


BMP Verification:
What is it and How Will it Impact Pennsylvania?

Chesapeake Bay Program Conservation District and Agency Staff Meeting

March 13, 2017

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Chesapeake Bay Program
Science. Restoration. Partnership.

+ over 400 other unique practices approved by the Partnership for tracking, verification and reporting!

Chesapeake Bay Program Partnership
Commitment to Verification: October 2014

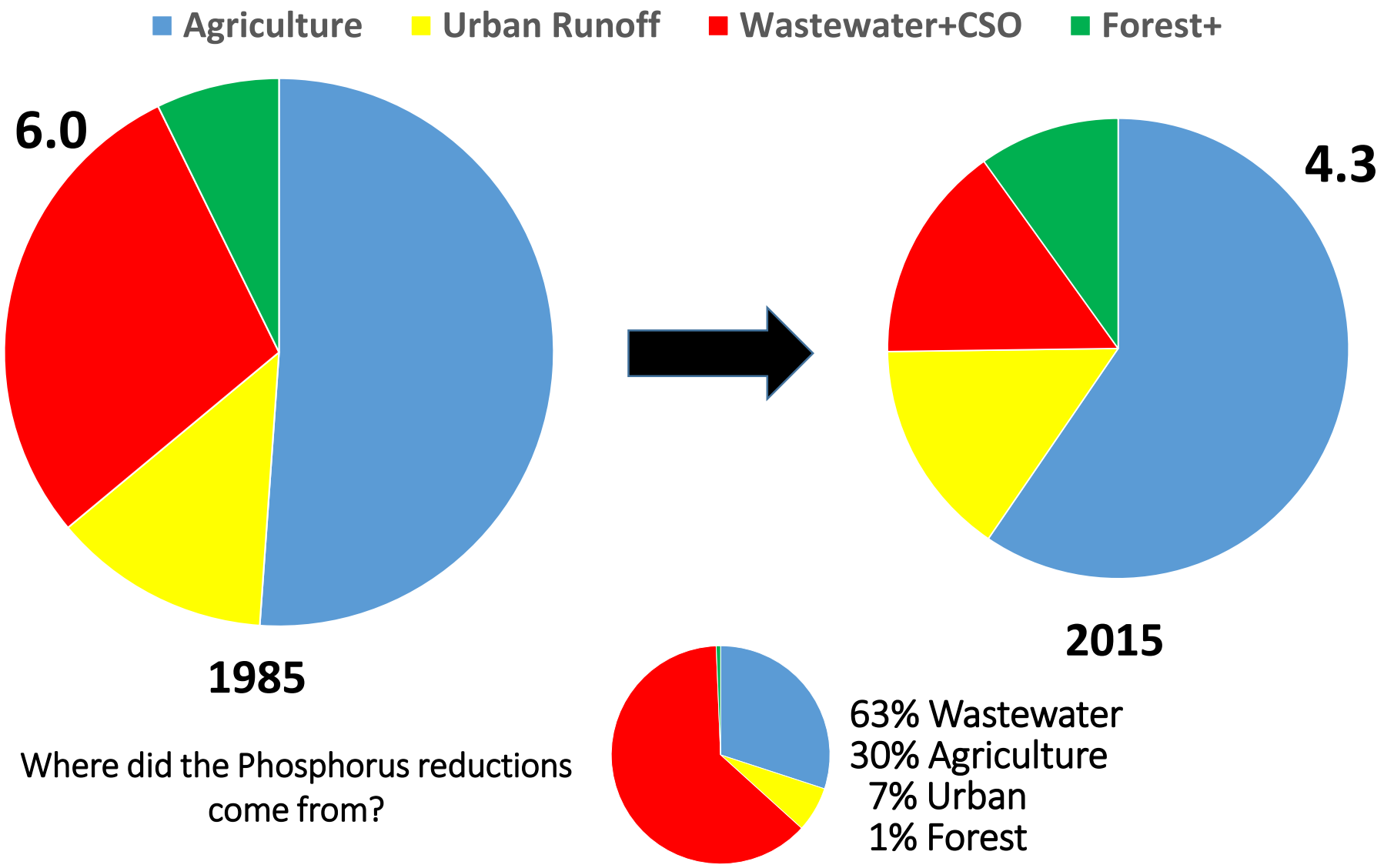
Strengthening Verification of Best Management Practices Implemented in the Chesapeake Bay Watershed: A Basinwide Framework




“Process through which agency partners ensure practices, treatments and technologies resulting in reductions of nitrogen, phosphorus and sediment pollutant loads are implemented and operating correctly.”

