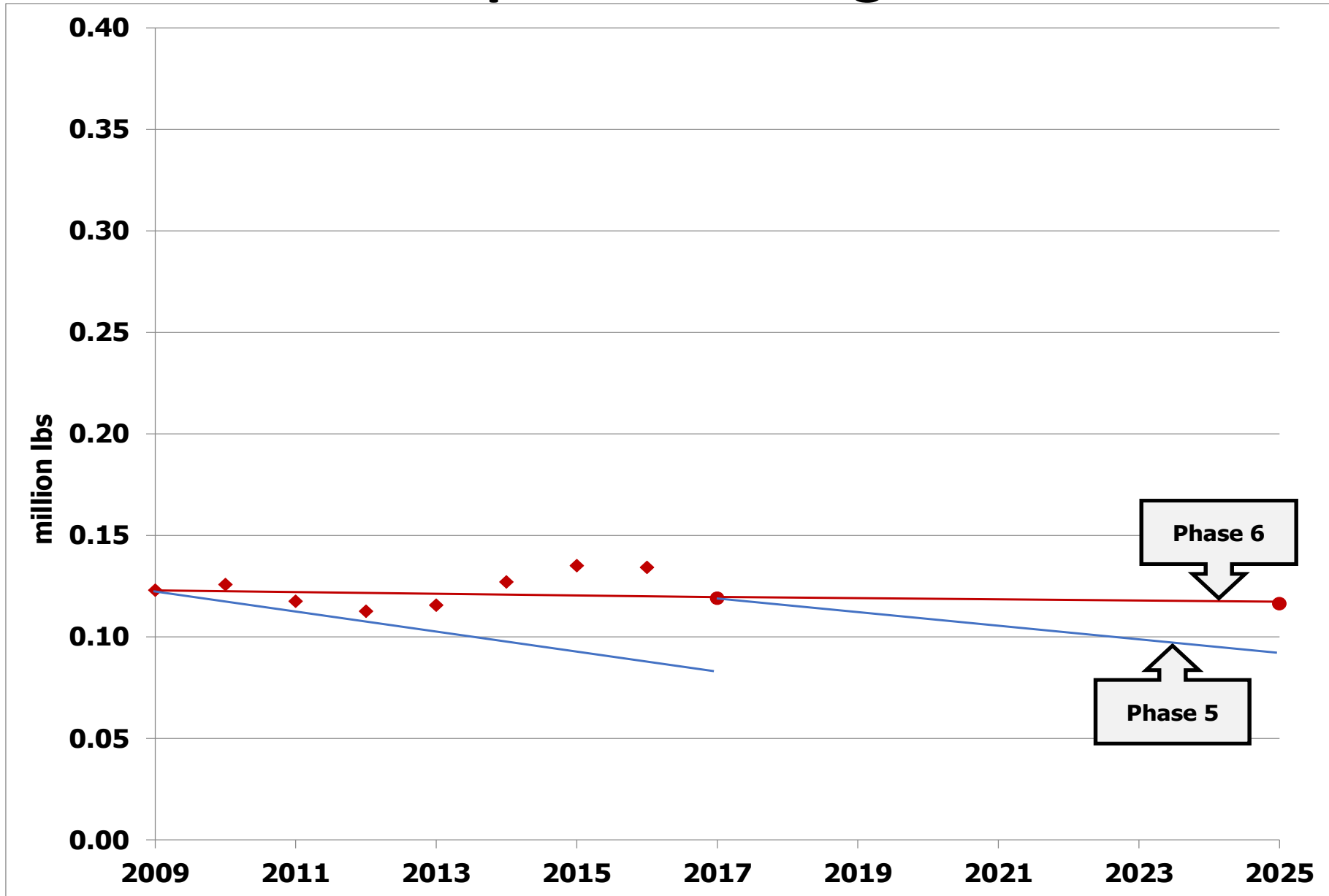
DE Phosphorus Loads-Goals, Phase 5.3.2



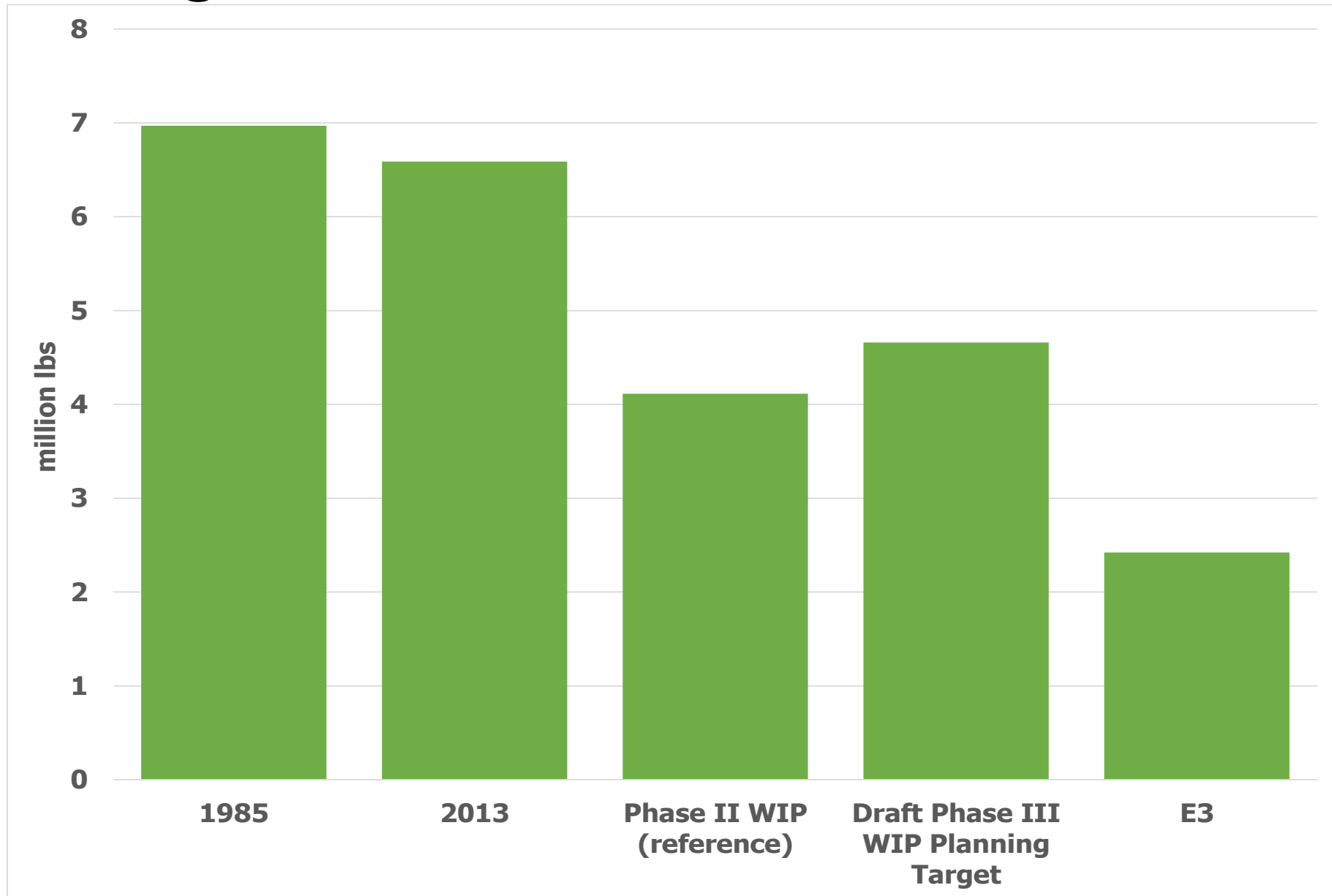
DE Phosphorus Loads-Goals, Phase 6



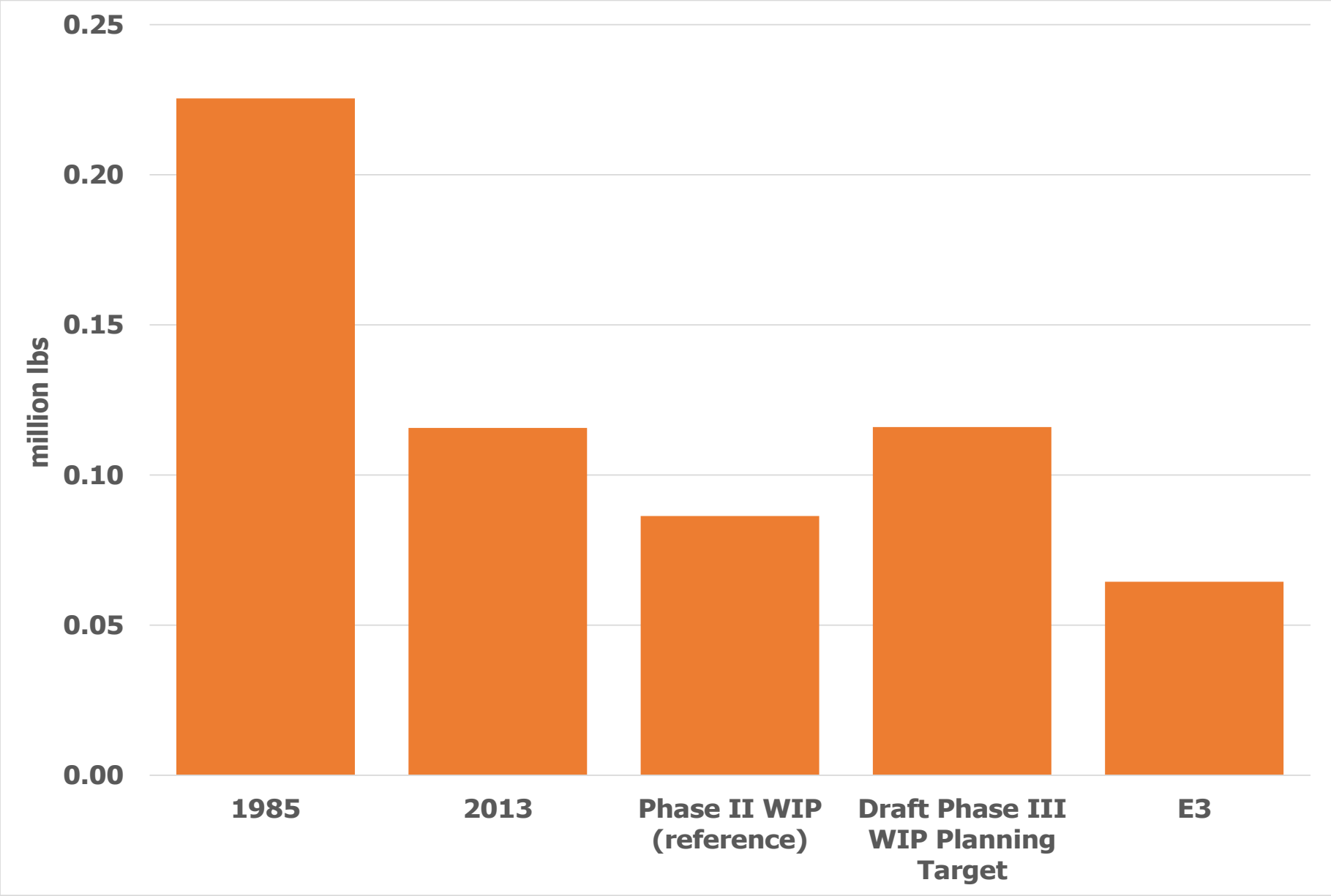
DE Phosphorus Change in LOE



DE Nitrogen Loads, Reference Scenarios, and Target

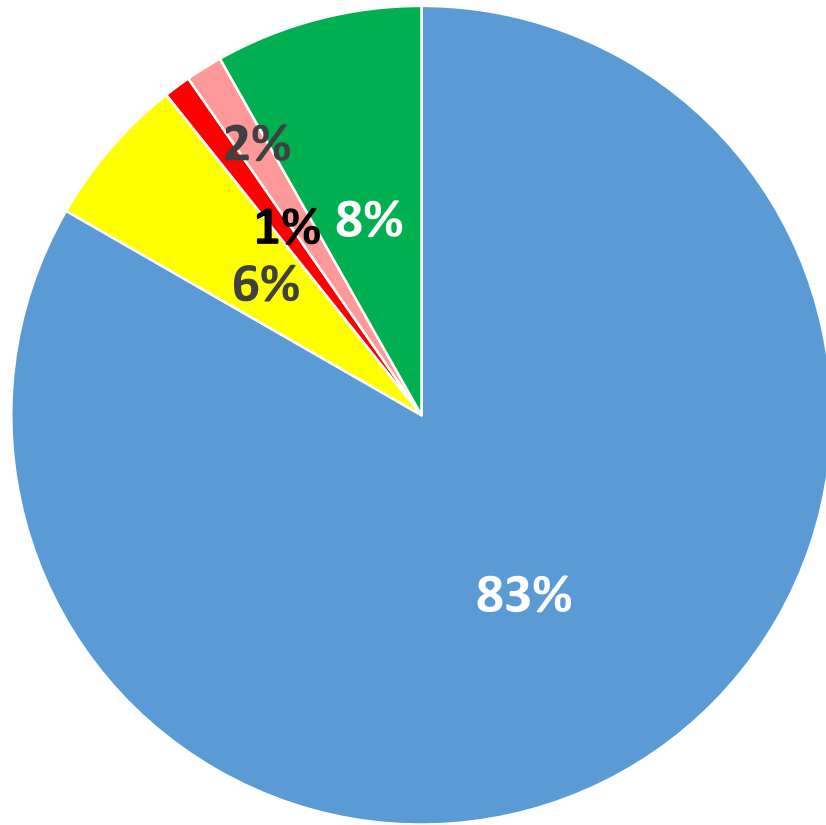


DE Phosphorus Loads, Reference Scenarios, and Target

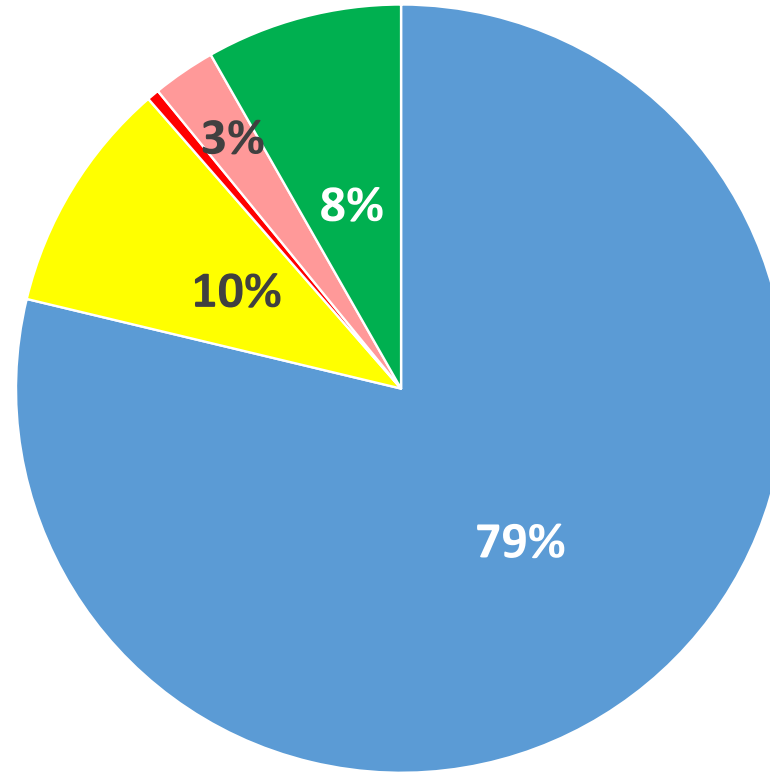


DE Nitrogen Loads and Target

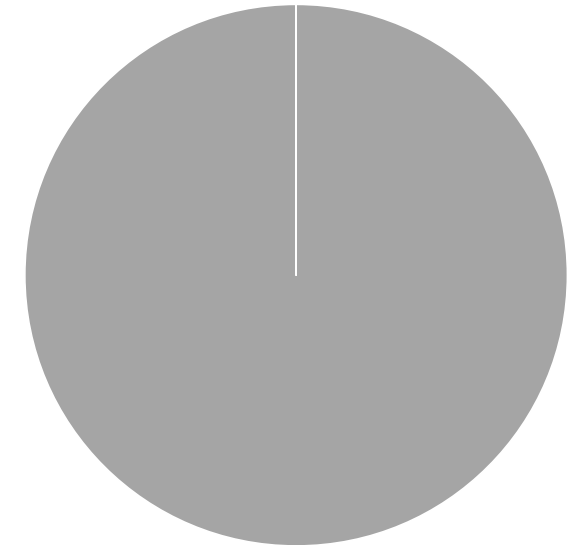
■ Agriculture ■ Developed ■ Wastewater ■ Septic ■ Natural



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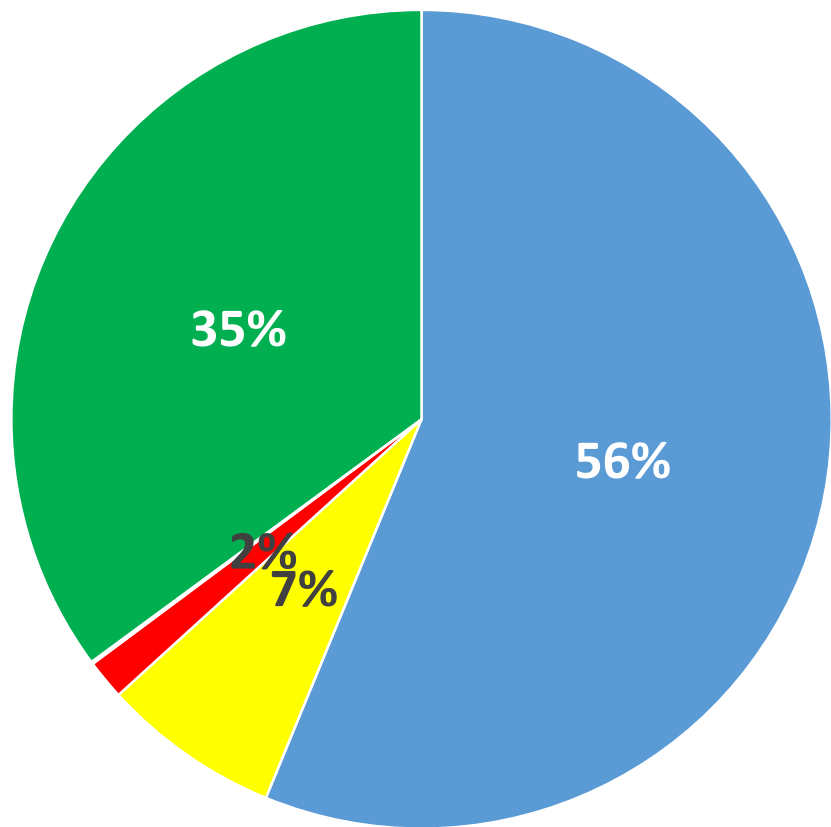
2013



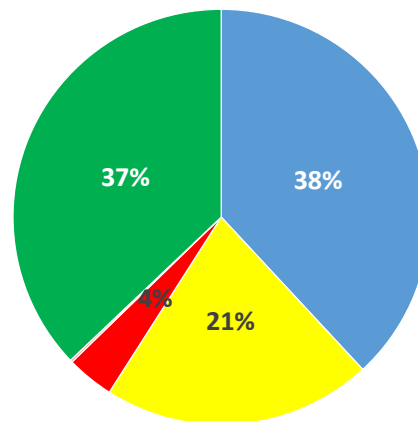
**Draft Phase III WIP
Planning Target**

DE Phosphorus Loads and Target

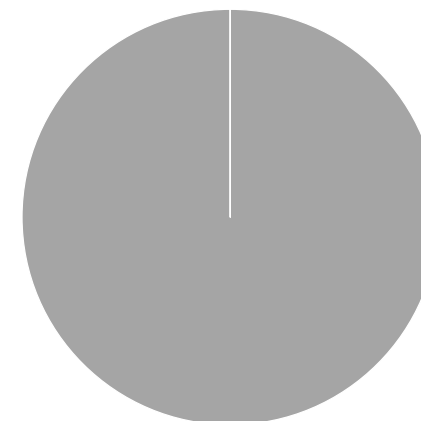
■ Agriculture ■ Developed ■ Wastewater ■ Natural



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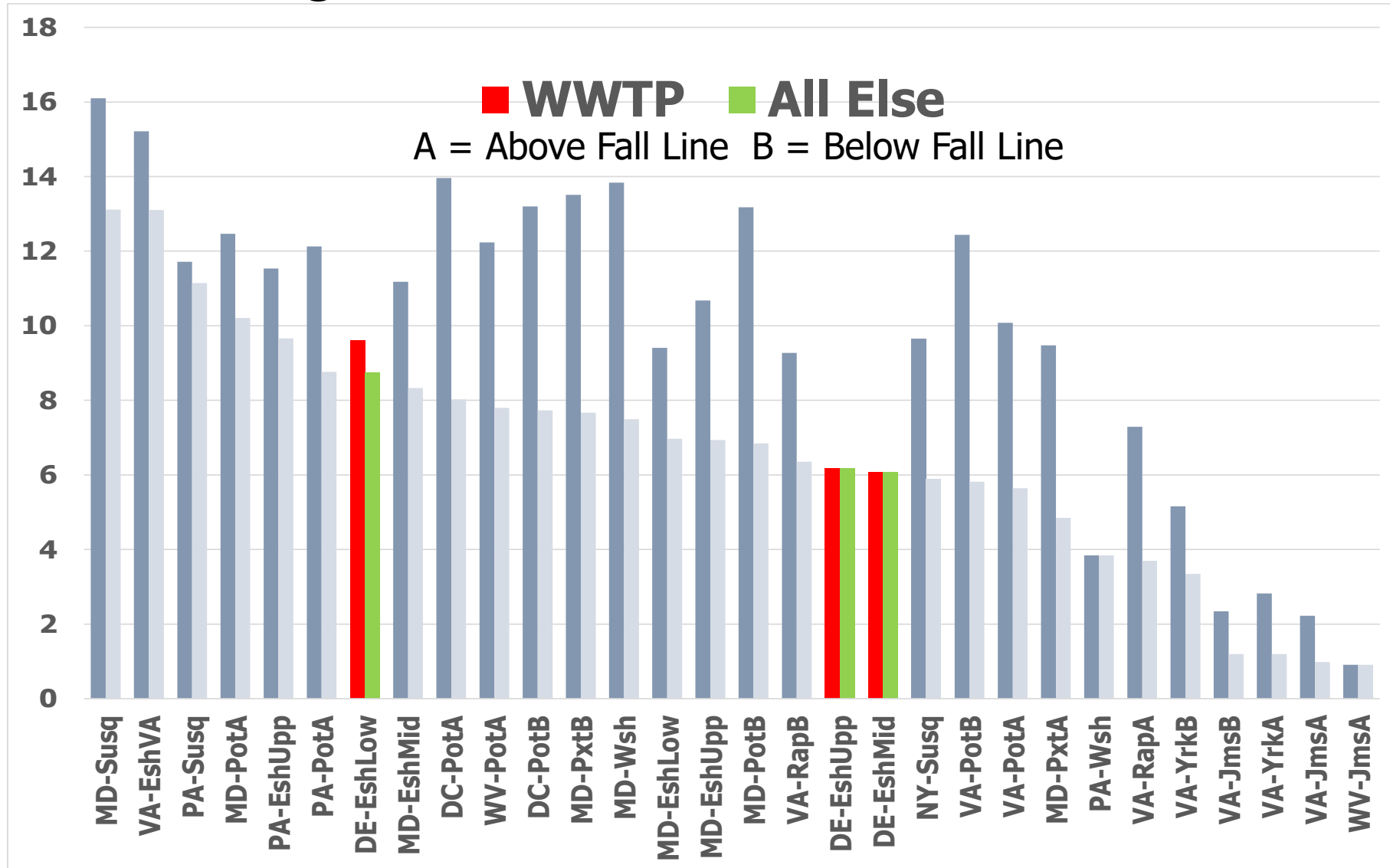
2013



**Draft Phase III WIP
Planning Target**

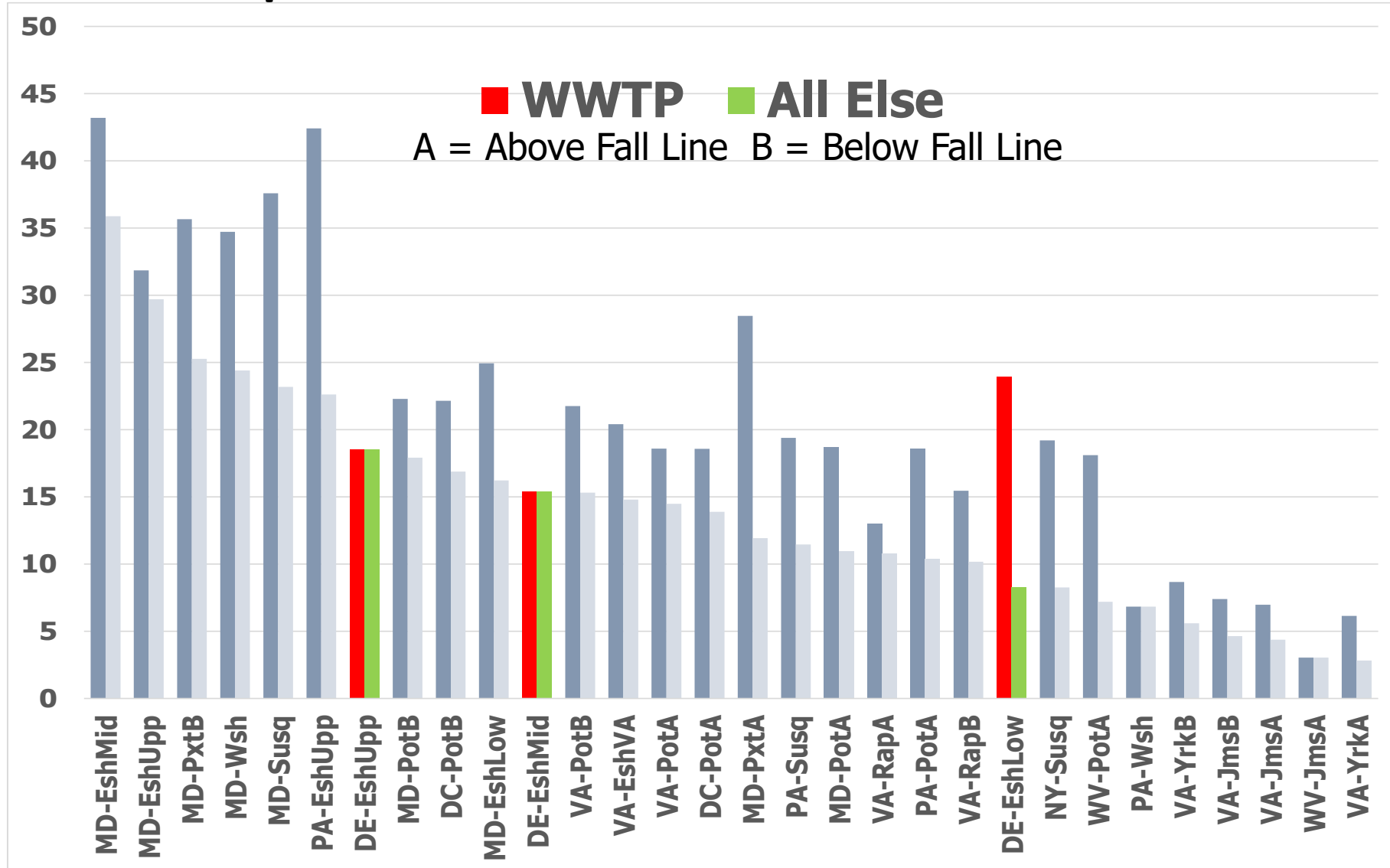
Nitrogen Relative Effectiveness

Effect of Nitrogen Load Reduction on WQ Standard Attainment



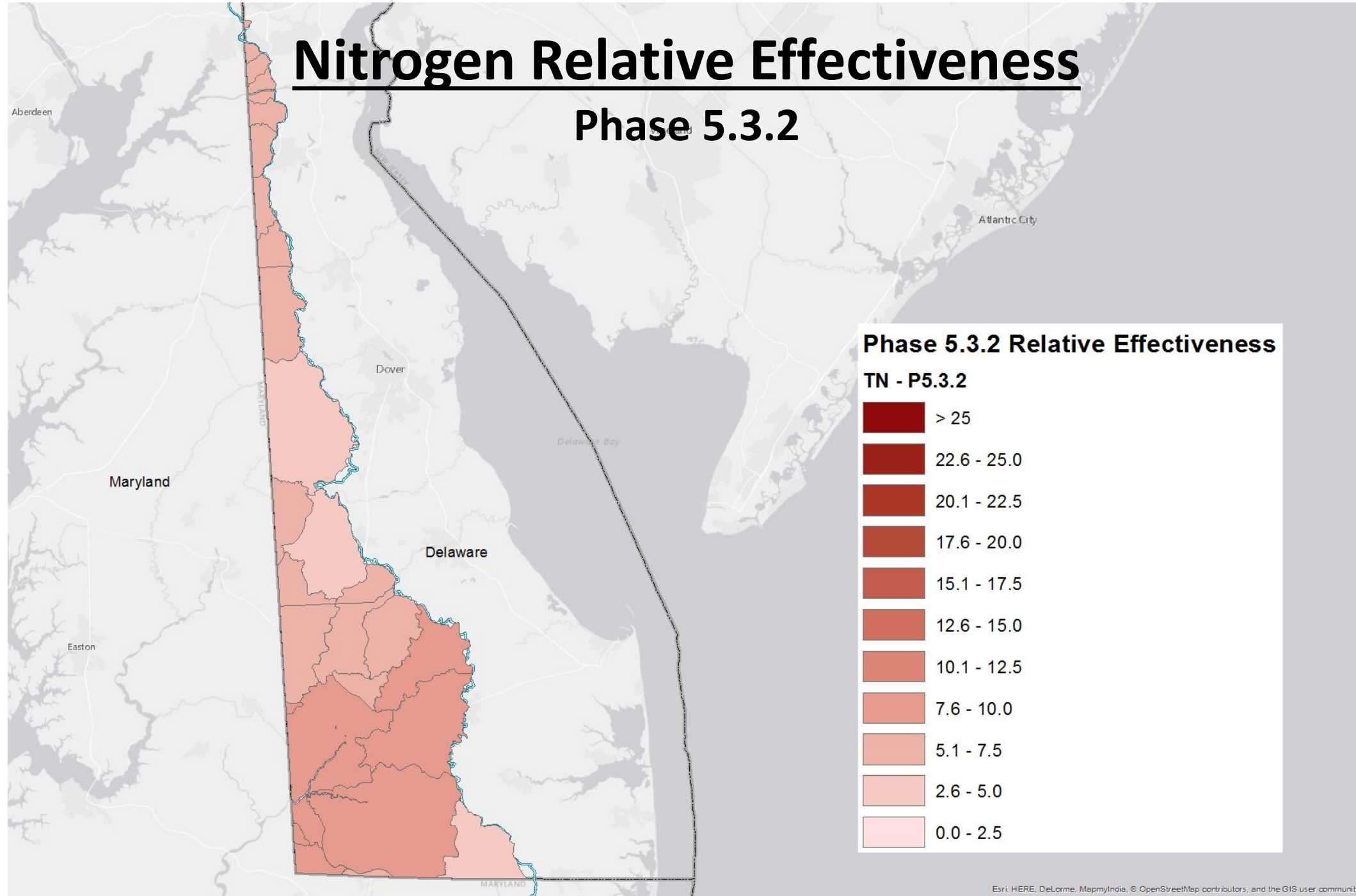
Phosphorus Relative Effectiveness

Effect of Phosphorus Load Reduction on WQ Standard Attainment



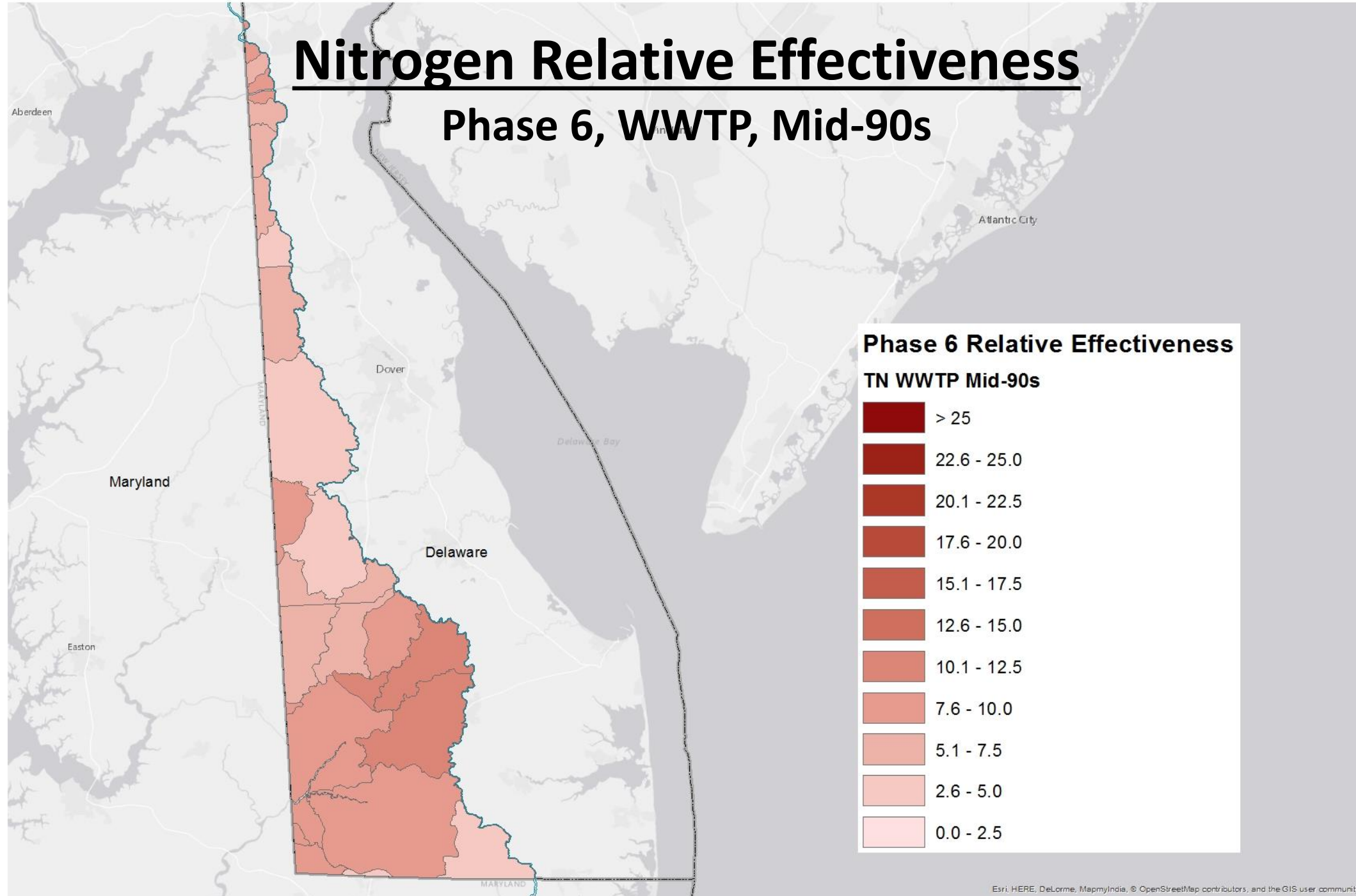
Nitrogen Relative Effectiveness

Phase 5.3.2



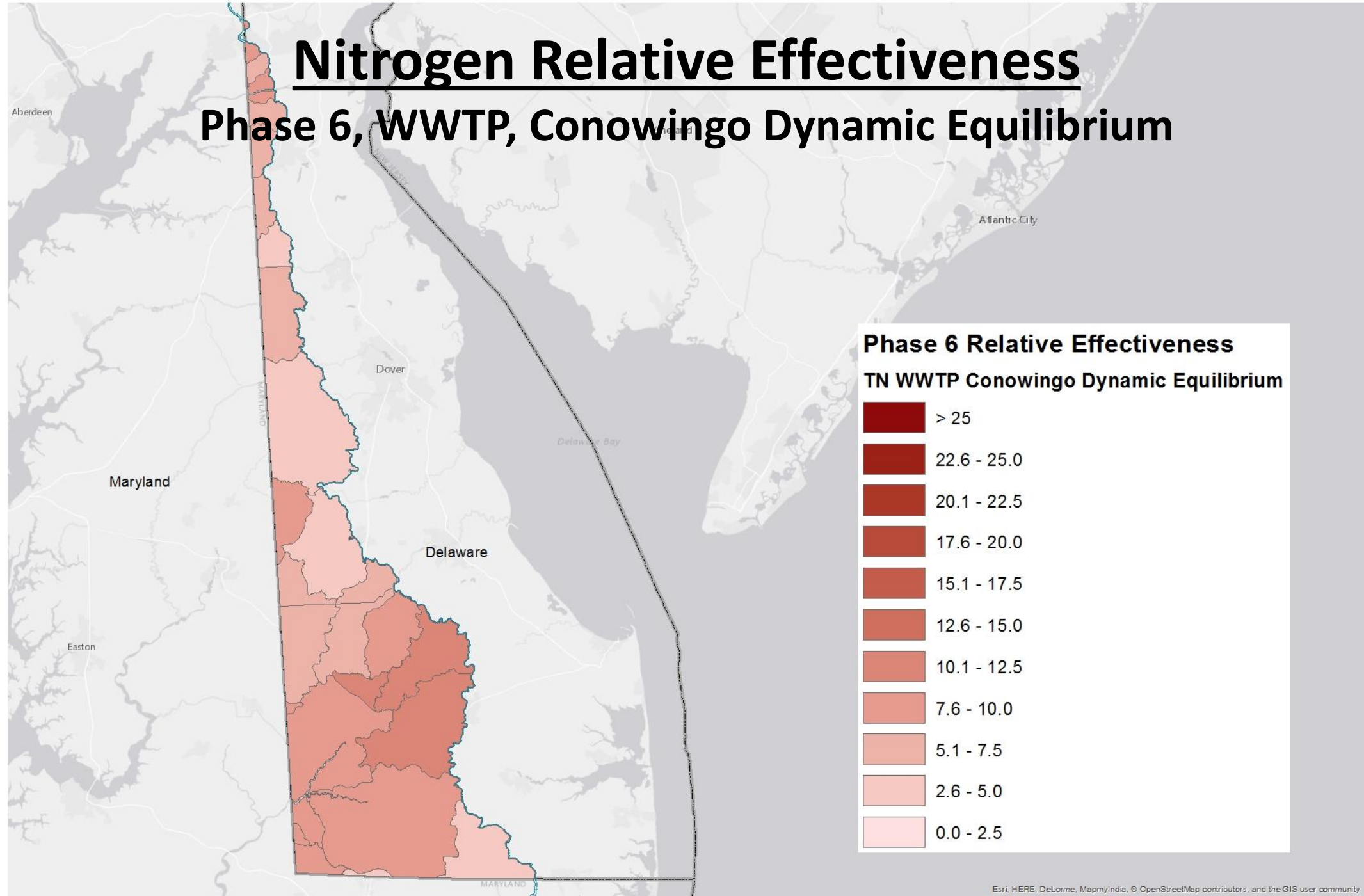
Nitrogen Relative Effectiveness

Phase 6, WWTP, Mid-90s



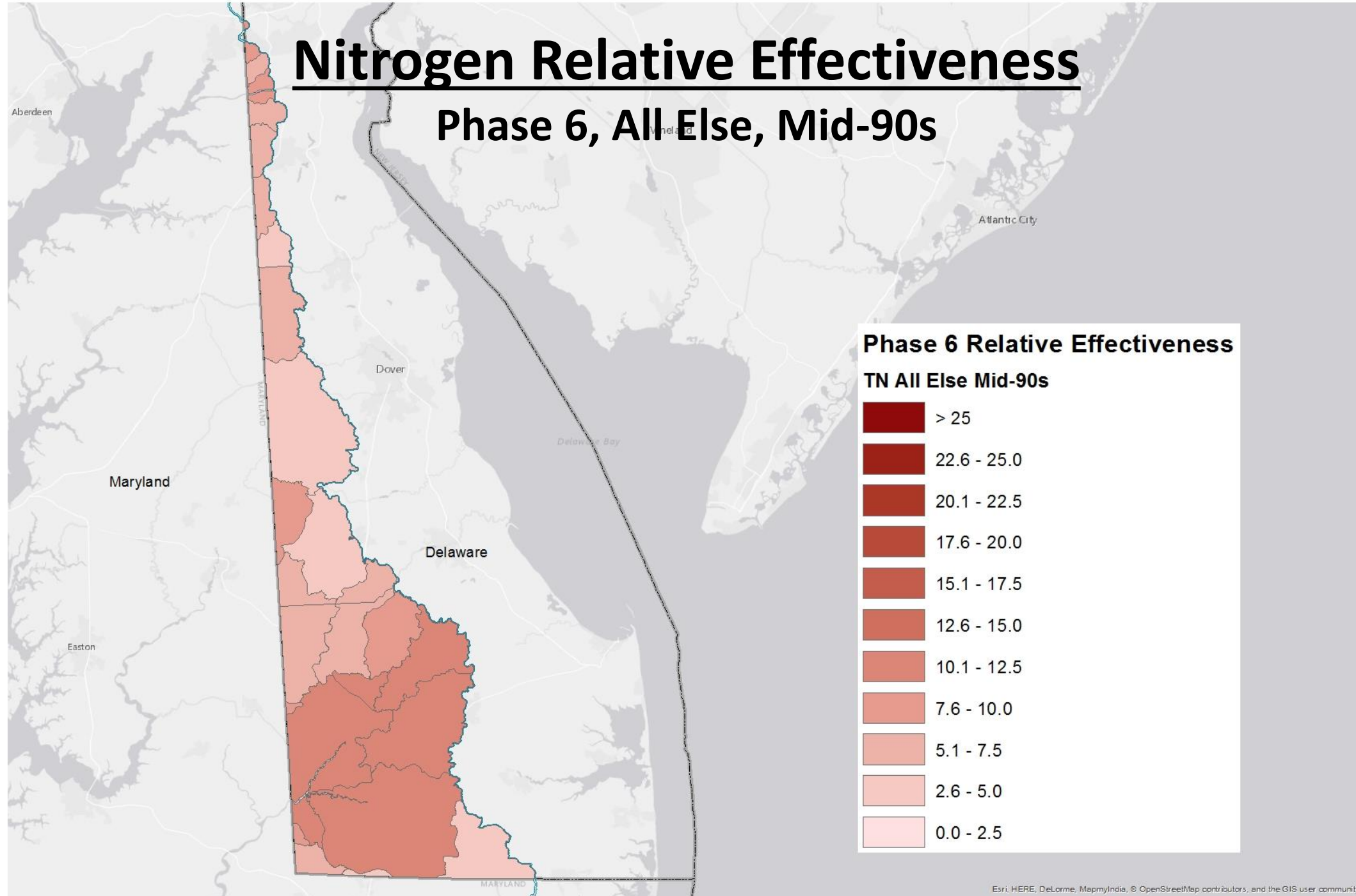
Nitrogen Relative Effectiveness

Phase 6, WWTP, Conowingo Dynamic Equilibrium



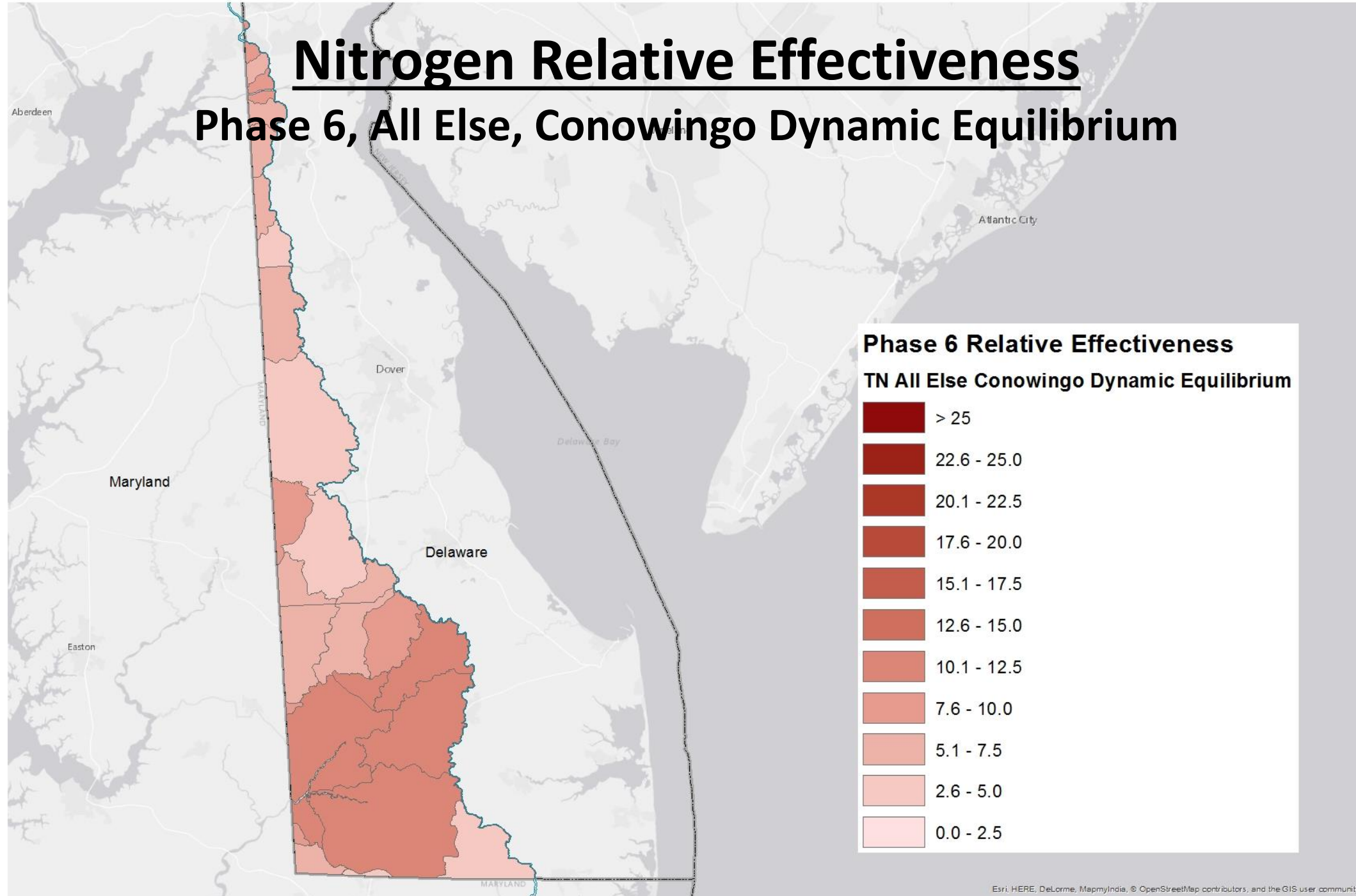
Nitrogen Relative Effectiveness

Phase 6, All Else, Mid-90s



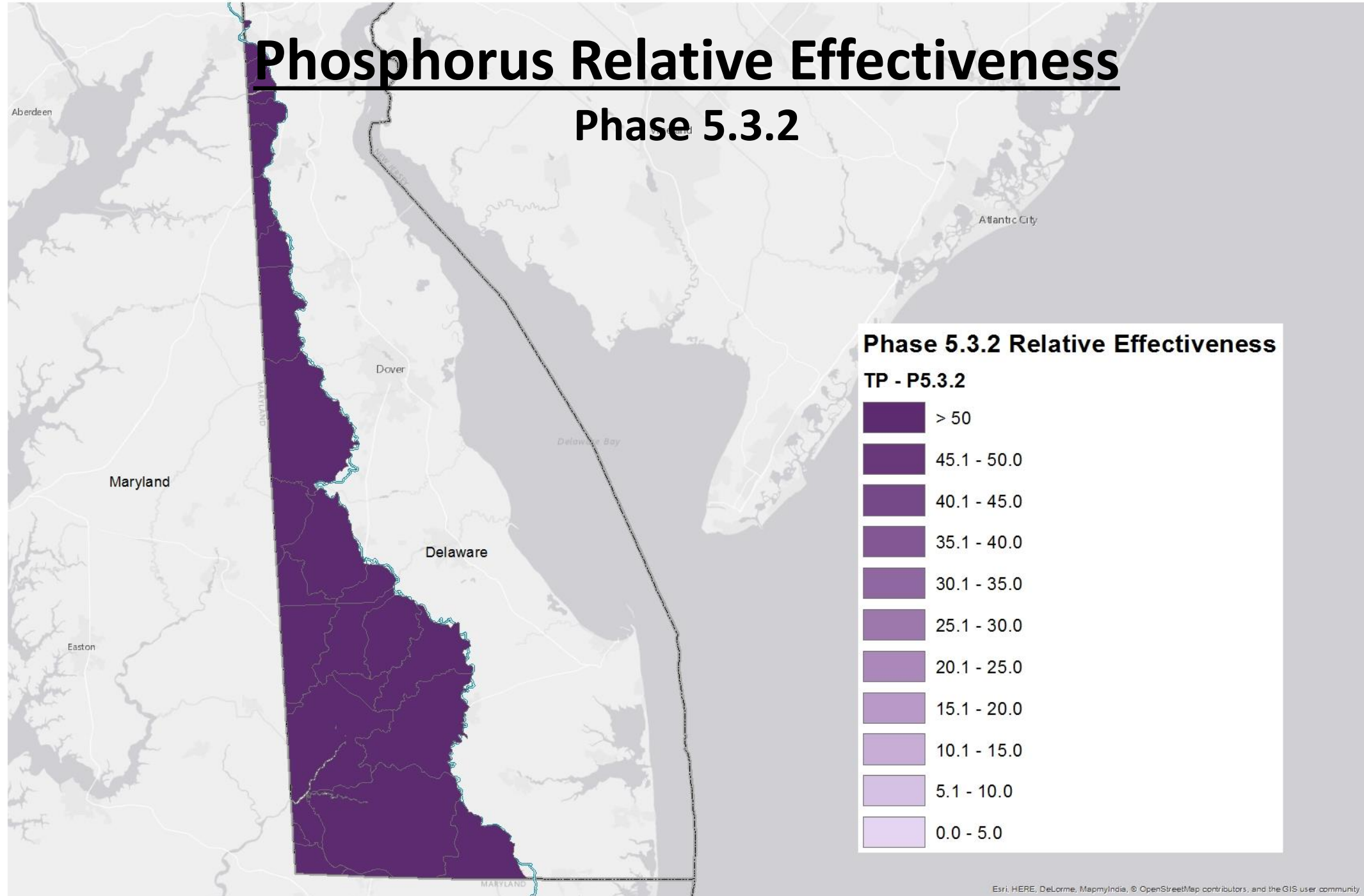
Nitrogen Relative Effectiveness

Phase 6, All Else, Conowingo Dynamic Equilibrium



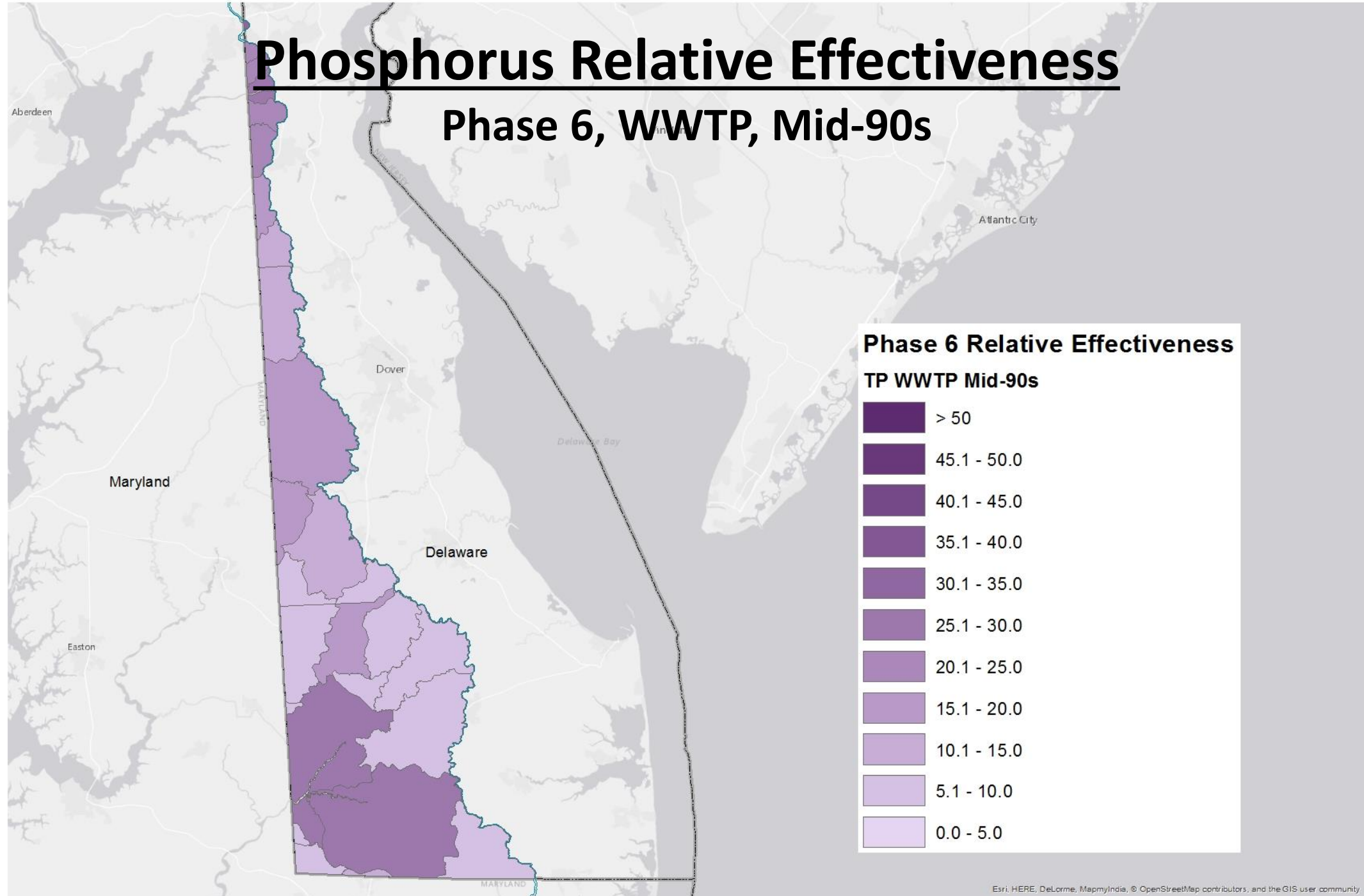
Phosphorus Relative Effectiveness

Phase 5.3.2



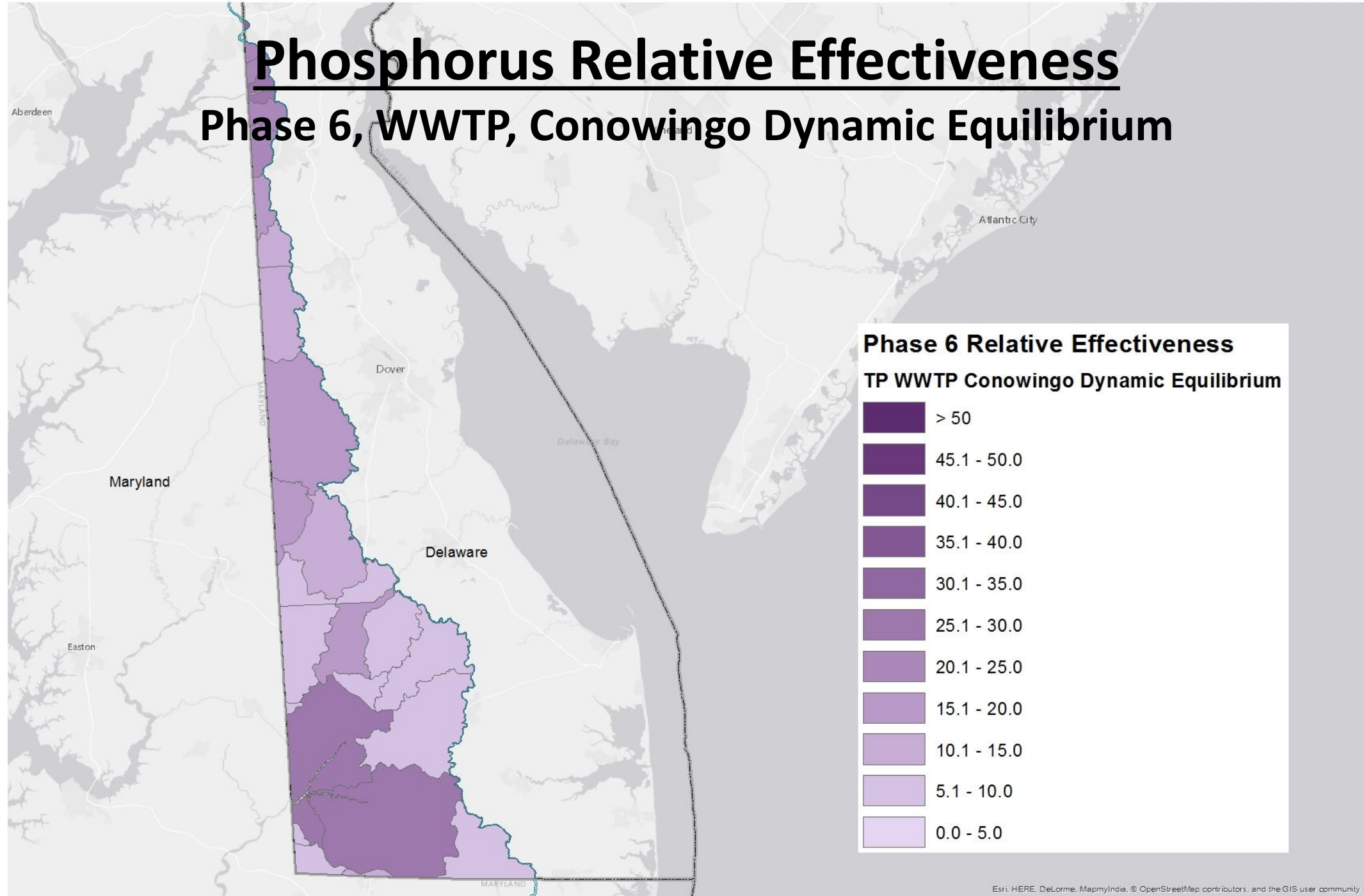
Phosphorus Relative Effectiveness

Phase 6, WWTP, Mid-90s



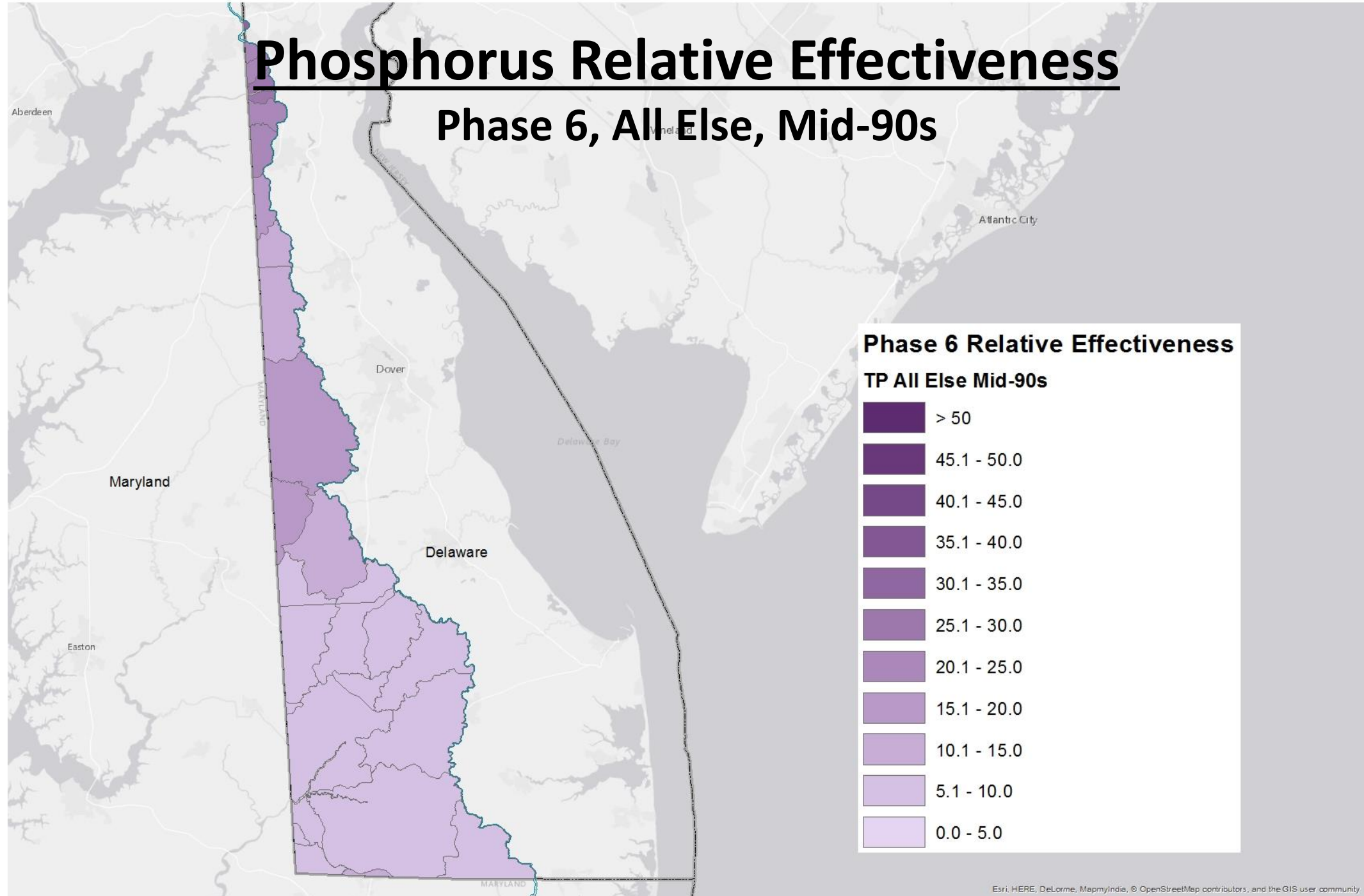
Phosphorus Relative Effectiveness

Phase 6, WWTP, Conowingo Dynamic Equilibrium



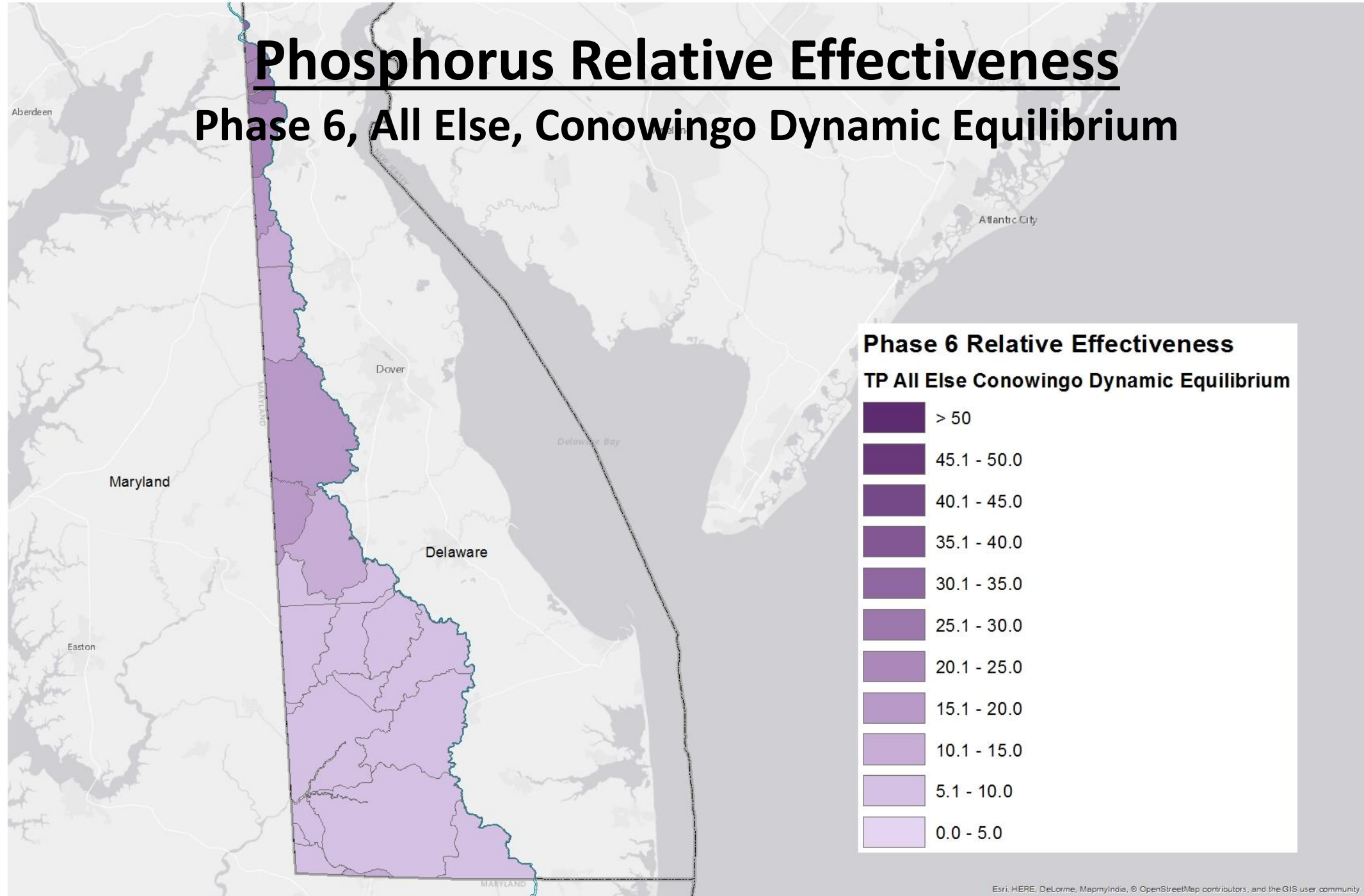
Phosphorus Relative Effectiveness

Phase 6, All Else, Mid-90s



Phosphorus Relative Effectiveness

Phase 6, All Else, Conowingo Dynamic Equilibrium

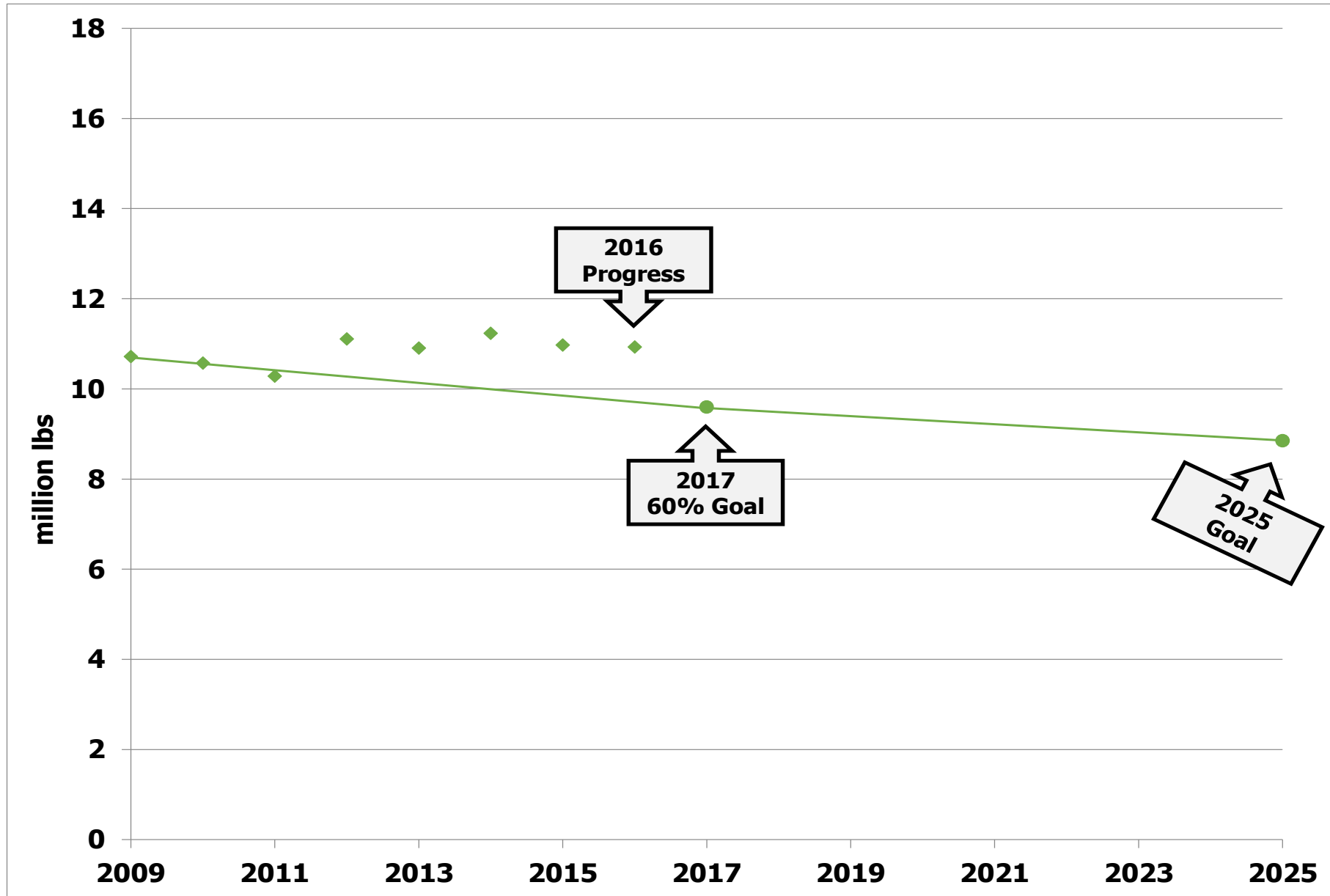


NY Draft Phase III WIP Planning Targets + Reference Loads

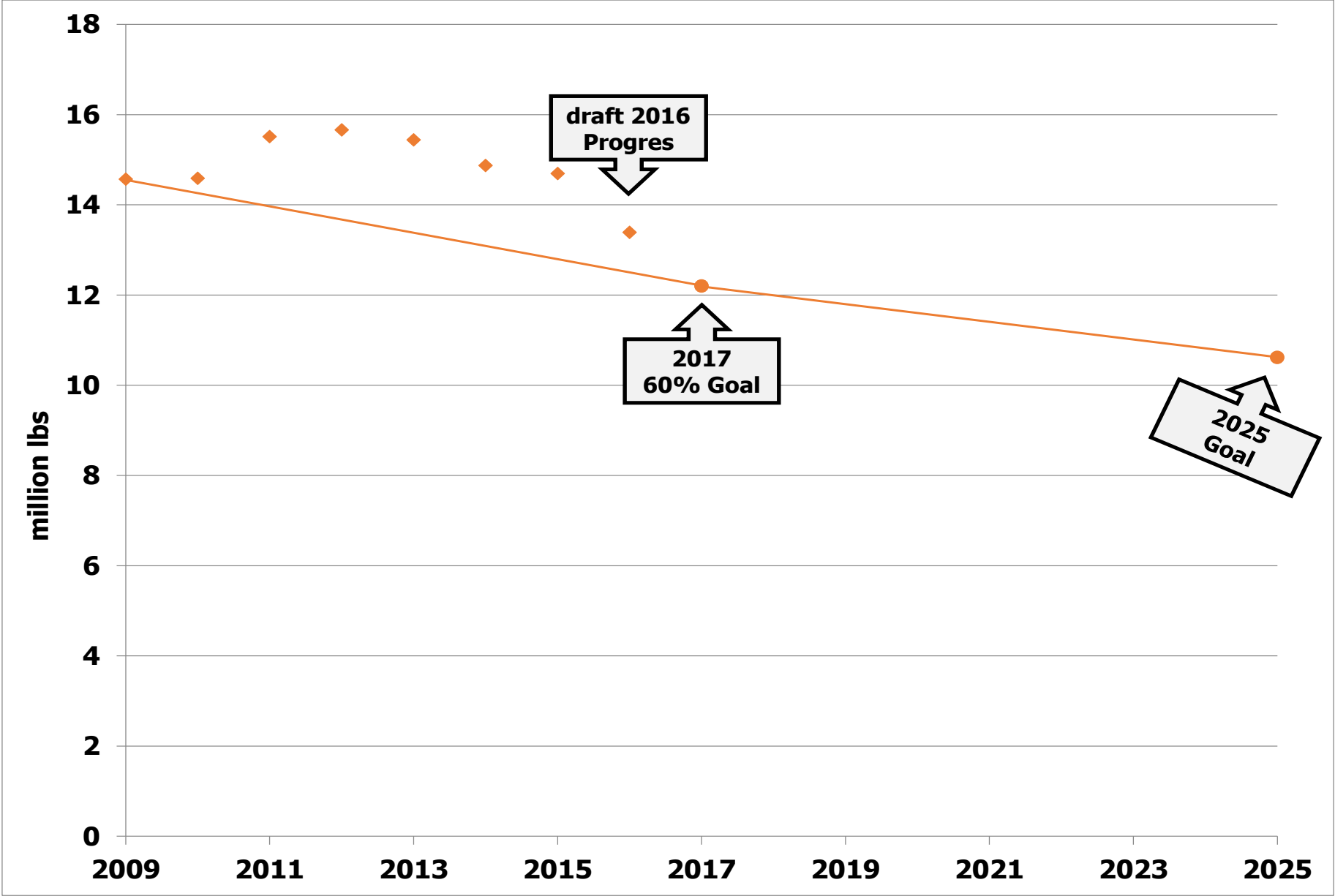
Nitrogen Load					
	No-Action (M lbs)	E3 (M lbs)	2013 Progress (M lbs)	Phase II WIP (reference) (M lbs)	Draft Phase III WIP Planning Target (M lbs)
NY Susquehanna	17.38	7.94	15.44	12.14	10.62

Phosphorus Load					
	No-Action (M lbs)	E3 (M lbs)	2013 Progress (M lbs)	Phase II WIP (reference) (M lbs)	Draft Phase III WIP Planning Target (M lbs)
NY Susquehanna	1.083	0.343	0.710	0.528	0.491

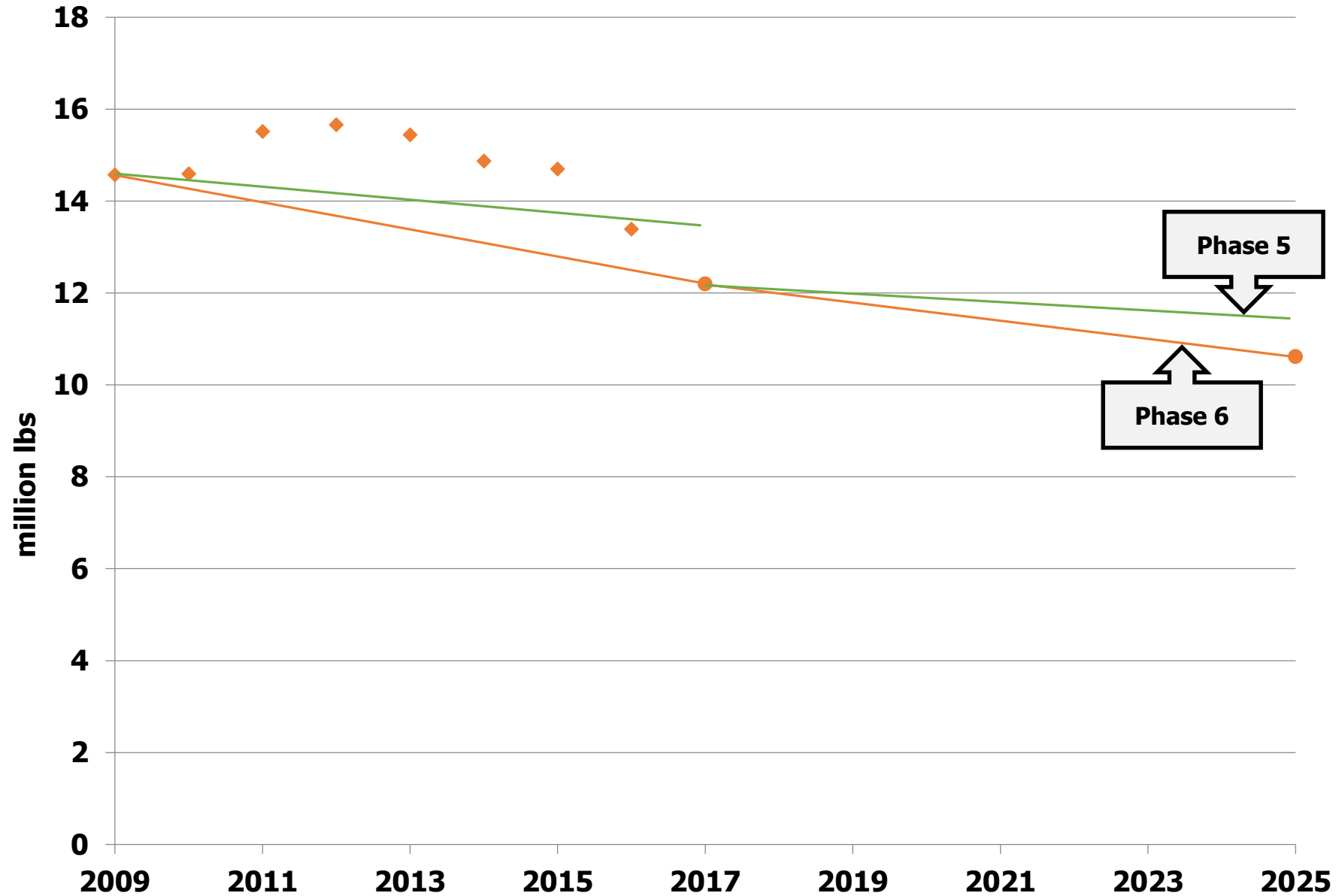
NY Nitrogen Loads-Goals, Phase 5.3.2



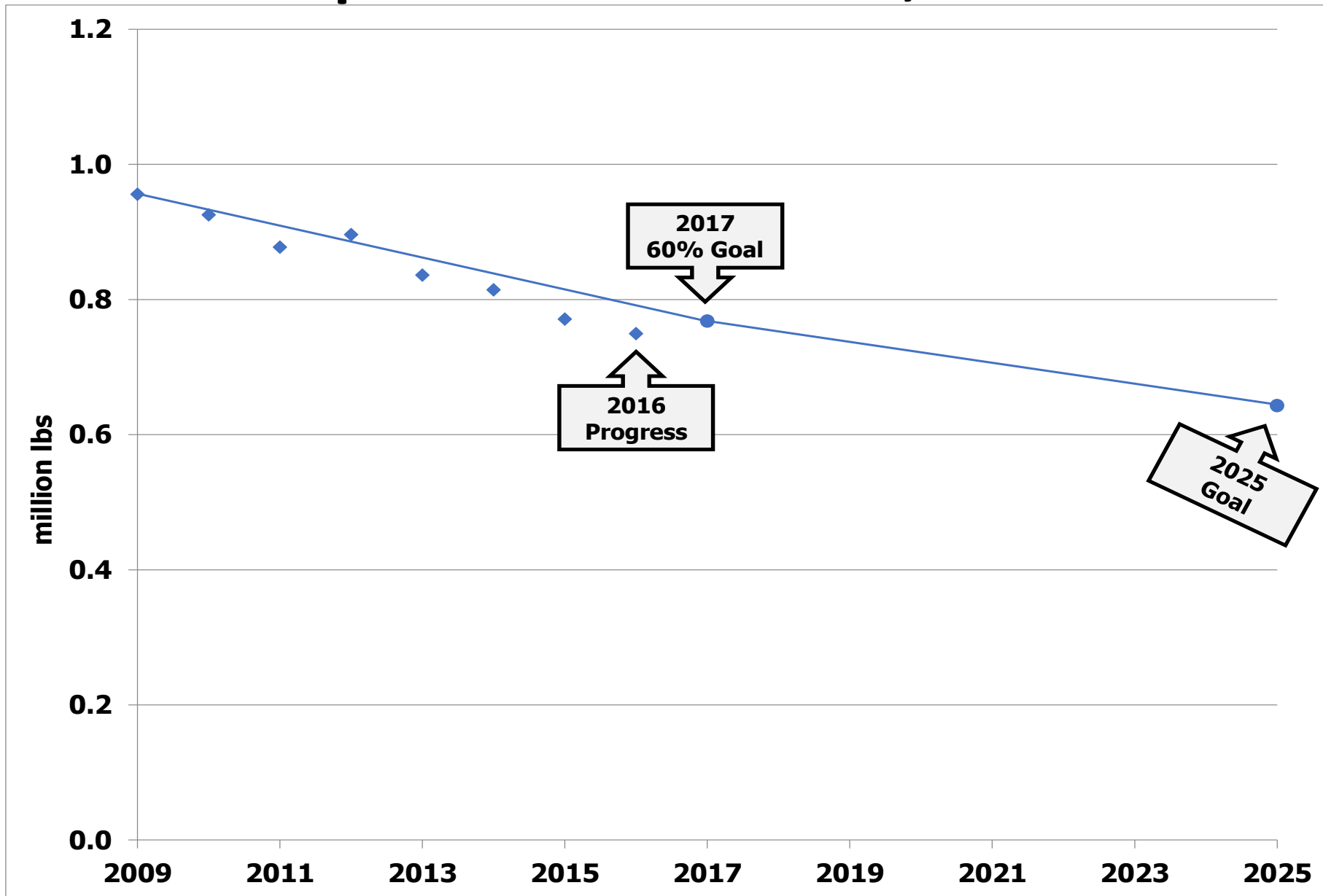
NY Nitrogen Loads-Goals, Phase 6



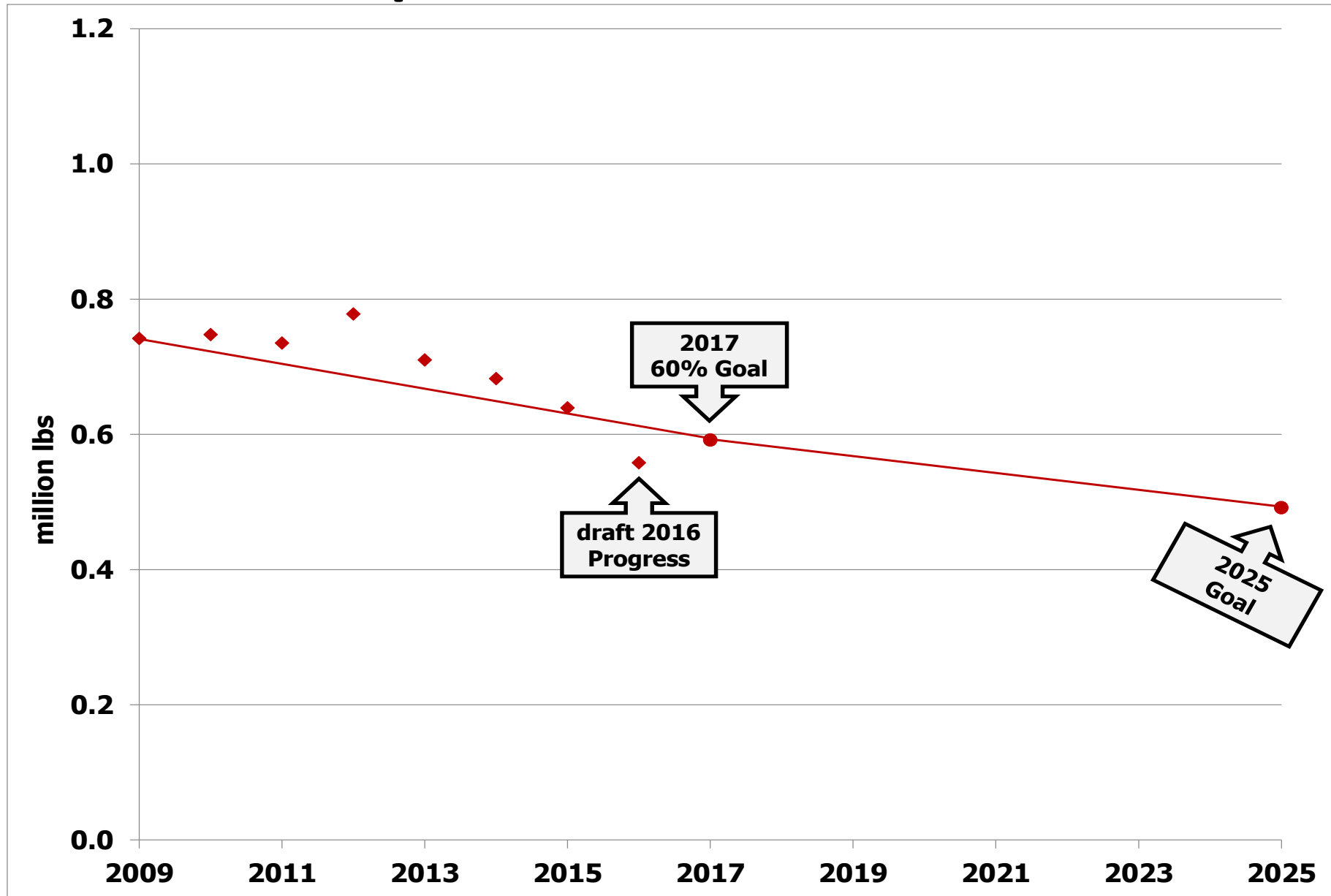
NY Nitrogen Change in LOE



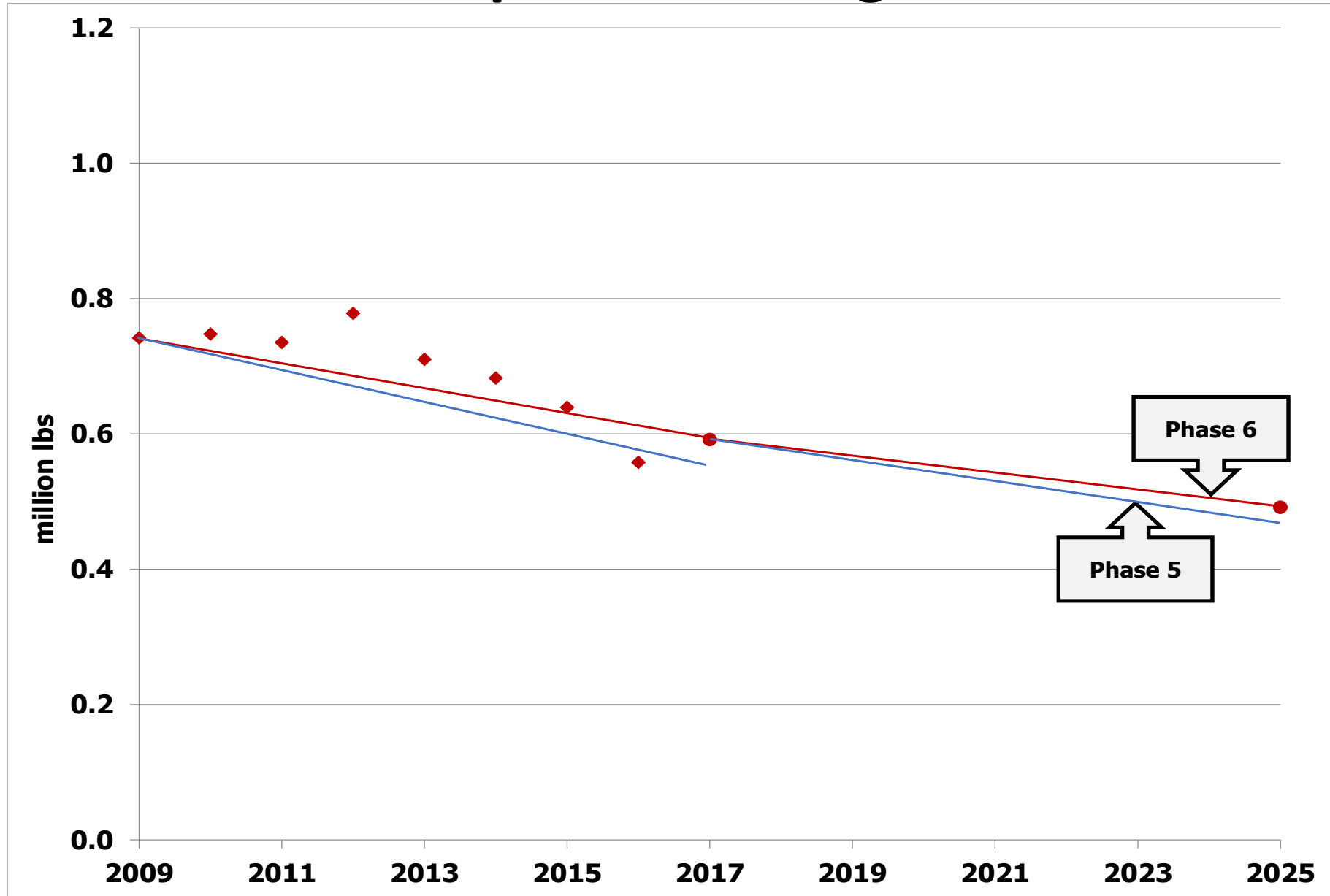
NY Phosphorus Loads-Goals, Phase 5.3.2



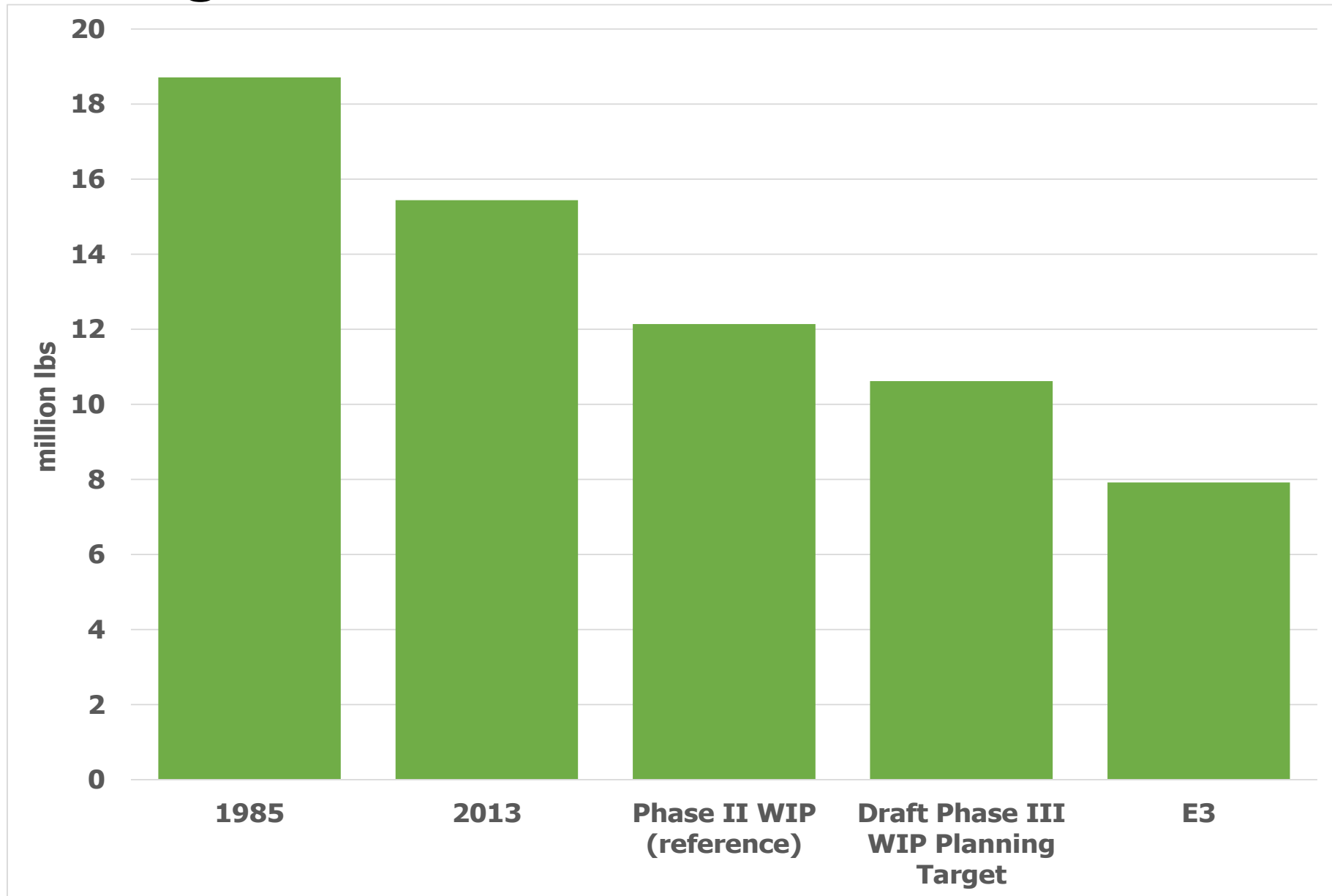
NY Phosphorus Loads-Goals, Phase 6



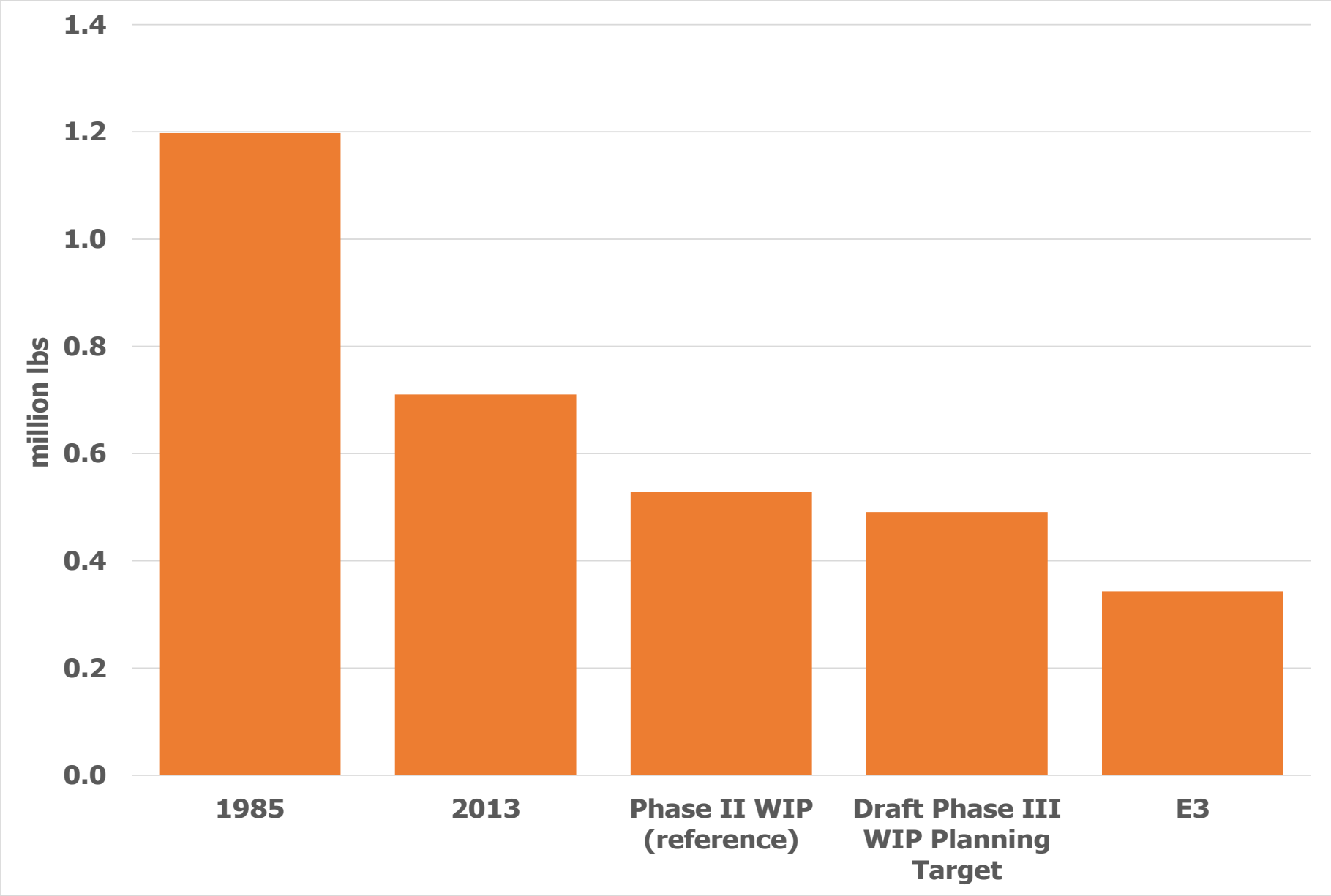
NY Phosphorus Change in LOE



NY Nitrogen Loads, Reference Scenarios, and Target

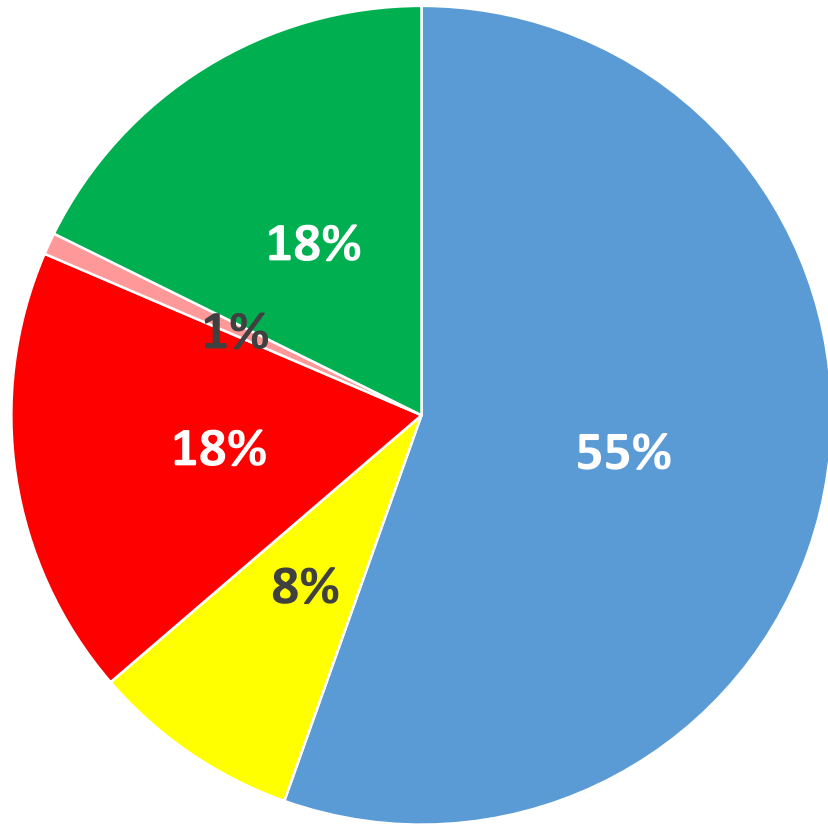


NY Phosphorus Loads, Reference Scenarios, and Target

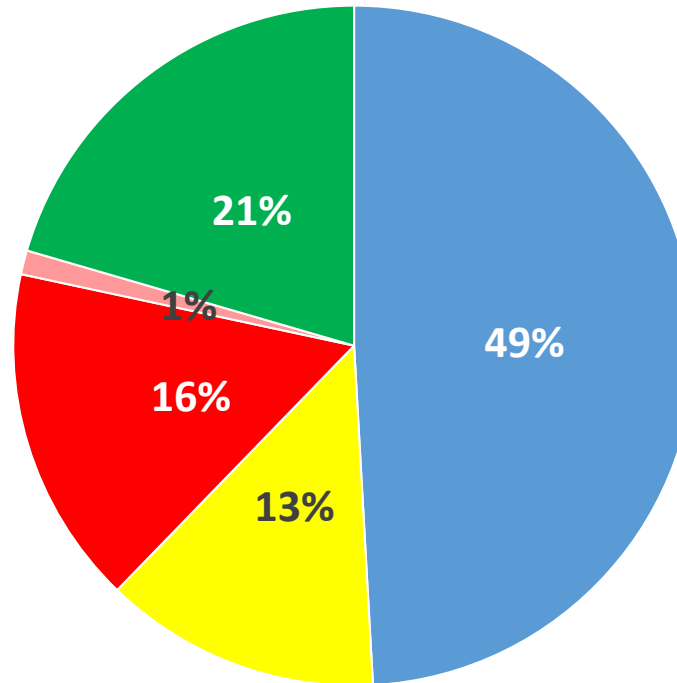


NY Nitrogen Loads and Target

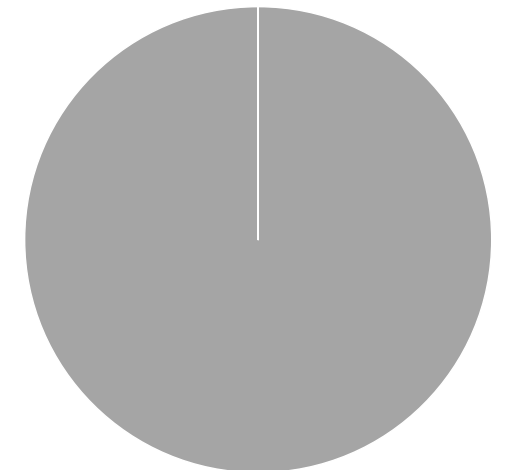
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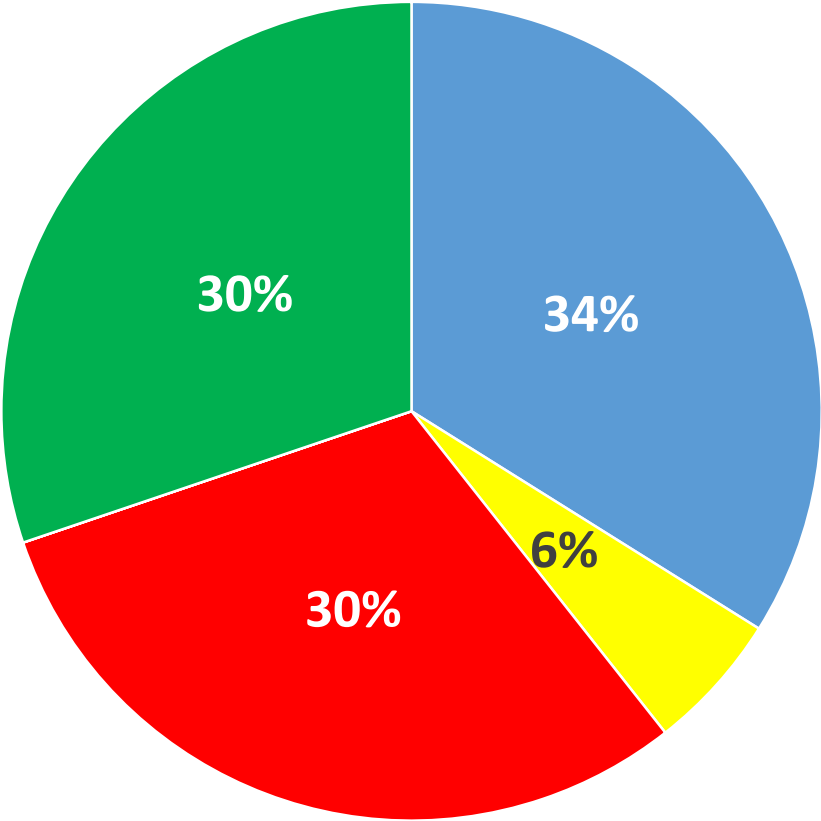
2013



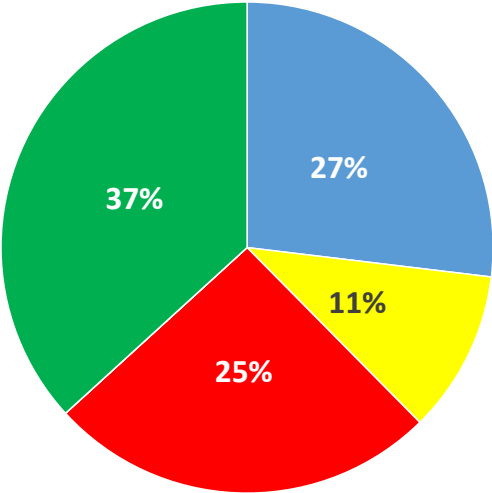
**Draft Phase III WIP
Planning Target**

NY Phosphorus Loads and Target

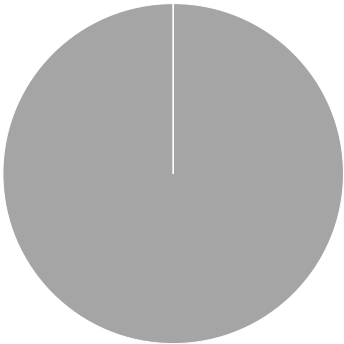
■ Agriculture ■ Developed ■ Wastewater ■ Natural