“are implemented and operating correctly”

Pennsylvania Phosphorus Loads: 1985-2015



Where did the Phosphorus reductions come from?

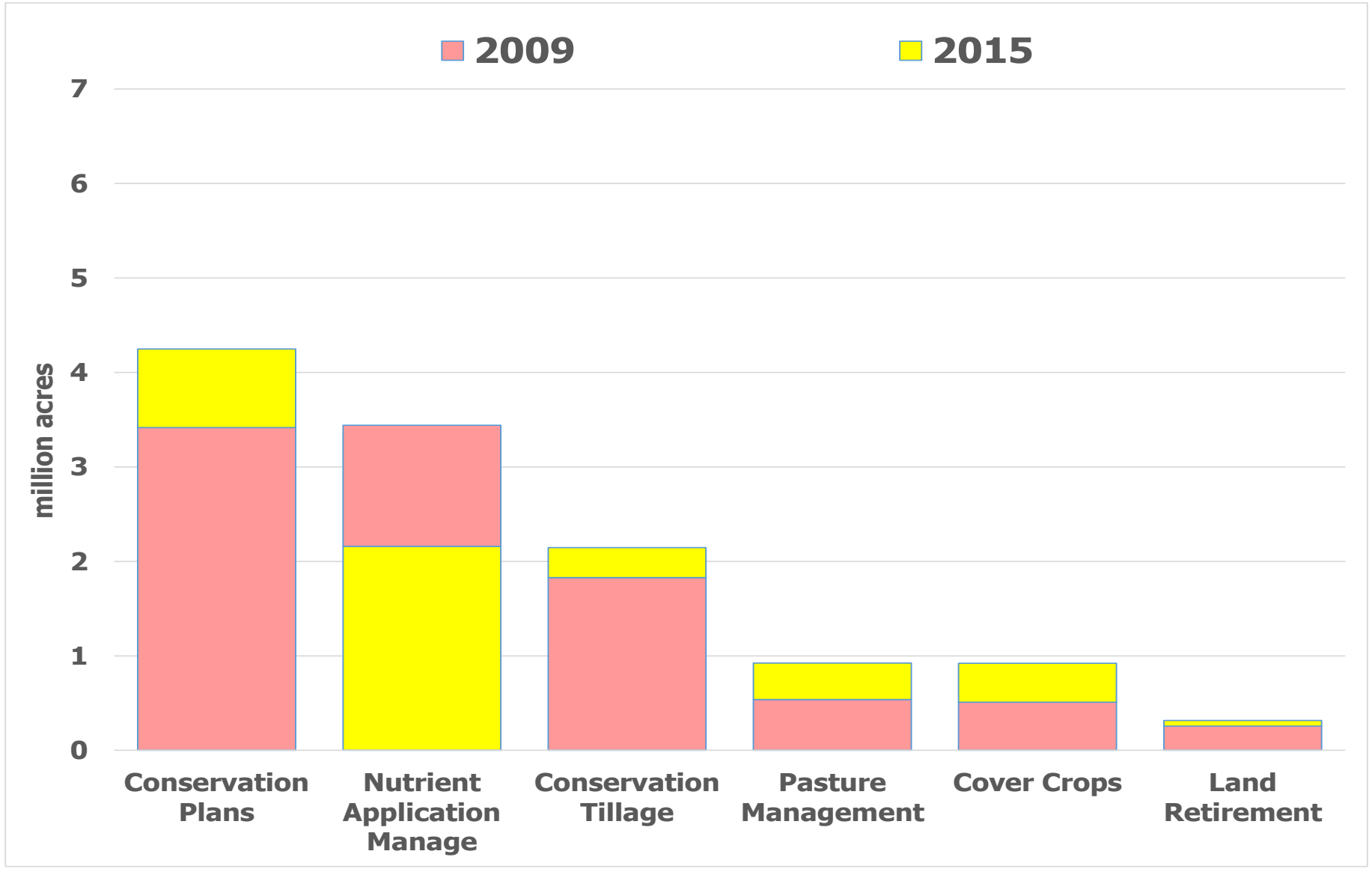
63% Wastewater
30% Agriculture
7% Urban
1% Forest