1985



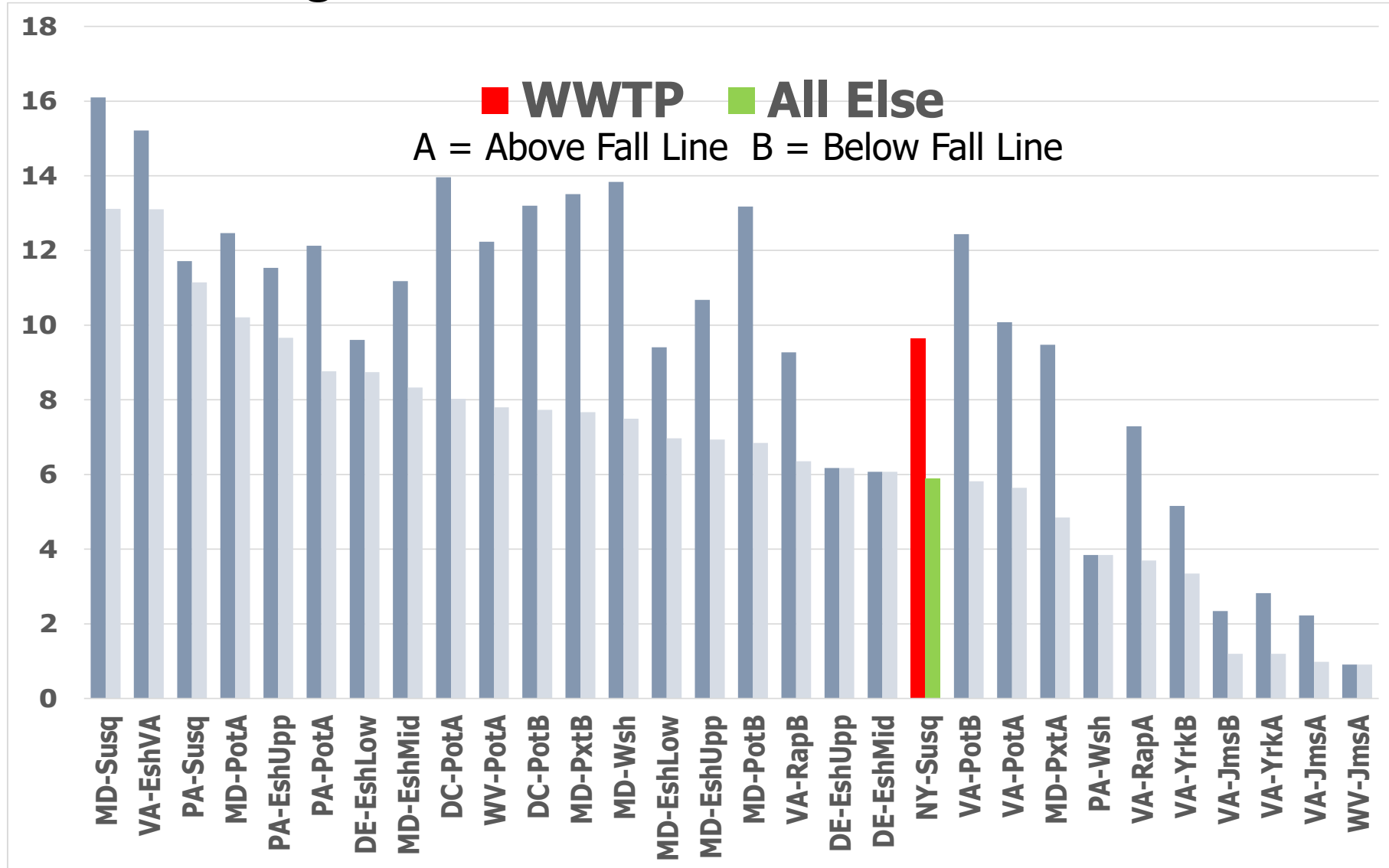
2013



Draft Phase III WIP
Planning Target

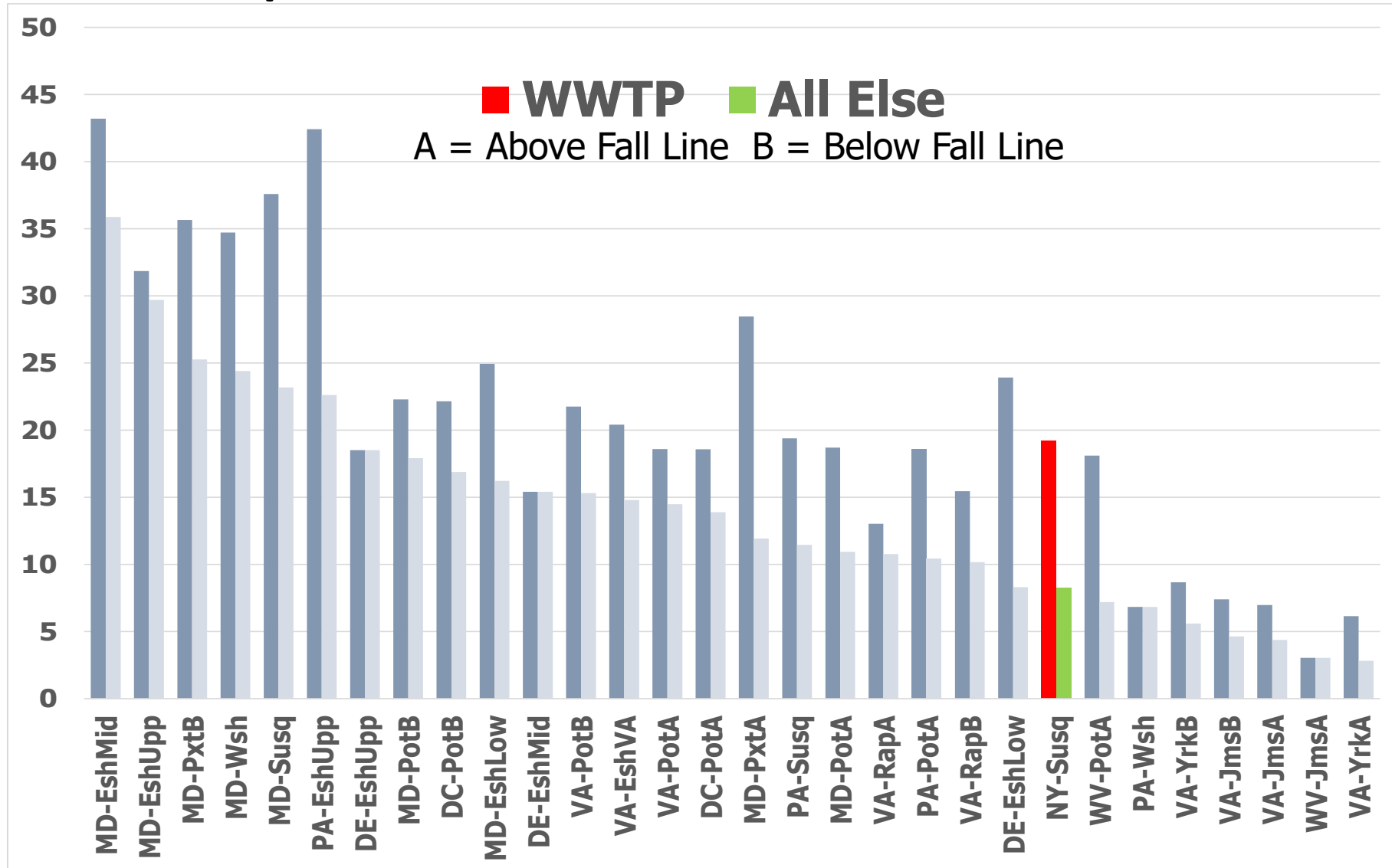
Nitrogen Relative Effectiveness

Effect of Nitrogen Load Reduction on WQ Standard Attainment



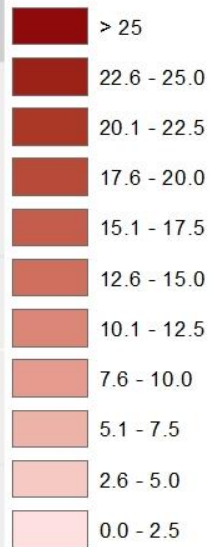
Phosphorus Relative Effectiveness

Effect of Phosphorus Load Reduction on WQ Standard Attainment



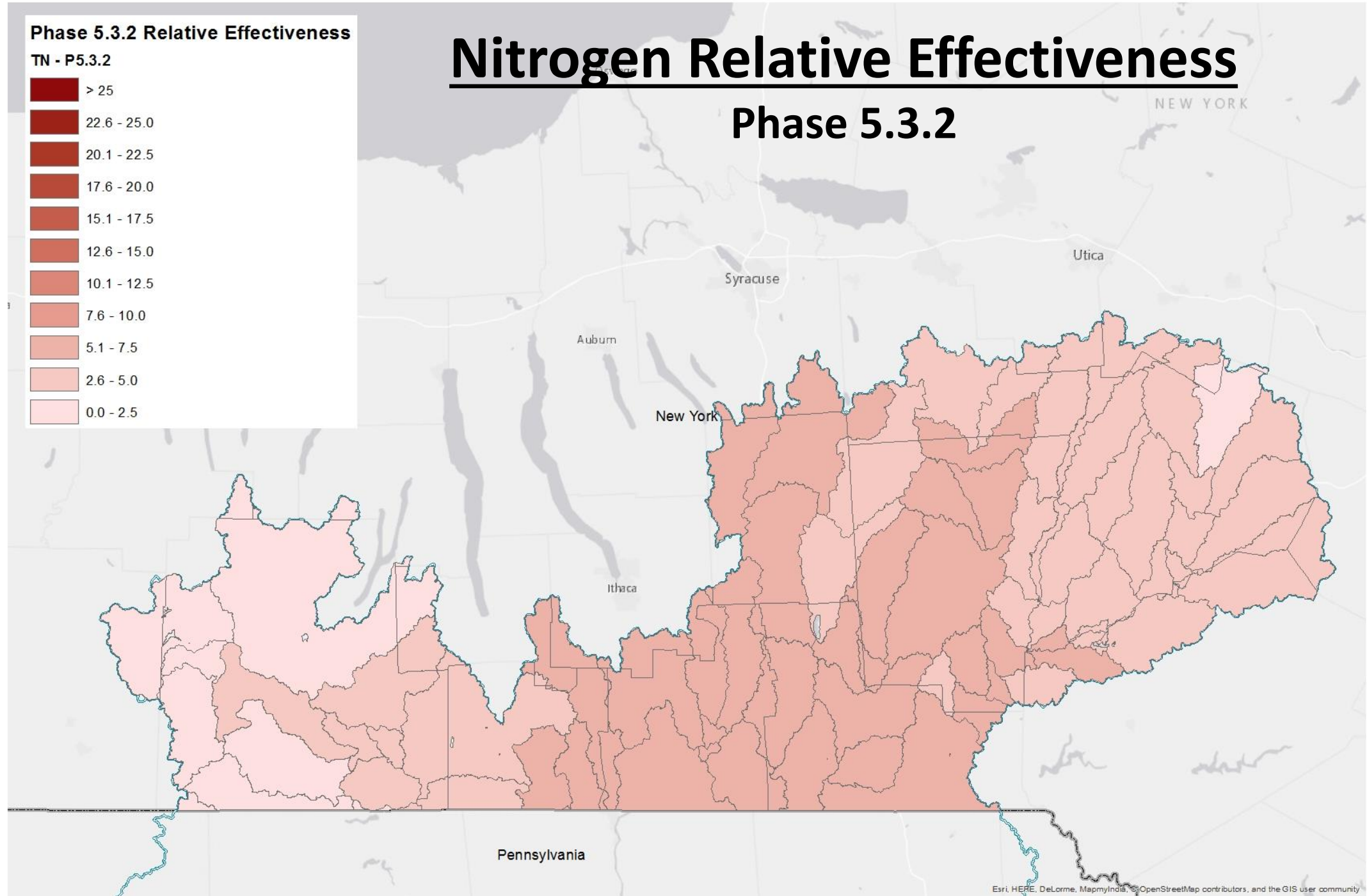
Phase 5.3.2 Relative Effectiveness

TN - P5.3.2



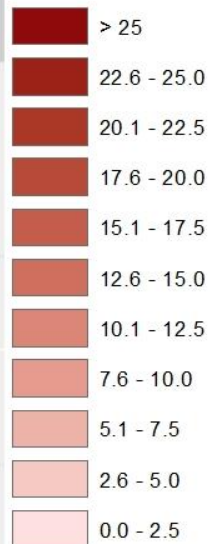
Nitrogen Relative Effectiveness

Phase 5.3.2



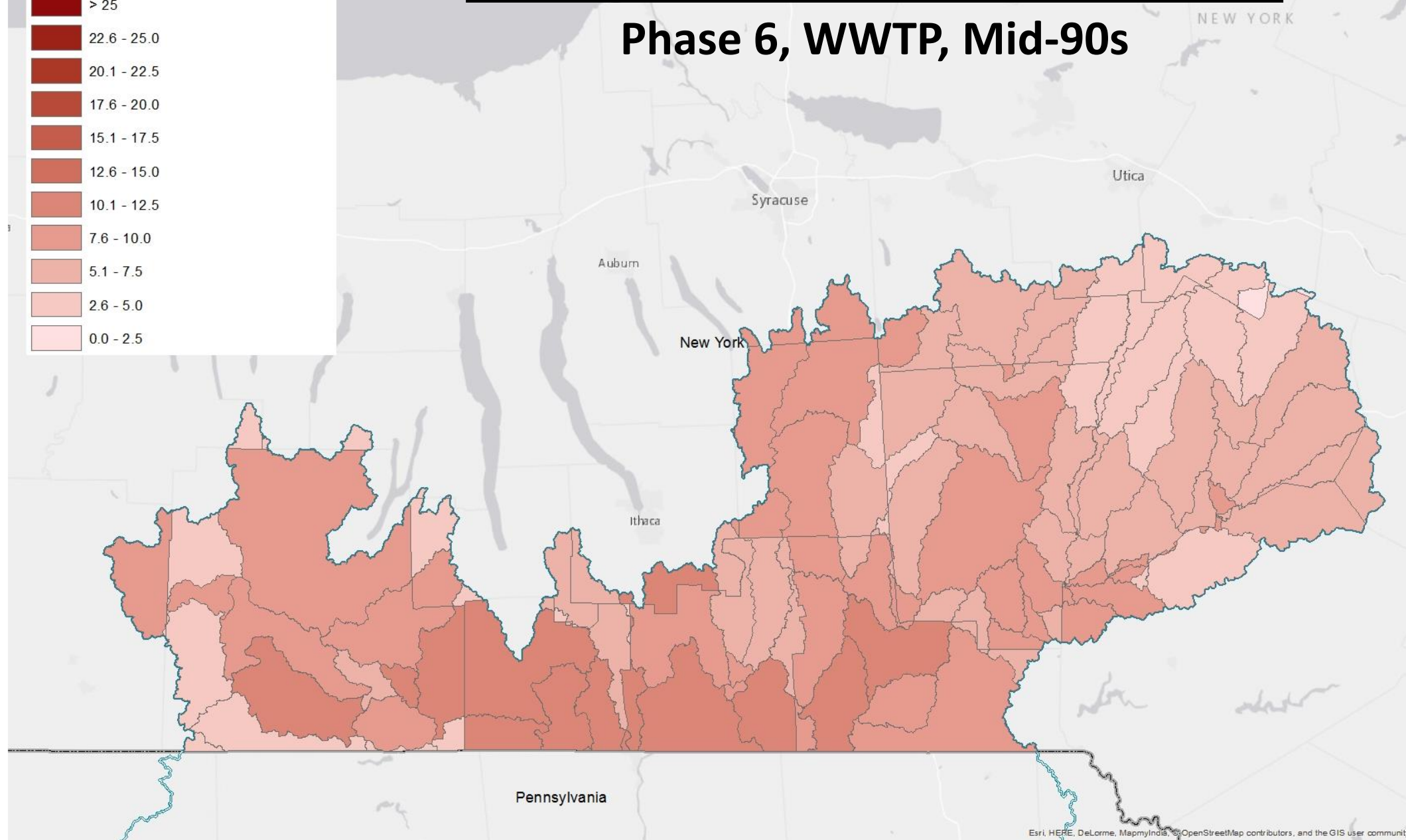
Phase 6 Relative Effectiveness

TN WWTP Mid-90s



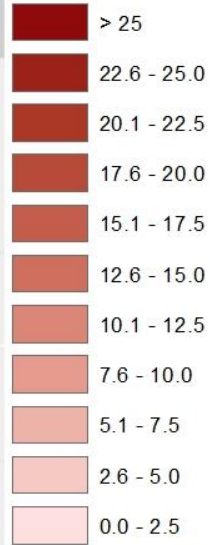
Nitrogen Relative Effectiveness

Phase 6, WWTP, Mid-90s



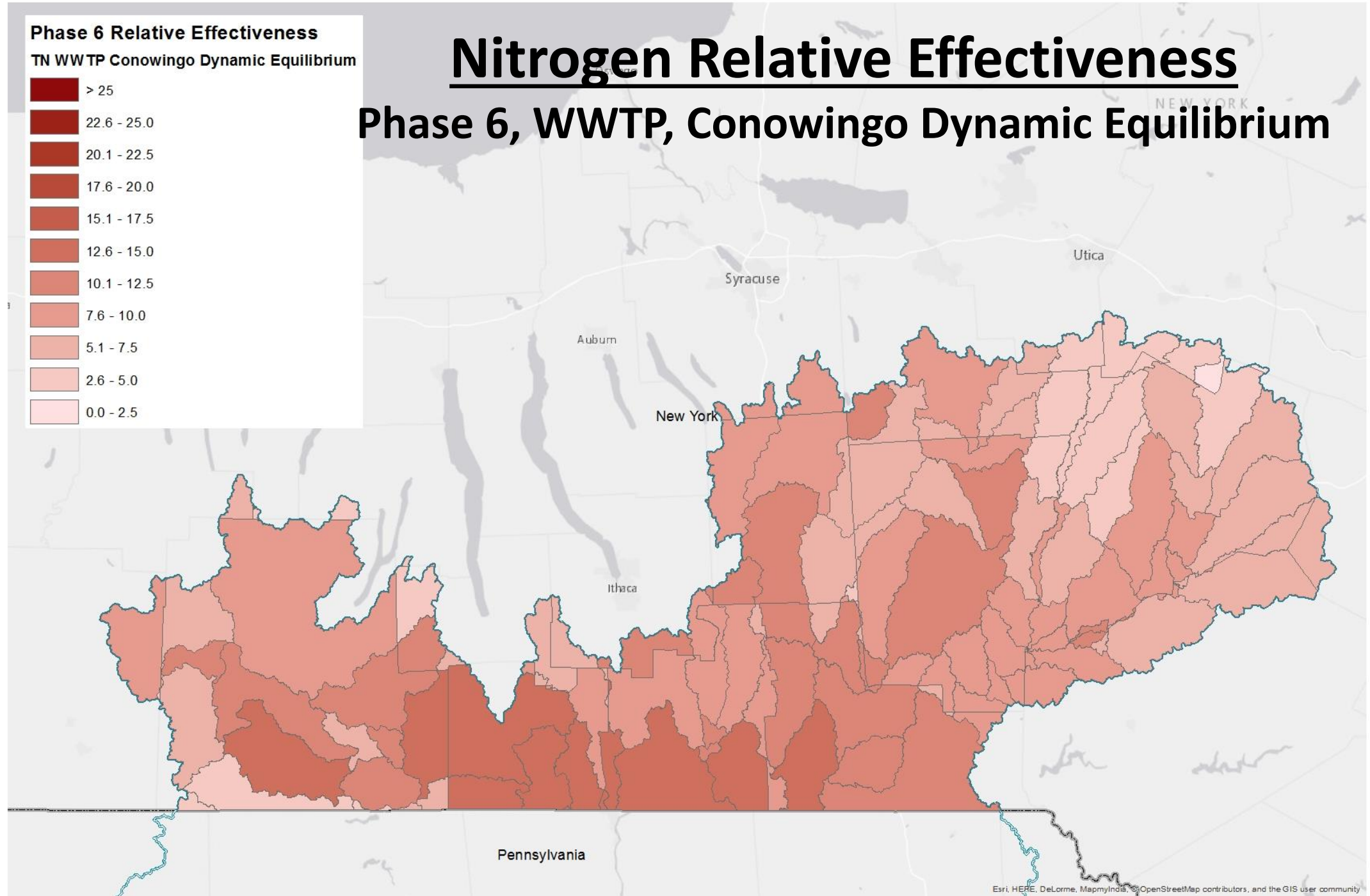
Phase 6 Relative Effectiveness

TN WWTP Conowingo Dynamic Equilibrium



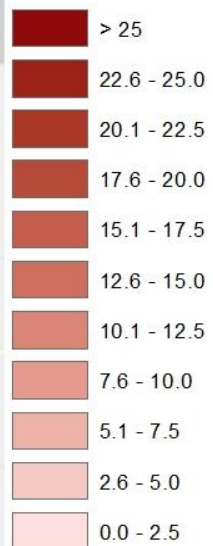
Nitrogen Relative Effectiveness

Phase 6, WWTP, Conowingo Dynamic Equilibrium



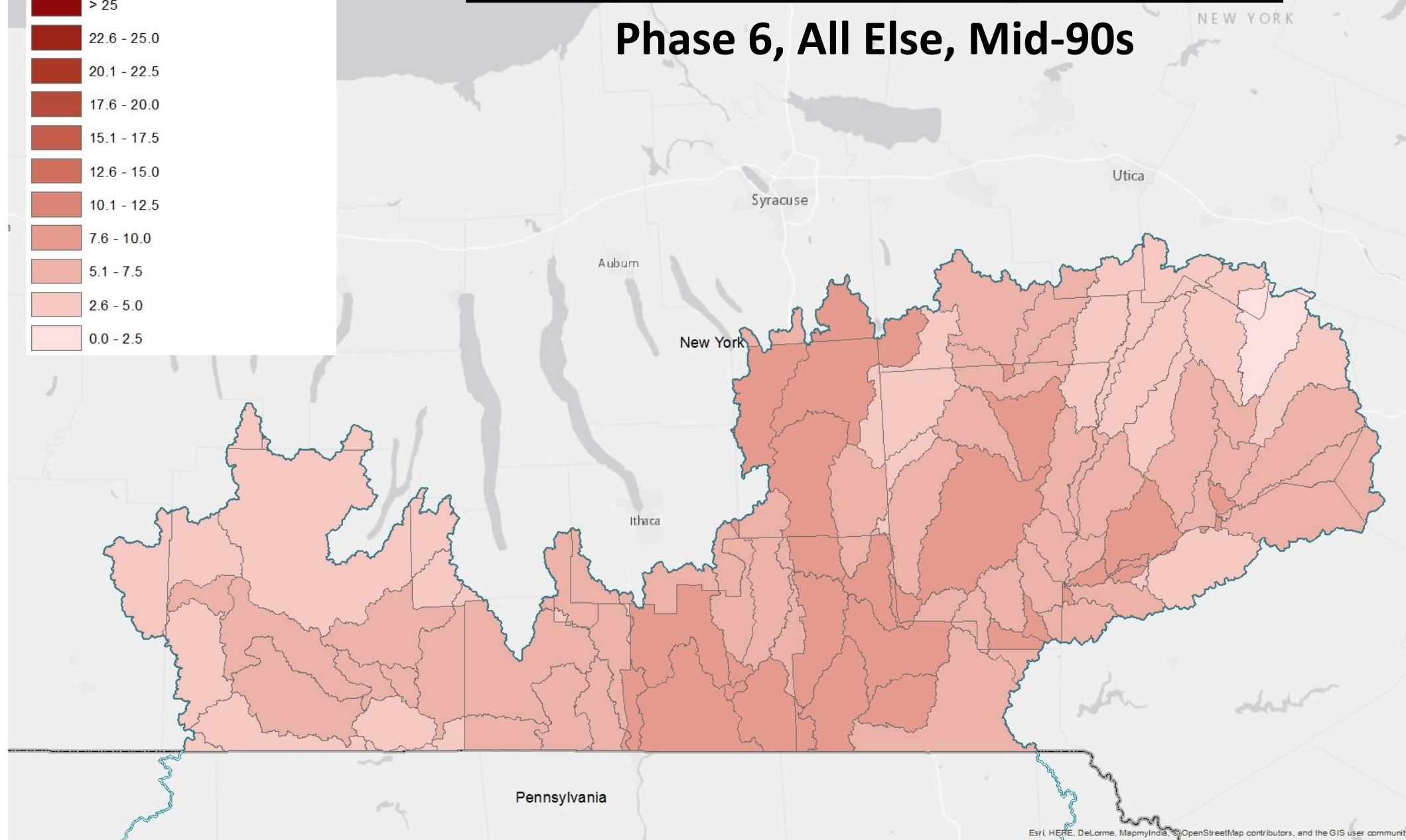
Phase 6 Relative Effectiveness

TN All Else Mid-90s



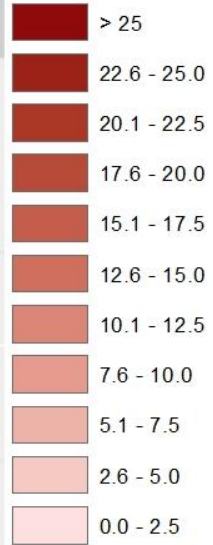
Nitrogen Relative Effectiveness

Phase 6, All Else, Mid-90s



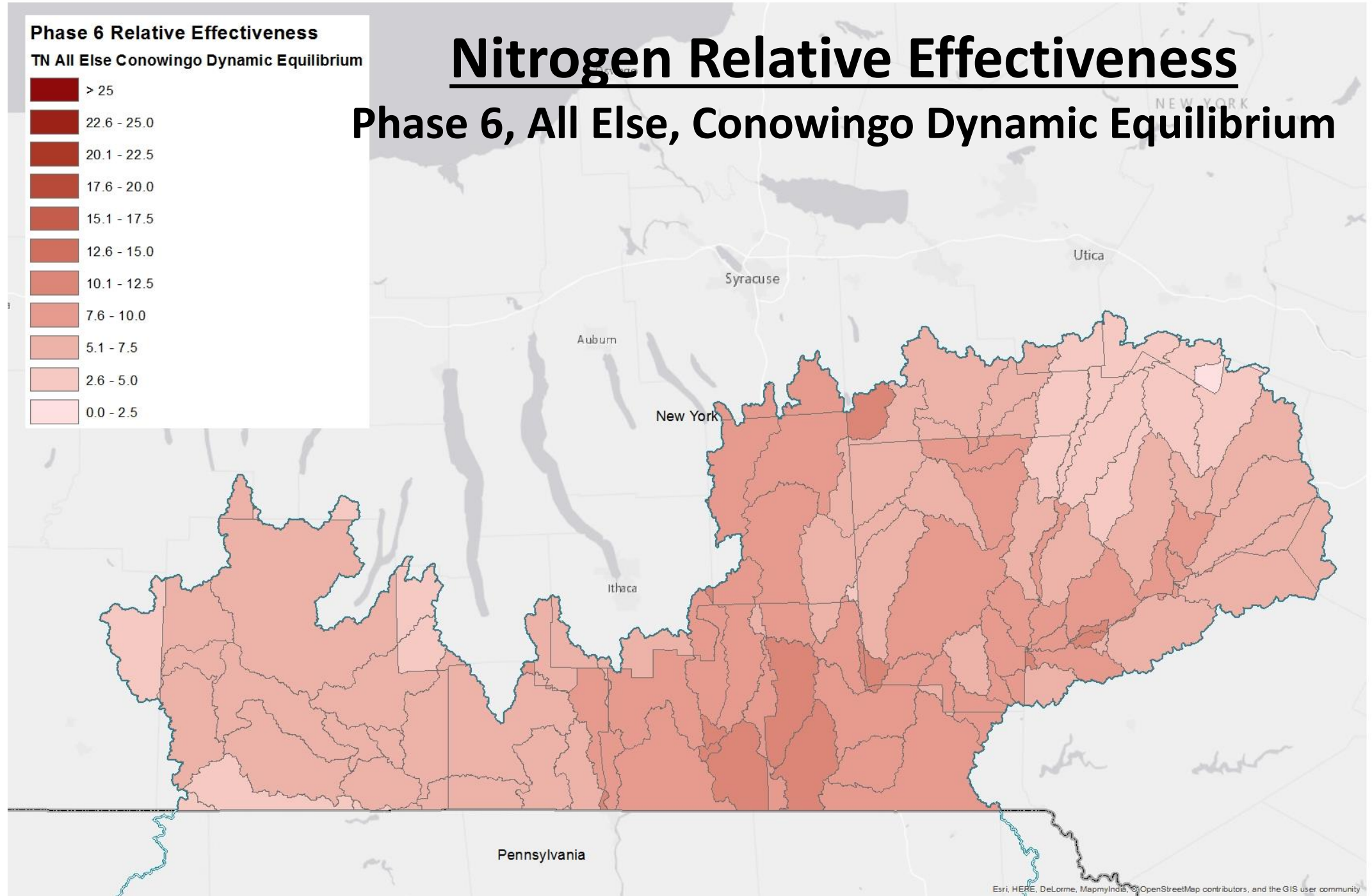
Phase 6 Relative Effectiveness

TN All Else Conowingo Dynamic Equilibrium



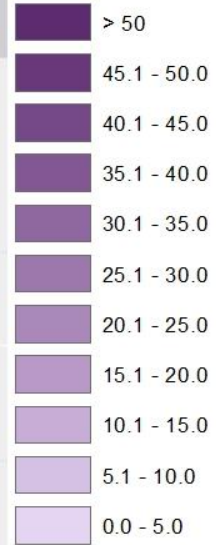
Nitrogen Relative Effectiveness

Phase 6, All Else, Conowingo Dynamic Equilibrium



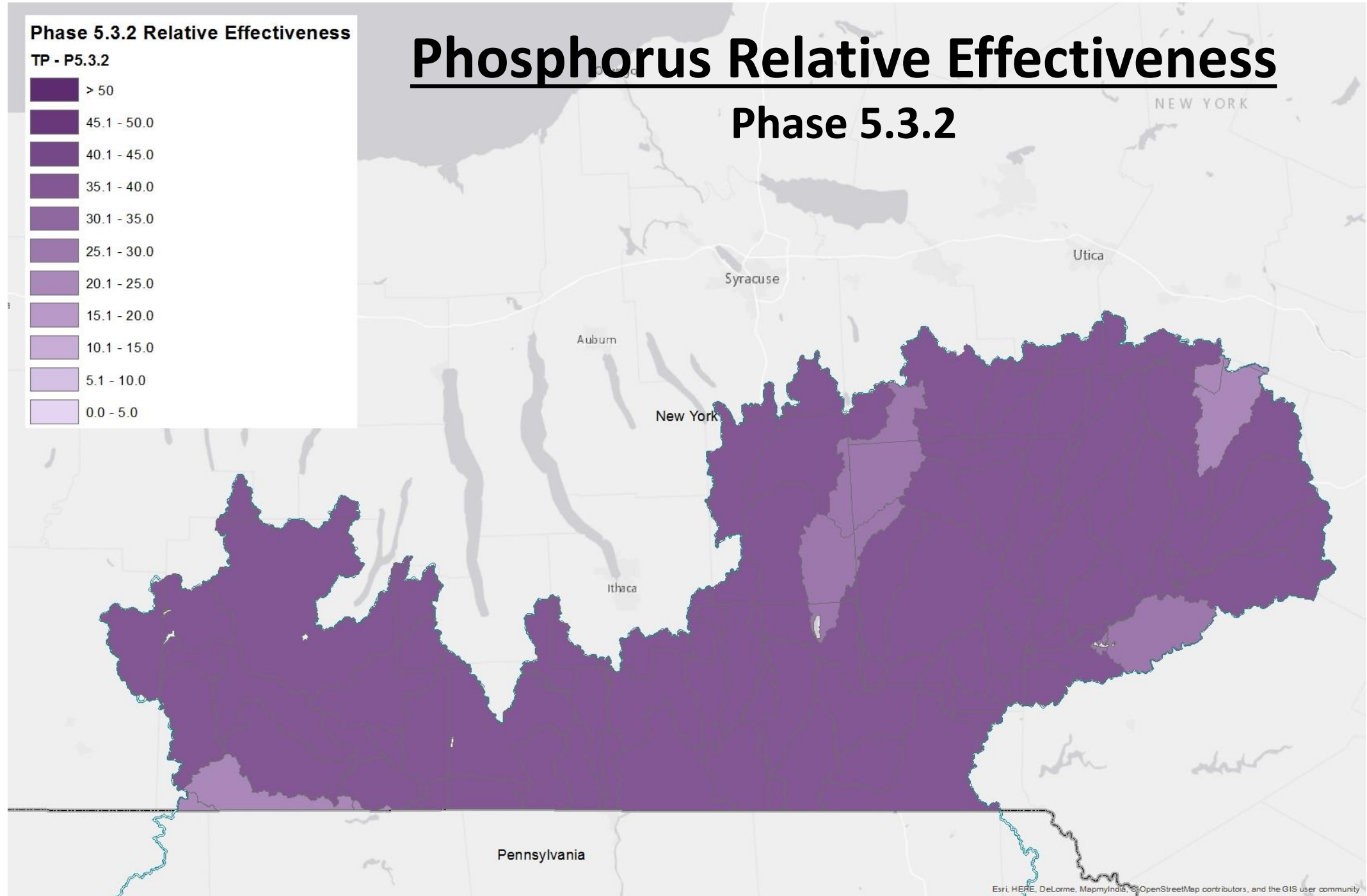
Phase 5.3.2 Relative Effectiveness

TP - P5.3.2



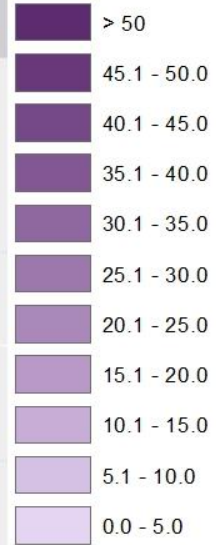
Phosphorus Relative Effectiveness

Phase 5.3.2



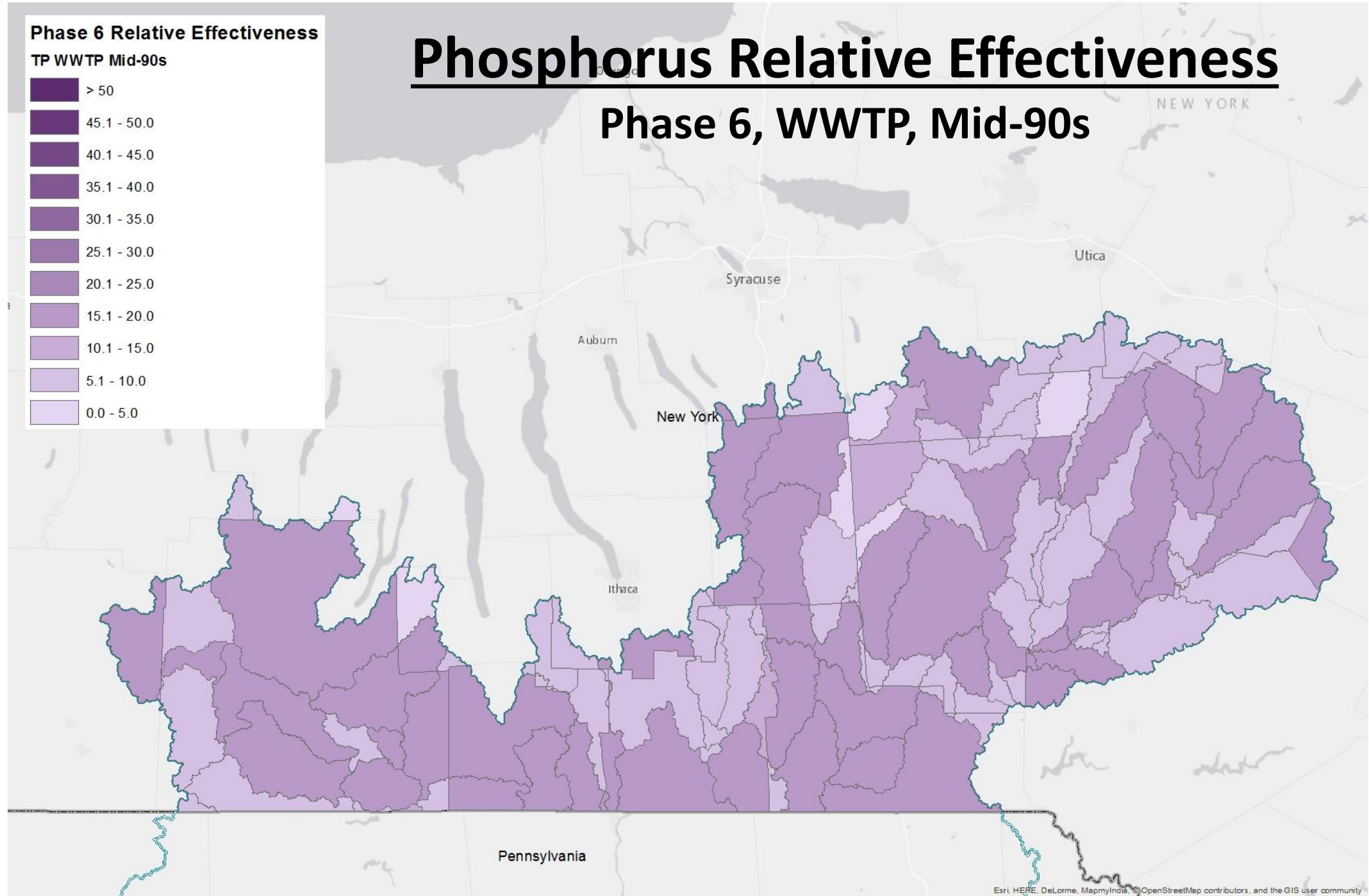
Phase 6 Relative Effectiveness

TP WWTP Mid-90s



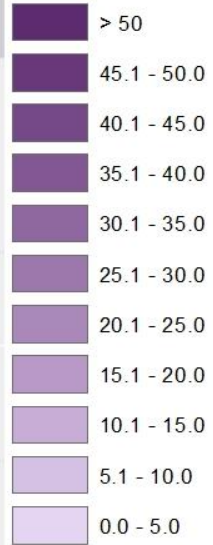
Phosphorus Relative Effectiveness

Phase 6, WWTP, Mid-90s



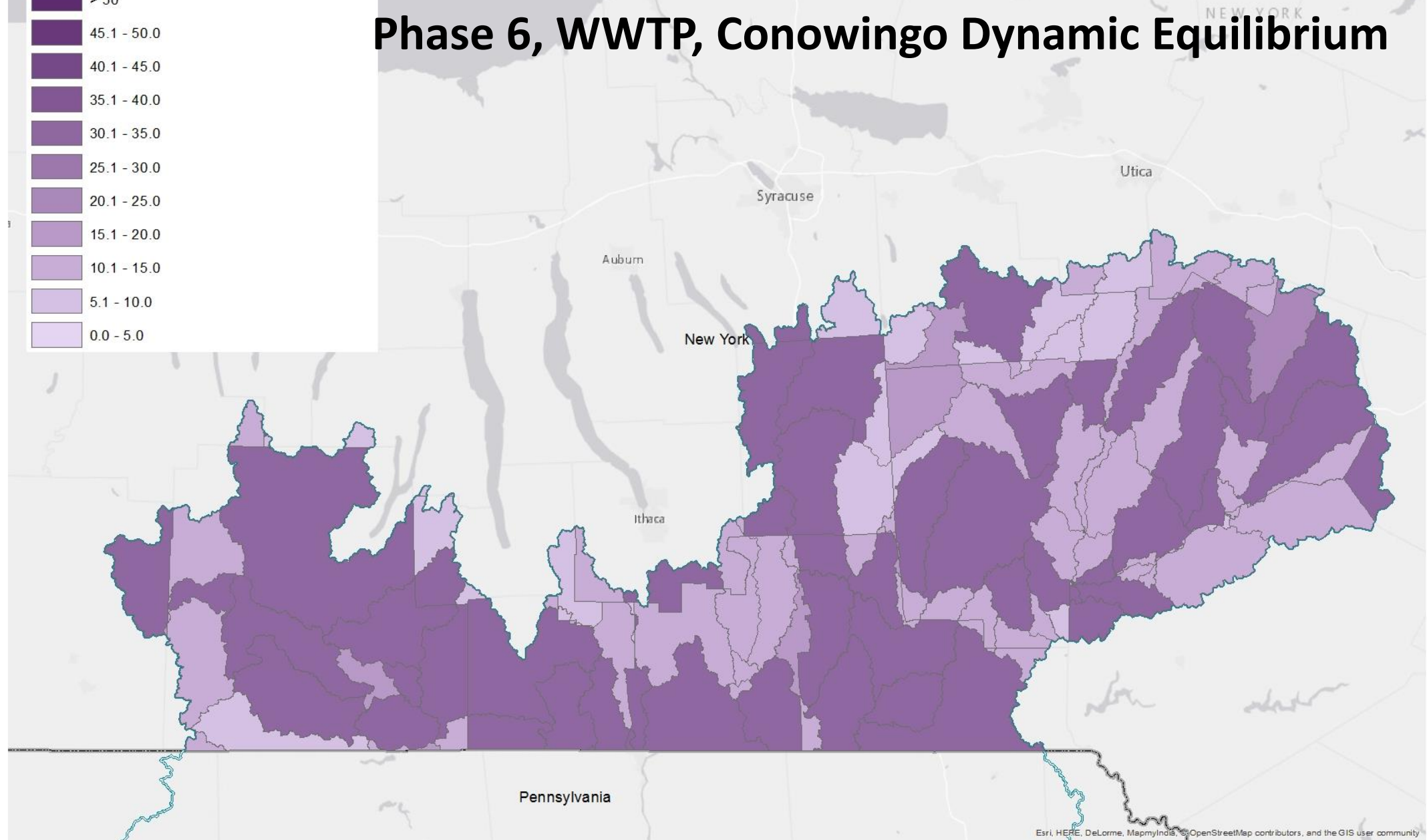
Phase 6 Relative Effectiveness

TP WWTP Conowingo Dynamic Equilibrium



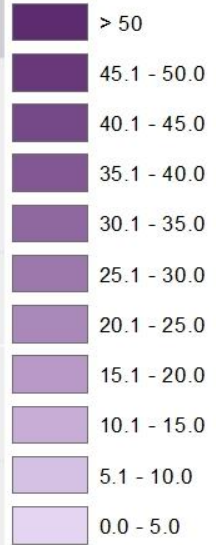
Phosphorus Relative Effectiveness

Phase 6, WWTP, Conowingo Dynamic Equilibrium



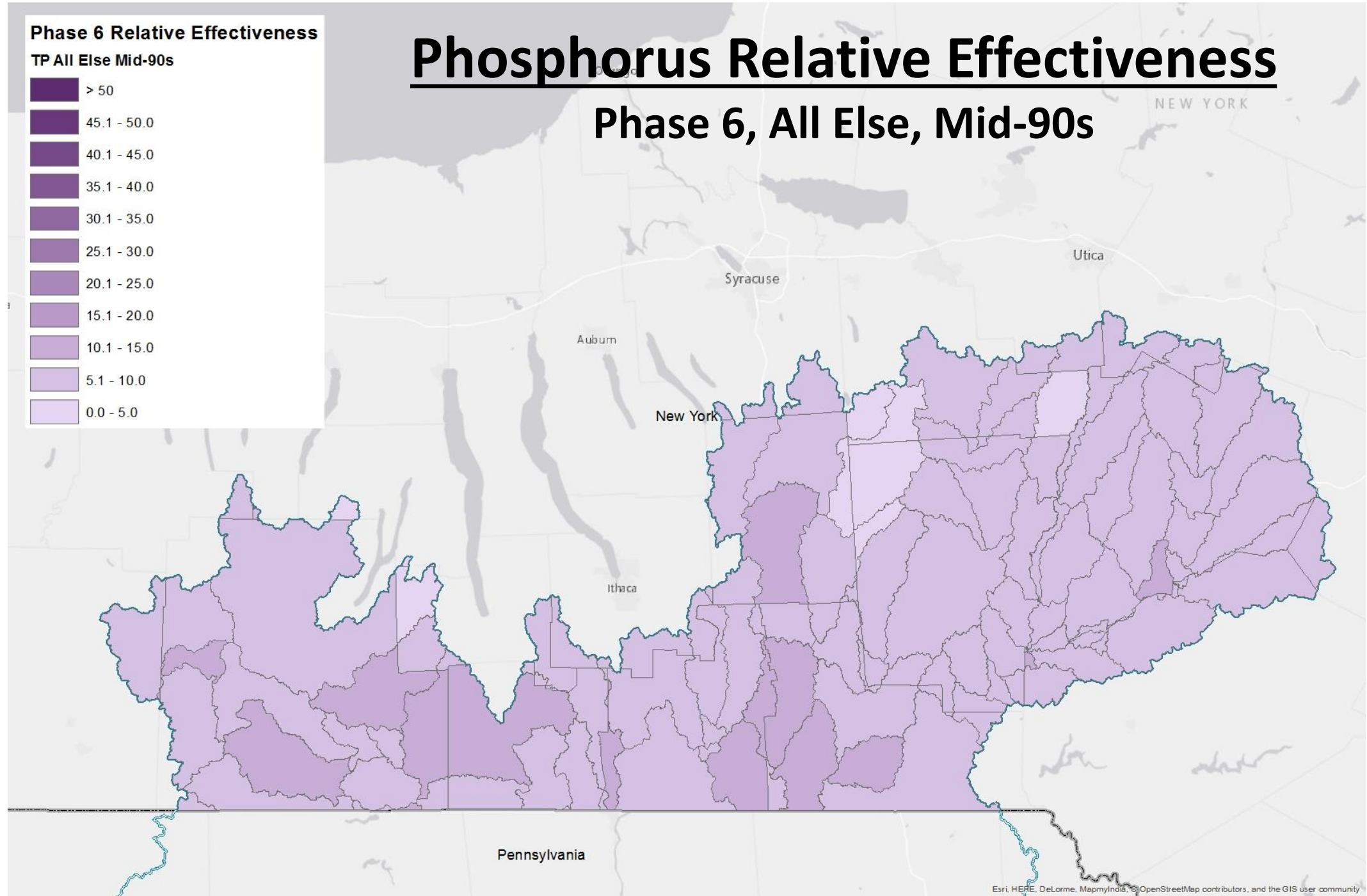
Phase 6 Relative Effectiveness

TP All Else Mid-90s



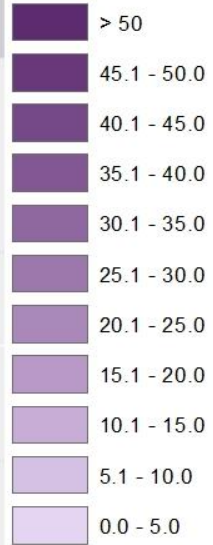
Phosphorus Relative Effectiveness

Phase 6, All Else, Mid-90s



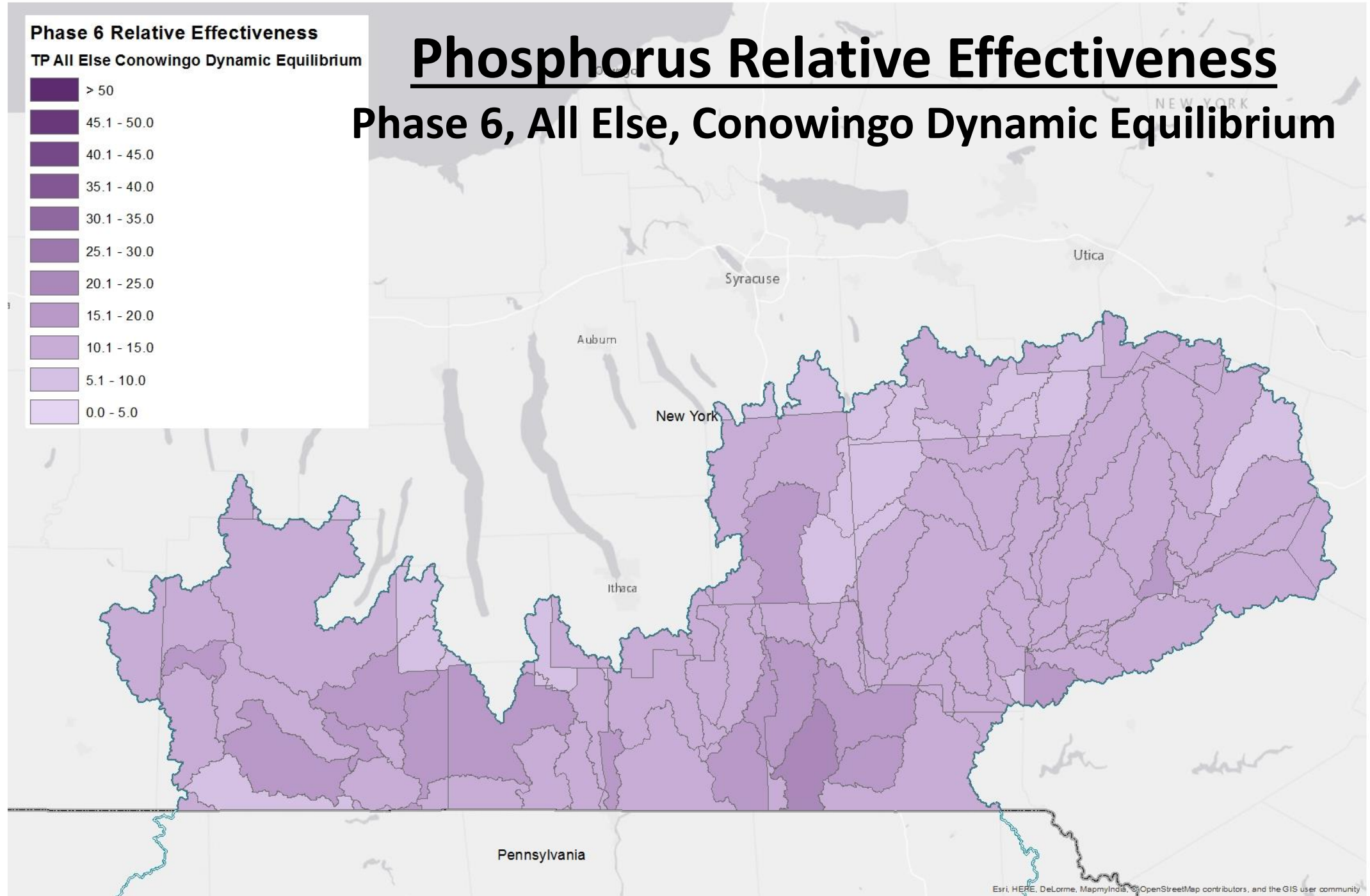
Phase 6 Relative Effectiveness

TP All Else Conowingo Dynamic Equilibrium



Phosphorus Relative Effectiveness

Phase 6, All Else, Conowingo Dynamic Equilibrium



DC Draft Phase III WIP Planning Targets + Reference Loads

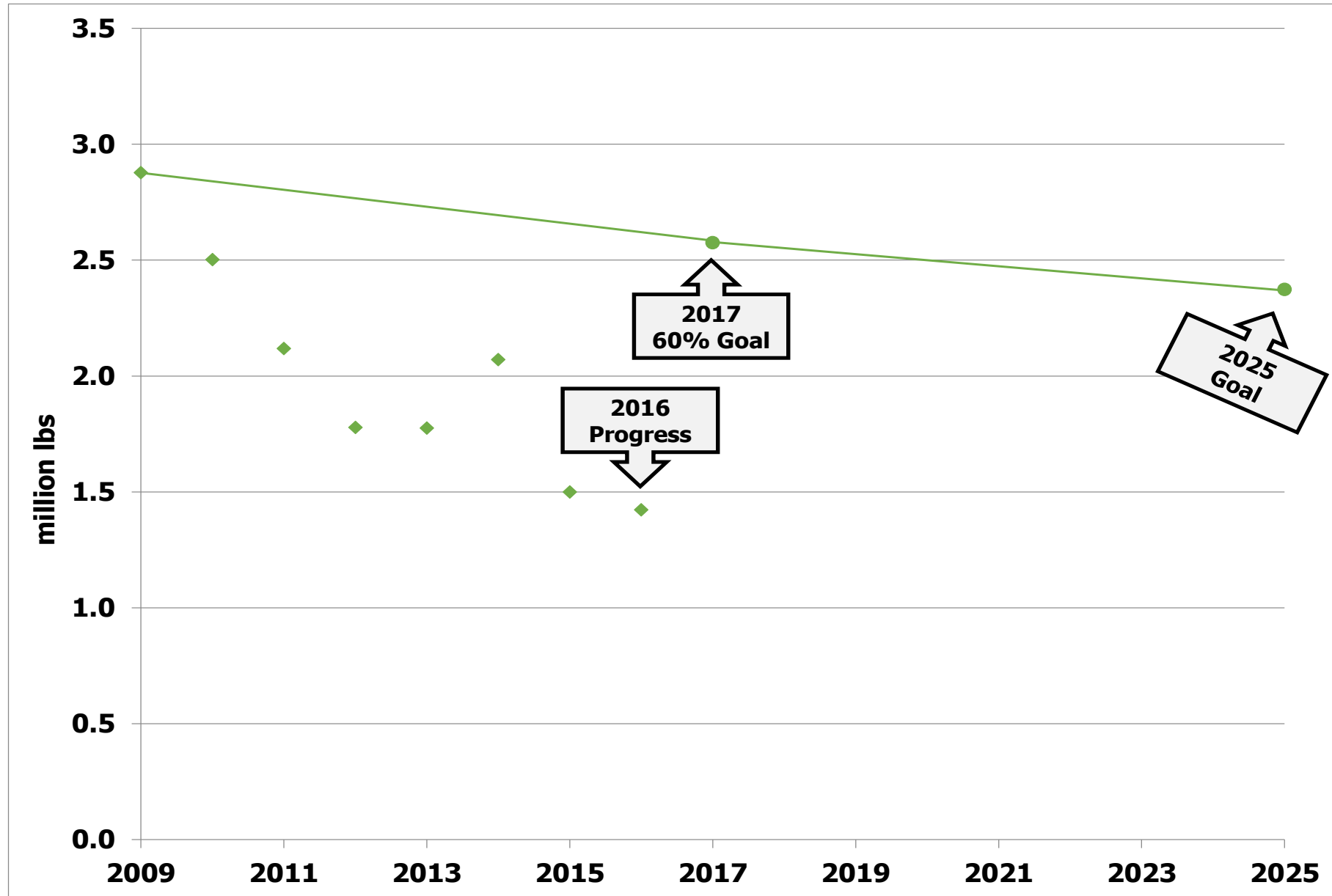
Nitrogen Load

	No-Action (M lbs)	E3 (M lbs)	2013 Progress (M lbs)	Phase II WIP (reference) (M lbs)	Draft Phase III WIP Planning Target (M lbs)
DC Potomac	8.66	1.51	1.75	2.43	2.25

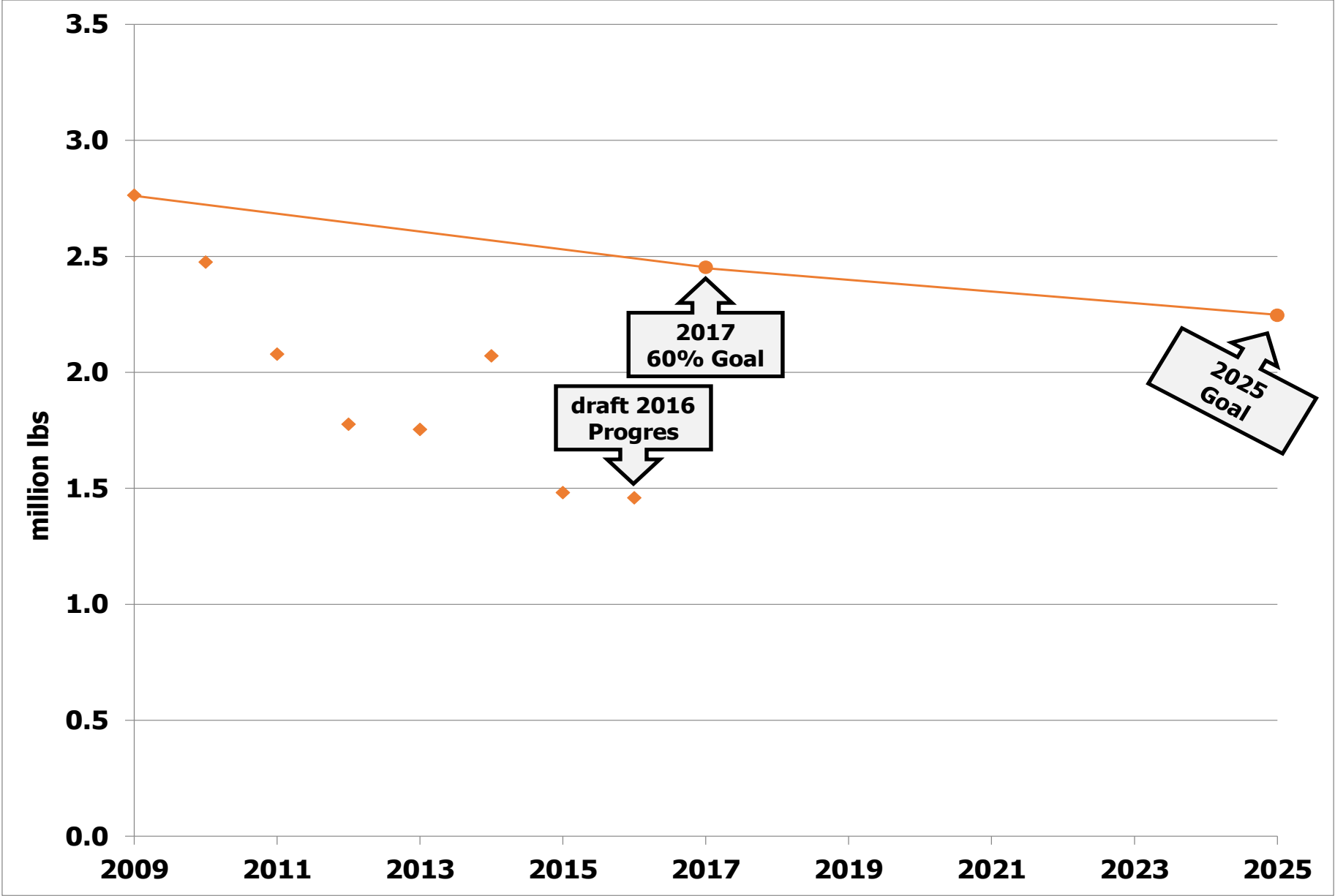
Phosphorus Load

	No-Action (M lbs)	E3 (M lbs)	2013 Progress (M lbs)	Phase II WIP (reference) (M lbs)	Draft Phase III WIP Planning Target (M lbs)
DC Potomac	1.444	0.056	0.062	0.143	0.120

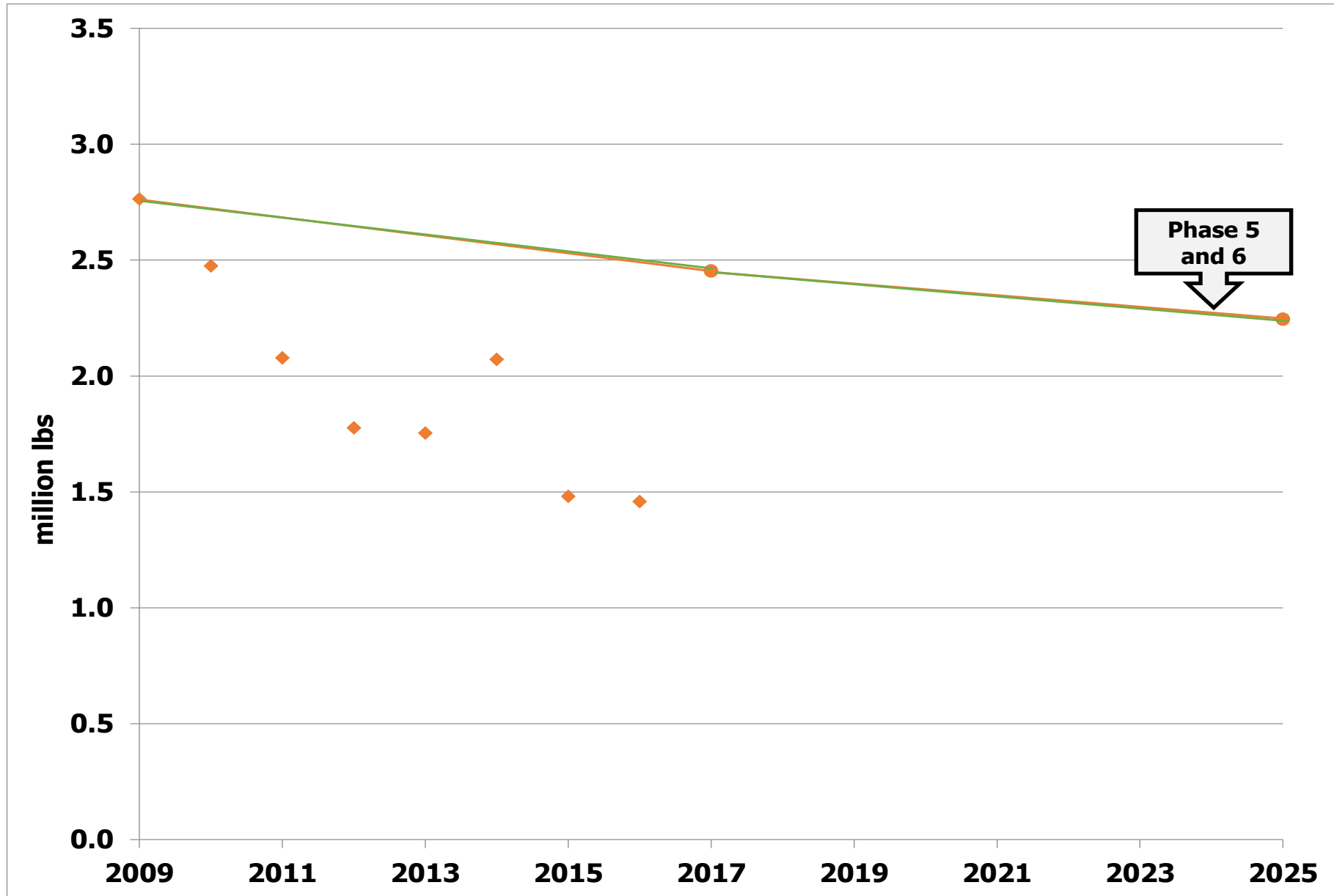
DC Nitrogen Loads-Goals, Phase 5.3.2



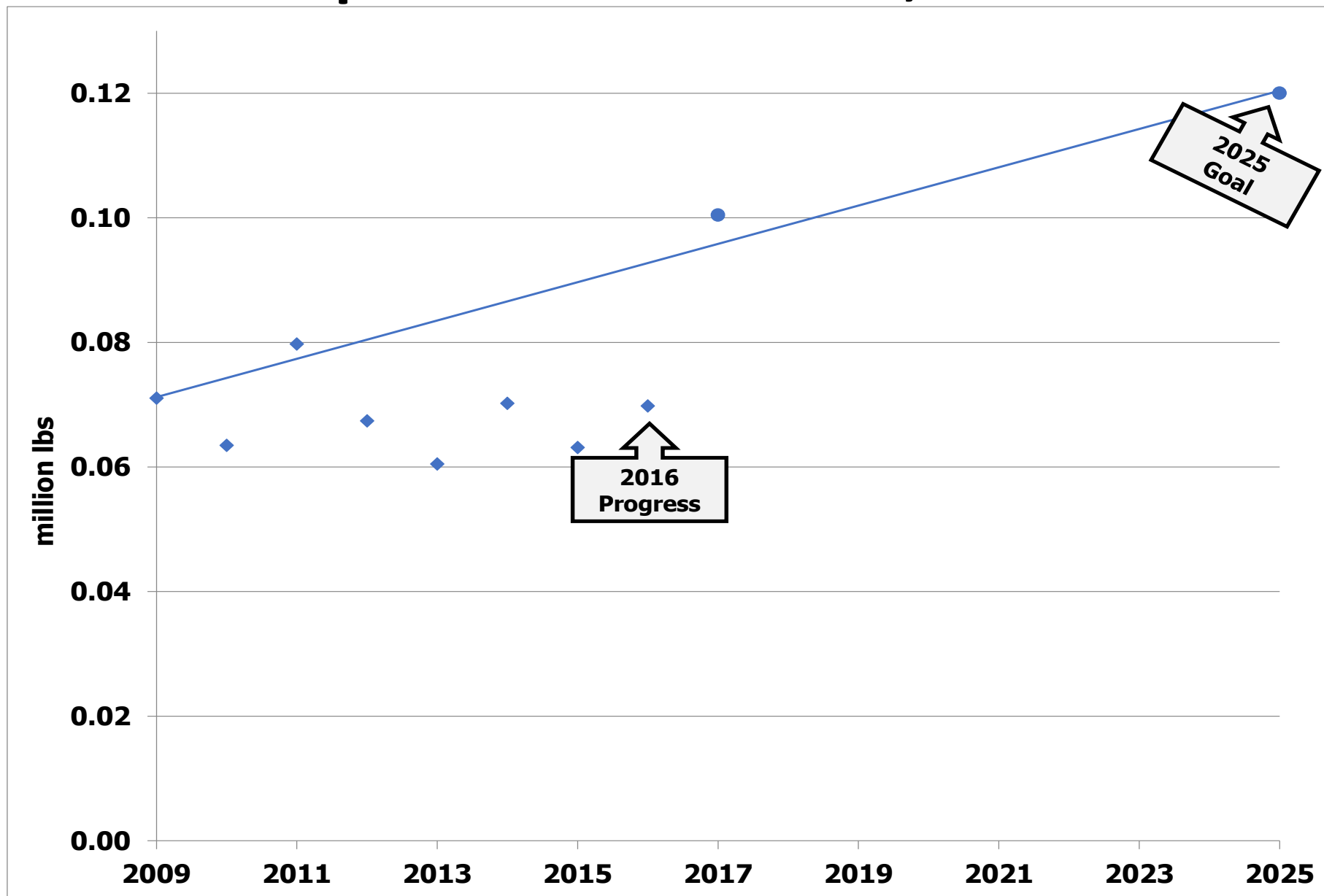
DC Nitrogen Loads-Goals, Phase 6



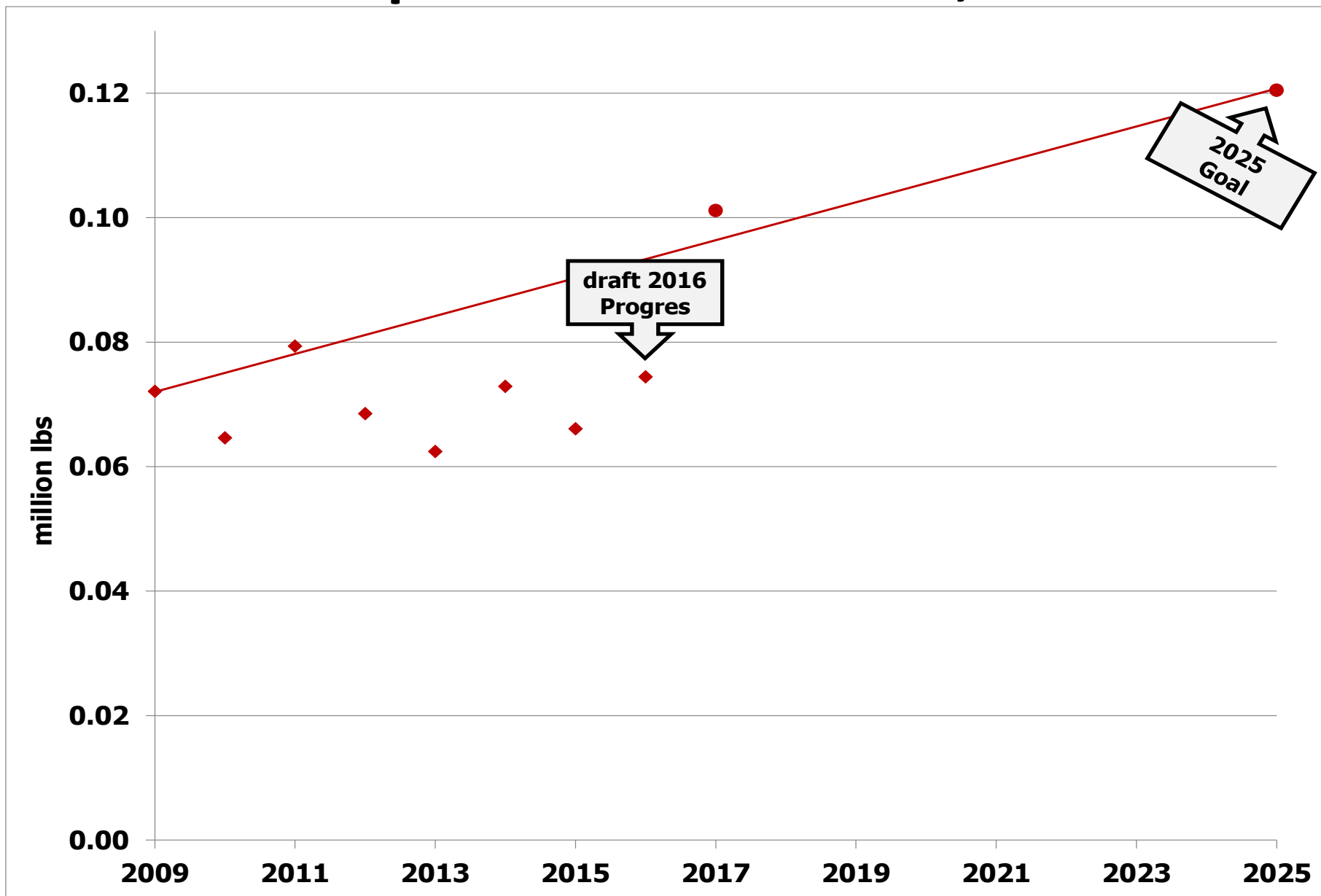
DC Nitrogen Change in LOE



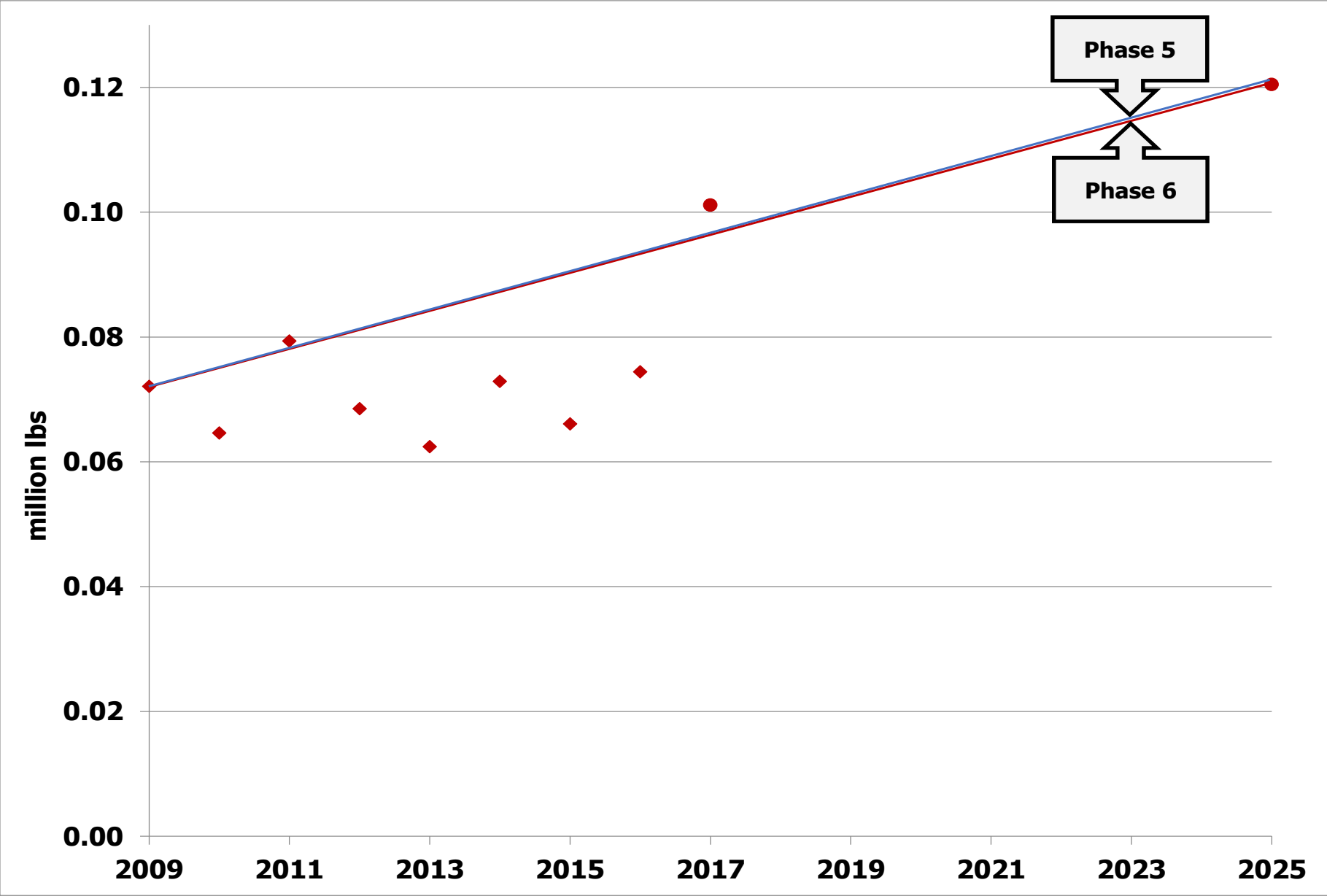
DC Phosphorus Loads-Goals, Phase 5.3.2



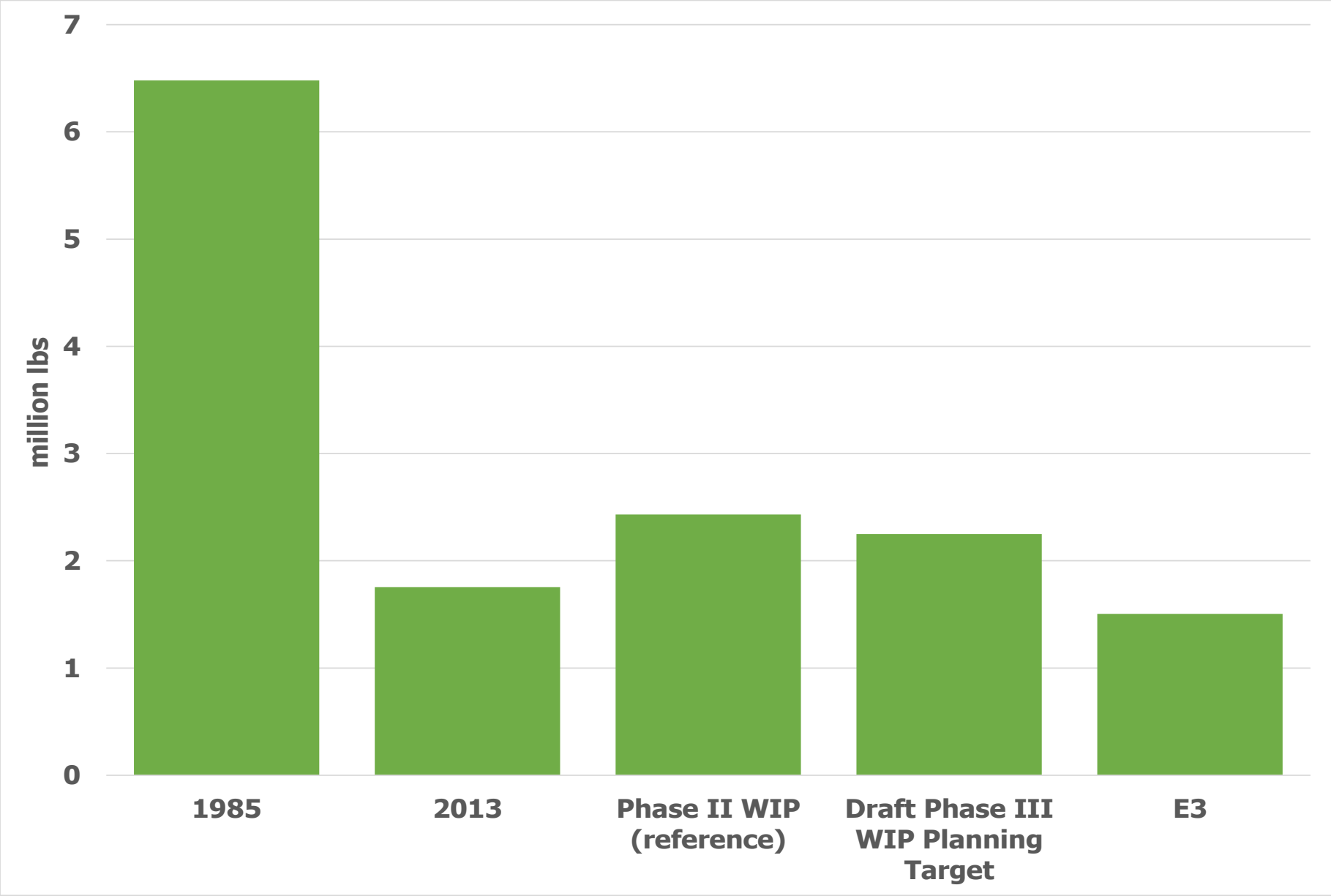
DC Phosphorus Loads-Goals, Phase 6



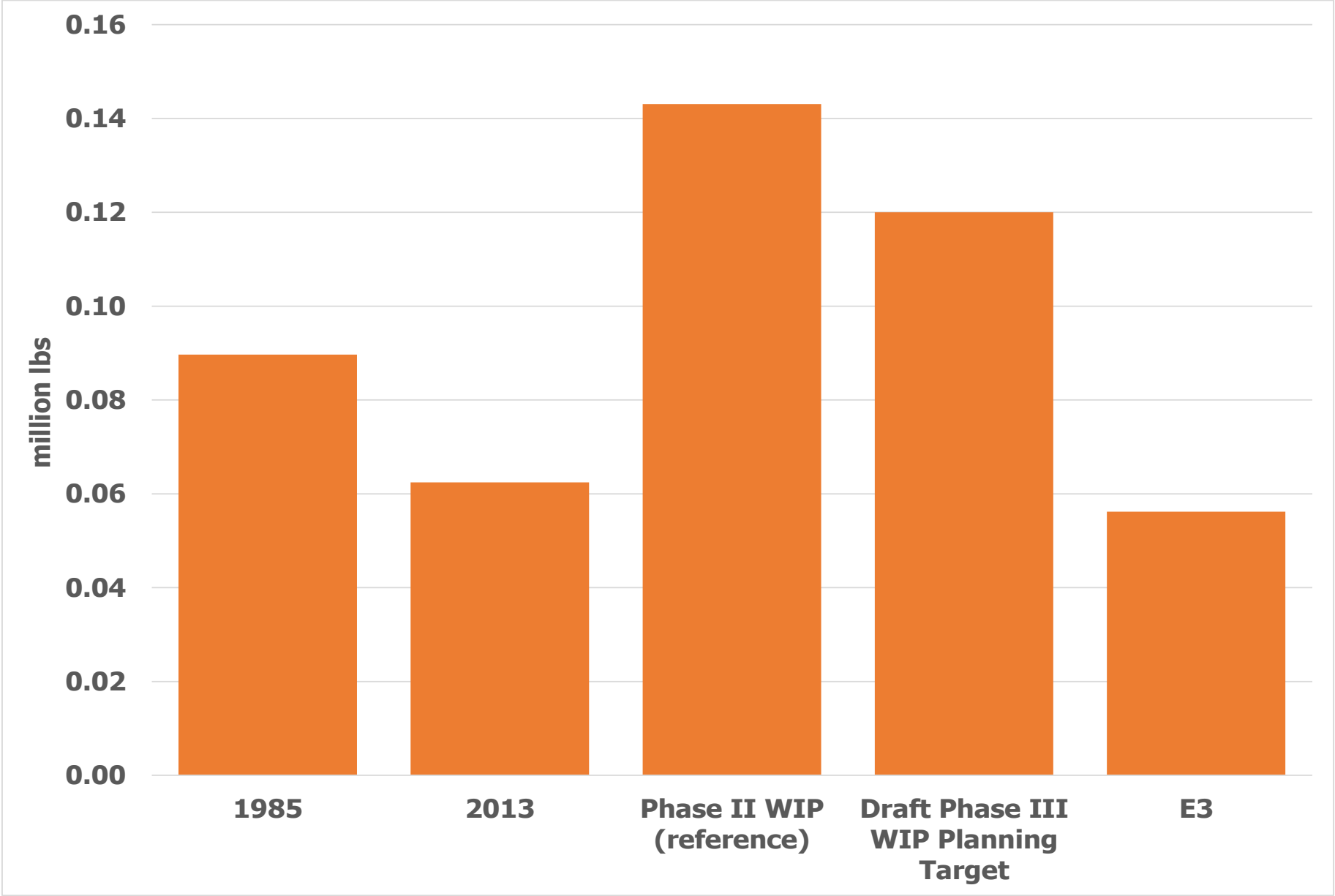
DC Phosphorus Change in LOE



DC Nitrogen Loads, Reference Scenarios, and Target

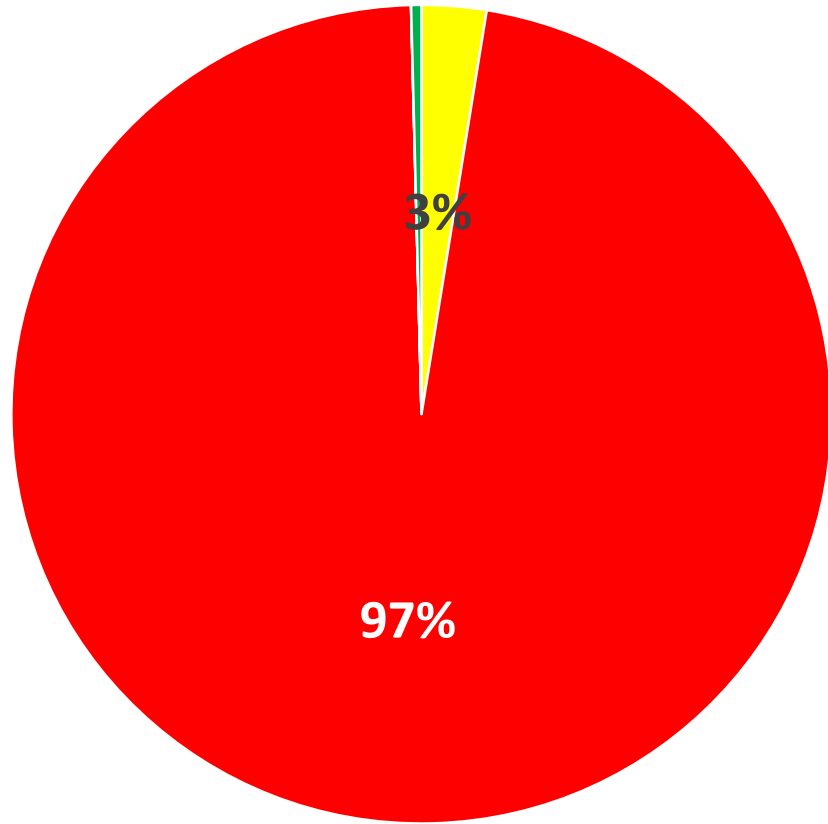


DC Phosphorus Loads, Reference Scenarios, and Target

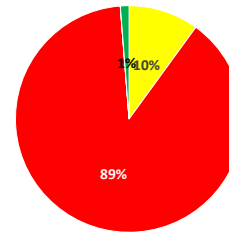


DC Nitrogen Loads and Target

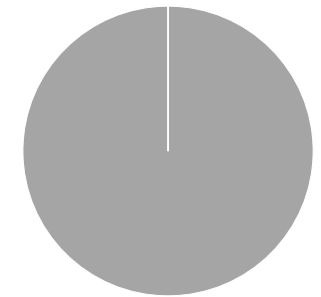
■ Agriculture ■ Developed ■ Wastewater ■ Septic ■ Natural



1985



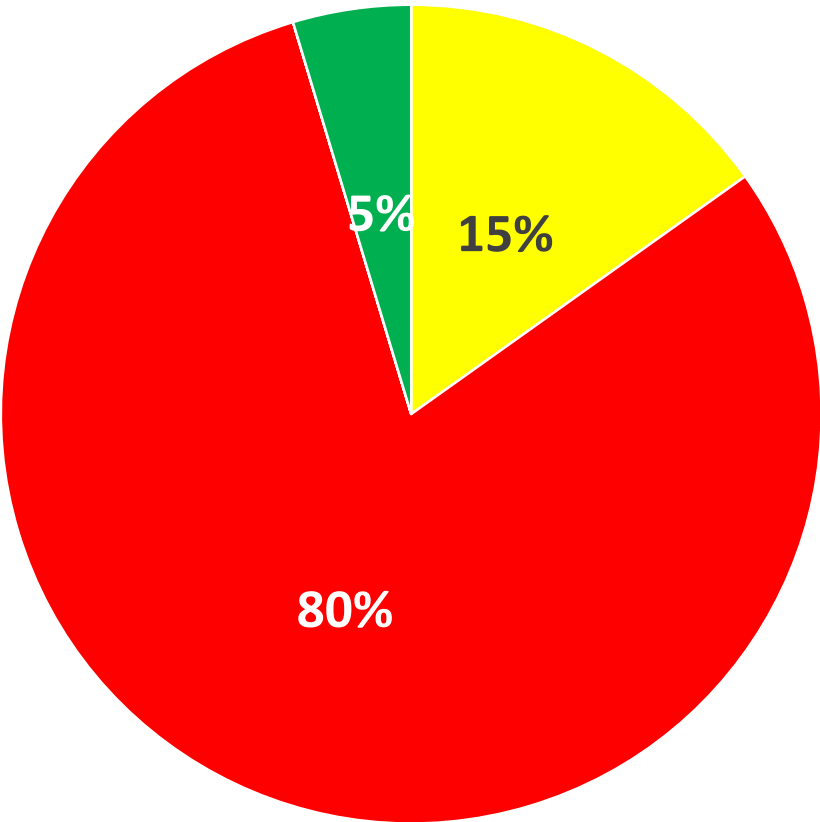
2013



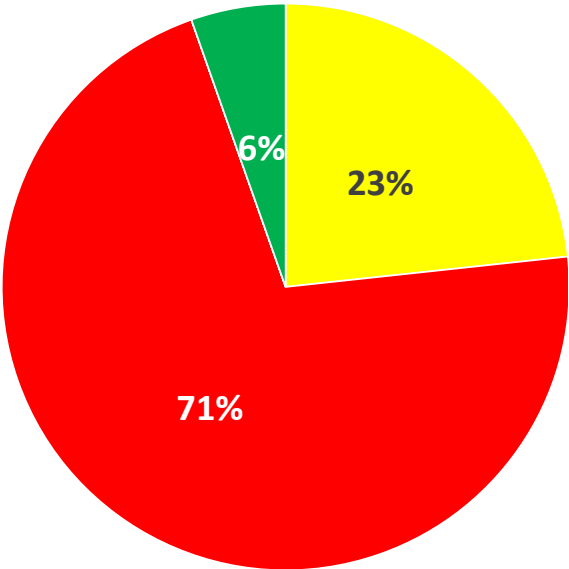
Draft Phase III WIP
Planning Target

DC Phosphorus Loads and Target

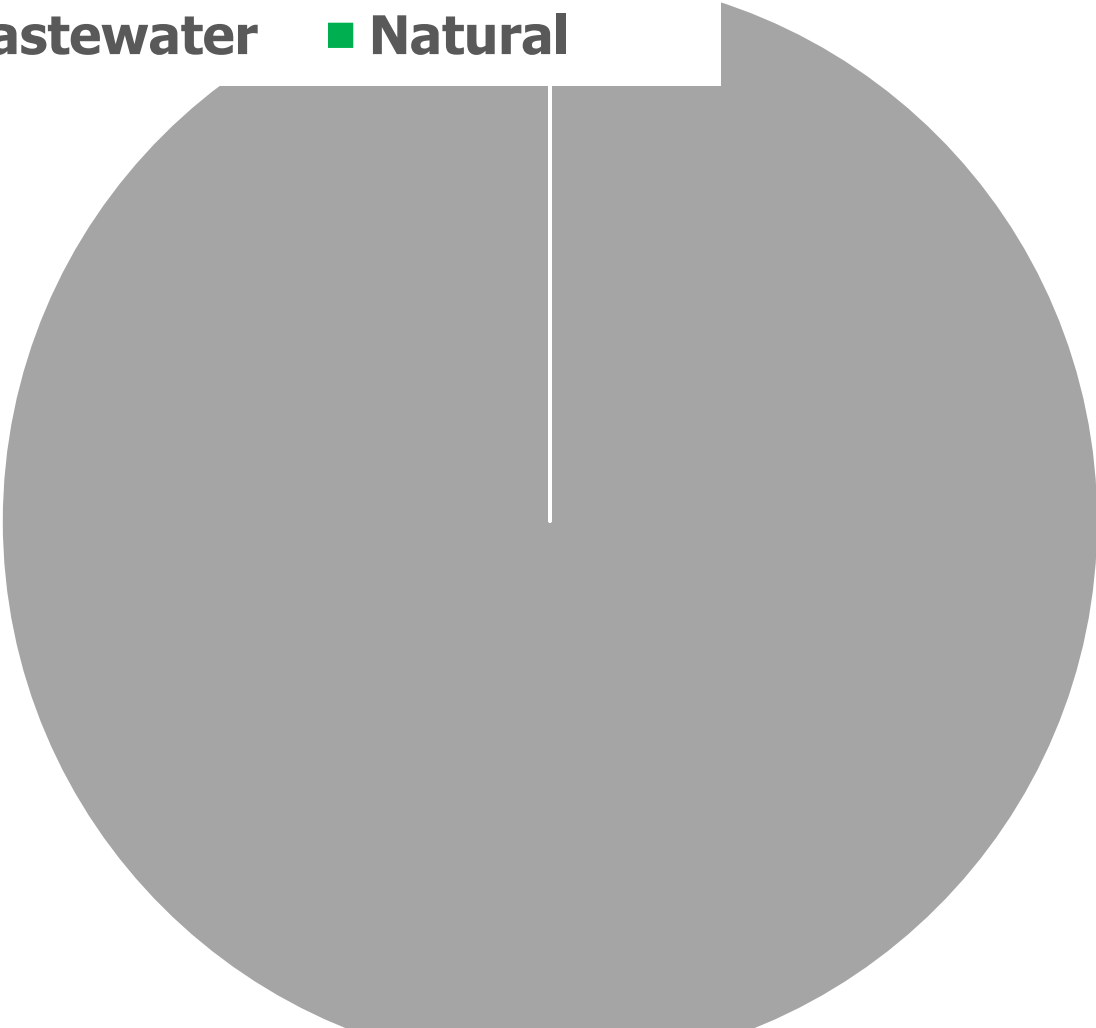
■ Agriculture ■ Developed ■ Wastewater ■ Natural



1985



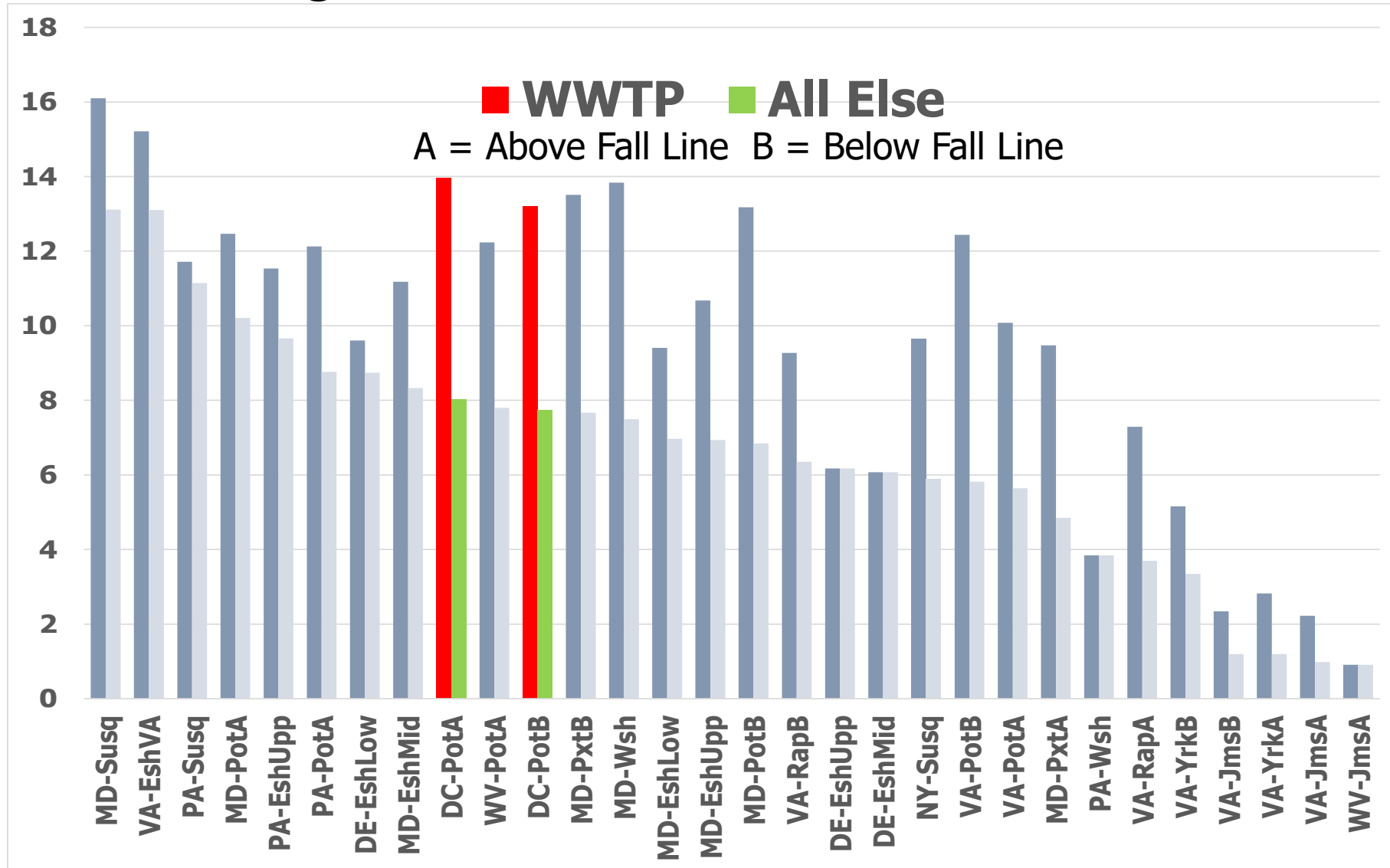
2013



Draft Phase III WIP
Planning Target

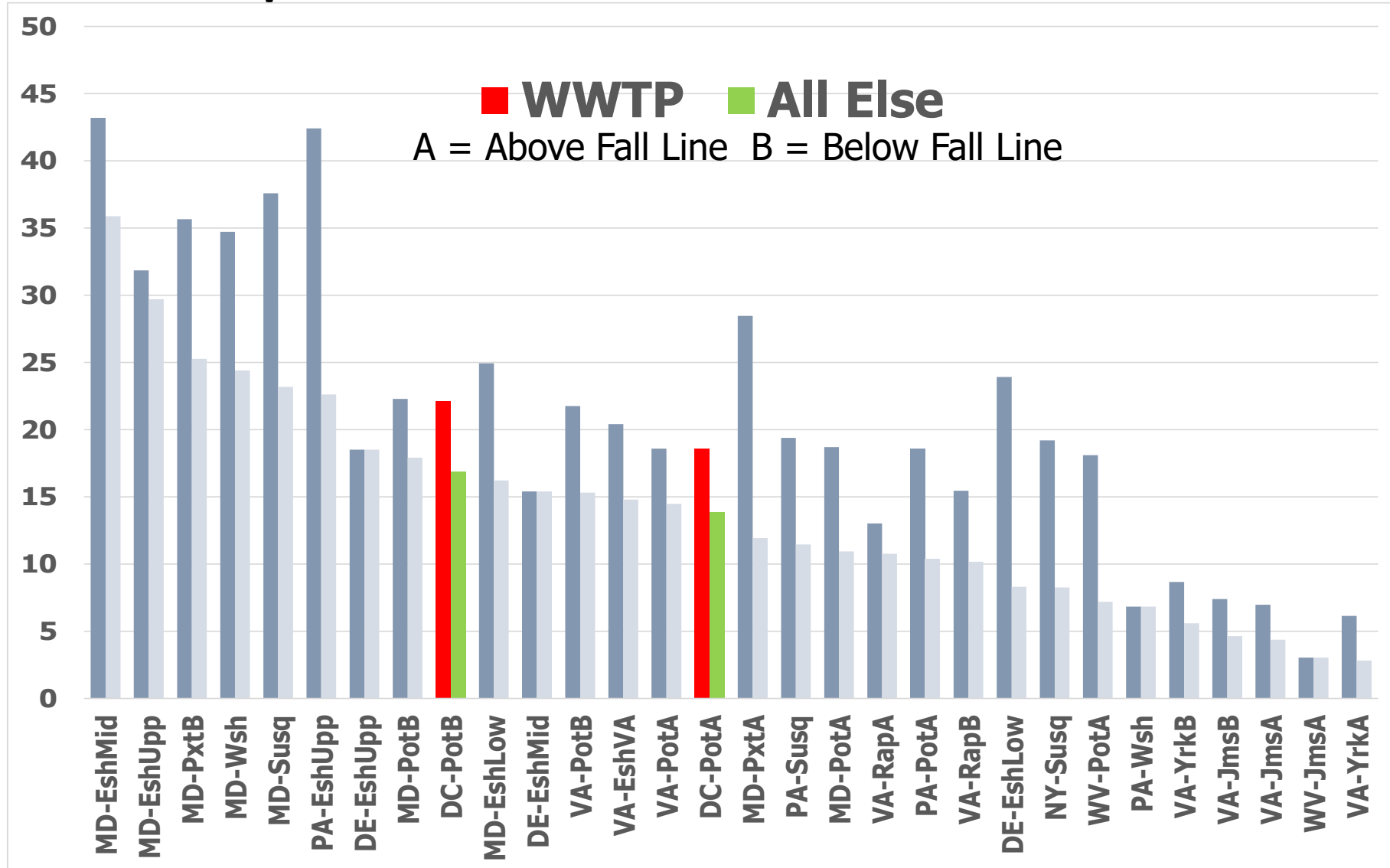
Nitrogen Relative Effectiveness

Effect of Nitrogen Load Reduction on WQ Standard Attainment



Phosphorus Relative Effectiveness

Effect of Phosphorus Load Reduction on WQ Standard Attainment

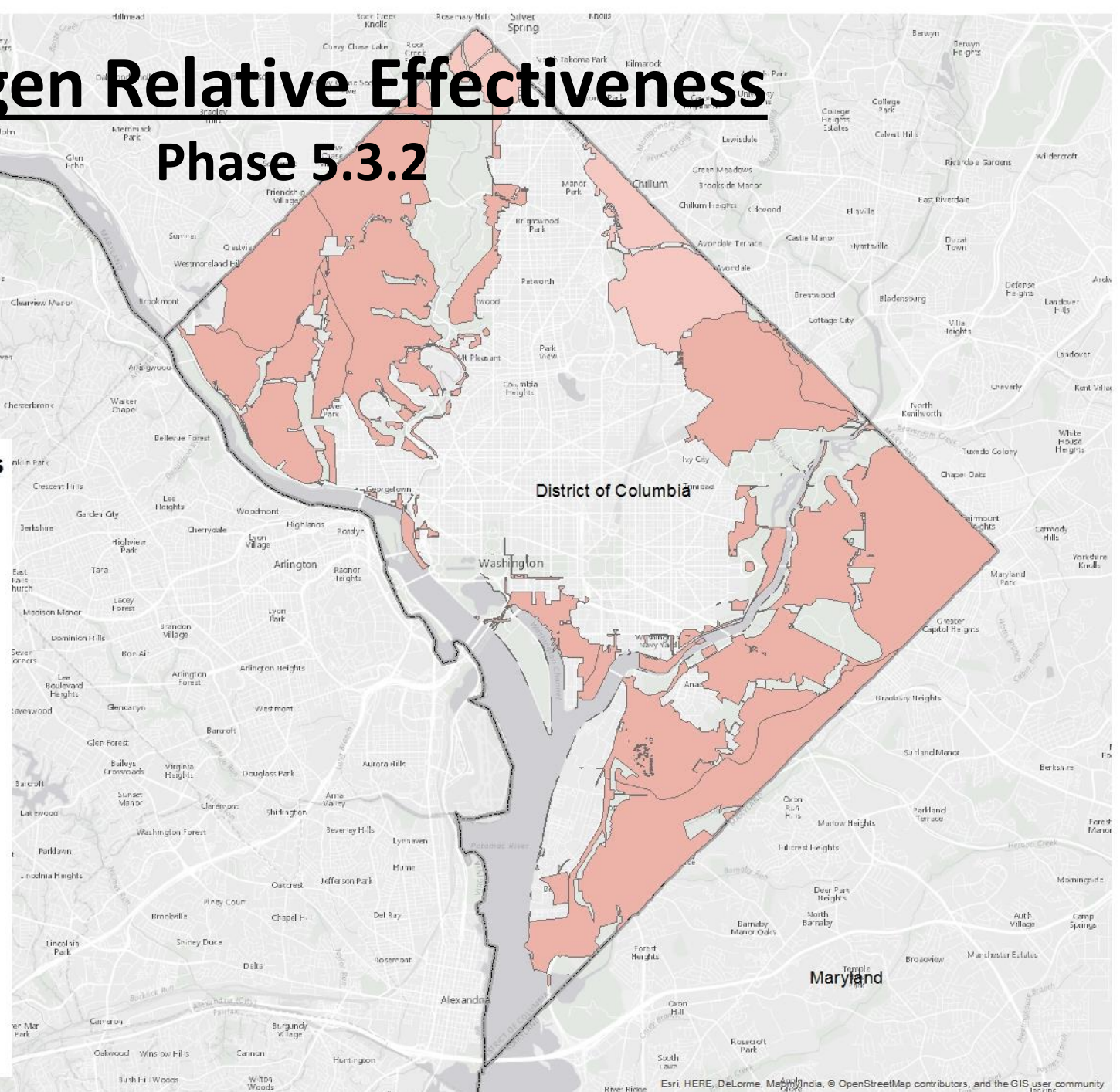
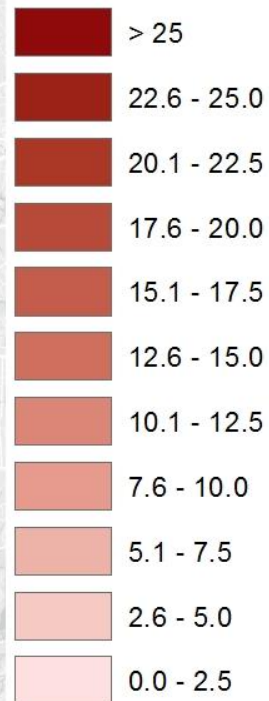


Nitrogen Relative Effectiveness

Phase 5.3.2

Phase 5.3.2 Relative Effectiveness

TN - P5.3.2

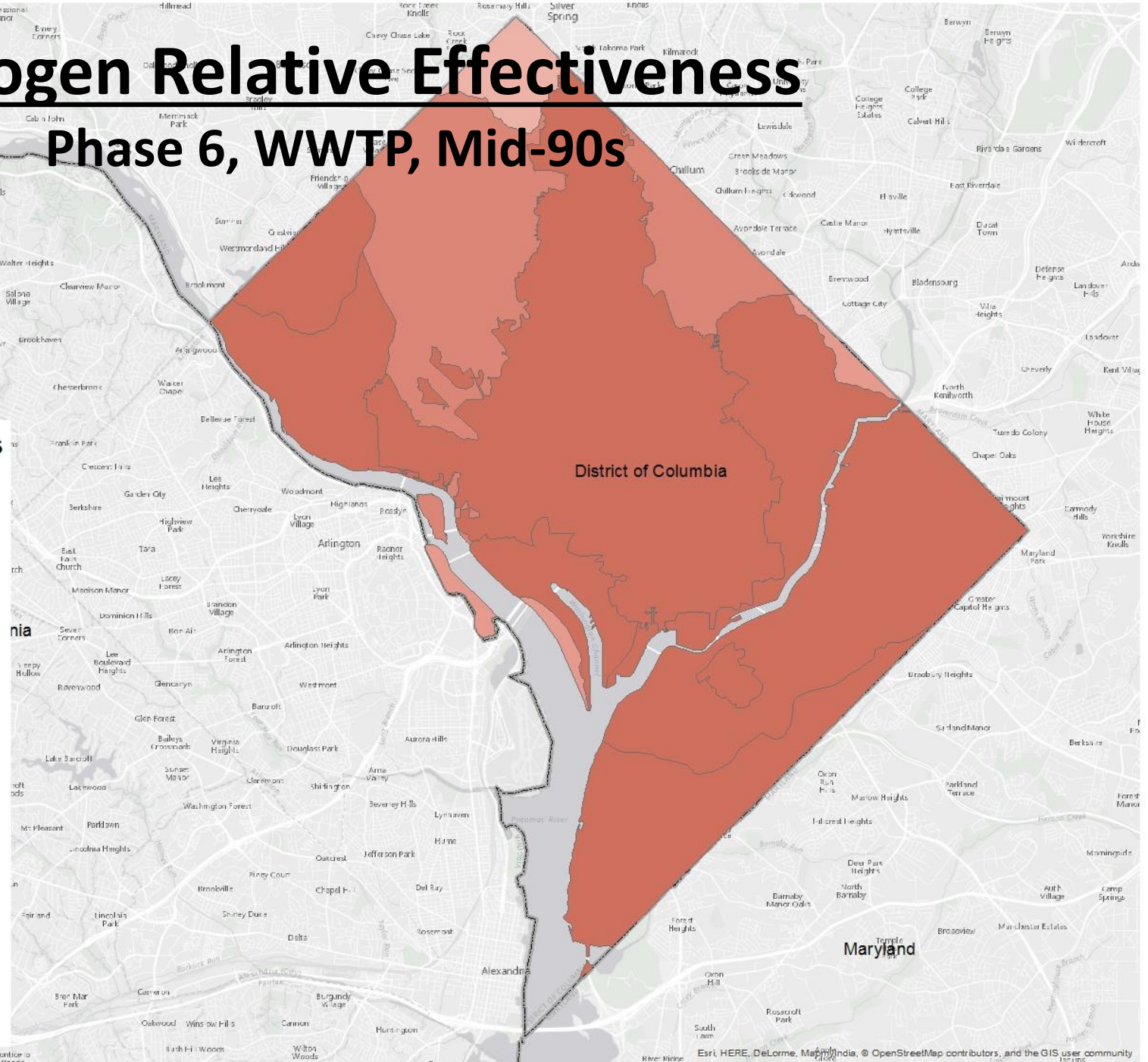
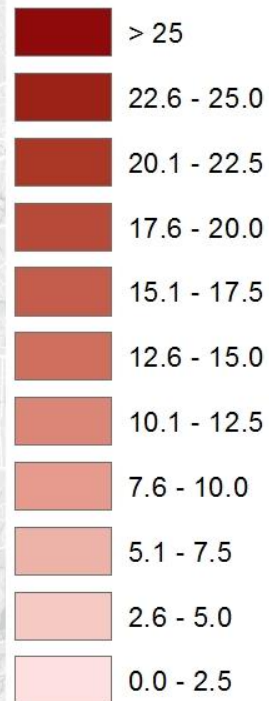


Nitrogen Relative Effectiveness

Phase 6, WWTP, Mid-90s

Phase 6 Relative Effectiveness

TN WWTP Mid-90s

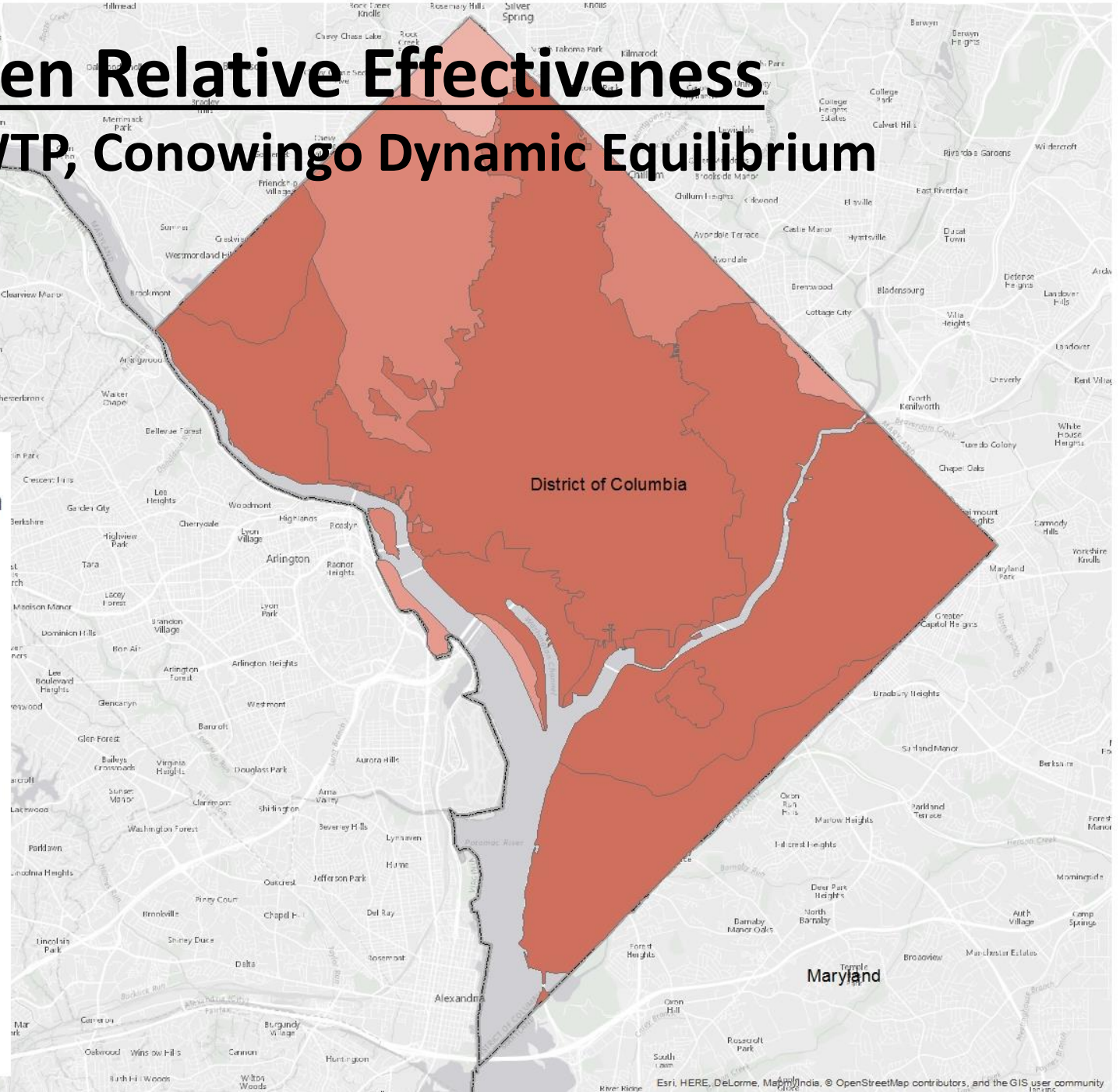
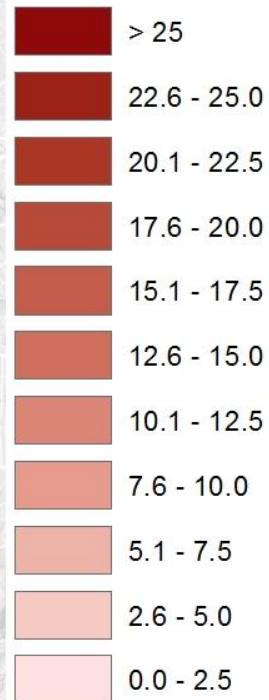


Nitrogen Relative Effectiveness

Phase 6, WWTP, Conowingo Dynamic Equilibrium

Phase 6 Relative Effectiveness

TN WWTP Conowingo Dynamic Equilibrium

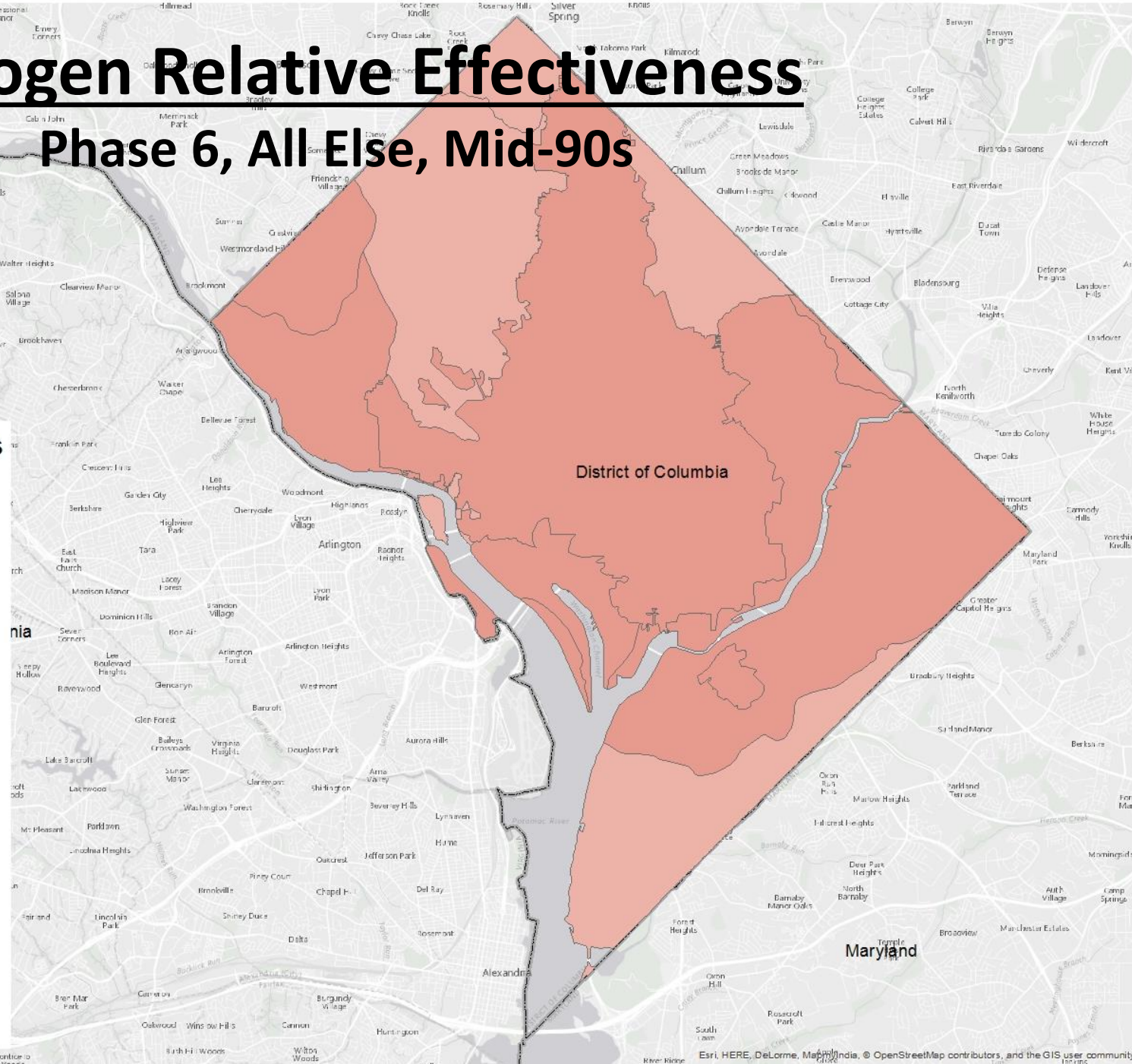
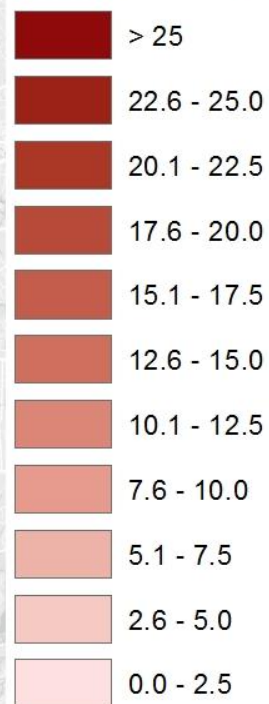


Nitrogen Relative Effectiveness

Phase 6, All Else, Mid-90s

Phase 6 Relative Effectiveness

TN All Else Mid-90s

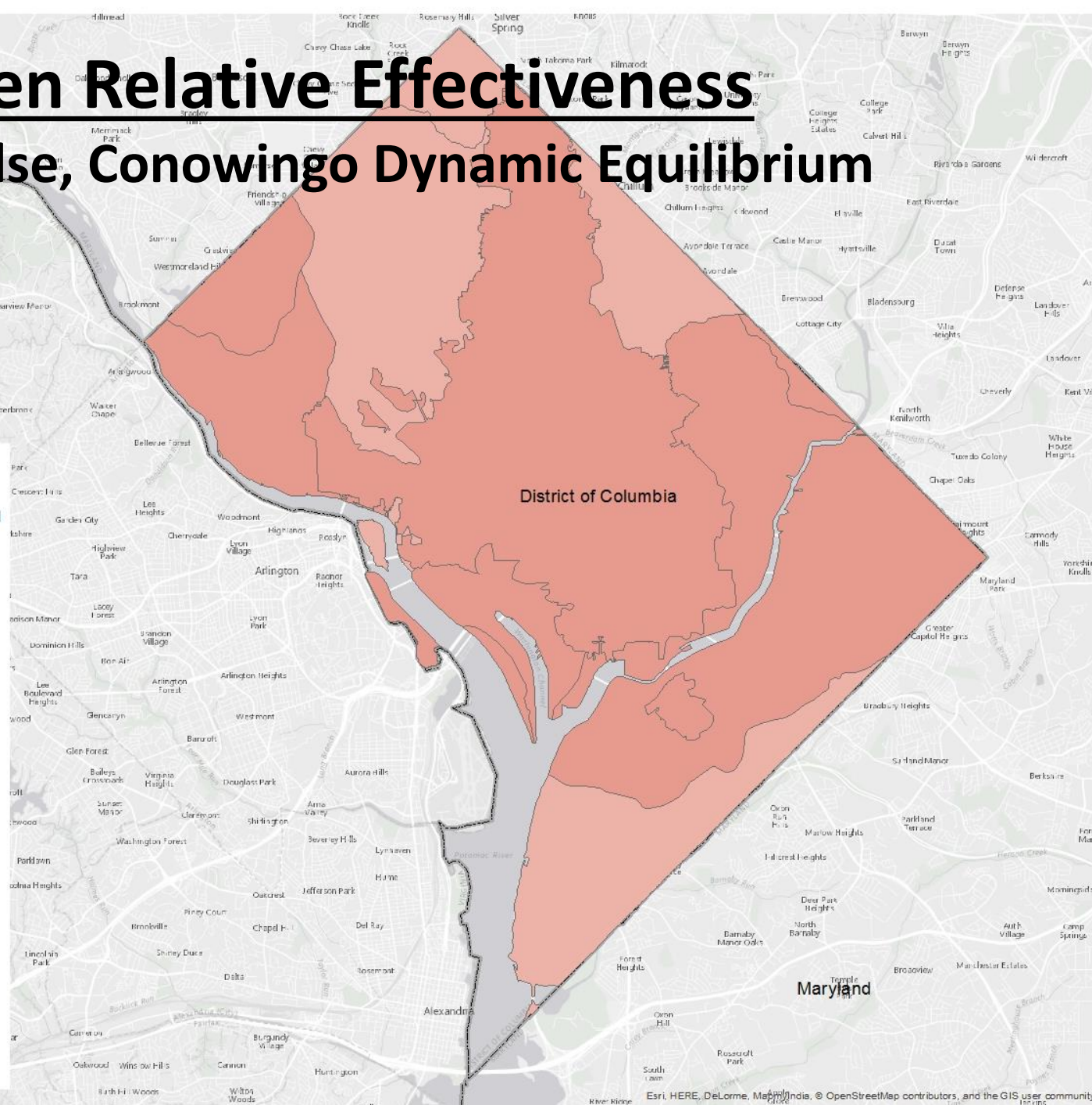
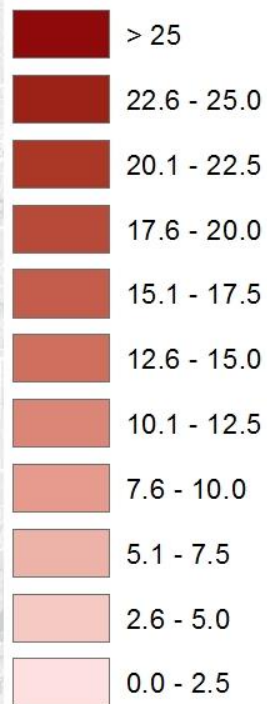


Nitrogen Relative Effectiveness

Phase 6, All Else, Conowingo Dynamic Equilibrium

Phase 6 Relative Effectiveness

TN All Else Conowingo Dynamic Equilibrium

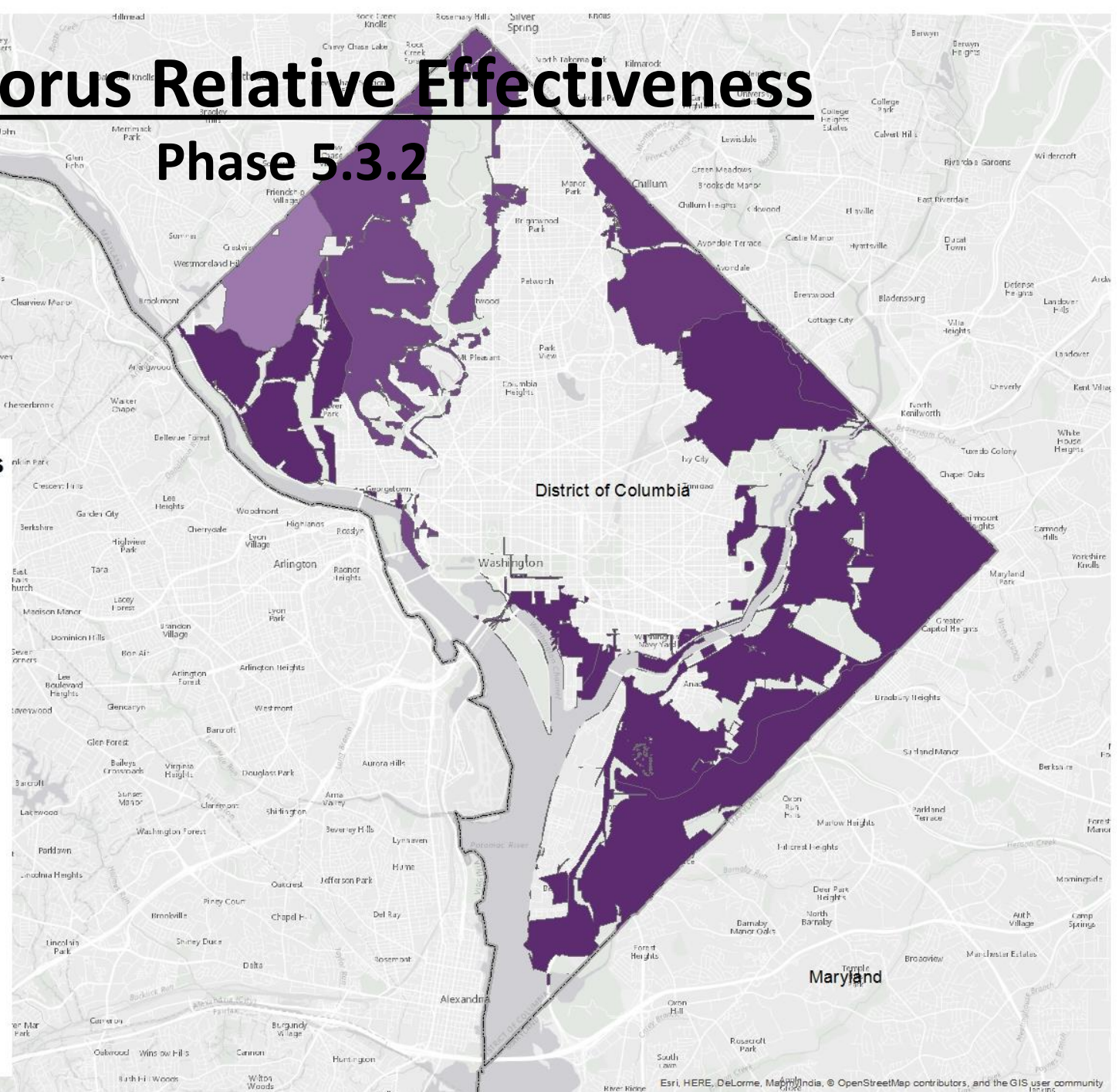
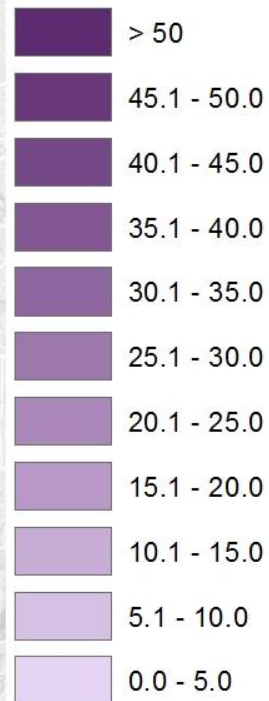


Phosphorus Relative Effectiveness

Phase 5.3.2

Phase 5.3.2 Relative Effectiveness

TP - P5.3.2

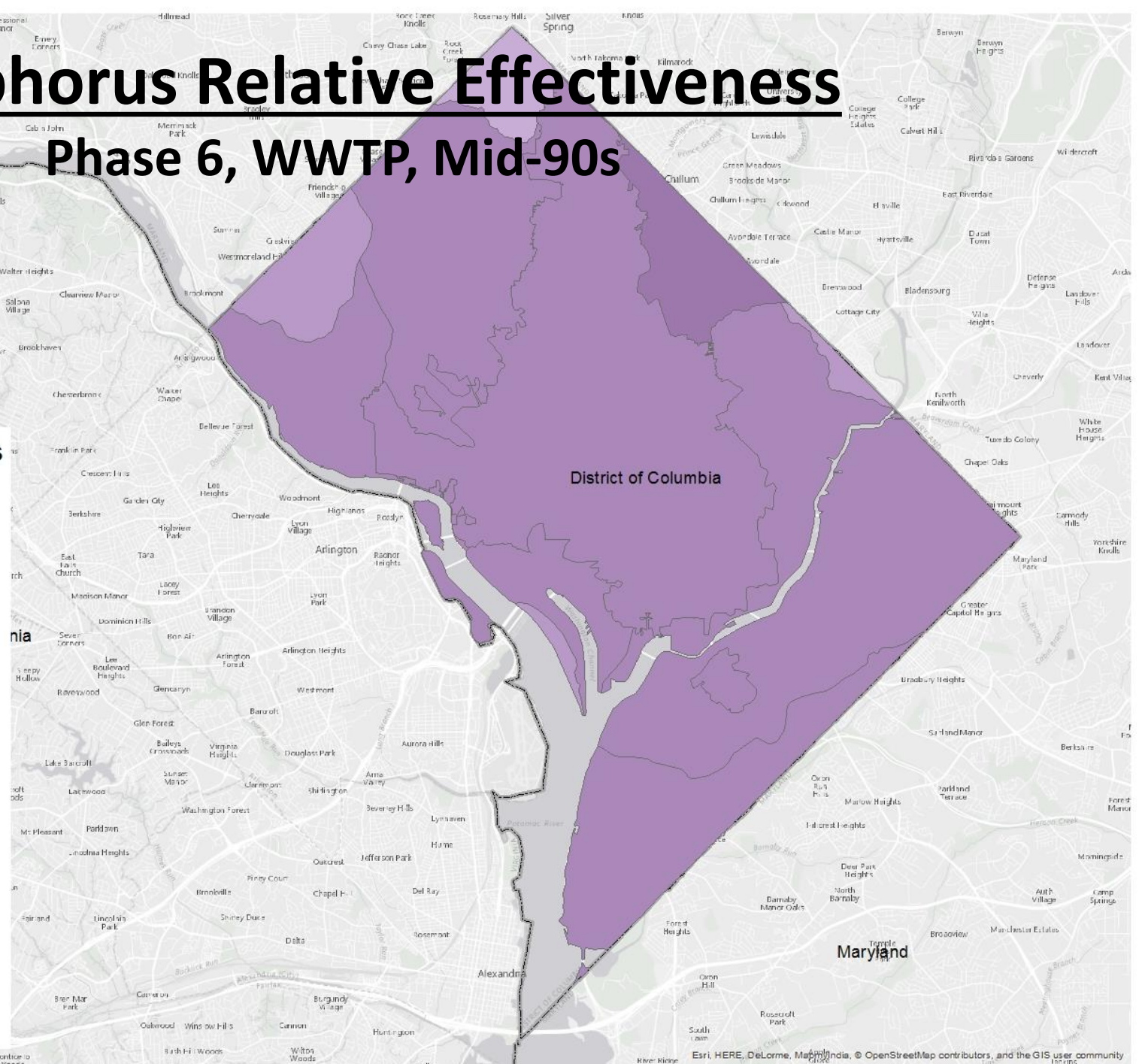
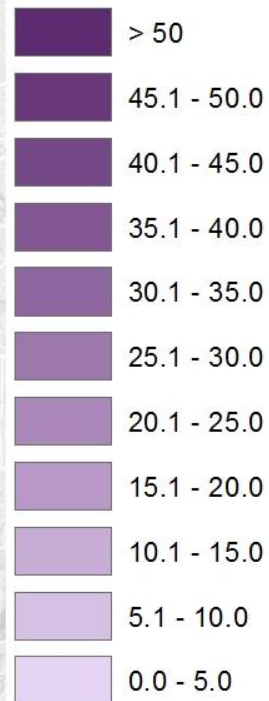


Phosphorus Relative Effectiveness

Phase 6, WWTP, Mid-90s

Phase 6 Relative Effectiveness

TP WWTP Mid-90s

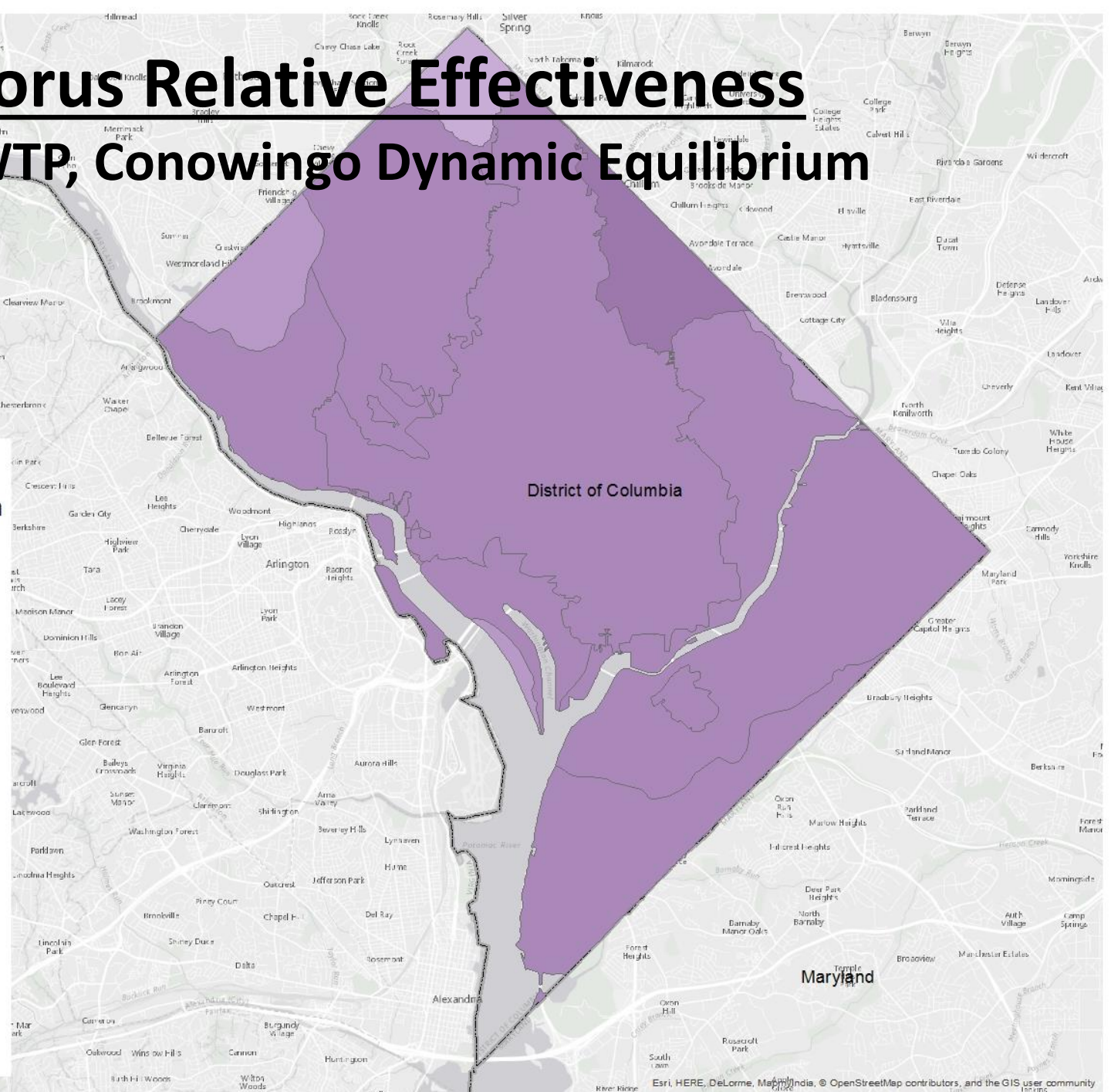
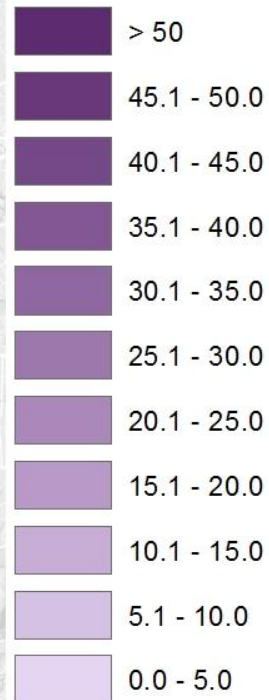


Phosphorus Relative Effectiveness

Phase 6, WWTP, Conowingo Dynamic Equilibrium

Phase 6 Relative Effectiveness

TP WWTP Conowingo Dynamic Equilibrium

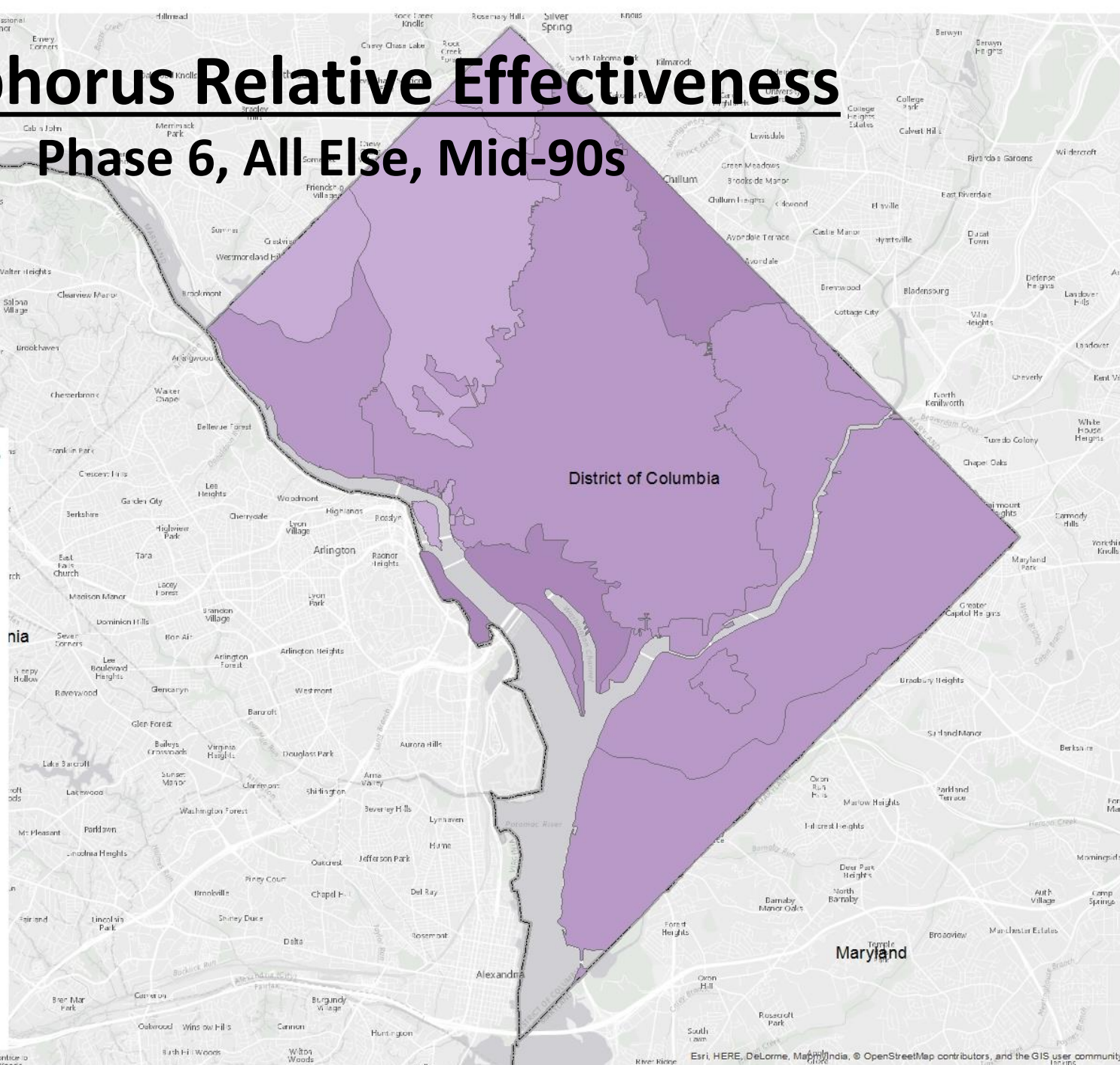
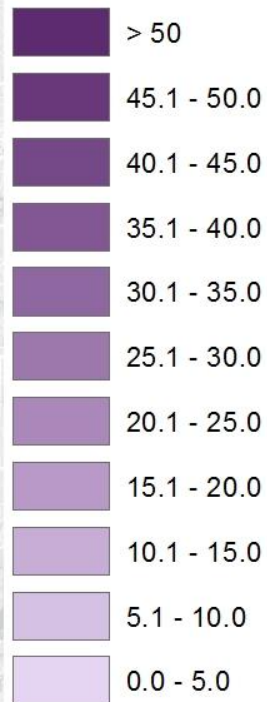


Phosphorus Relative Effectiveness

Phase 6, All Else, Mid-90s

Phase 6 Relative Effectiveness

TP All Else Mid-90s

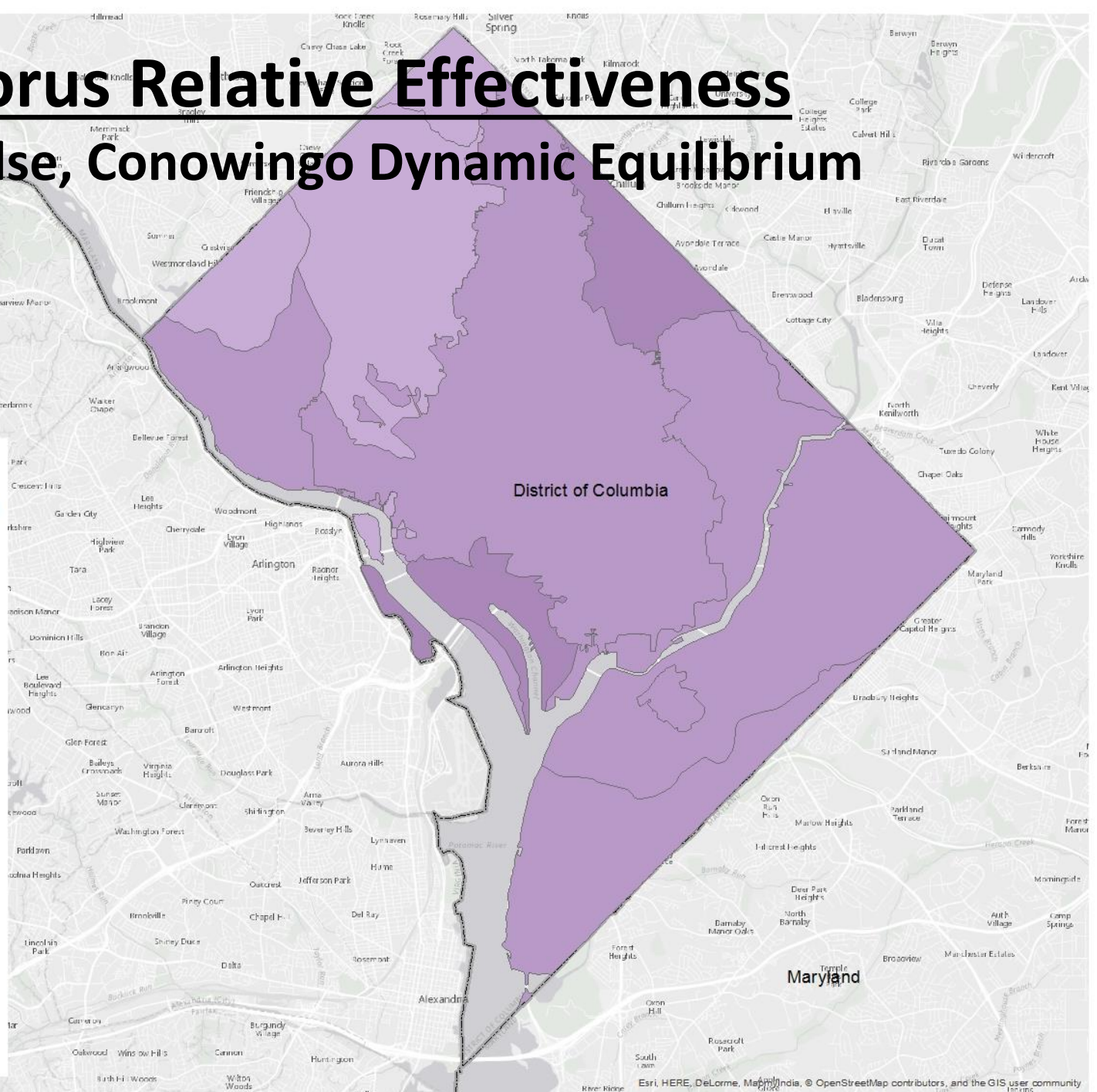
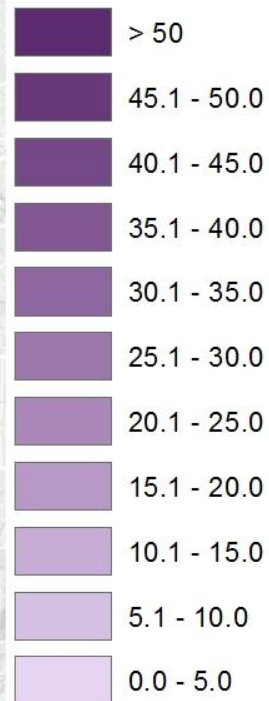


Phosphorus Relative Effectiveness

Phase 6, All Else, Conowingo Dynamic Equilibrium

Phase 6 Relative Effectiveness

TP All Else Conowingo Dynamic Equilibrium



Day Two Requested Policy Decision

Approval of draft Phase III Planning Targets as the starting point for the Partnership's 4-month review process

Proposed Process and Schedule for 4-Month Review Period

**Lucinda Power, U.S. EPA, CBP Water Quality Goal
Implementation Team Coordinator**

PSC Approved Schedule

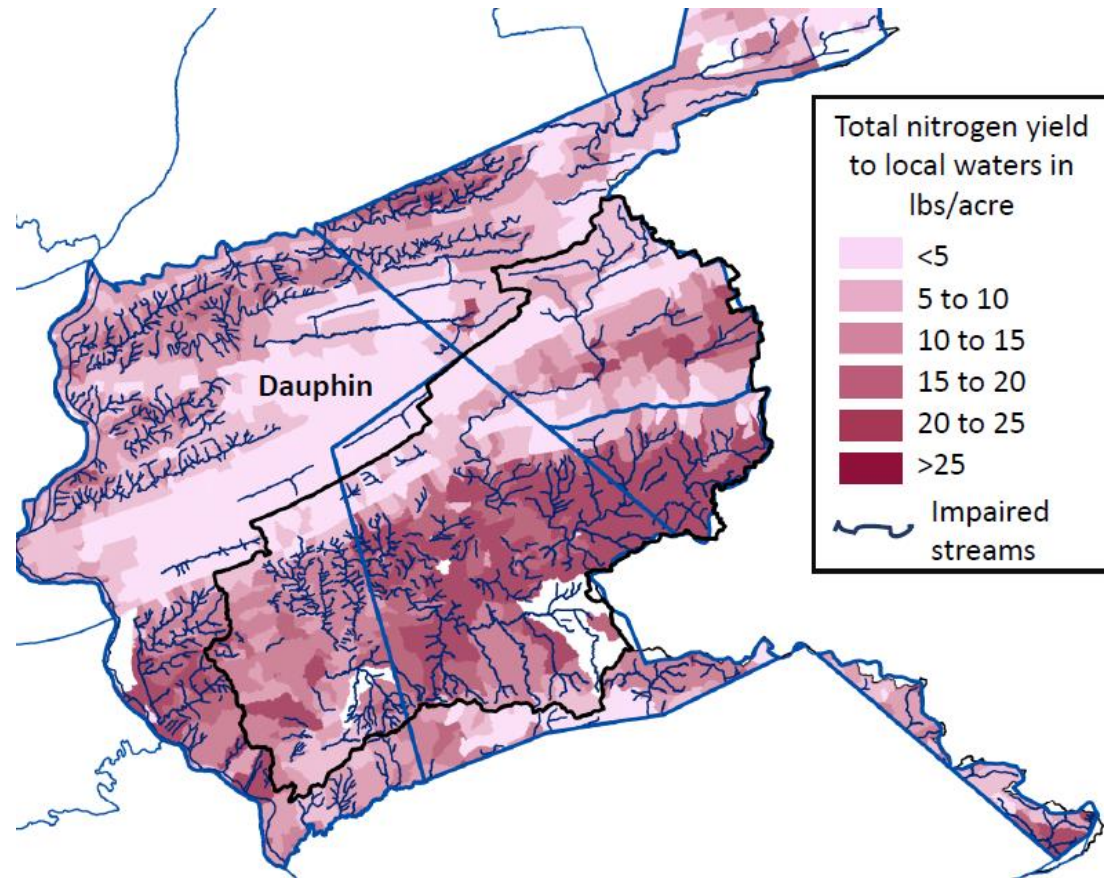
- **December 19-20, 2017:** PSC 2-day retreat and decision making
- **December 22, 2017:** Release of draft Phase III WIP planning targets
- **December 22, 2017 – April 20, 2018:** Partnership's review of the draft Phase III WIP planning targets
- **Late April/Early May 2018:** PSC approval of the final Phase III WIP planning targets with any agreed-to special cases
- **May 7, 2018:** Release of the final Phase III WIP planning targets

During the 4-Month Review Period

- Analyze level of effort to achieve the draft planning targets
- Evaluate effects of accounting for growth, Conowingo infill, and climate change on level of effort
- Assess the need for exchanges of nitrogen and/or phosphorus loads between a jurisdiction's major river basins
- Assess the need for exchanges of nitrogen for phosphorus or phosphorus for nitrogen within a jurisdiction's major river basins
- Determine if any special cases are needed

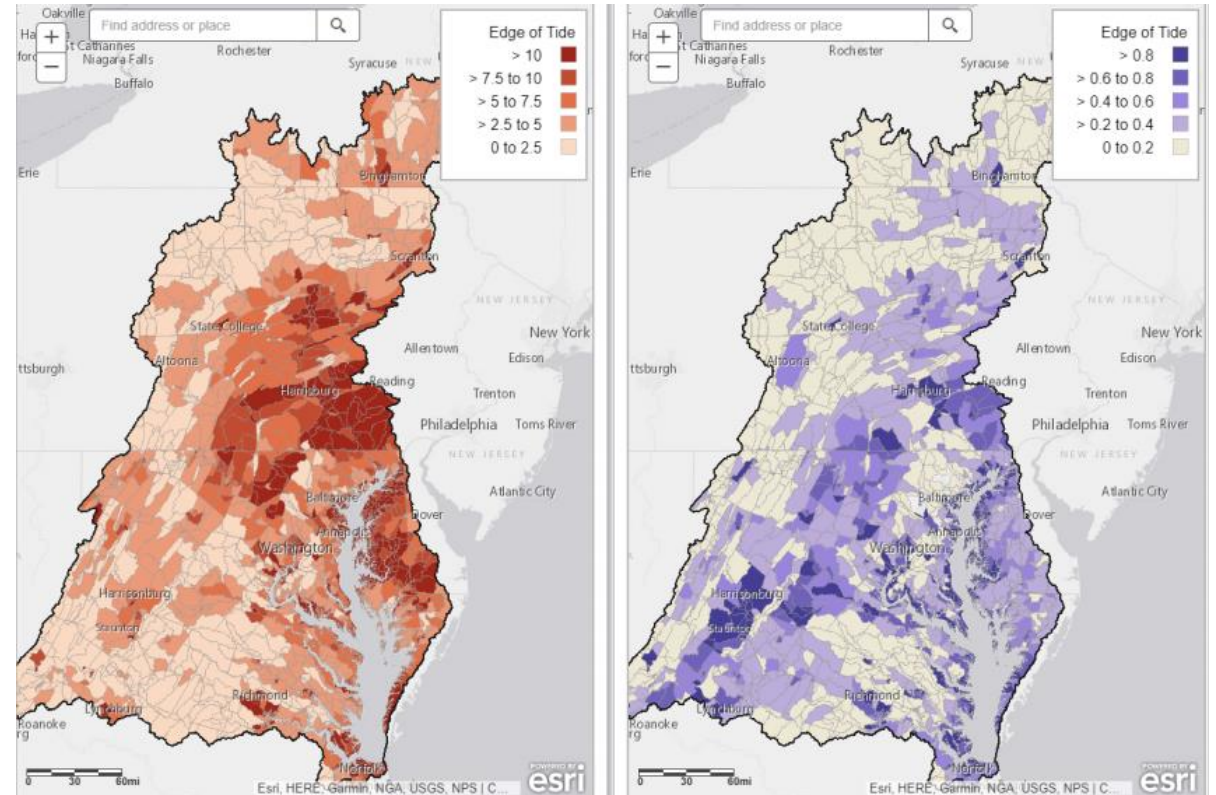
Further Analyses for Consideration

Testing out preliminary development of measurable, local planning goals below the major state-basin level



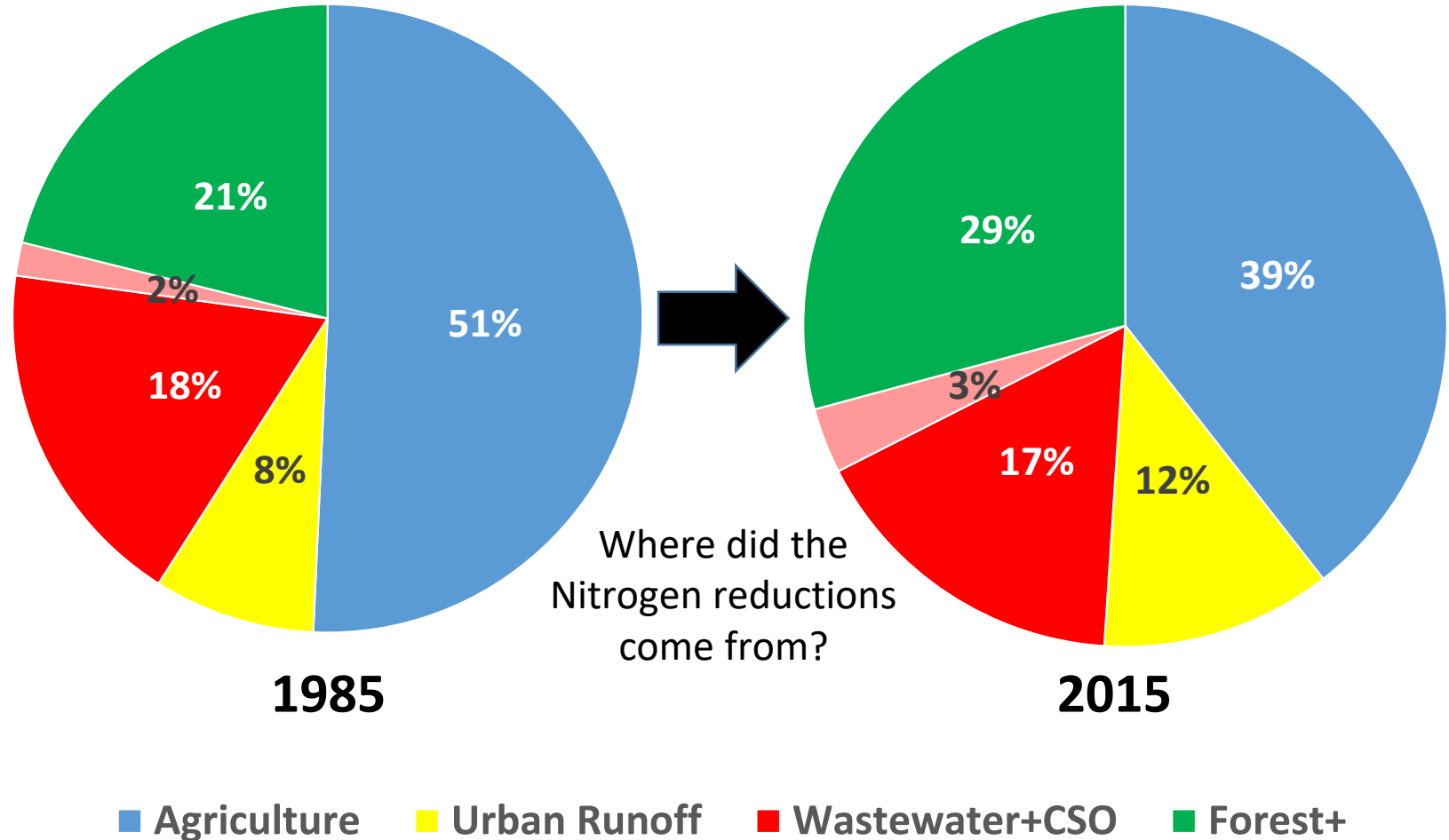
Further Analyses for Consideration

Apply the results of the geographic isolation runs to help inform implementation planning and targeting



Further Analyses for Consideration

Evaluate potential changes needed to a jurisdiction's Phase I and Phase II WIP source sector goals



Support to Jurisdictions During their Reviews

- The Partnership Office in Annapolis can support the jurisdictions by helping:
 - Test out possible N for P and P for N exchanges
 - Test out possible major river basin to basin exchanges
 - Test for possible water quality/load reduction impacts on upstream and down tide neighboring jurisdictions
 - Think through and help test possible approaches to developing local area planning goals
 - Evaluate feasibility of achieving the draft planning targets and what are the opportunities for further reductions by source sector, geography

Possible Changes Between Now and April 2018

- Requests for special conditions
- Conducting basin to basin exchanges of N, P, and sediment loads
- Conducting significant N for P and P for N exchanges
- Virginia's decisions on N and P reductions needed to achieve their existing or revised chlorophyll *a* criteria and water quality standards for the tidal James River

What are Special Cases?

Special cases are requests by the jurisdictions for any:

- 1) Changes to their draft Phase III WIP planning targets
- 2) Changes to the methodology used to establish the draft Phase III WIP planning targets

Who Can Submit a Special Case Request?

- Any one of the seven Bay watershed jurisdictions to the CBP Water Quality Goal Implementation Team (WQGIT) Chair and the CBP WQGIT Coordinator
- Requests for special cases from non-jurisdictional partners must be submitted through their respective WQGIT jurisdictional representative

Notification of Special Case Requests

February 28, 2018

Deadline for notifying WQGIT jurisdictional representatives and EPA of a jurisdiction's intent to submit special case requests

March 16, 2018

Final deadline for submitting the special case request(s), along with the justification and associated nutrient and basin exchanges, to the Partnership for consideration

Process for Addressing Special Cases

- 1. CBPO staff will work with the jurisdictions to address and identify potential resolutions for special cases during the 4-month review period**
- 2. For transparency, updates will be provided to the WQGIT during each conference call during the 4-month review period communicating:**
 - Who has submitted special case requests
 - Proposed options for resolving the special case request(s)

Day Two Requested Policy Decision

Approval of proposed process for the Partnership's 4-month review of the draft Phase III WIP planning targets, including addressing special case requests

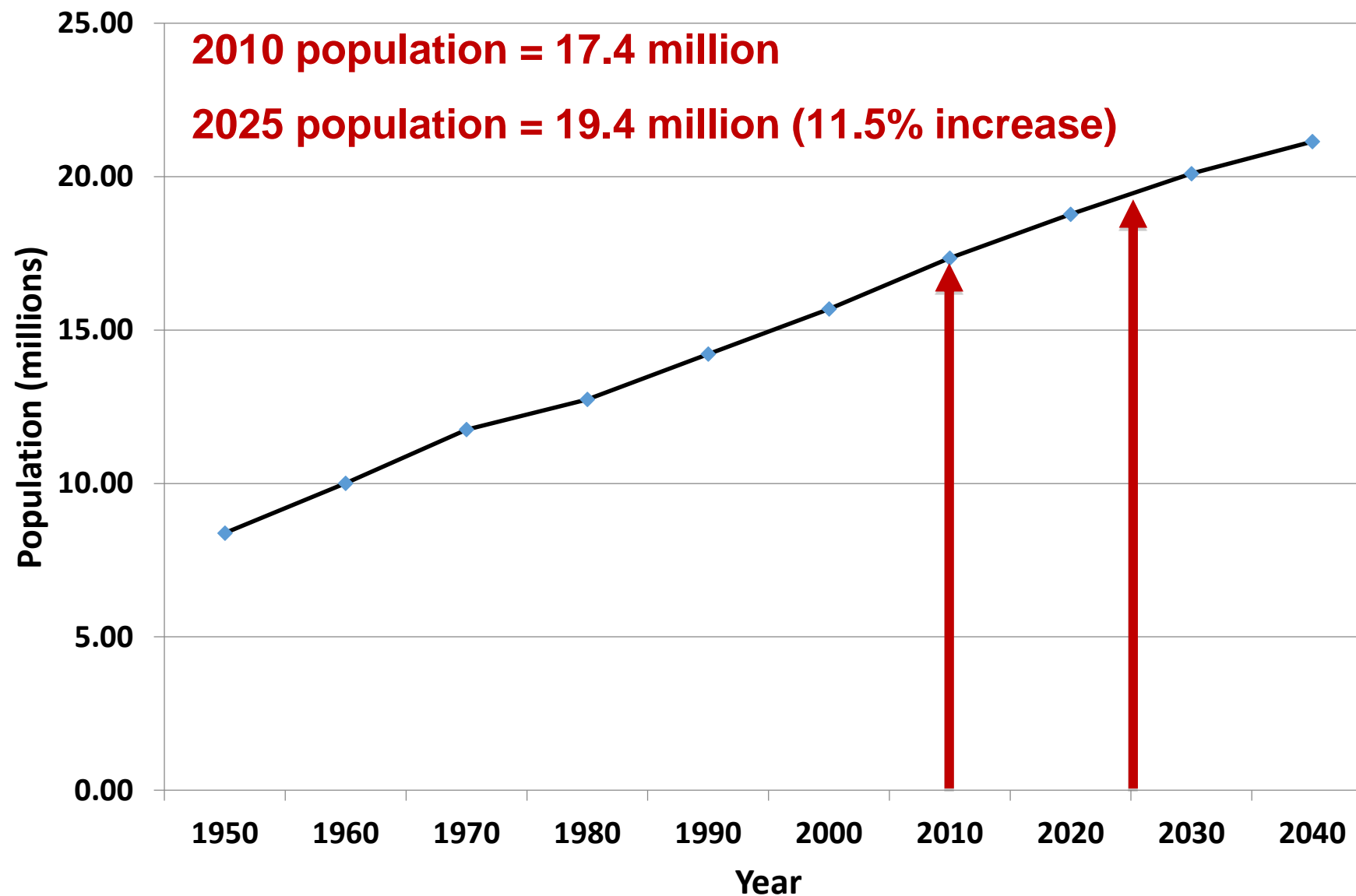
Accounting for Growth in the Jurisdictions' Phase III WIPs

**Karl Berger, MWCOC, CBP Land Use Workgroup Chair
and
Peter Claggett, USGS, CBP Land Use Workgroup
Coordinator**

Accounting for Growth Equitably Across Jurisdictions

1. Watershed population is increasing by over 1 million persons/decade
 - Population change from 2010 -2025 = 2.0 million persons
2. Chesapeake Bay Land Change Model (CBLCM) estimates land use and wastewater impacts of future population growth.
 - Parameterized uniquely for every state/county/city in the Bay watershed.
 - Accounts for uncertainty at sub-county scales.
3. Partnership agreement on future land use scenarios reflecting a range of planning and conservation efforts.
4. Developing the WIPs on 2025 land use conditions enable the use of planning and conservation efforts to help “account for growth” for the TMDL.

Chesapeake Bay Watershed Population Trends



Future Growth Scenarios

Purpose:

To provide information to state and local partners to account for the effects of land use planning and conservation actions for reducing future pollutant loads in their Phase III WIPs and two-year milestones.

Scenarios:

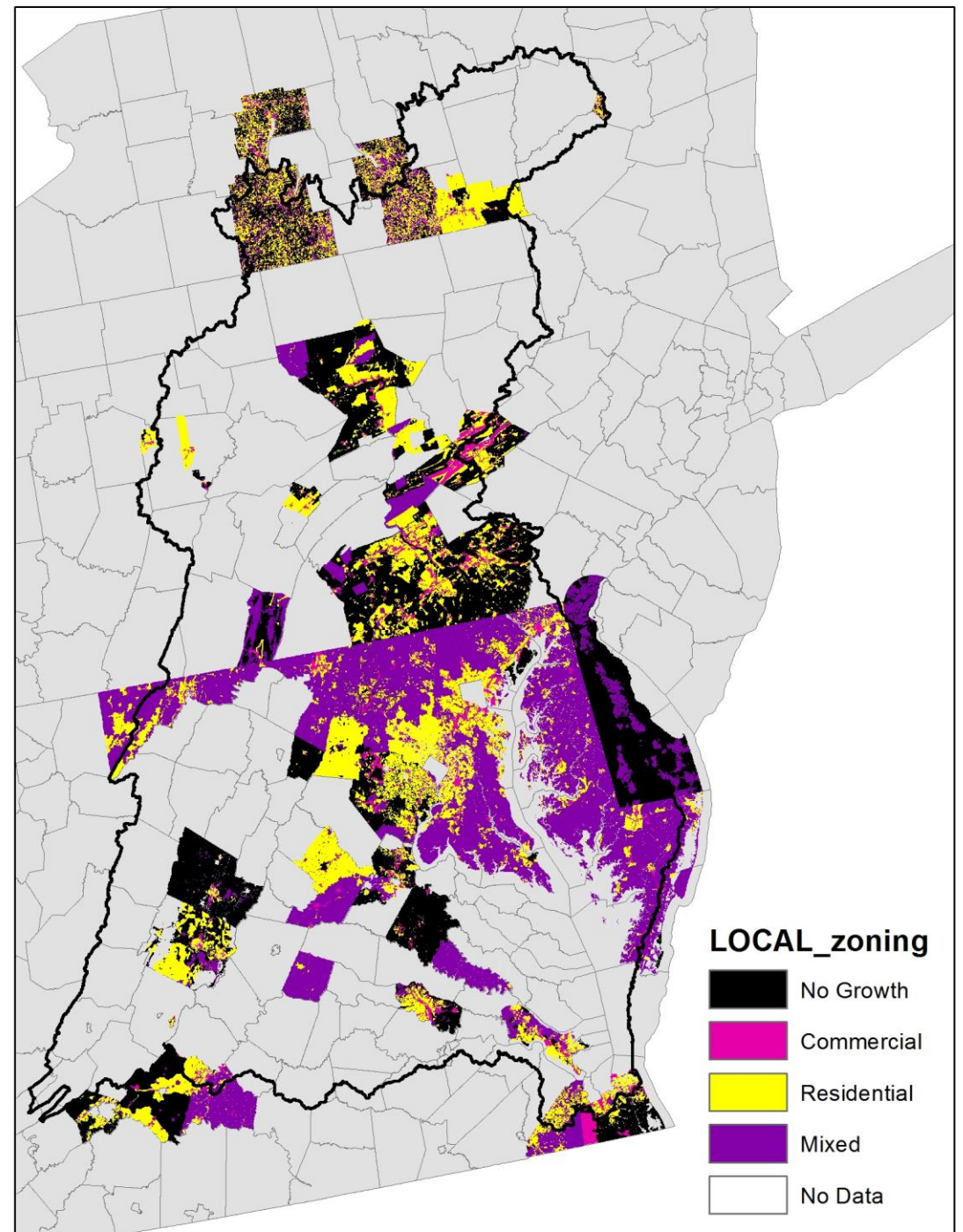
Two scenarios emerged from Land Use Workgroup deliberations following a June 2017 joint workshop with local planners and elected officials organized by with the Local Government Advisory Committee and Land Use Workgroup.

Future Growth Scenarios

- 1. Current Zoning:** continuation of historic trends constrained by existing local zoning. Includes the best available regional and local data representing current conditions
- 2. Conservation Plus:** continuation of historic trends constrained by local zoning, aggressive land conservation, accelerated infill/redevelopment, densification of urban areas, avoidance of riparian areas, 100-year floodplains, frequently flooded soils, areas subject to sea-level rise and storm surge, and soils unsuitable for on-site septic systems

Extent of Local Zoning Data

Collected by CBP from local and state agencies, 2013 - 2017



Land Use Planning and Conservation in CAST

- Loading impacts from individual or combinations of components of the Conservation Plus scenario, e.g., land conservation, floodplain protection, incentives for infill, will be evaluated with the Partnership models to quantify the water quality benefits of each particular action or collection of actions.
- Users of CAST will be able to select a subset of policy and conservation actions as components of their WIPs. To inform their selection, supplementary information will be provided about the potential local loading effects of policy and conservation actions.
- Planning and conservation actions will be simulated as changes in land use against which, CAST users can add other BMPs and estimate loads.

Accounting for Growth into the Future

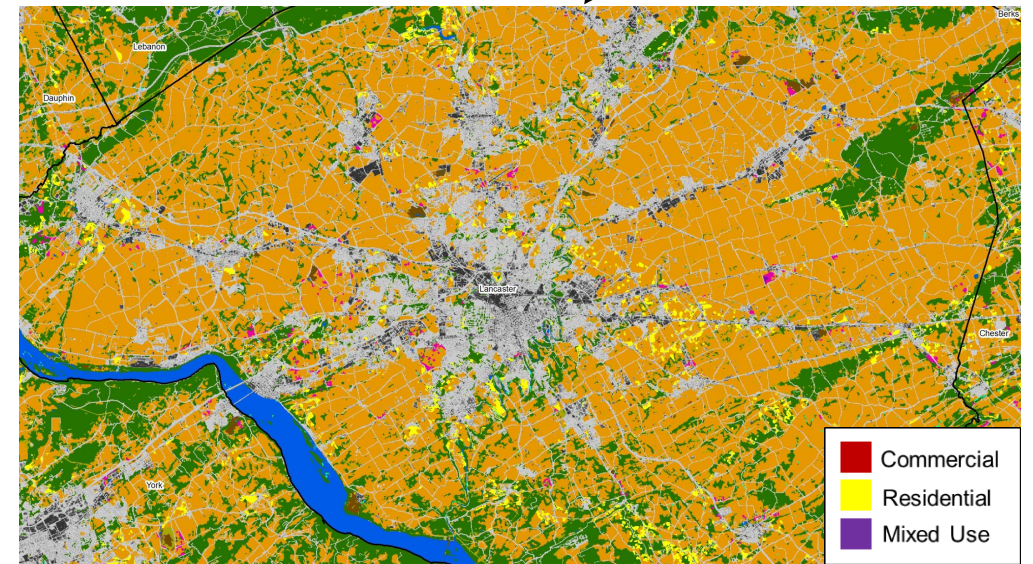
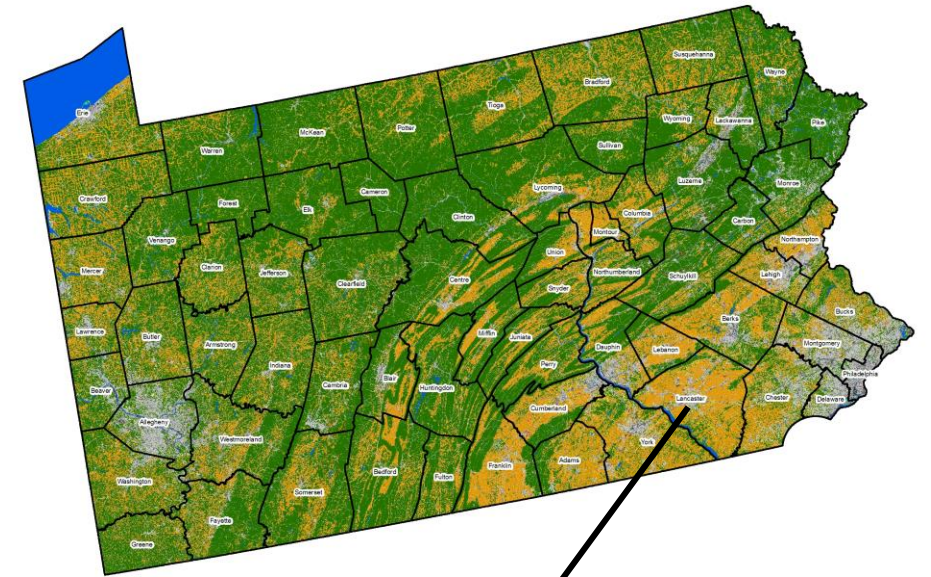
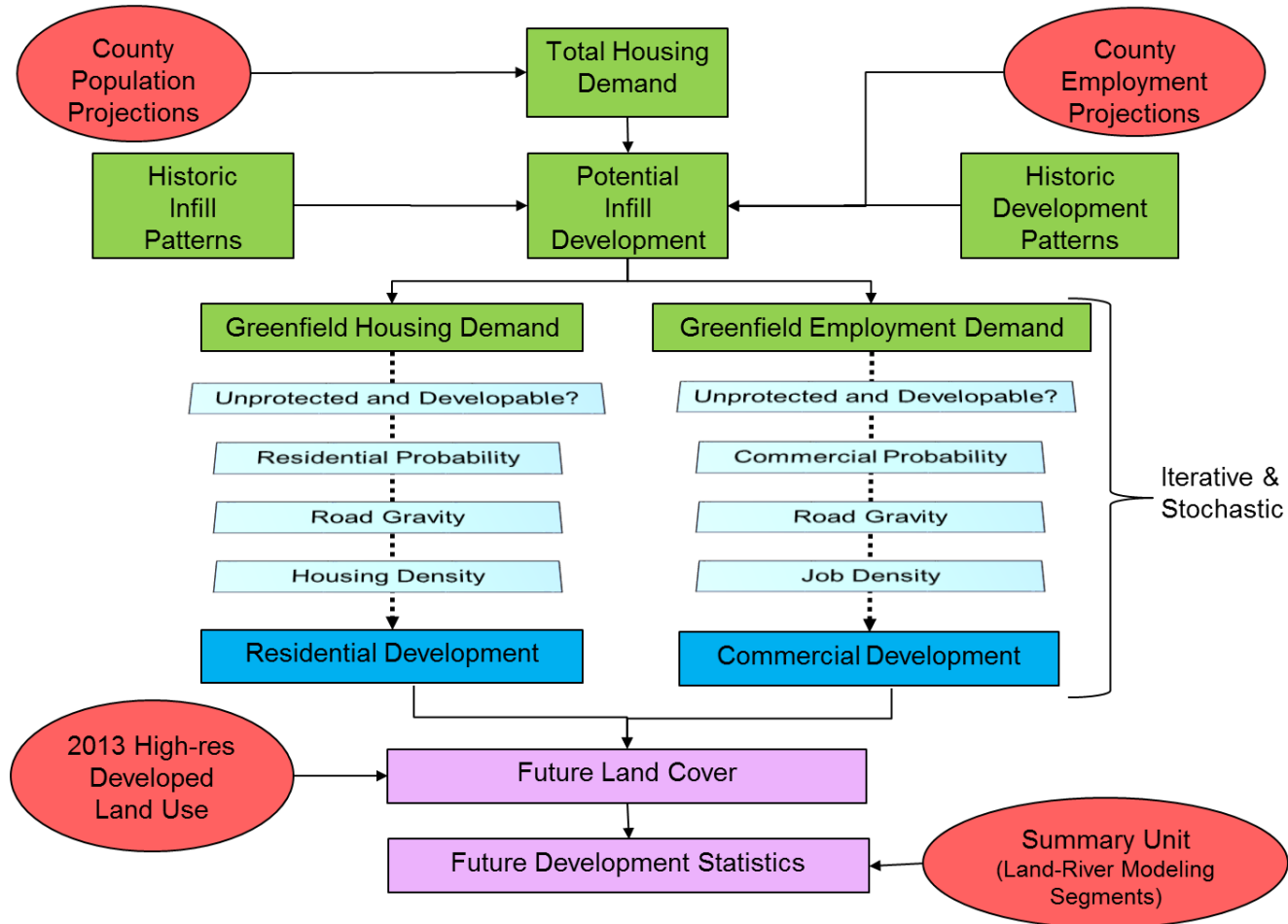
- **Update the land change model and future growth forecasts every two years**
 - Update with the best available local and regional data.
 - Add future scenario land uses into the Partnership's CAST tool
 - Factor into the next round of the jurisdictions' two-year milestones
- **Factor in future (every 4 years) updates to the Partnership's high resolution land use/cover data across the entire watershed**
 - Future high resolution land use will allow us to verify the assumptions and results of the land change model
- **Ensure local partner review of the future growth forecasts with each 2-year update.**

Estimated Changes in Land Use and Loads Through 2025

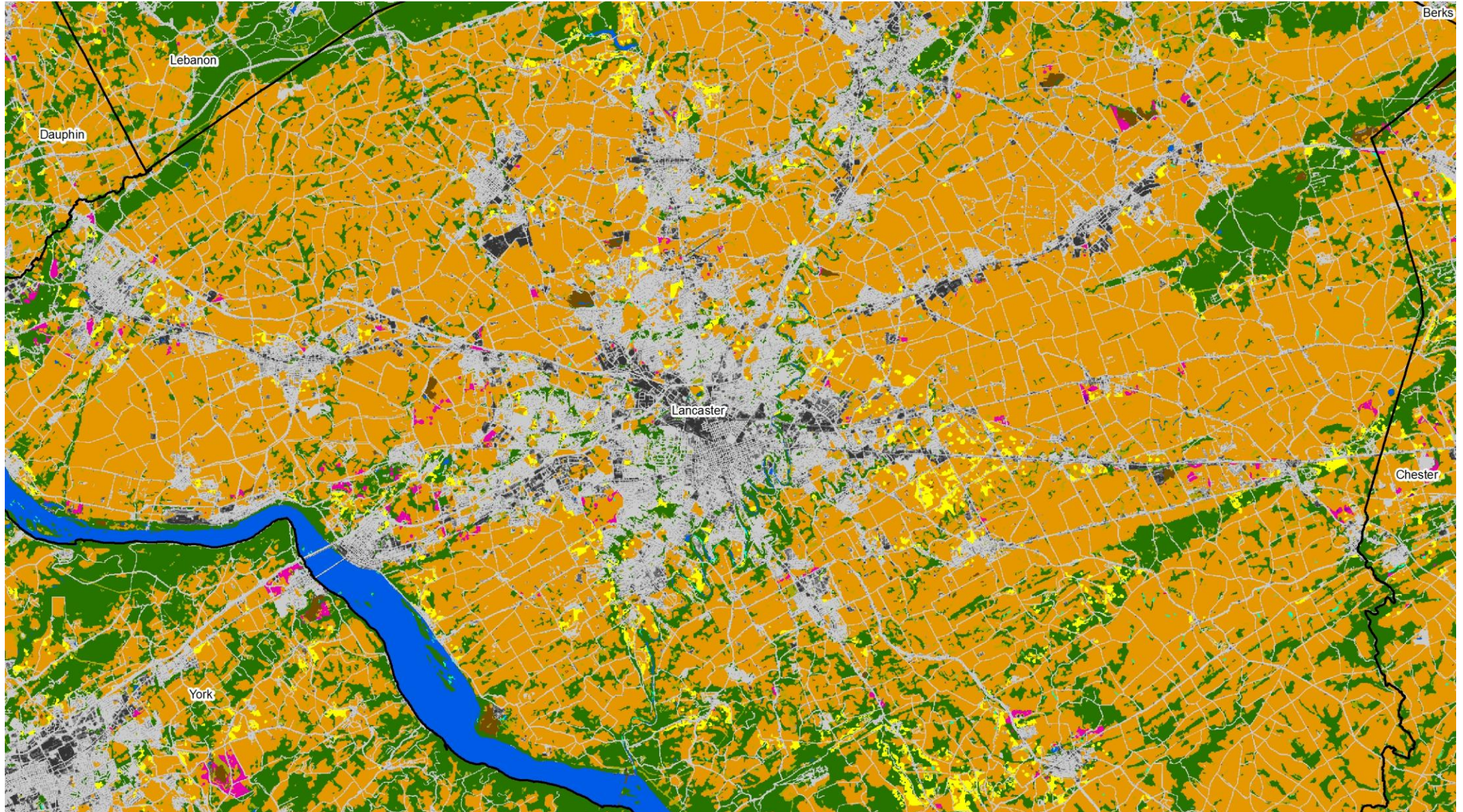
**Peter Claggett, USGS, CBP Land Use Workgroup
Coordinator**

Partnership's Chesapeake Bay Land Change Model

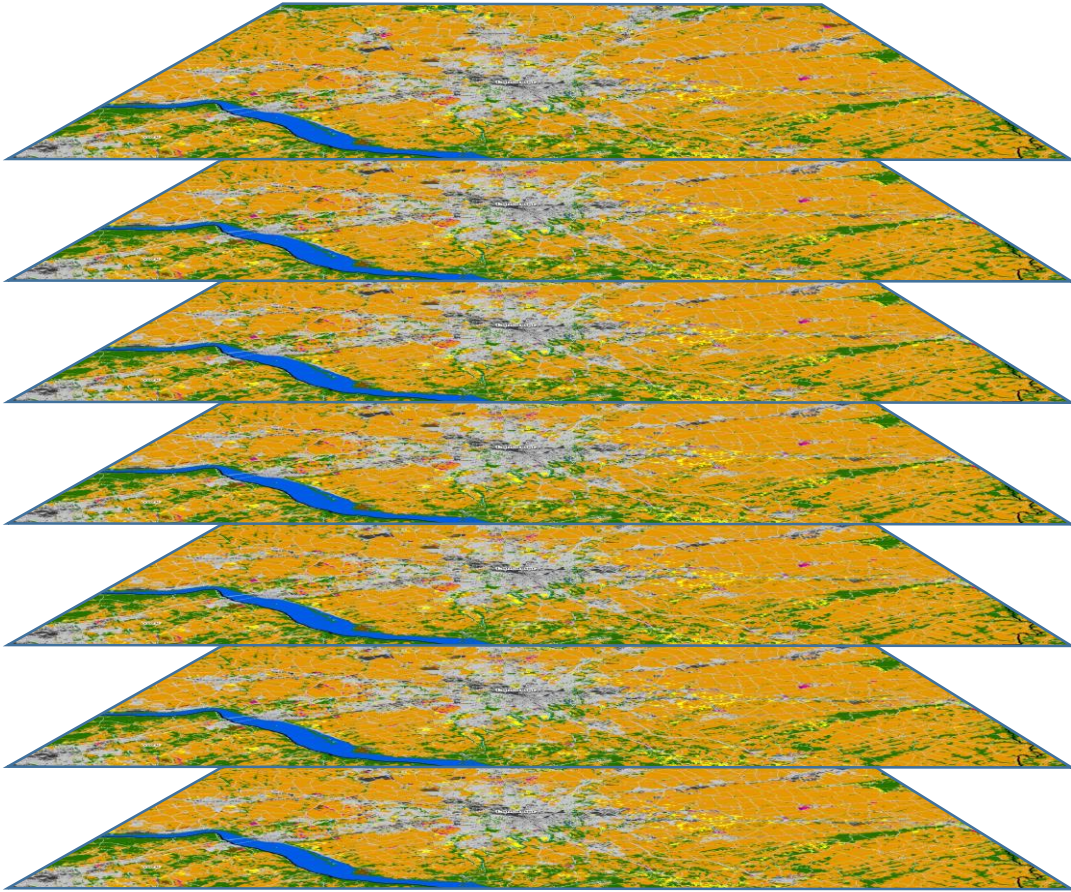
Chesapeake Bay Land Change Model v3a



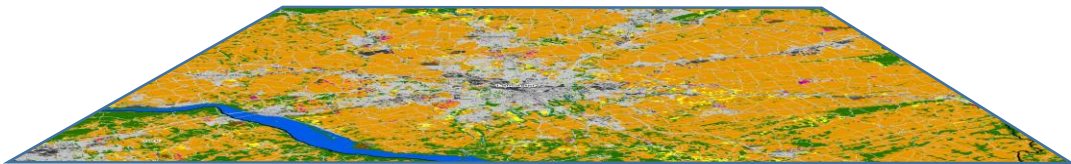
Assessing Uncertainty at Local Scales



Assessing Uncertainty at Local Scales



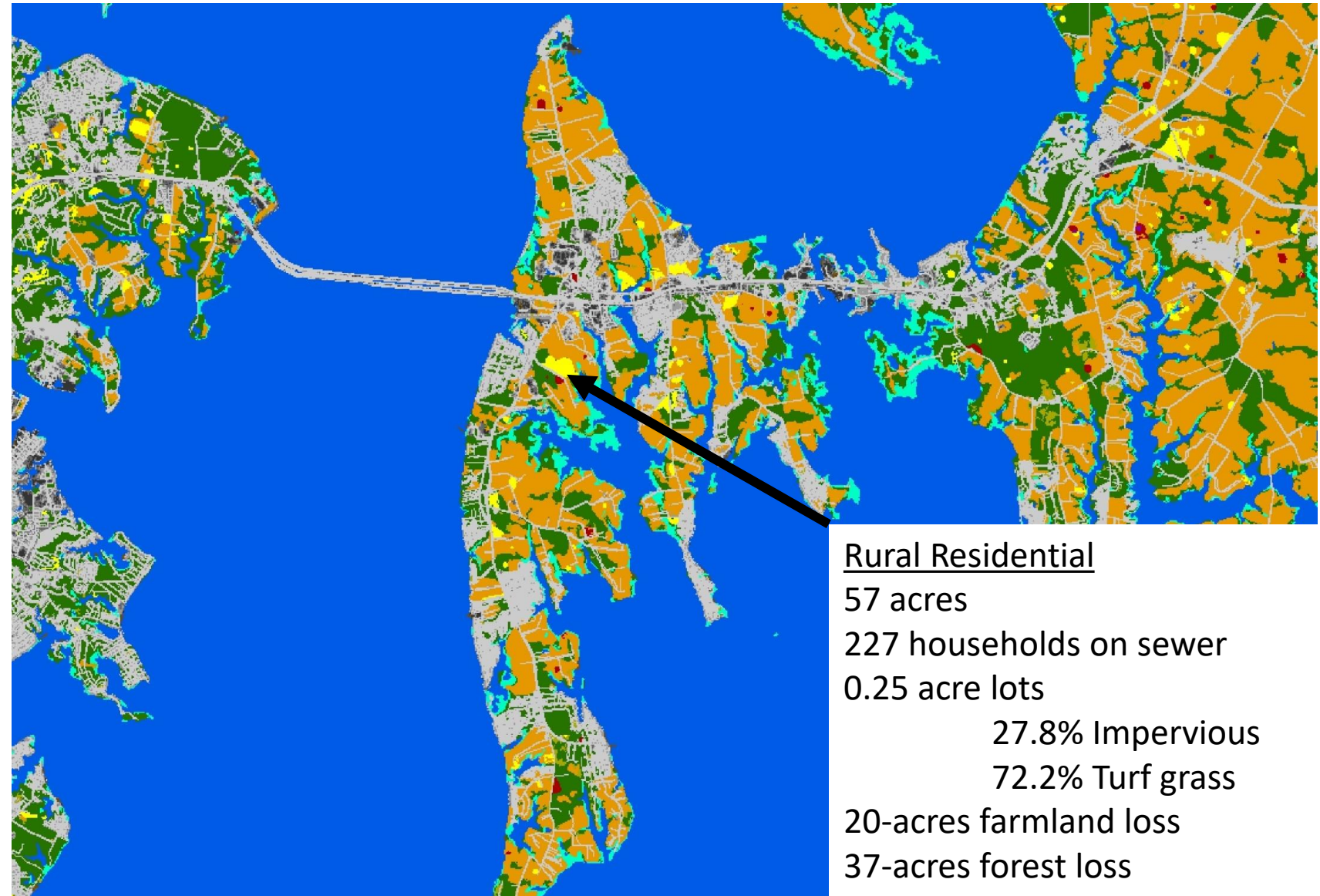
Every county is simulated 101 times for each scenario and target year, i.e., 2025.



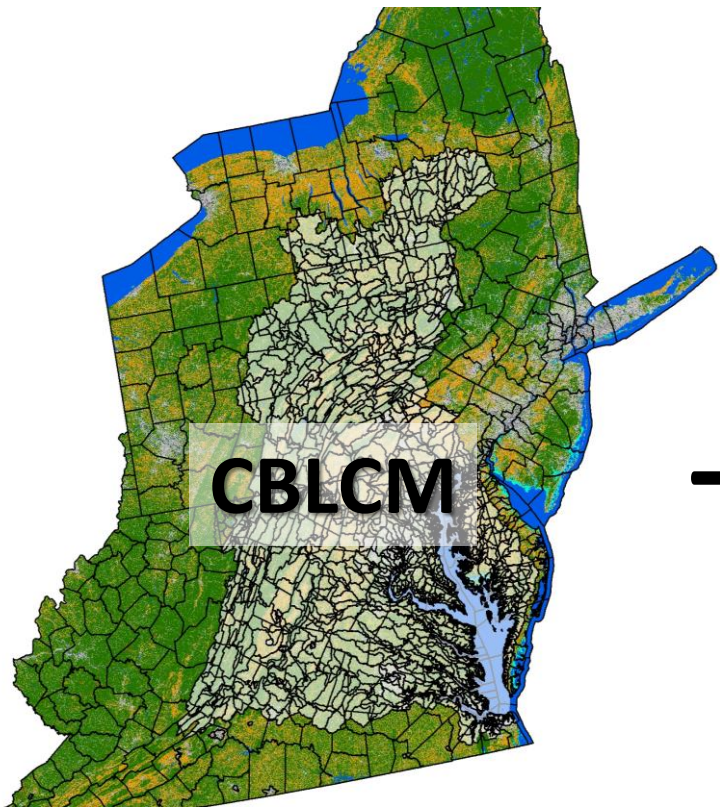
Average of 101 simulations used to estimate amount of future residential and commercial development in 2025 by land-river segment.

Land Change Model Outputs

- Impervious surface and turf grass expansion
- Forest conversion to development
- Farmland conversion to development
- Future population on sewer and septic



Year 2025 Land Use



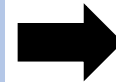
+

Reported County-level
Construction Acres



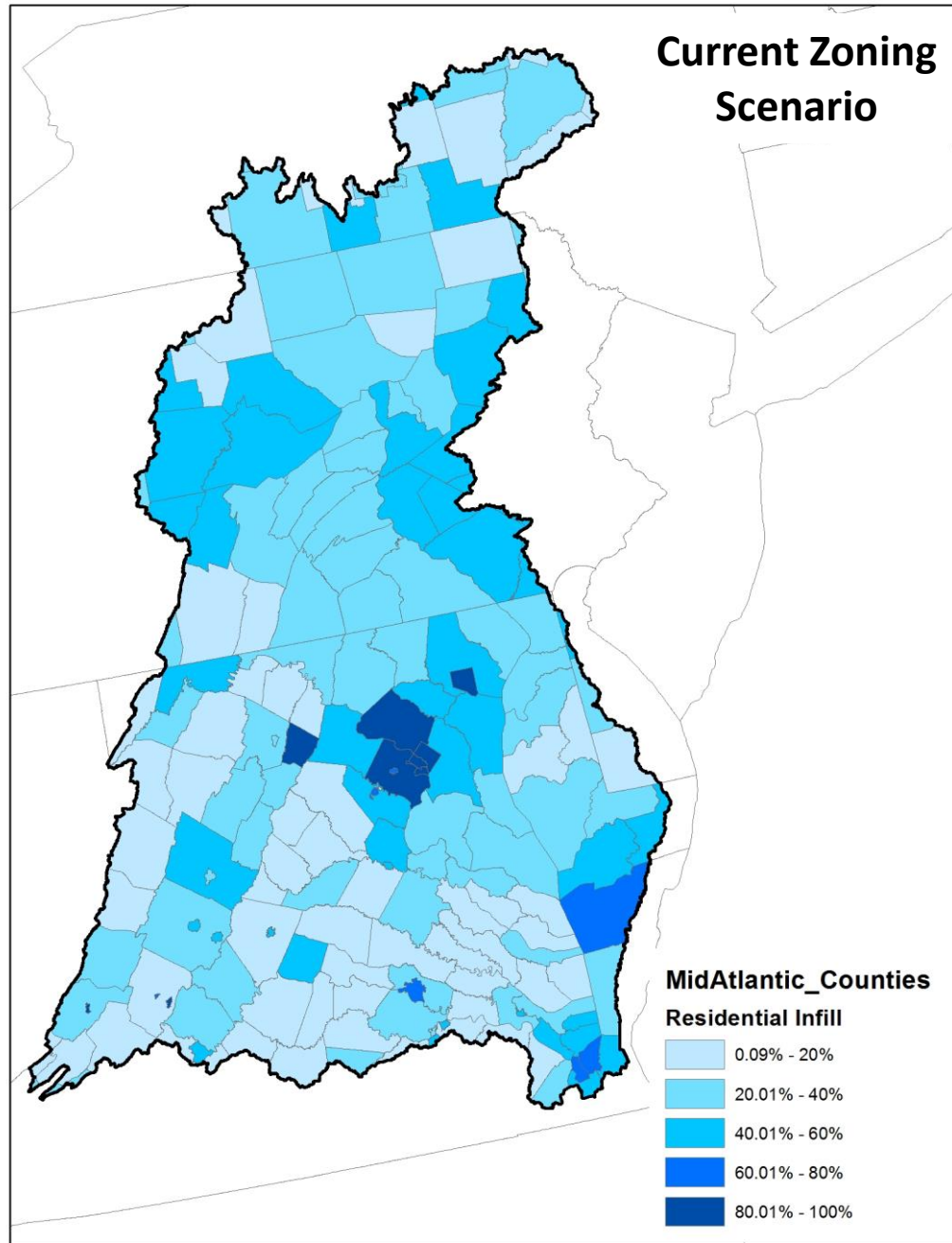
Extrapolated
**CENSUS_{OF}
AGRICULTURE**

True-Up
Process

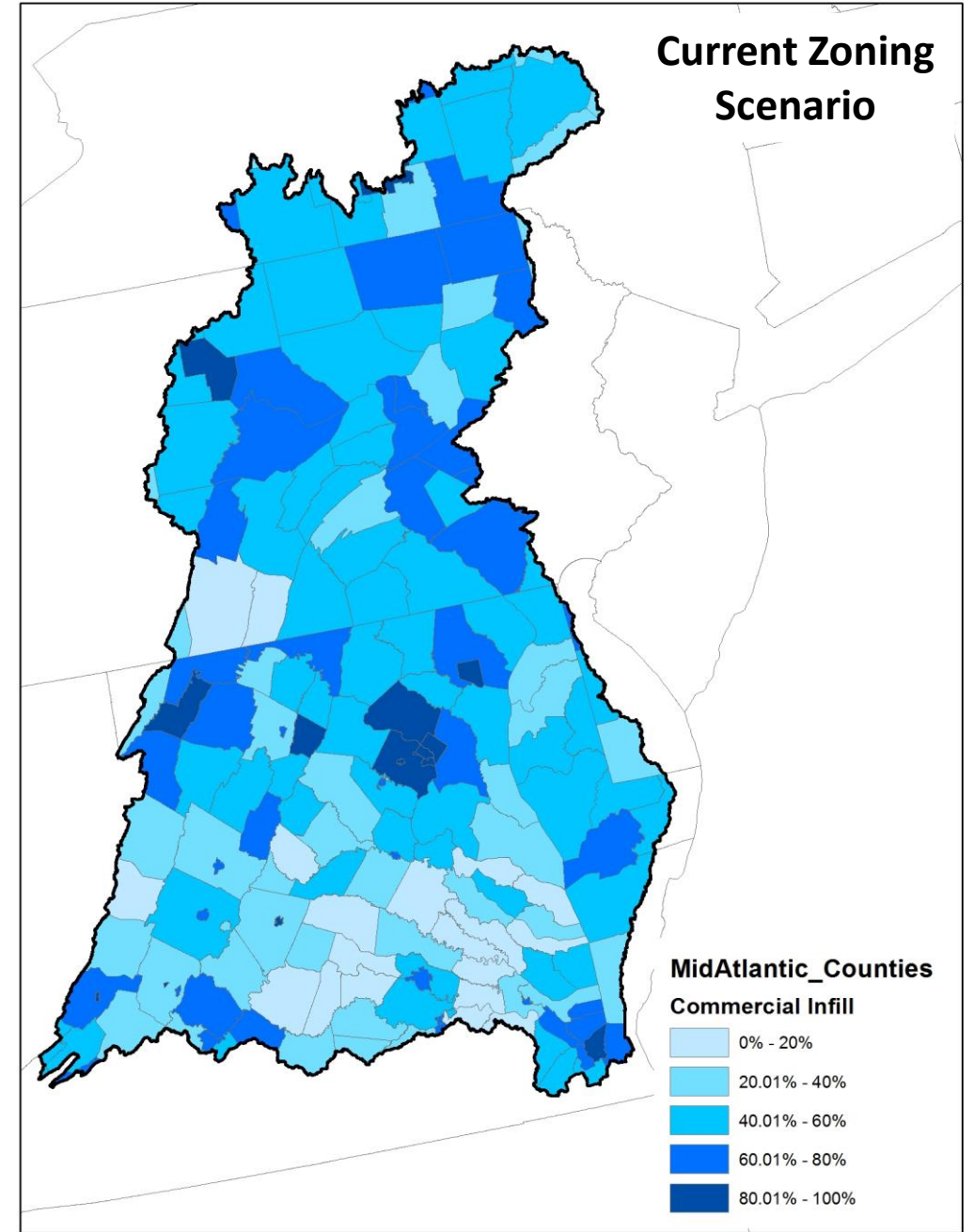


Phase 6
2025 Land
Use Dataset

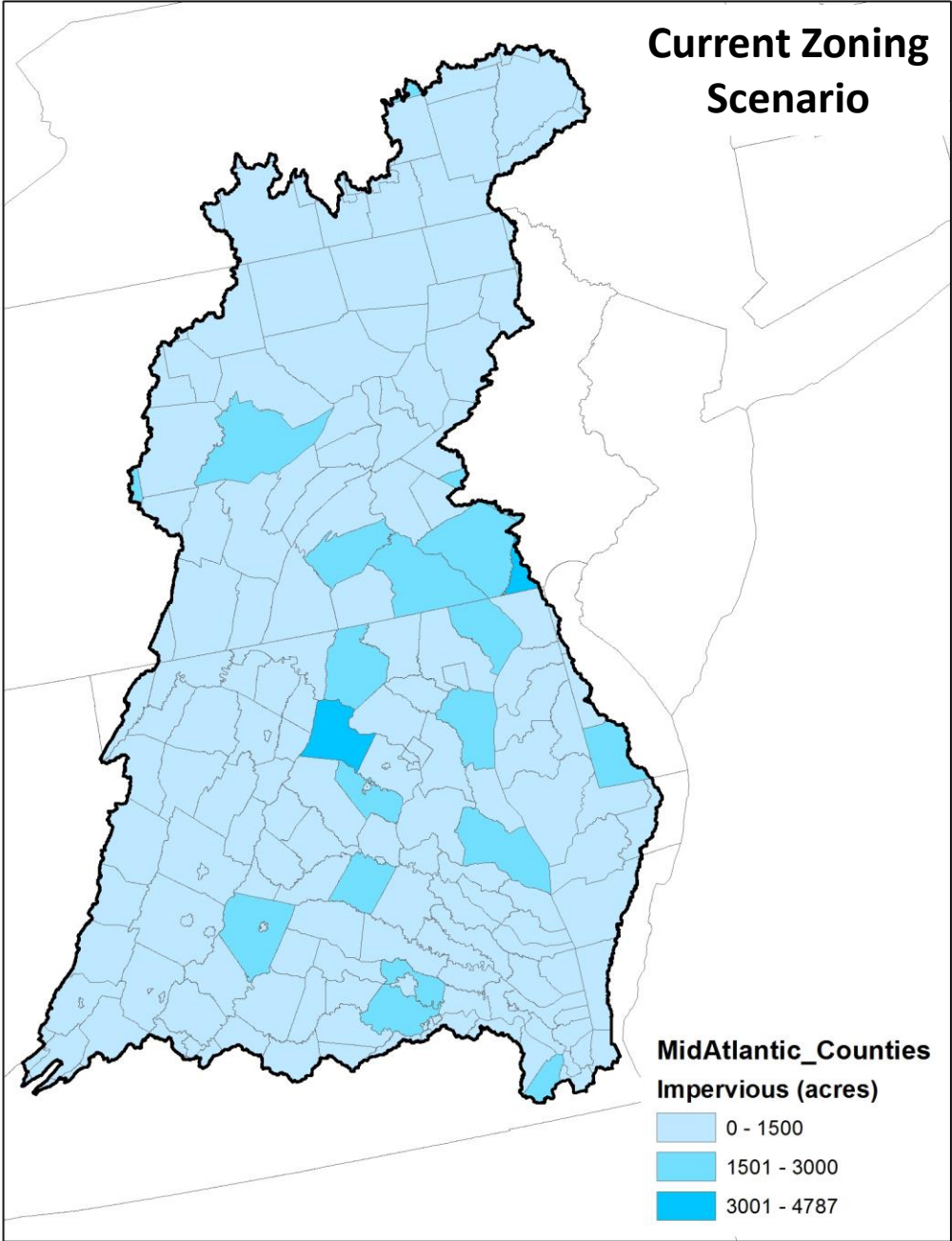
Residential Infill/Redevelopment



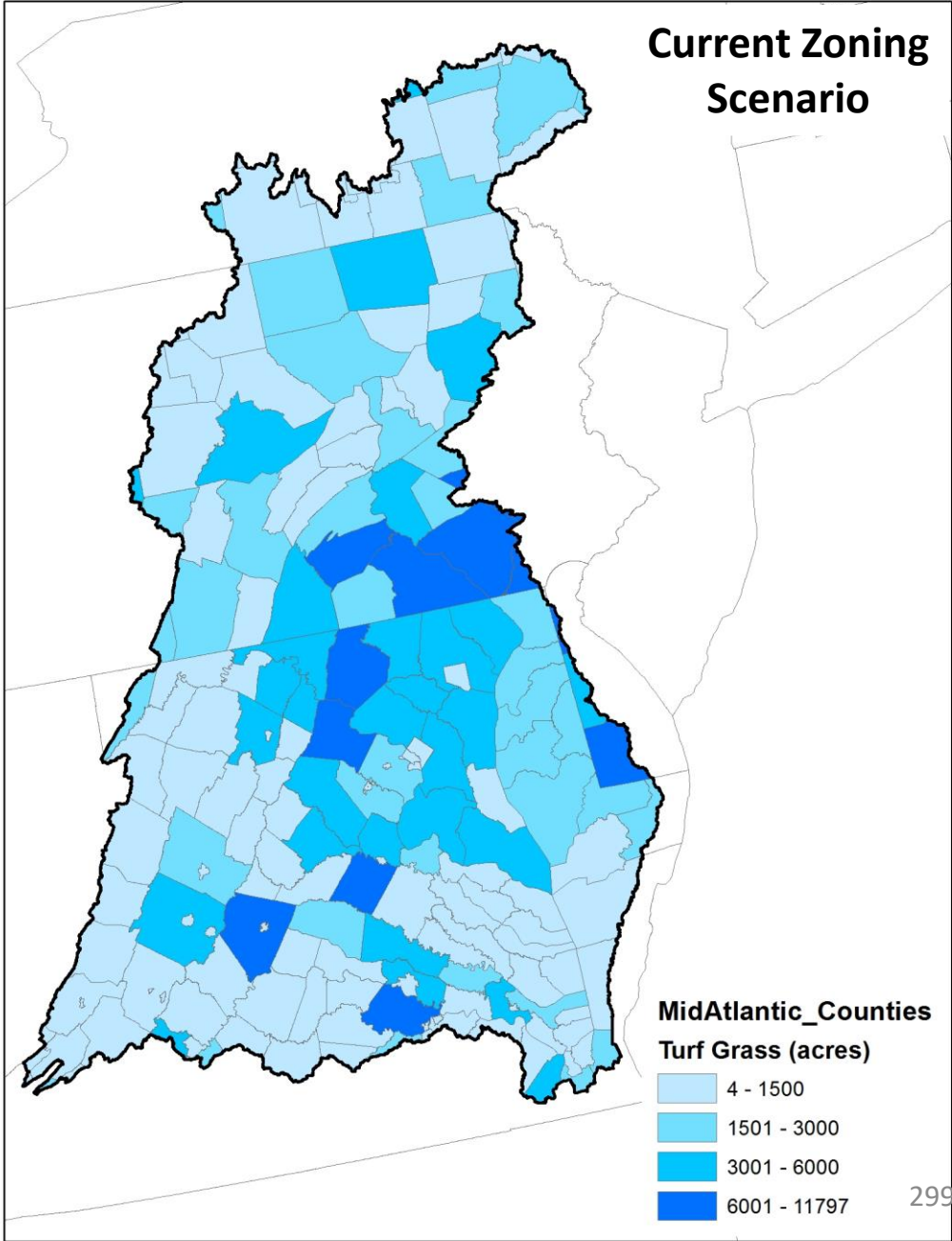
Commercial Infill/Redevelopment



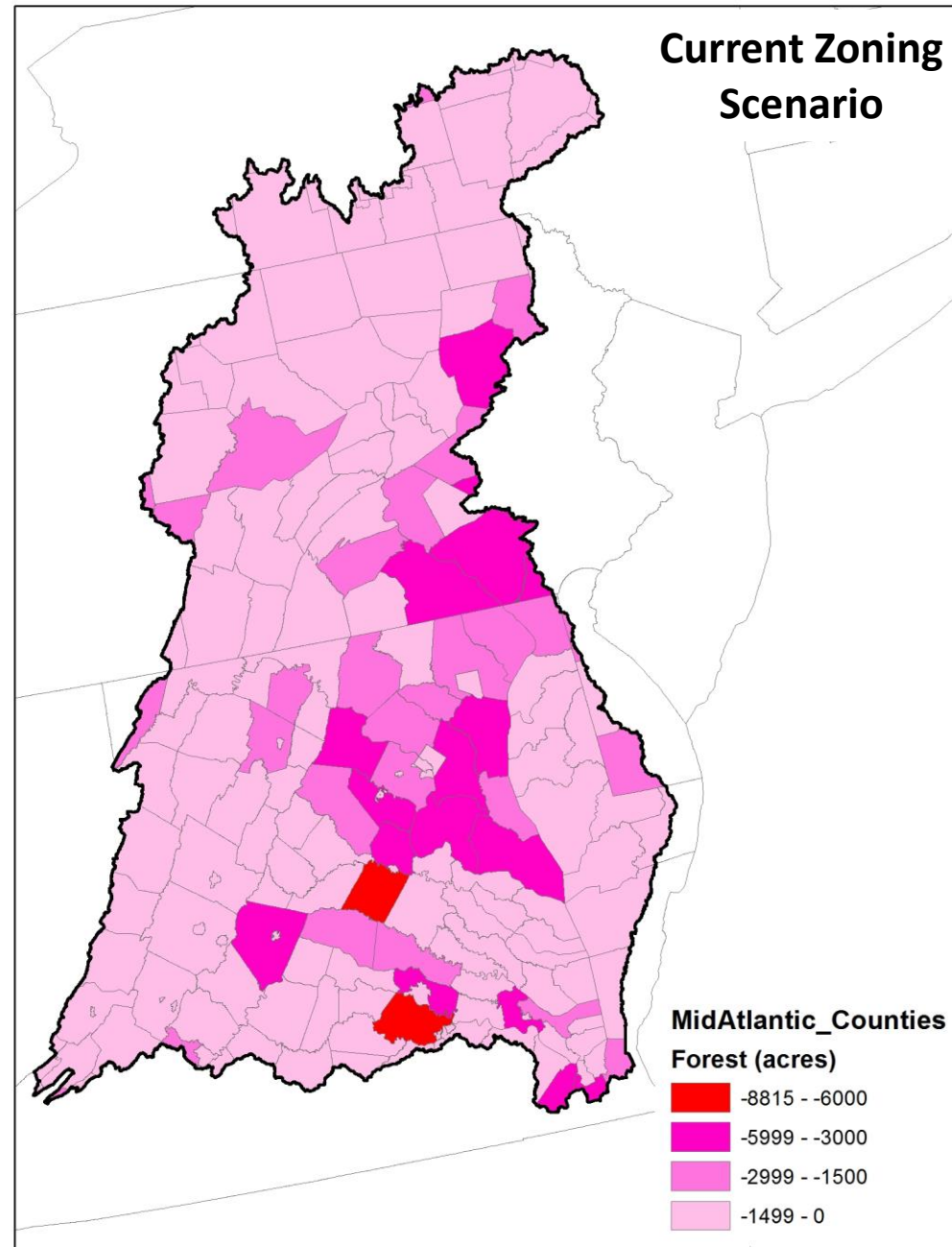
Increase in Impervious Surfaces



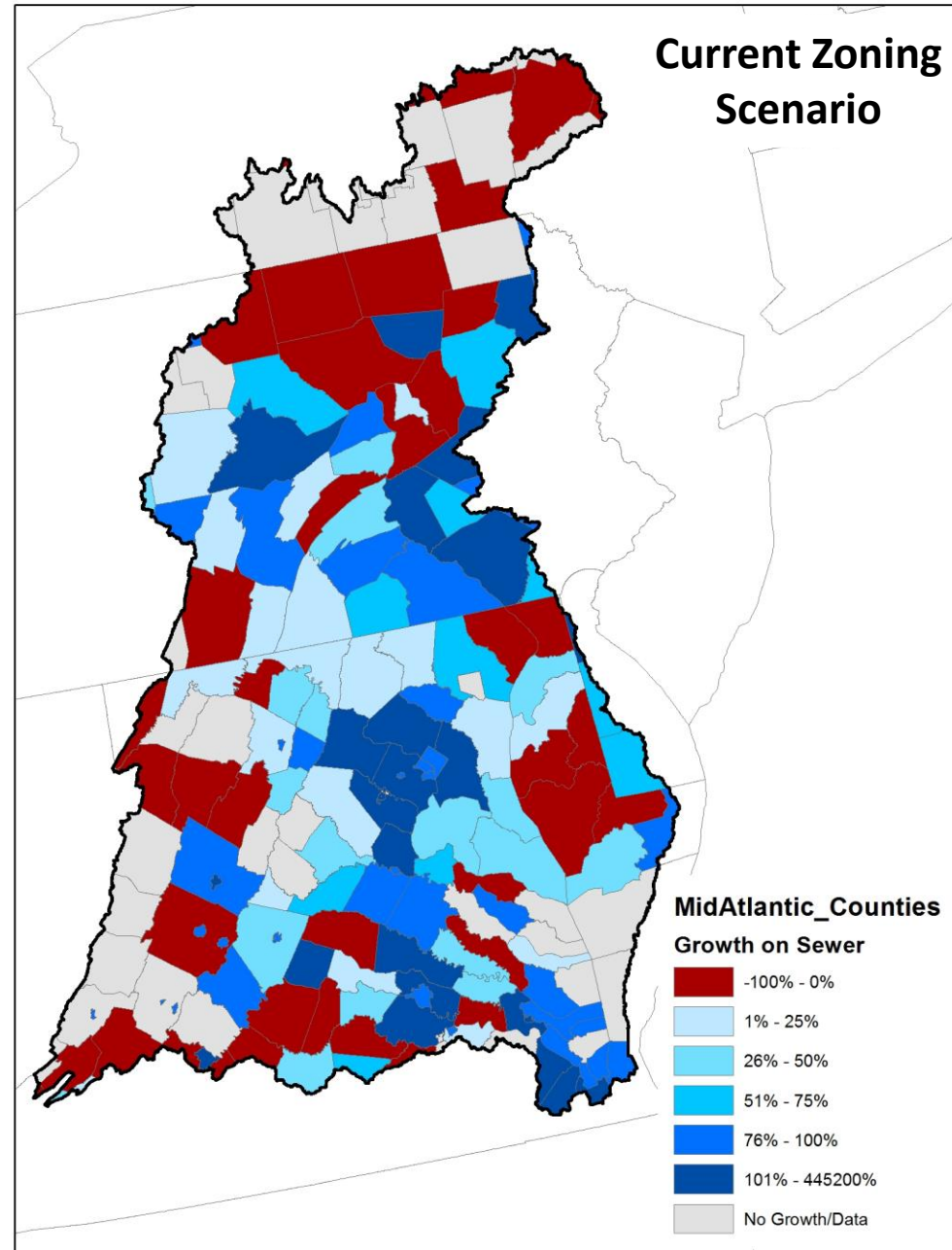
Increase in Turf Grass



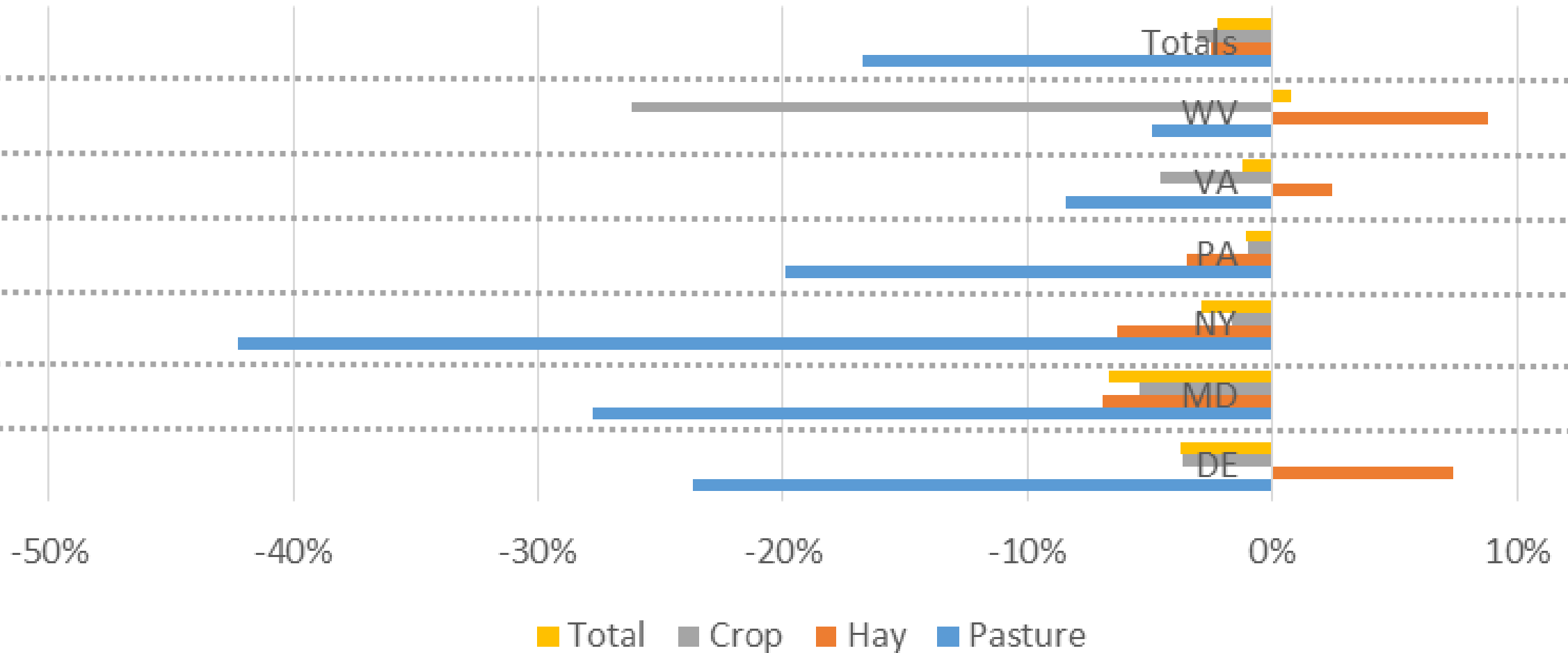
Forest Conversion to Development



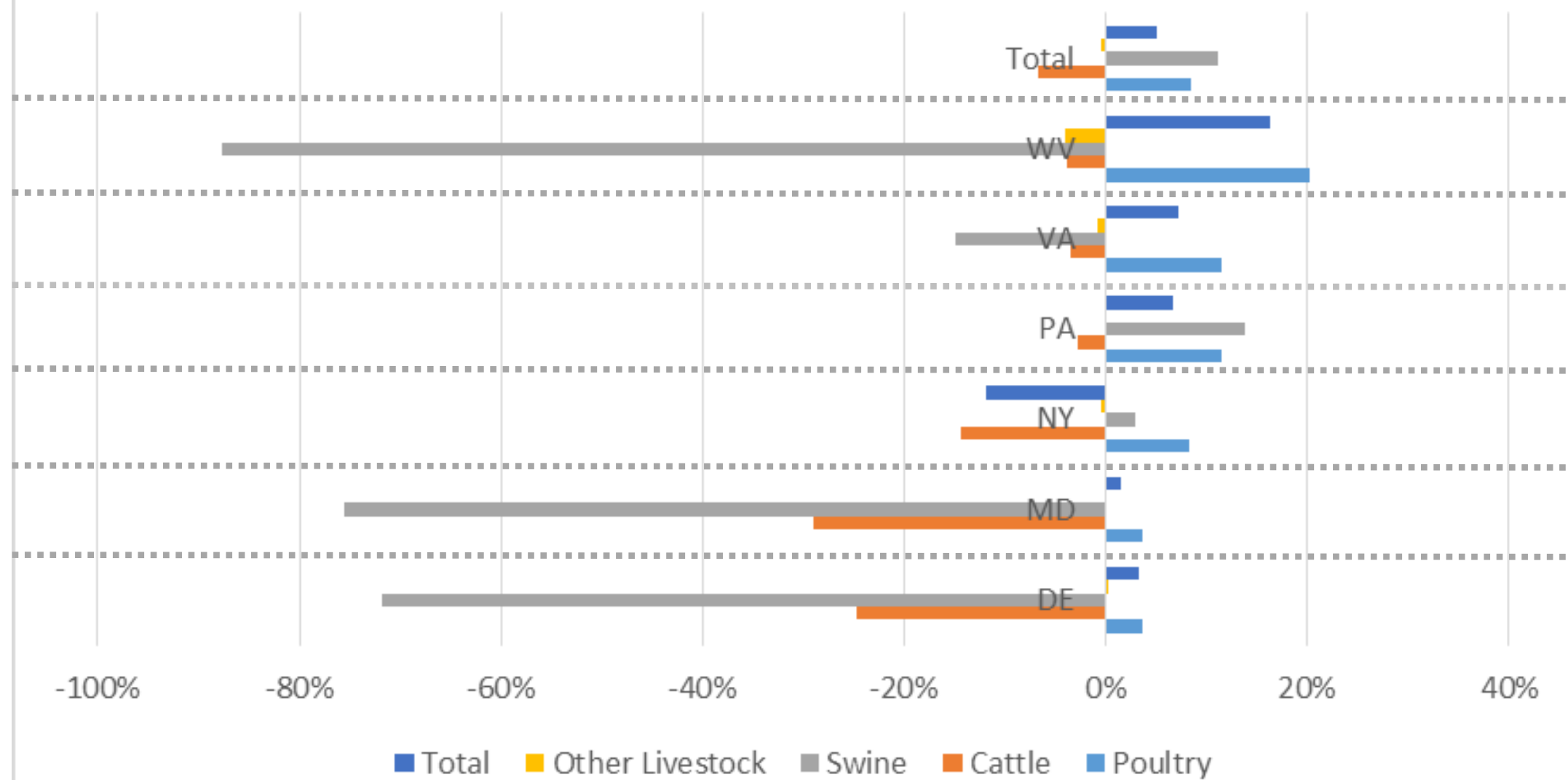
Growth on Sewer and Septic



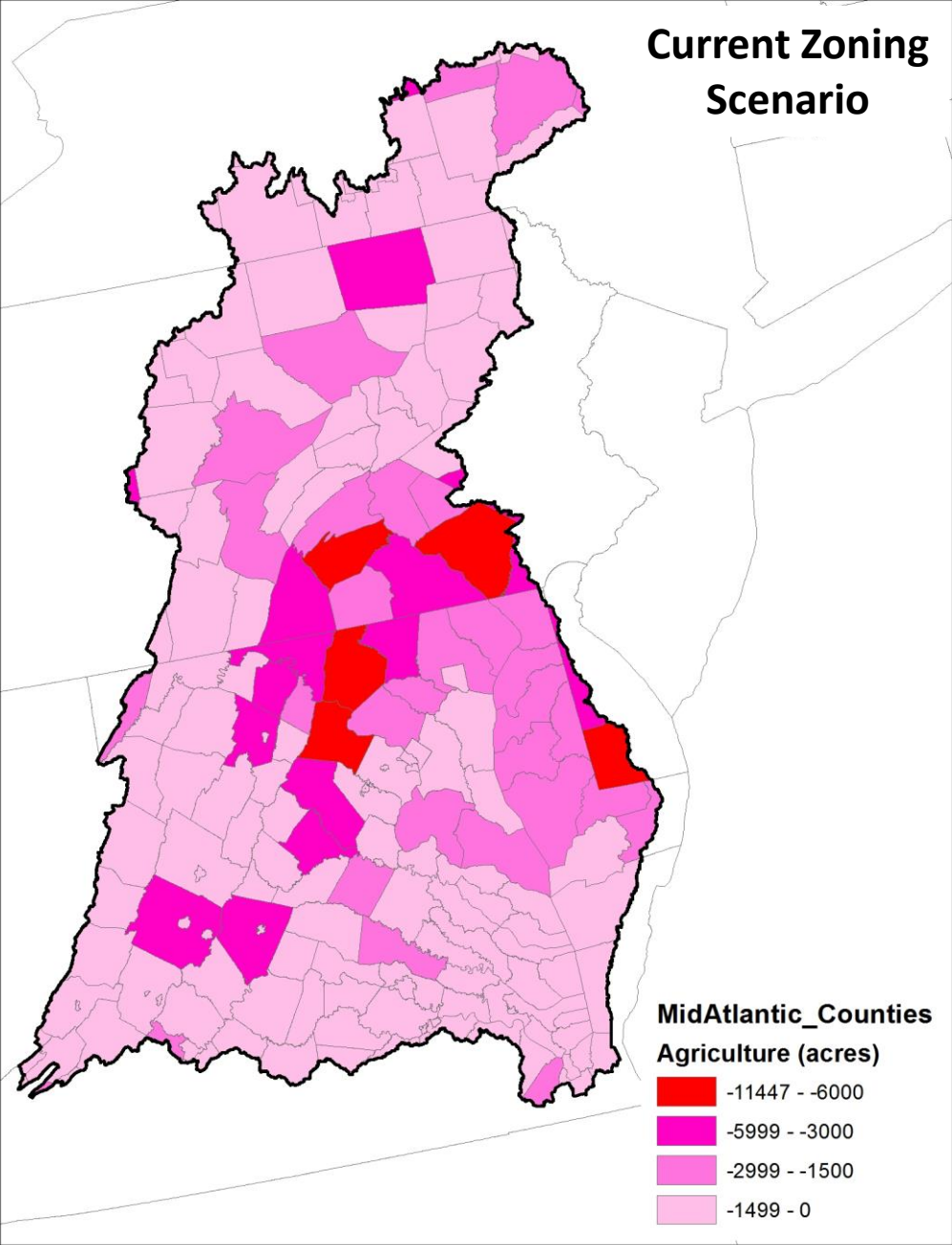
Estimated Percent Change in Ag Acres from 2016 through 2025



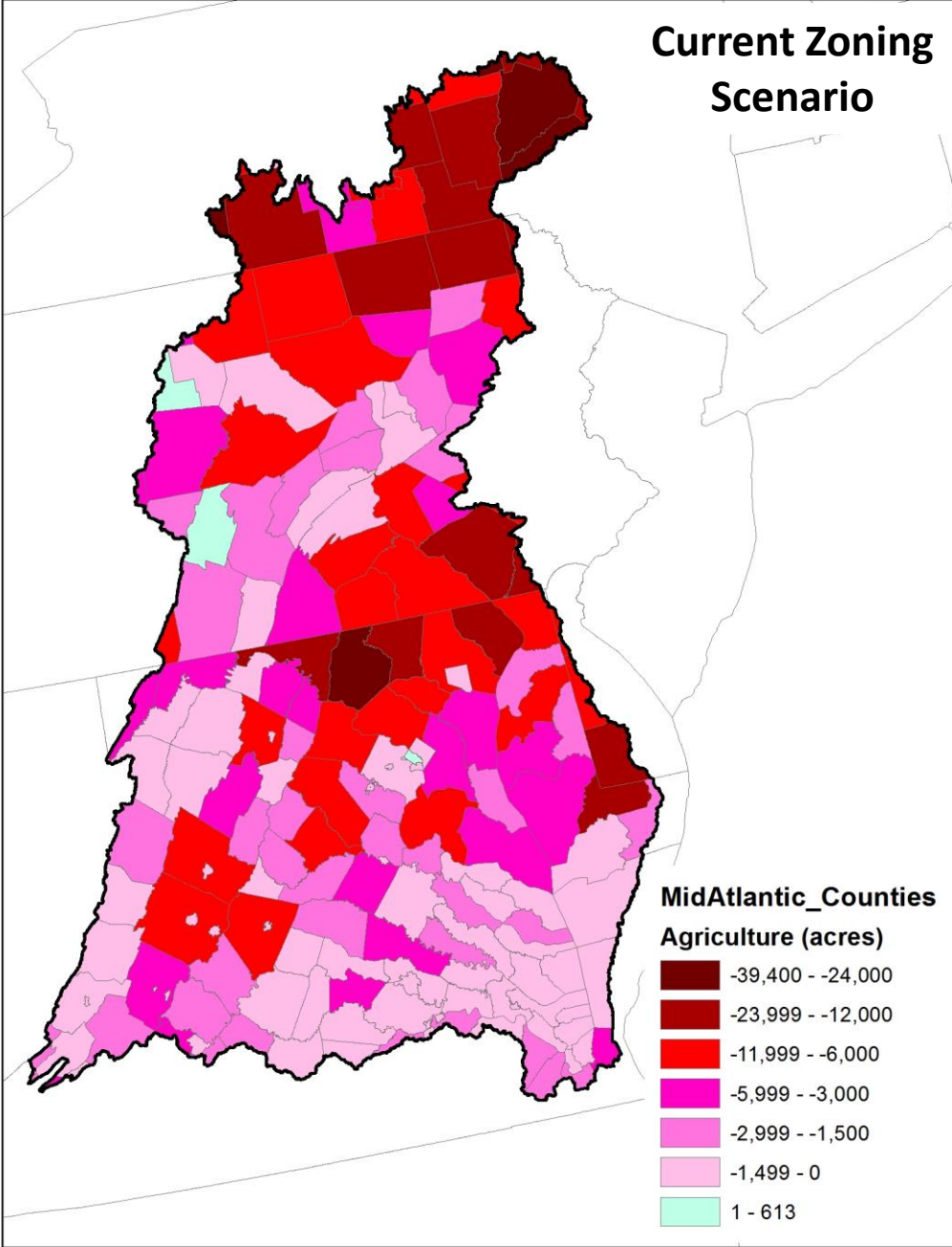
Percent Changes in Animal Units by Animal Type from 2016 through 2025



Farmland Conversion to Development



Farmland Conversion + Land Retirement



Proposed Draft Phase III Planning Targets: Nitrogen

Jurisdiction	1985 Baseline	2013 Progress	Growth in Load to 2025	Conowingo Load Responsibility	Climate Change	2013 Progress +	Phase III Planning Target
NY	18.71	15.44	-0.52			14.92	10.62
PA	122.41	99.28	1.38			100.66	72.99
MD	83.56	55.89	0.76			56.65	45.39
WV	8.73	8.06	0.20			8.26	6.36
DC	6.48	1.75	0.00			1.76	2.25
DE	6.97	6.59	0.22			6.81	4.66
VA	84.29	61.53	0.86			62.39	56.37
BasinWide	331.15	248.54	2.91			251.45	198.64

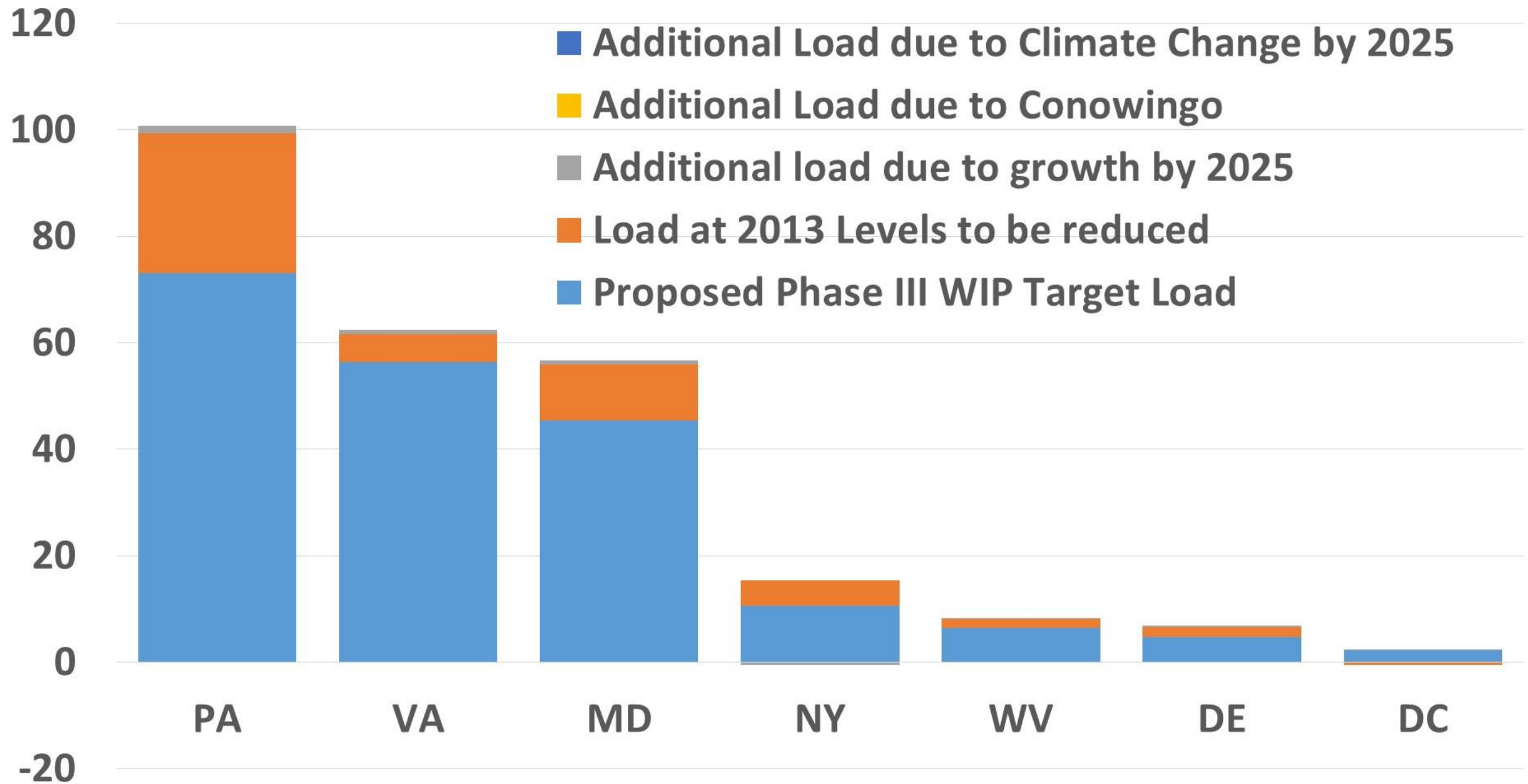
*Units = millions of pounds

Proposed Draft Phase III Planning Targets: Phosphorus

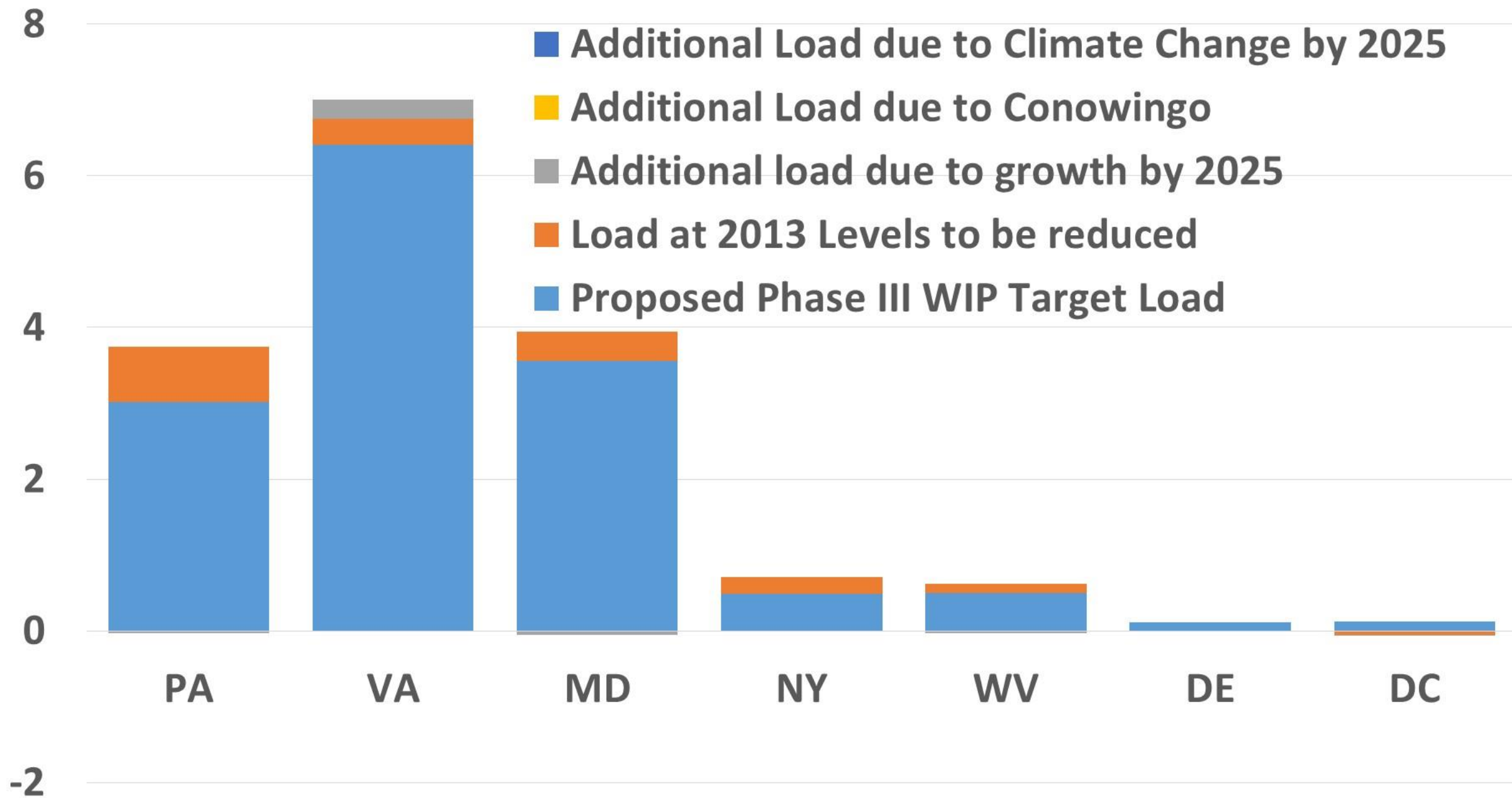
Jurisdiction	1985 Baseline	2013 Progress	Growth in Load to 2025	Conowingo Load Responsibility	Climate Change	2013 Progress +	Phase III Planning Target
NY	1.198	0.710	-0.010			0.700	0.491
PA	6.282	3.749	-0.034			3.716	3.012
MD	7.495	3.942	-0.053			3.888	3.553
WV	0.902	0.617	-0.027			0.591	0.493
DC	0.090	0.062	-0.001			0.062	0.120
DE	0.225	0.116	-0.004			0.111	0.116
VA	14.244	6.751	0.254			7.005	6.411
BasinWide	30.44	15.95	0.125			16.072	14.20

*Units = millions of pounds

Proposed Draft Nitrogen Targets



Proposed Draft Phosphorus Targets



Day Two Requested Policy Decision

Approval of the Water Quality Goal Implementation Team's recommended use of 2025 projected conditions to account for growth in the development and implementation of the jurisdictions' Phase III WIPs

Approval of the Water Quality Goal Implementation Team's proposed approach to continued Partnership accounting for growth into the future by:

- Updating the Partnership's projection of future growth every two years
- Factoring these updated future projections into next round of the jurisdictions' two-year milestones
- Factoring in future (every 4 years) updates to the Partnership's high resolution land use/cover data across the entire watershed
- Ensuring local partner review of the future growth forecasts with each 2-year update

Conowingo Dam Infill: How Much, Who, How, and By When

Lee Currey, MDE, CBP Modeling Workgroup Co-Chair

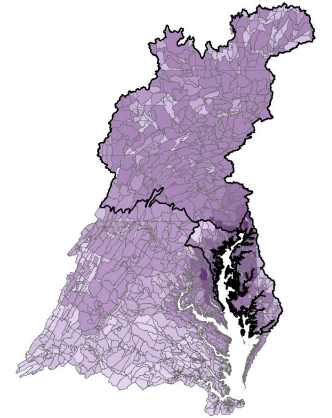
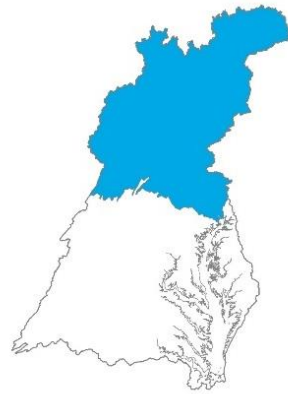
How to Offset the Additional Loads Due to Conowingo Dam Infill

How much?

Who?

How?

When?



Allocation equity rules
used in the Bay TMDL

Assign additional load as
local planning goal

By 2025

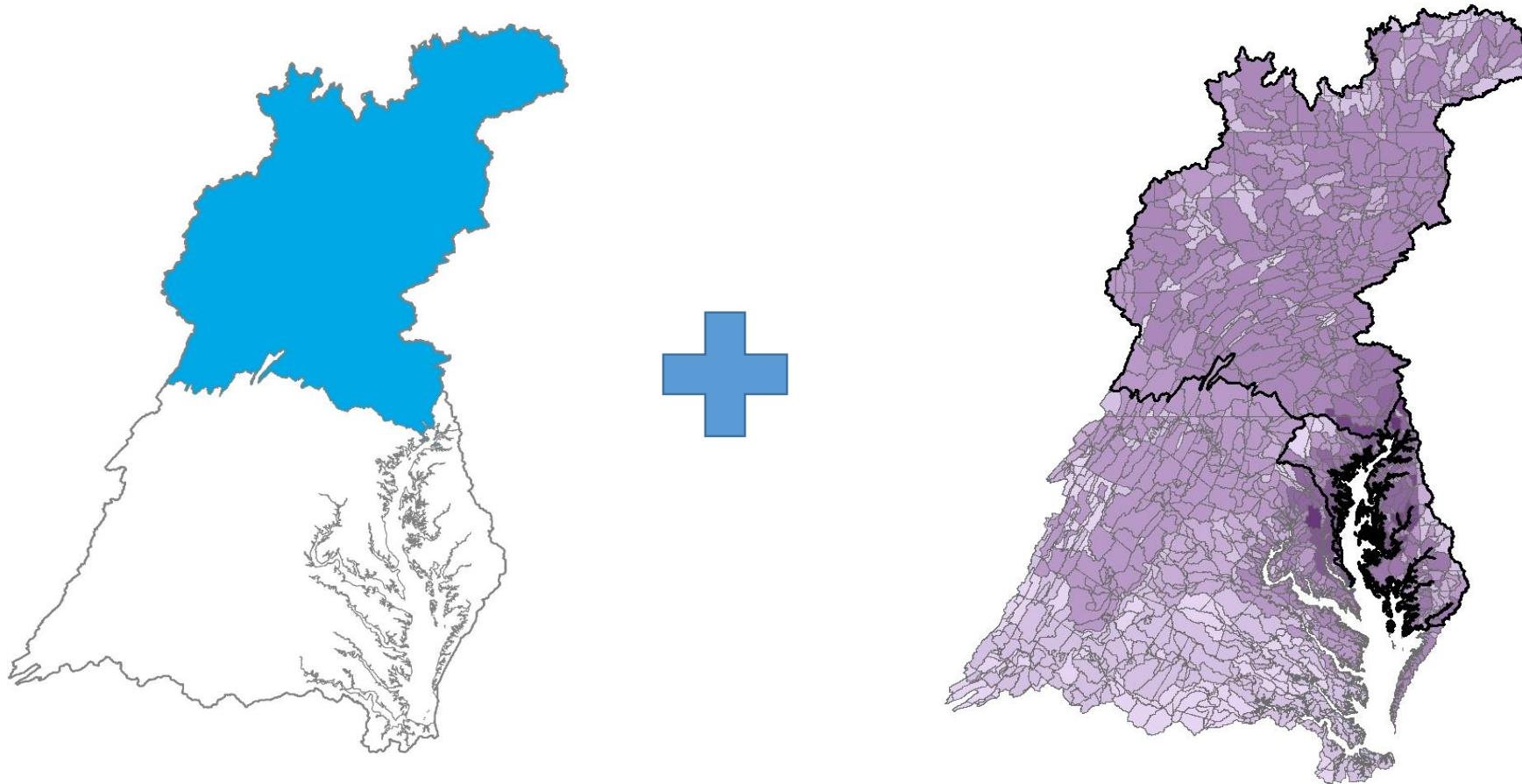
Post-2025 with
agreed-upon
date

Beyond 2025 –
no future date
identified

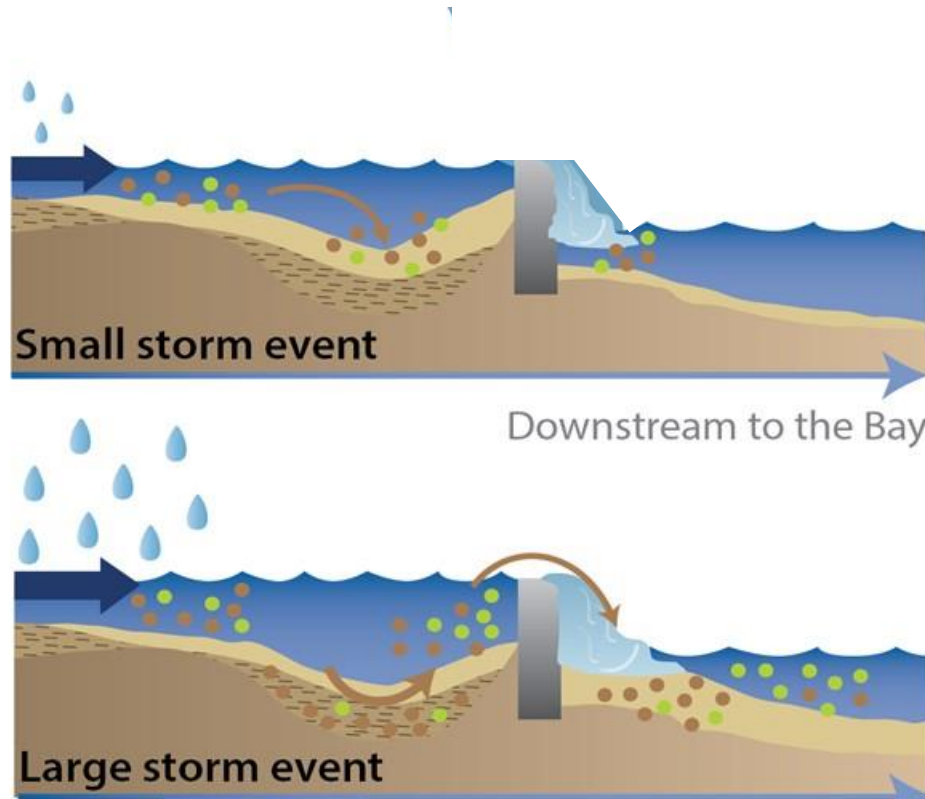
Conowingo Dam Infill

October 3, 2017 PSC Decisions

PSC agreed to add the “Susquehanna + most effective basins” option for final PSC decision.



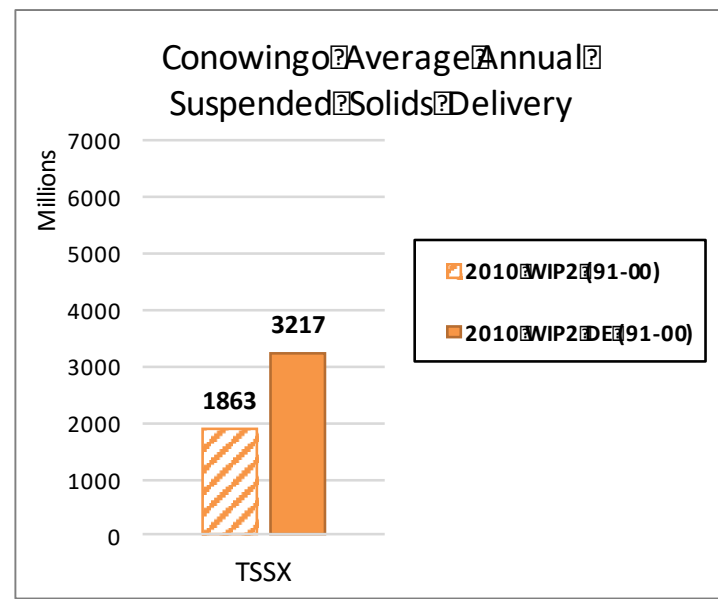
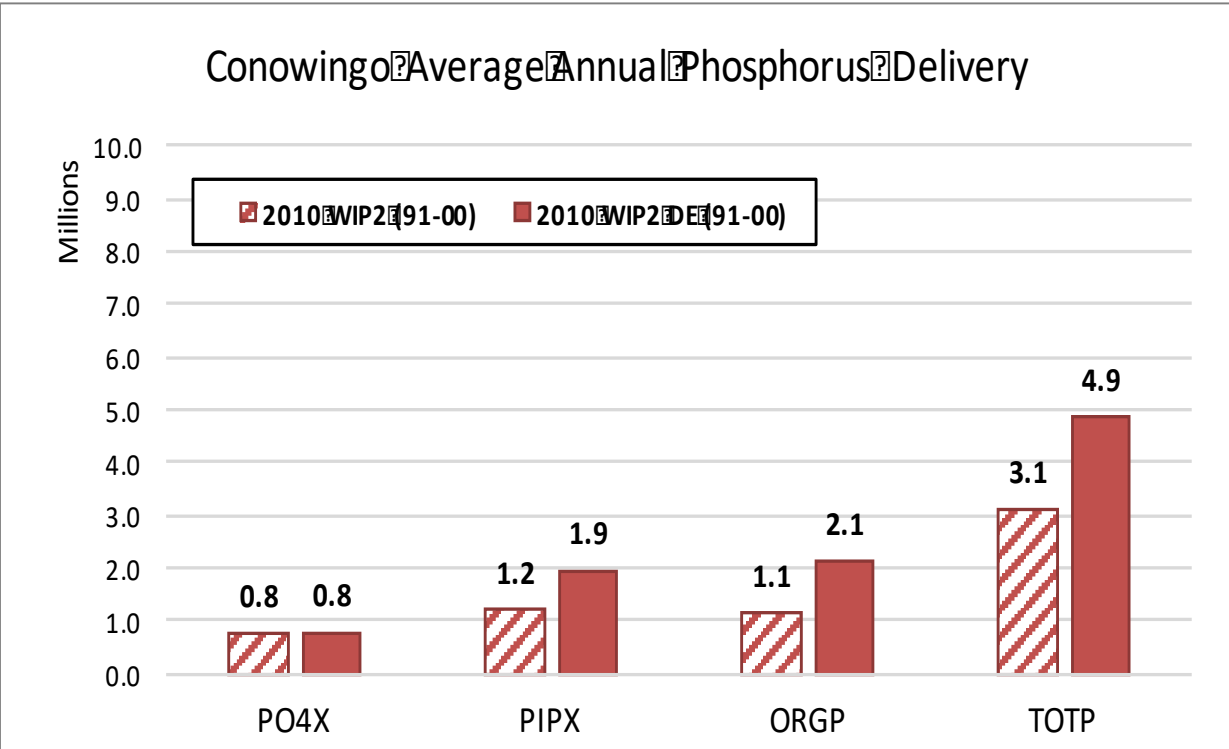
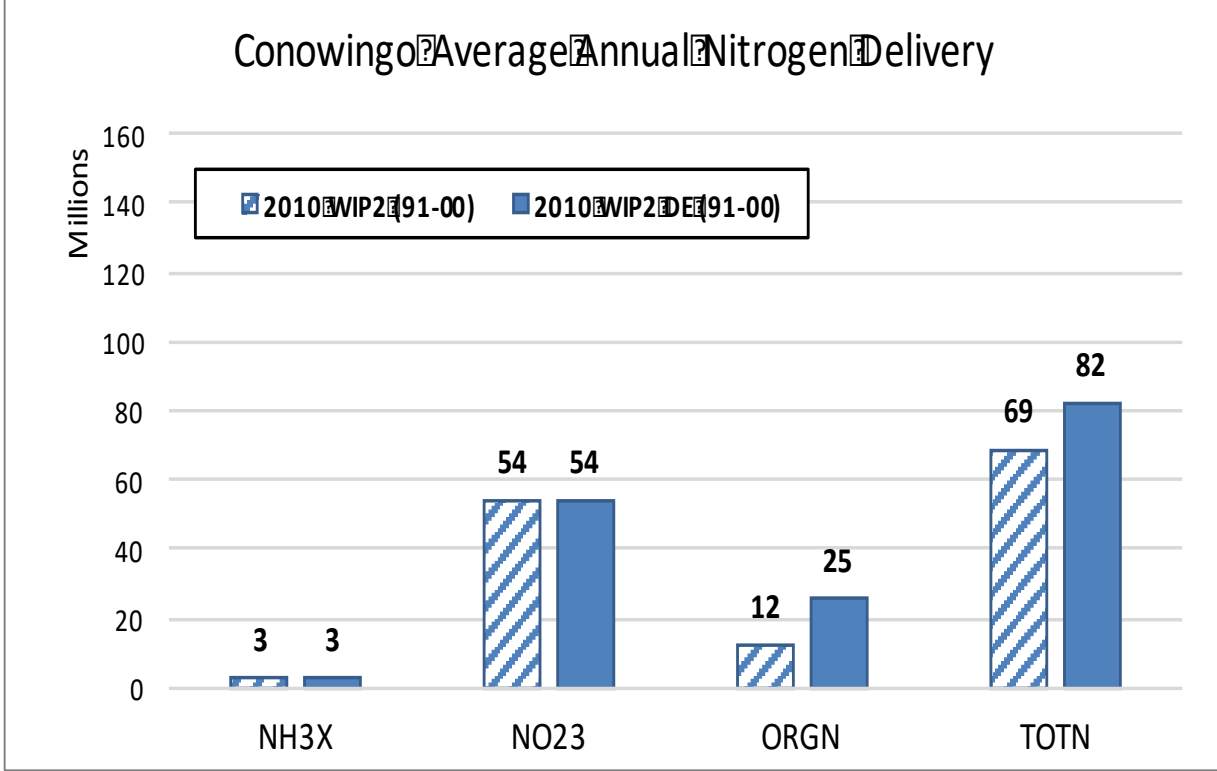
Estimated Loads to the Bay with Conowingo Dam and Reservoir at Infill Conditions



- Almost all of the nutrients are from upstream sources
- Much of the nutrients are biologically available to algae when they enter tidal waters
- Some of the nutrients are scoured from the bottom sediments behind the dam
- Much of these scoured nutrients are not biologically available to algae when they enter tidal waters

Therefore, the determination of nutrient loads to be reduced to account for Conowingo infill must factor in the type of nutrients and the timing of delivery

Conowingo Effect on Loads at the WIP2 condition

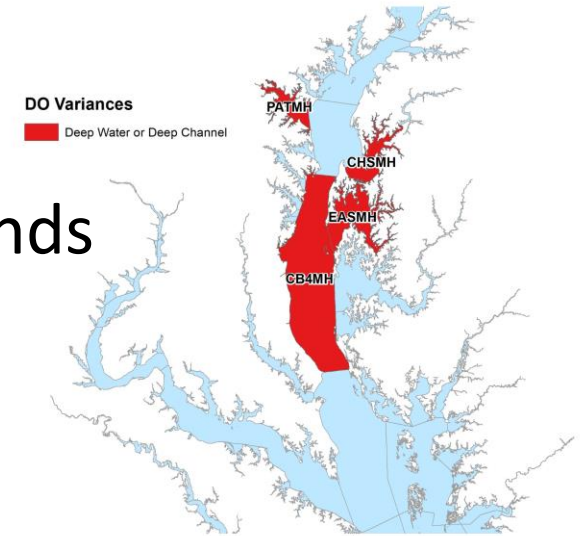
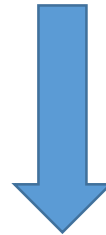


Estimated Loads to the Bay with Conowingo Dam and Reservoir at Infill Conditions

Additional Nitrogen Load: 13 million pounds



Additional Phosphorus Load: 1.8 million pounds



HOWEVER: These are less bioavailable nutrients and its delivery to Bay is dependent on large storm events. Therefore, only a smaller than expected (2 Percent increase) in non-attainment in Middle Central Chesapeake Bay Deep-Channel. Equivalent to 6 million pounds of Nitrogen and 0.26 million pounds of Phosphorus

Estimated Additional Nitrogen Reductions Required Under the Five Options

Jurisdiction	Susquehanna Only	Susquehanna plus effective basins	Susquehanna plus MD and VA	Entire Watershed	Increased Slope
NY	5.4%	4.6%	3.4%	3.0%	1.9%
PA	7.3%	6.2%	4.6%	4.5%	5.3%
MD	0.3%	2.9%	4.3%	3.9%	3.4%
WV	0.0%	0.0%	0.0%	3.0%	2.5%
DC	0.0%	0.0%	0.0%	0.2%	0.2%
DE	0.0%	0.0%	0.0%	6.8%	6.2%
VA	0.0%	0.0%	2.7%	2.4%	1.2%

Estimated Additional Nitrogen Reductions Required Under the Five Options

Jurisdiction	Susquehanna Only	Susquehanna plus effective basins	Susquehanna plus MD and VA	Entire Watershed	Increased Slope
NY	0.57	0.49	0.36	0.32	0.20
PA	5.31	4.56	3.34	3.31	3.88
MD	0.12	1.30	1.97	1.76	1.55
WV	0.00	0.00	0.00	0.19	0.16
DC	0.00	0.00	0.00	0.00	0.00
DE	0.00	0.00	0.00	0.32	0.29
VA	0.00	0.00	1.54	1.38	0.65

Estimated Additional Phosphorus Reductions Required Under the Five Options

Jurisdiction	Susquehanna Only	Susquehanna plus effective basins	Susquehanna plus MD and VA	Entire Watershed	Increased Slope
NY	5.4%	4.1%	2.5%	2.3%	1.3%
PA	7.7%	5.9%	3.6%	3.8%	3.0%
MD	0.1%	1.9%	2.8%	2.6%	3.7%
WV	0.0%	0.0%	0.0%	3.1%	1.6%
DC	0.0%	0.0%	0.0%	0.7%	0.8%
DE	0.0%	0.0%	0.0%	4.1%	2.7%
VA	0.0%	0.0%	2.6%	2.4%	1.7%

Estimated Additional Phosphorus Reductions Required Under the Five Options

Jurisdiction	Susquehanna Only	Susquehanna plus effective basins	Susquehanna plus MD and VA	Entire Watershed	Increased Slope
NY	0.026	0.020	0.012	0.011	0.007
PA	0.231	0.177	0.108	0.113	0.092
MD	0.005	0.069	0.099	0.091	0.131
WV	0.000	0.000	0.000	0.015	0.008
DC	0.000	0.000	0.000	0.001	0.001
DE	0.000	0.000	0.000	0.005	0.003
VA	0.000	0.000	0.168	0.155	0.112

Proposed Draft Phase III Planning Targets: Nitrogen

Jurisdiction	1985 Baseline	2013 Progress	Growth in Load to 2025	Conowingo Load Responsibility	Climate Change	2013 Progress +	Phase III Planning Target
NY	18.71	15.44	-0.52	0.49		15.40	10.62
PA	122.41	99.28	1.38	4.56		105.22	72.99
MD	83.56	55.89	0.76	1.30		57.95	45.39
WV	8.73	8.06	0.20	0.00		8.26	6.36
DC	6.48	1.75	0.00	0.00		1.76	2.25
DE	6.97	6.59	0.22	0.00		6.81	4.66
VA	84.29	61.53	0.86	0.00		62.39	56.37
BasinWide	331.15	248.54	2.91	6.34		257.80	198.64

*Units = millions of pounds

Proposed Draft Phase III WIP Planning Targets: Nitrogen

Jurisdiction	Growth in Load to 2025	Conowingo Load Responsibility	Climate Change	2013 Progress +
NY	-4.9%	4.6%	3.8%	3.4%
PA	1.9%	6.2%	5.7%	13.8%
MD	1.7%	2.9%	4.8%	9.4%
WV	3.1%	0.0%	3.7%	6.8%
DC	0.1%	0.0%	0.3%	0.3%
DE	4.8%	0.0%	8.5%	13.3%
VA	1.5%	0.0%	3.1%	4.6%
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Proposed Draft Phase III Planning Targets: Phosphorus

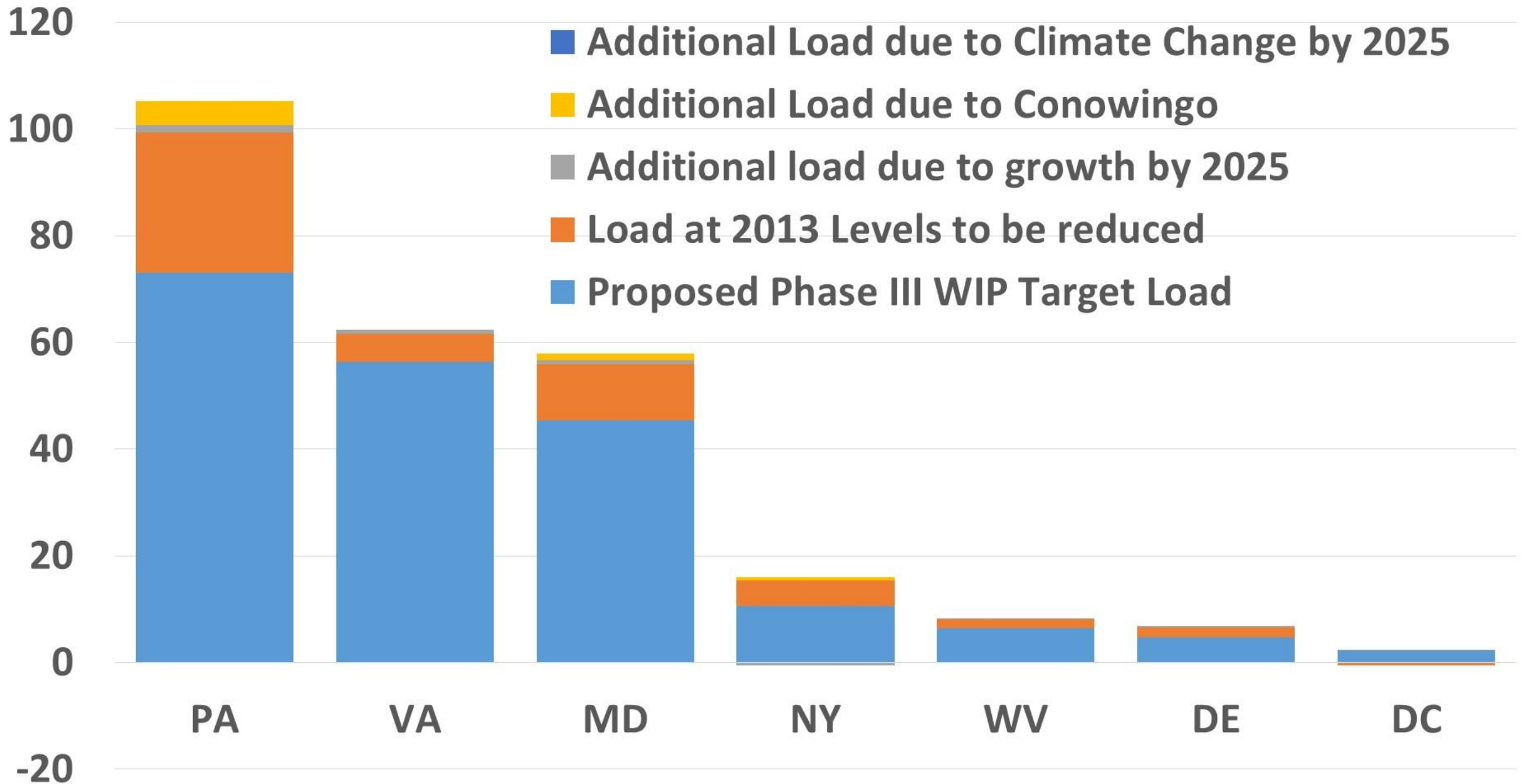
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PA	6.282	3.749	-0.034	0.177		3.893	3.012
MD	7.495	3.942	-0.053	0.069		3.957	3.553
WV	0.902	0.617	-0.027	0.000		0.591	0.493
DC	0.090	0.062	-0.001	0.000		0.062	0.120
DE	0.225	0.116	-0.004	0.000		0.111	0.116
VA	14.244	6.751	0.254	0.000		7.005	6.411
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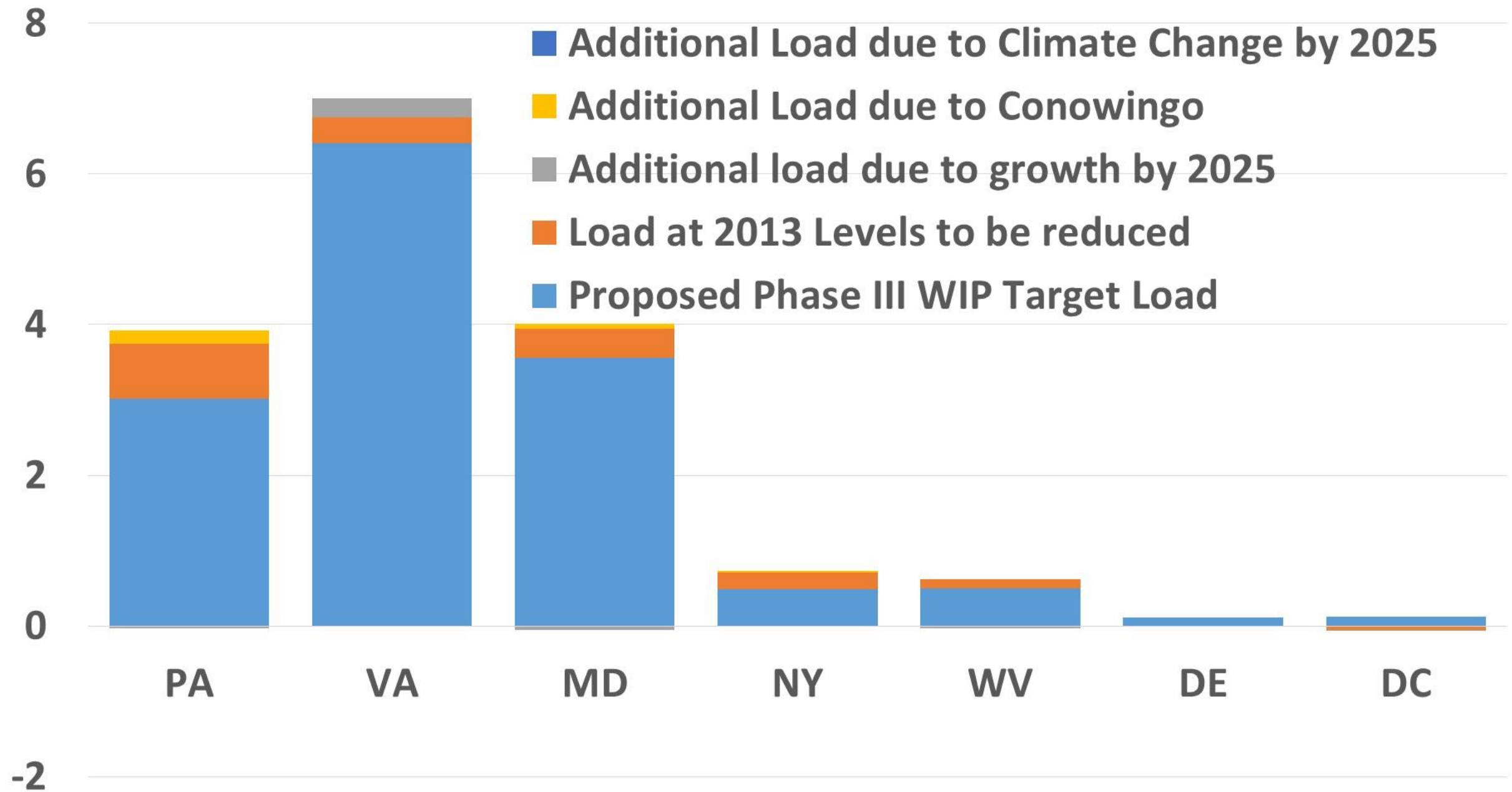
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PA	-1.1%	5.9%	4.7%	9.5%
MD	-1.5%	1.9%	3.2%	3.6%
WV	-5.4%	0.0%	3.9%	-1.5%
DC	-0.6%	0.0%	0.8%	0.2%
DE	-3.6%	0.0%	5.1%	1.5%
VA	4.0%	0.0%	3.0%	7.0%
BasinWide	0.9%	1.9%	3.4%	6.2%

Proposed Draft Nitrogen Targets



Proposed Draft Phosphorus Targets



WQGIT’s Conowingo Infill Recommendations

Narrative, description of the WQGIT’s recommendations

Jurisdiction	
New York	
Pennsylvania	
Maryland	
Virginia	
District of Columbia	
Delaware	
West Virginia	

Day Two Requested Policy Decision

Approval of which jurisdictions will be responsible for addressing the additional nutrient and sediment loads delivered to the Bay due to the Conowingo Dam and Reservoir infill

Approval of how the additional nutrient and sediment loads will be assigned to the jurisdictions responsible for addressing those loads

Approval of the timeframe by which the jurisdictions have to address the additional nutrient and sediment loads

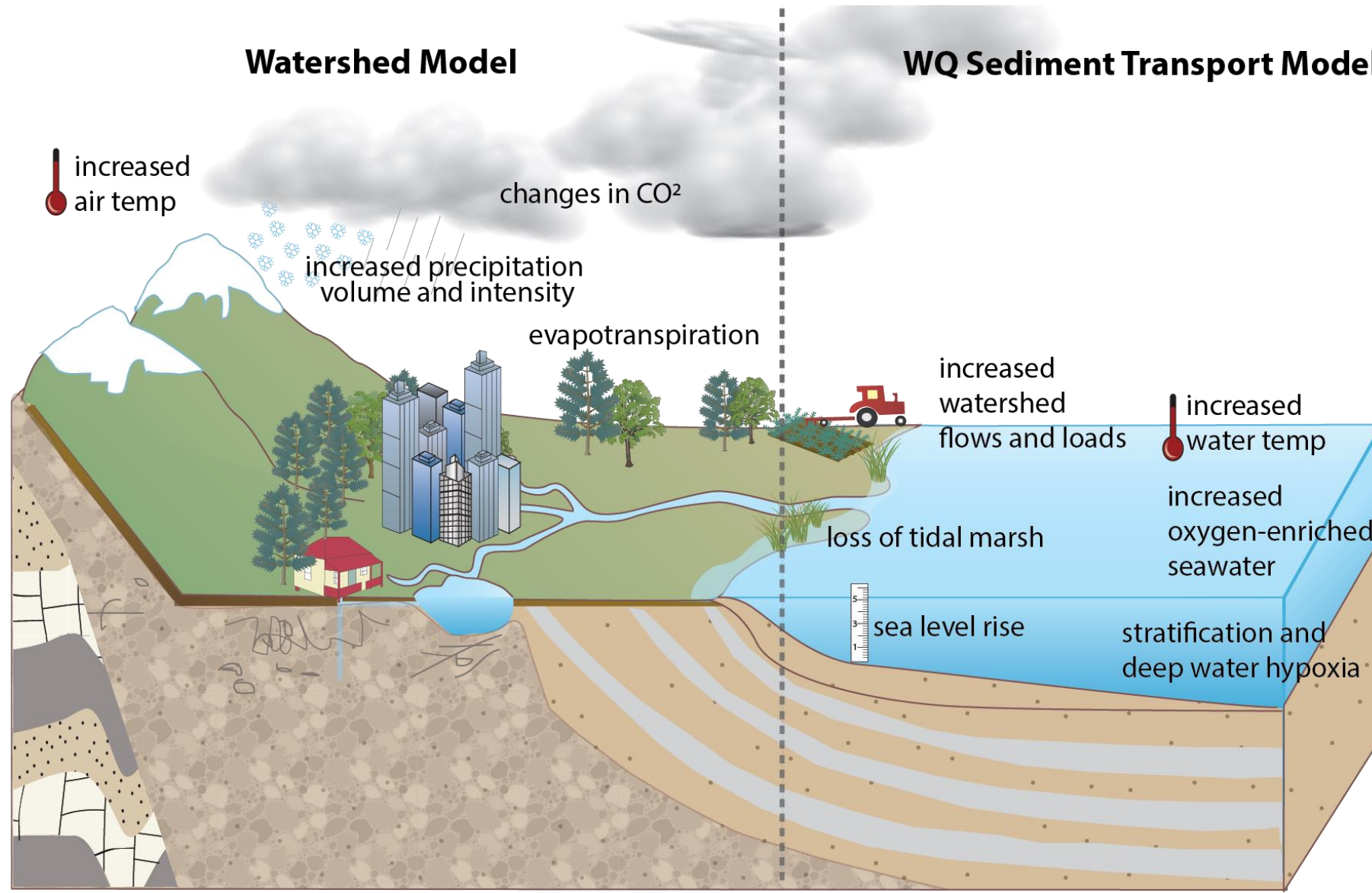
Factoring in Climate Change into the Jurisdictions' Phase III WIPs

**Mark Bennett, USGS, CBP Climate Resiliency
Workgroup Chair**

Accounting for the Changing Conditions

- The Climate Resiliency Workgroup and the Modeling Workgroup have been working with the Partnership's Scientific and Technical Advisory Committee to account for changing conditions occurring in the watershed and the Bay's tidal waters in a scientifically defensible manner
- The Water Quality Goal Implementation Team recommends that the Partnership take into account the cumulative responses of climate change (watershed and estuary) and not view impacts separately or in isolation

Accounting for Changing Conditions



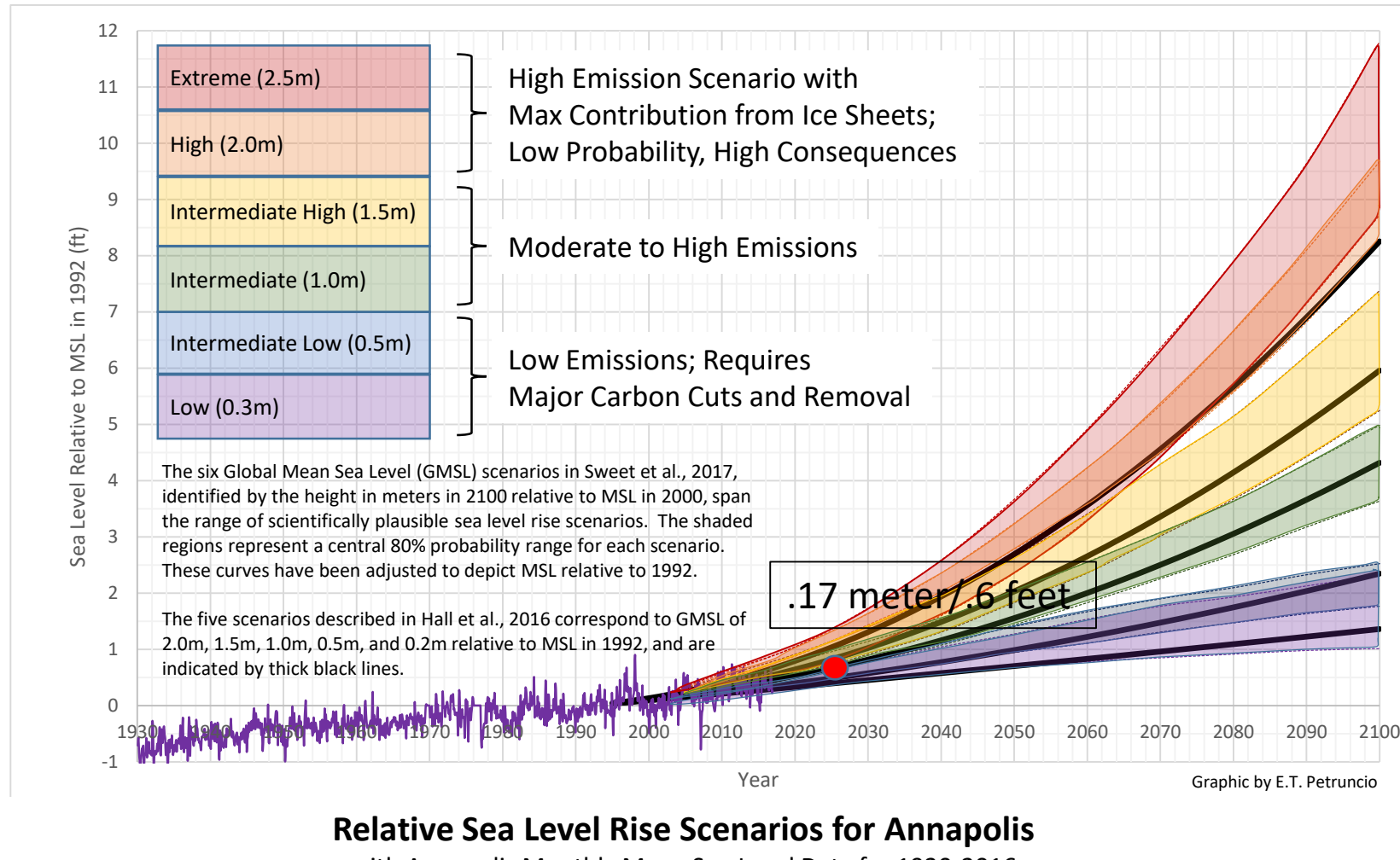
Impact of Changing Conditions on Bay and Watershed Increase Through Time

- Based on STAC guidance¹, the Partnership is using projections for 2025 that have a high level of confidence
 - Selection of projections for sea level rise and precipitation change were based on past records of observed climatic and resultant river flow conditions.
 - There is less uncertainty in downscaled temperature projections for 2025.
- According to the National Climate Assessment², impacts associated with precipitation, temperature and sea level are all expected to increase beyond 2025

Impact of Changing Conditions on Bay and Watershed Increase Through Time

- “The Chesapeake Bay Watershed is already experiencing impacts associated with sea level rise (e.g., coastal storm impacts and nuisance flooding) as well as heavy precipitation events¹”
- “Heavy precipitation events in most parts of the United States have increased in both intensity and frequency since 1901 (high confidence). There are important regional differences in trends, with the largest increases occurring in the northeastern United States (high confidence).²”

Relative Sea Level Rise

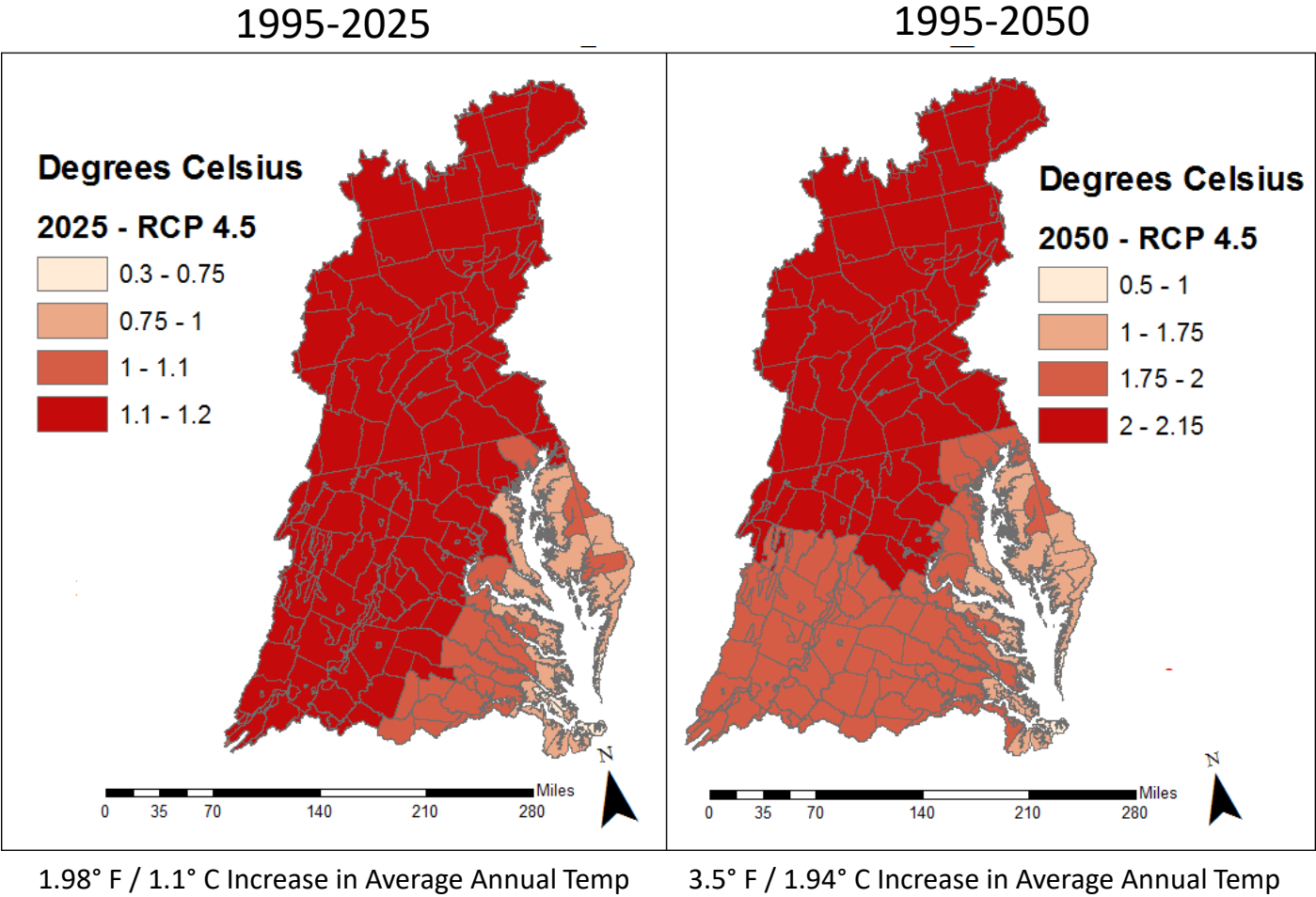


CBP Climate Resiliency Workgroup recommended 2025 projection: .17 meter/.6 feet

Relative Sea Level Rise Scenarios for Annapolis
with Annapolis Monthly Mean Sea Level Data for 1930-2016

Temperature Change

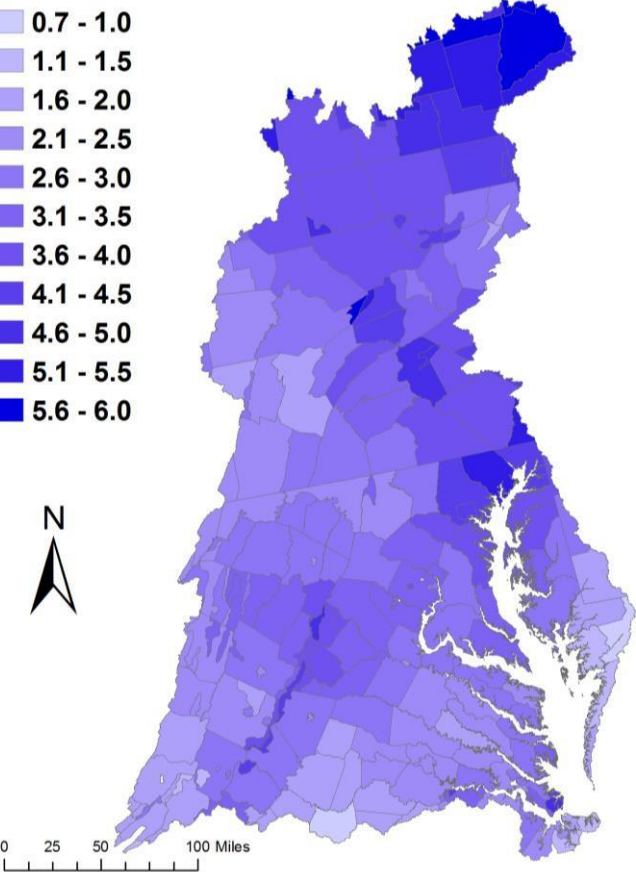
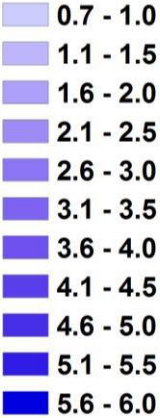
2025/2050 STAC Recommended Projections



Precipitation Change

2025 STAC Recommended Projection: Trends in 88-years of annual PRISM^[1] data

2025 Rainfall Projection (percent change)

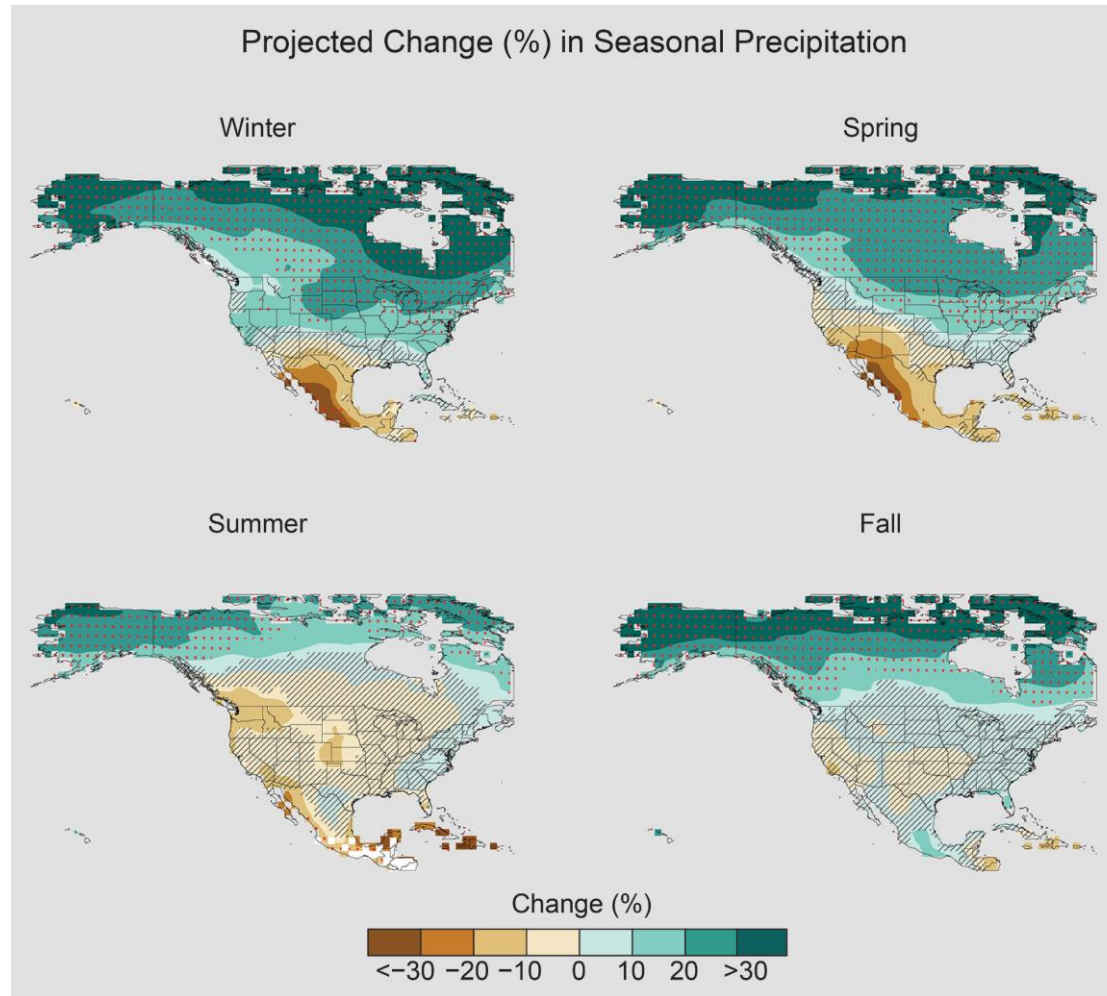


Change in Rainfall Volume 2021-2030 vs. 1991-2000

Major Basins	PRISM Trend
Youghiogheny River	2.1%
Patuxent River Basin	3.3%
Western Shore	4.1%
Rappahannock River Basin	3.2%
York River Basin	2.6%
Eastern Shore	2.5%
James River Basin	2.2%
Potomac River Basin	2.8%
Susquehanna River Basin	3.7%
Chesapeake Bay Watershed	3.1%

Precipitation Change

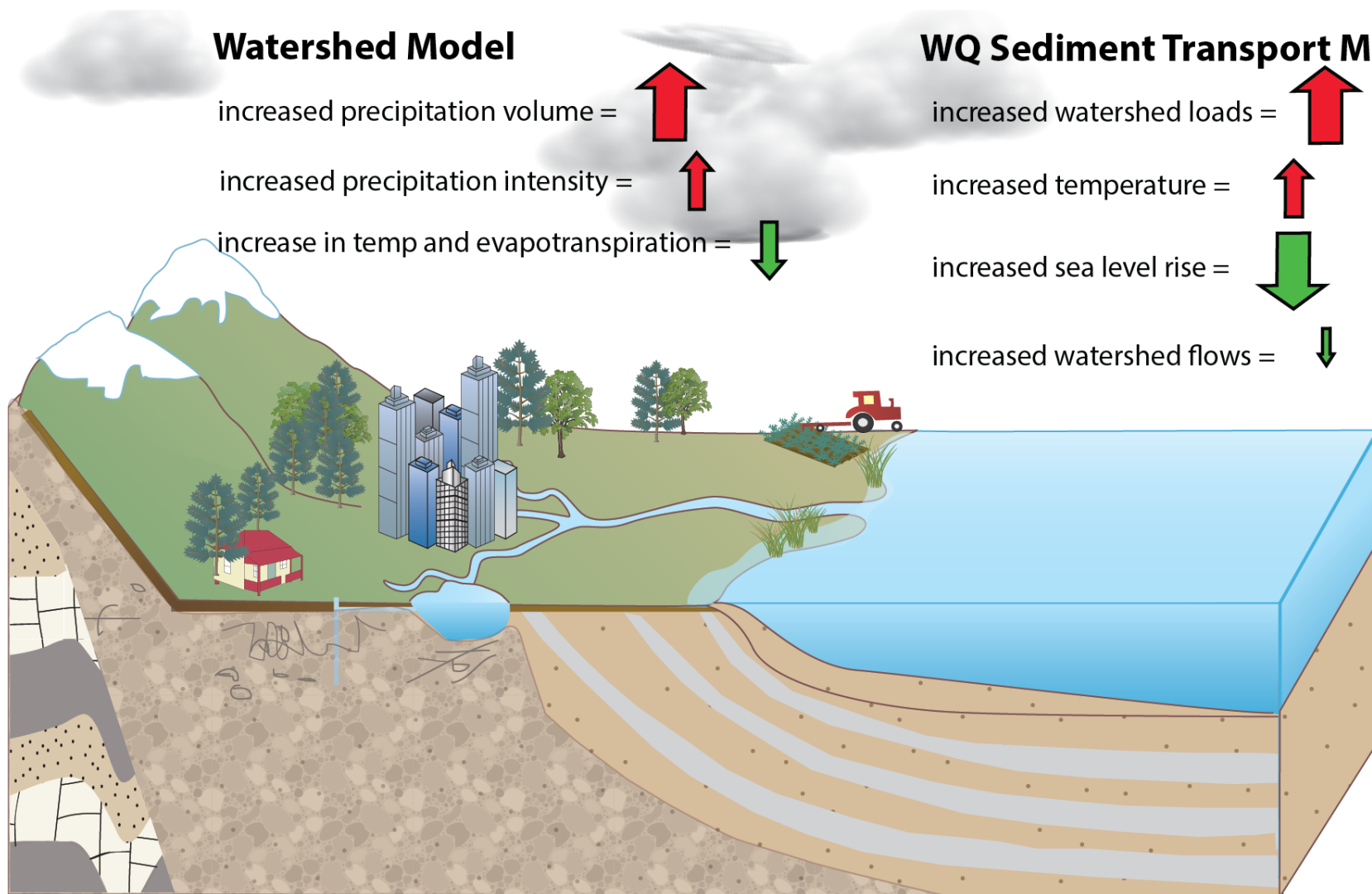
4th NCA Future Seasonal Patterns (2070 – 2099)



Projected change (%) in total seasonal precipitation from CMIP5 simulations for 2070–2099. The values are weighted multimodel means and expressed as the percent change relative to the 1976–2005 average. These are results for the higher scenario (RCP8.5).

Accounting for Changing Conditions

Cumulative Assessment of Bay Low Dissolved Oxygen Impacts



Bay Water Quality Responses to 2025 Climate Change Conditions

Changes in estimated 2025 dissolved oxygen criteria attainment for Deep Channel, Deep Water, and Open Water due to observed temperature and precipitation changes since 1991-2000 (years of average Bay hydrology).

		WIP2	WIP2 + Cono Infill	WIP2 + Cono Infill + CC
Run 223		195TN	208TN	210TN
11/30/17		13.7TP	15.4TP	15.3TP
CAST Loads		1993-1995	1993-1995	1993-1995
Cbseg	State	Deep Channel	Deep Channel	Deep Channel
CB3MH	MD		0%	0%
CB4MH	MD	6%	8%	10%
CB5MH	MD	0%	0%	0%
CB5MH	VA	0%	0%	0%
POTMH	MD	0%	0%	0%
RPPMH	VA	0%	0%	0%
ELIPH	VA	0%	0%	0%
CHSMH	MD	0%	0%	4%
EASMH	MD	6%	7%	8%

Deep Channel nonattainment increases by 2% in CB4MH

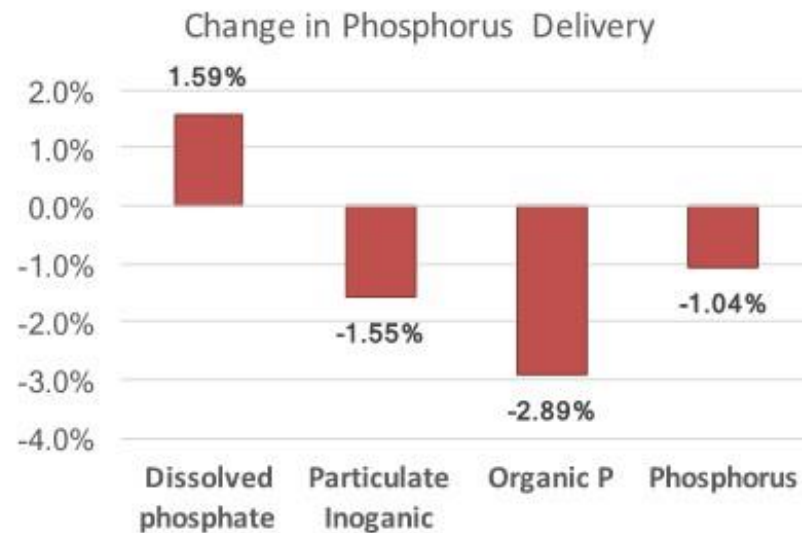
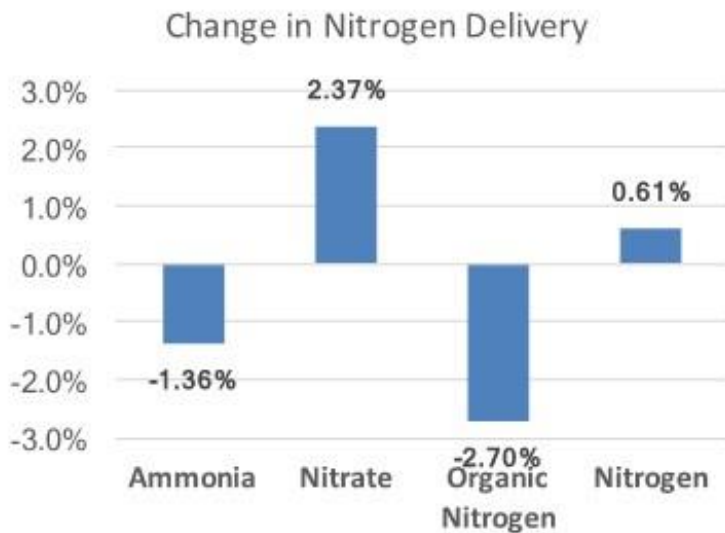
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11/30/17		13.7TP	15.4TP	15.3TP
CAST Loads		1993-1995	1993-1995	1993-1995
Cbseg	State	Deep Water	Deep Water	Deep Water
CB4MH	MD	5%	6%	7%
CB5MH	MD	1%	1%	2%
CB5MH	VA	0%	0%	0%
CB6PH	VA	0%	0%	0%
CB7PH	VA	0%	0%	0%
PATMH	MD	1%	2%	3%
MAGMH	MD	1%	5%	5%
SOU MH	MD	3%	8%	7%
SEVMH	MD	0%	0%	0%
PAXMH	MD	0%	0%	0%
POTMH	MD	0%	0%	0%
RPPMH	VA	0%	0%	0%
YRKPH	VA	0%	0%	0%
ELIPH	VA	0%	0%	0%
CHSMH	MD	0%	0%	0%
EASMH	MD	0%	0%	0%

Deep Water nonattainment increases by 1% in CB5MH

Procedures for assessing Open Water attainment under climate change conditions are being developed.

Estimated Changes in Watershed and Bay Loads by 2025 Due to Climate Change

- Inorganic nutrients are increased with climate change
- Organic nutrients are decreased
- Inorganic nutrients have a higher effect on dissolved oxygen



Proposed Draft Phase III WIP Planning Targets: Nitrogen

Jurisdiction	1985 Baseline	2013 Progress	Growth in Load to 2025	Conowingo Load Responsibility	Climate Change	2013 Progress +	Phase III Planning Target
NY	18.71	15.44	-0.52	0.49	0.400	15.80	10.62
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MD	83.56	55.89	0.76	1.30	2.194	60.15	45.39
WV	8.73	8.06	0.20	0.00	0.236	8.50	6.36
DC	6.48	1.75	0.00	0.00	0.006	1.76	2.25
DE	6.97	6.59	0.22	0.00	0.397	7.21	4.66
VA	84.29	61.53	0.86	0.00	1.722	64.11	56.37
BasinWide	331.15	248.54	2.91	6.34	9.09	266.89	198.64

*Units = millions of pounds

Proposed Draft Phase III WIP Planning Targets: Nitrogen

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VA	1.5%	0.0%	3.1%	4.6%
BasinWide	1.5%	3.2%	4.6%	9.2%

Proposed Draft Phase III WIP Planning Targets: Phosphorus

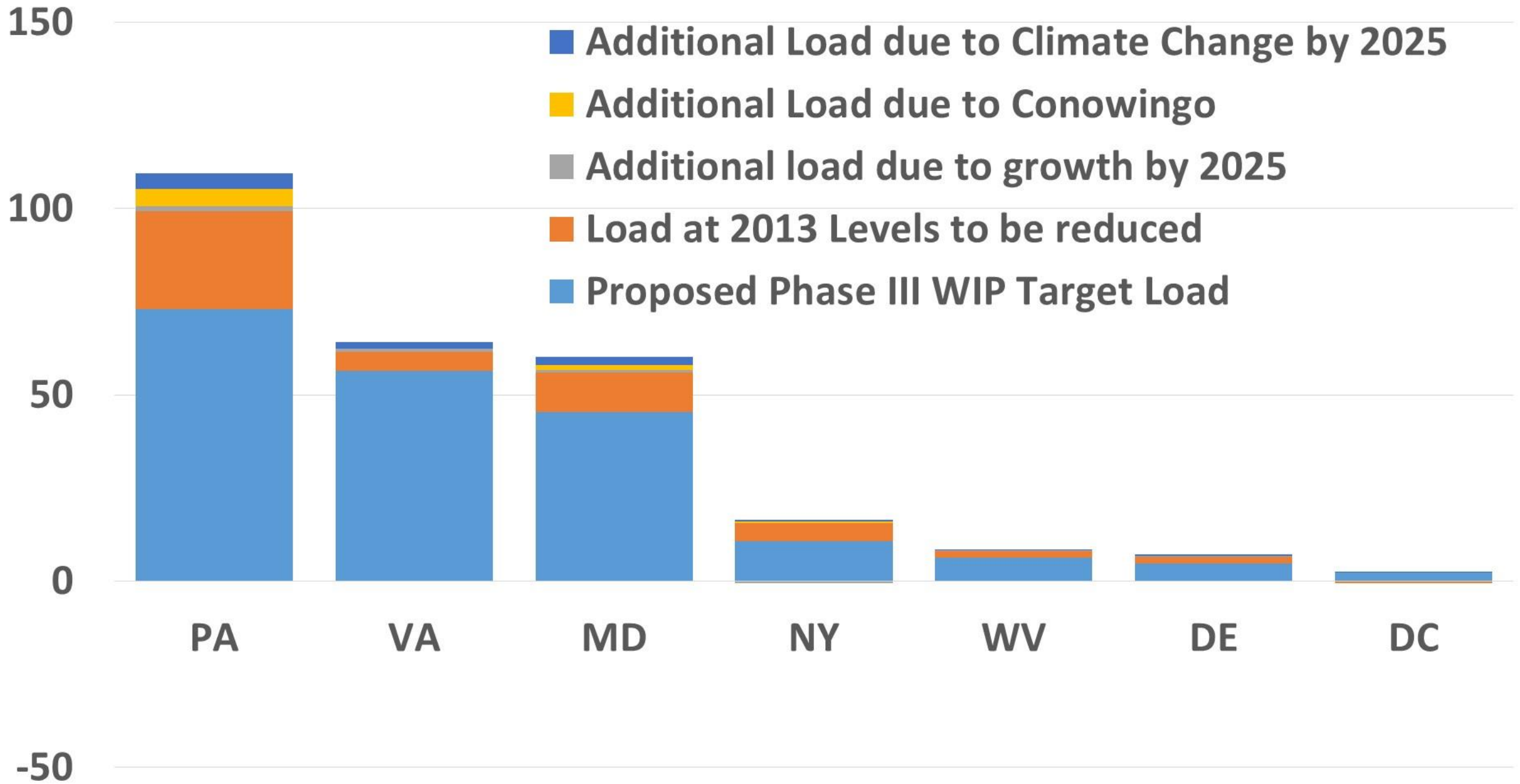
Jurisdiction	1985 Baseline	2013 Progress	Growth in Load to 2025	Conowingo Load Responsibility	Climate Change	2013 Progress +	Phase III Planning Target
NY	1.198	0.710	-0.010	0.020	0.014	0.734	0.491
PA	6.282	3.749	-0.034	0.177	0.141	4.034	3.012
MD	7.495	3.942	-0.053	0.069	0.114	4.071	3.553
WV	0.902	0.617	-0.027	0.000	0.019	0.610	0.493
DC	0.090	0.062	-0.001	0.000	0.001	0.063	0.120
DE	0.225	0.116	-0.004	0.000	0.006	0.117	0.116
VA	14.244	6.751	0.254	0.000	0.193	7.198	6.411
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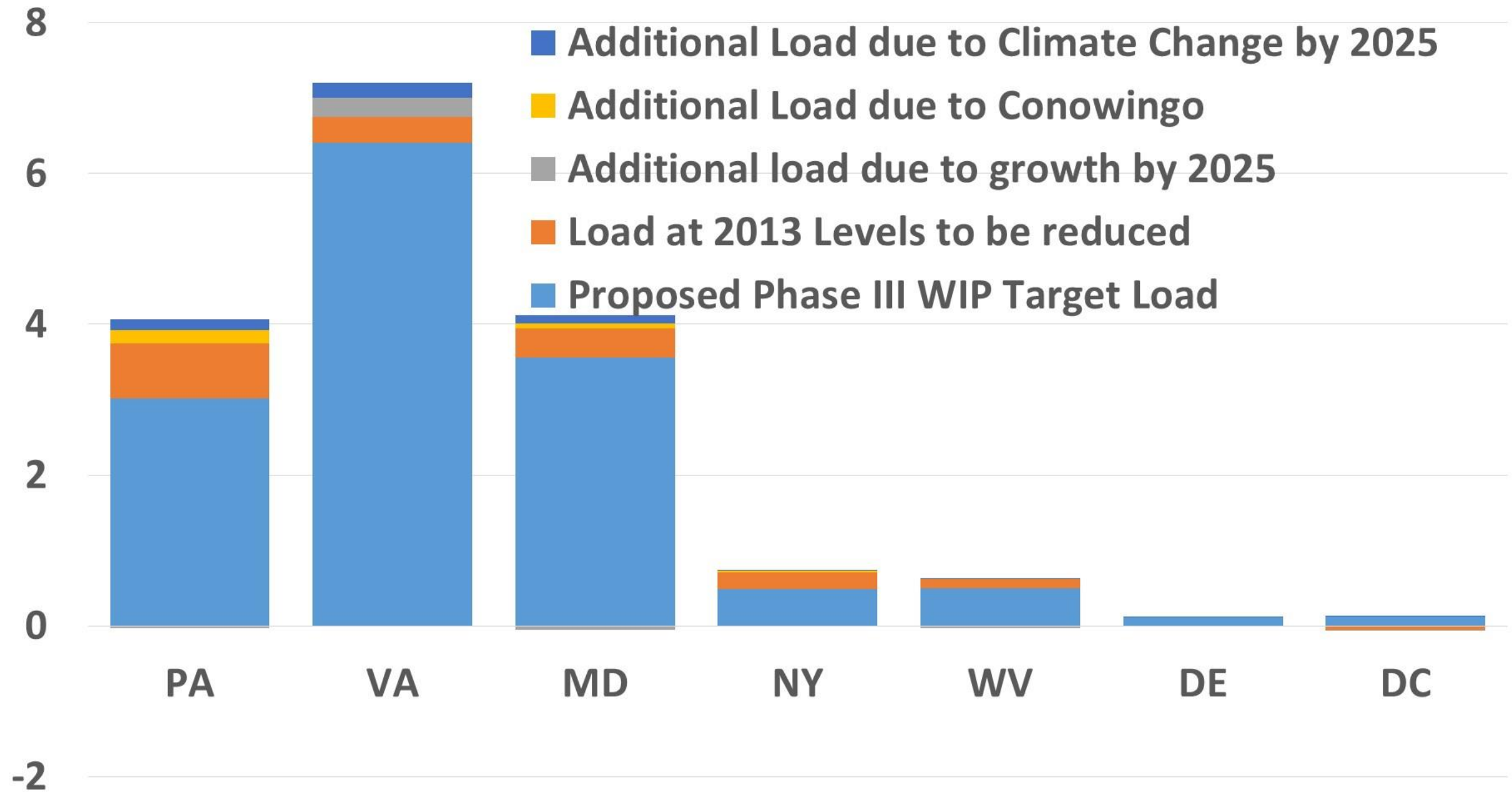
Proposed Draft Phase III WIP Planning Targets: Phosphorus

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WV	-5.4%	0.0%	3.9%	-1.5%
DC	-0.6%	0.0%	0.8%	0.2%
DE	-3.6%	0.0%	5.1%	1.5%
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BasinWide	0.9%	1.9%	3.4%	6.2%

Proposed Draft Nitrogen Targets



Proposed Draft Phosphorus Targets



Policy Options for Accounting for Climate Change in the Jurisdictions' Phase III WIPs

**Mark Bennett, USGS, CBP Climate Resiliency Workgroup
Co-Chair**

Two Policy Approaches



Numeric

and/or



Programmatic

Numerical Approach

- A quantitative, numerical approach will result in a very small changed level of effort necessary to meet water quality standards
- Account for the increased pollutant loads to each jurisdiction's portion of the Bay watershed
- Accounts for feedbacks to the Bay's assimilative capacity
- This approach would treat the estimated cumulative effect of changed conditions due to climate change similarly to the approach being taken to account for growth
- Jurisdictions would develop Phase III WIPs which account for the estimated increased pollutant loads

Numerical Approach: Pros & Cons

Pros	Cons
<ul style="list-style-type: none">• Comprehensive, straight-forward approach• Demonstrates Partnership's commitment to Chesapeake Bay Agreement Climate Resiliency Goal• Small level of increased effort necessary• Near-term response• Implemented in sequence with development of Phase III WIPs	<ul style="list-style-type: none">• Potential change in the level of effort required to meet water quality standards• If implemented in isolation (w/o the programmatic approach), would not address the anticipated impacts of climate change on BMPs

Programmatic Approach

- An “adaptive management approach” that would be implemented through the two-year milestone process
- Would not change a jurisdictions' planning targets
- Directs the Partnership to collect and consider new information on the performance of BMPs, including the contribution of seasonal, inter-annual climate variability, and weather extremes.
 - Jurisdictions would assess this information and adjust plans, over-time, to better mitigate anticipated changes in loads and impacts on the performance of BMPs.
- Would require the inclusion of a narrative strategy in Phase III WIPs, describing a jurisdictions’ programmatic commitments to address climate change.
 - A sample “*narrative strategy*” would be provided to jurisdictions to guide implementation.

Programmatic Approach: Pros & Cons

Pros	Cons
<ul style="list-style-type: none">• Adaptively managing for long-term change• Allows for use of local expertise and knowledge• Provides for learning across jurisdictions about methods and results• Allows for flexibility in jurisdictions' approaches to addressing climate change• Provides standard elements to be addressed	<ul style="list-style-type: none">• If implemented in isolation (w/o numeric approach), delays substantive action to address climate change in the near-term• Lack of specific technical understanding to guide implementation• Requires additional monitoring and assessment efforts• Inconsistency in implementation across jurisdictions

Day Two Requested Policy Decision

Approval of taking the numeric, programmatic or combined numeric/programmatic approach for addressing climate change impacts in the jurisdictions' development and implementation of their Phase III WIPs

Approval of providing flexibility among jurisdictions, as well as in commitments for CBP programmatic support (e.g., guidance, data, funding, etc.), for implementation of climate change policies that exceed the Partnership approved policies

Accounting for Growth, Conowingo, and Climate Change in the Jurisdictions' Phase III WIPs

**Teresa Koon, WV DEP, CBP Water Quality Goal
Implementation Team Vice Chair
and**

Lee Currey, MDE, CBP Modeling Workgroup Co-Chair

Summary of “All the Numbers”: Nitrogen

Jurisdiction	1985 Baseline	2013 Progress	Growth in Load to 2025	Conowingo Load Responsibility	Climate Change	2013 Progress +	Phase III Planning Target
NY	18.71	15.44	-0.52	0.49	0.400	15.80	10.62
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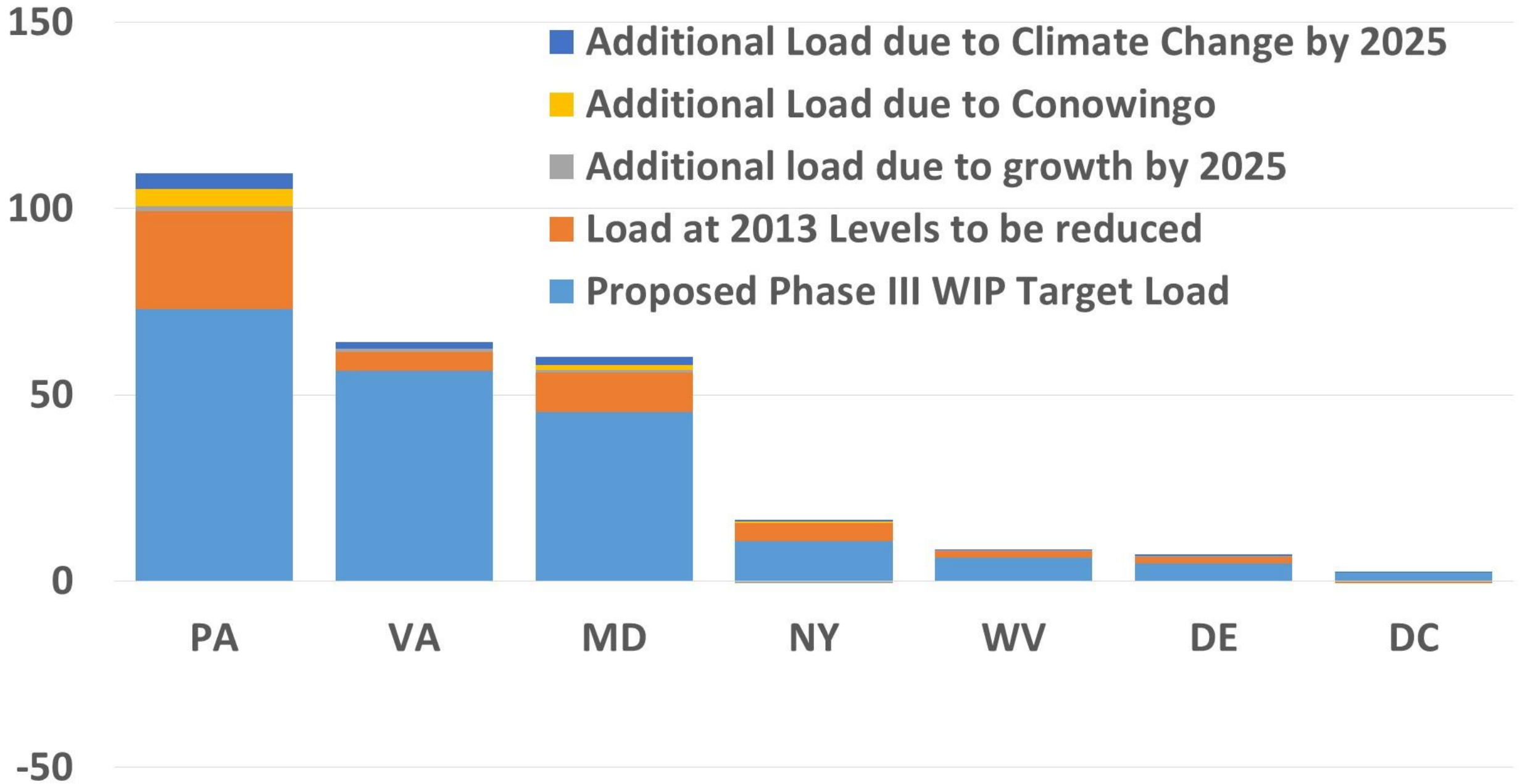
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Summary of “All the Numbers”: Phosphorus

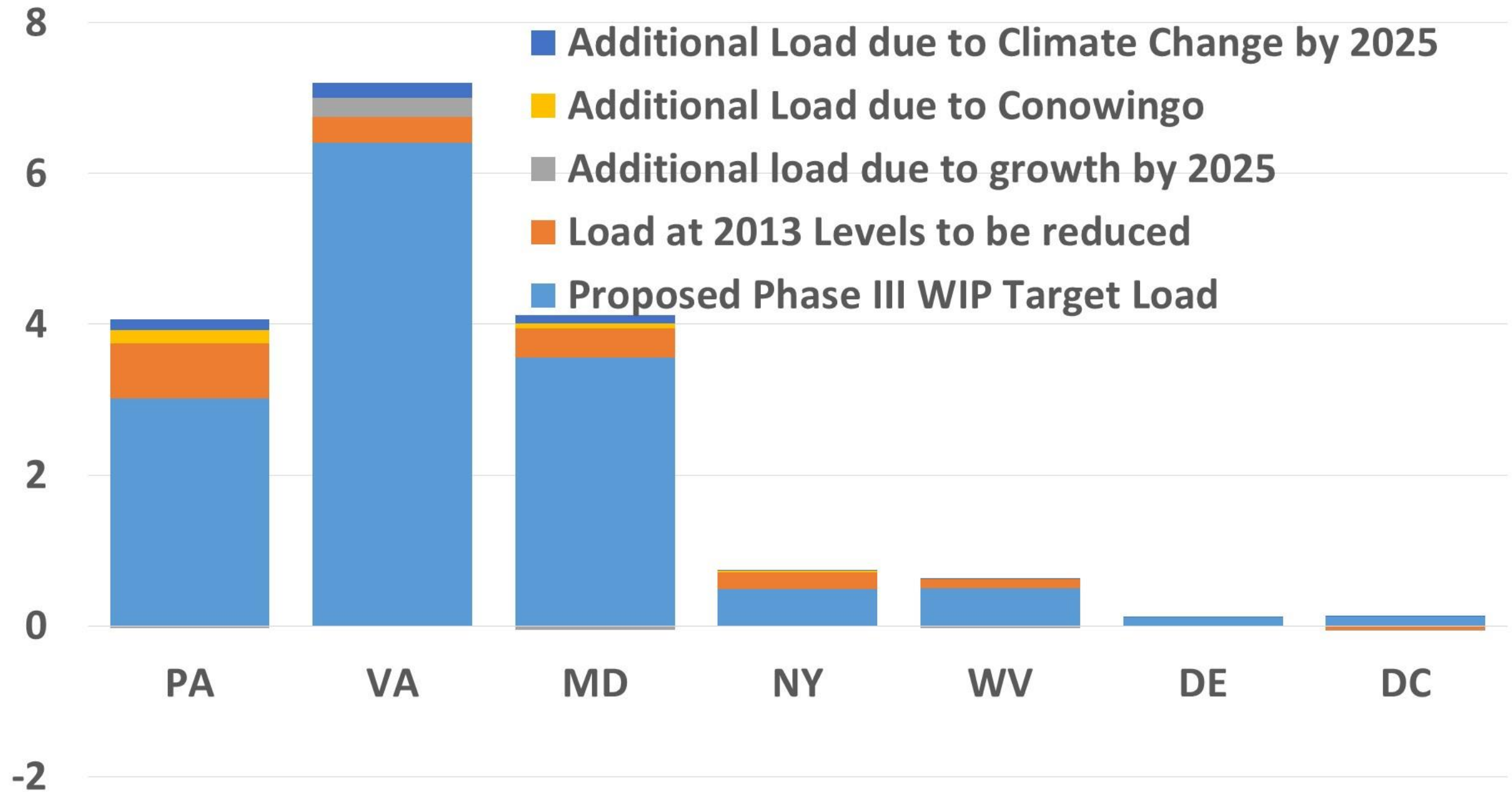
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Proposed Draft Nitrogen Targets



Proposed Draft Phosphorus Targets



Day Two Requested Policy Decision

- 1) Adoption of **Partnership's Phase 6 models** for management application
- 2) Approval of the proposed **Bay assimilative capacity** and adjustments to Maryland's water quality standards regulations' restoration variances
- 3) Approval of **draft Phase III Planning Targets** as the starting point for the 4-month review process
- 4) Approval of proposed process for the **four-month review** of the draft Phase III WIP planning targets

Day Two Requested Policy Decision

- 5) Approval of using 2025 for **accounting for growth** in the Phase III WIPs
- 6) Approval of the approach to account for the additional loads delivered to the Bay due to the **Conowingo infill**
- 7) Approval of how to factor **climate change** into the Phase III WIPs