Agriculture BMP Implementation

Example

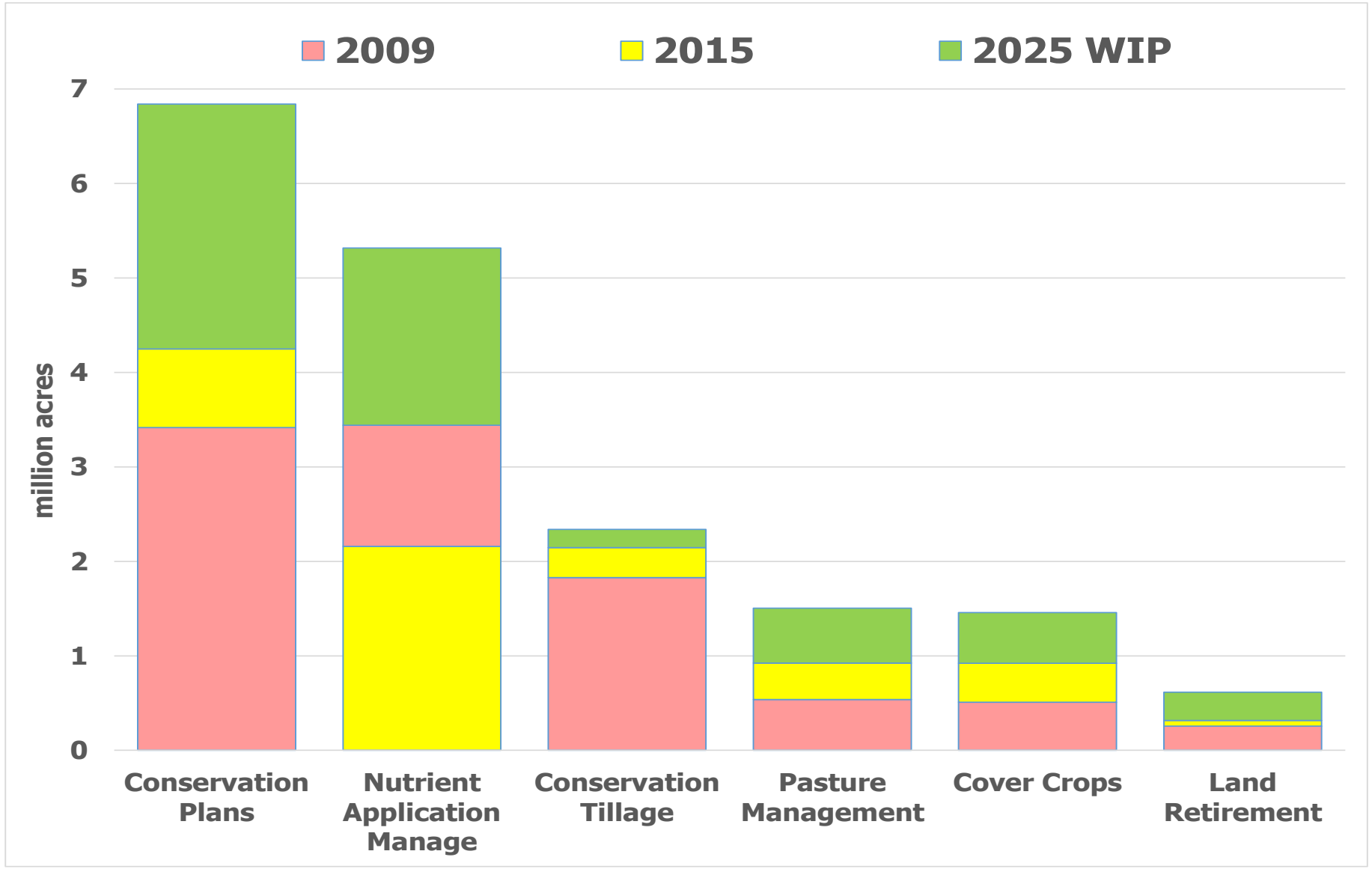
Agriculture BMP Implementation

Example



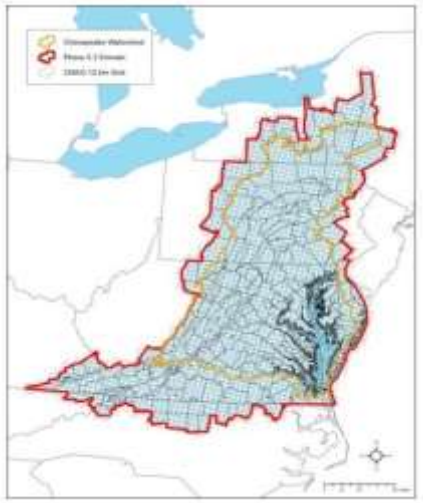
Agriculture BMP Implementation

Example



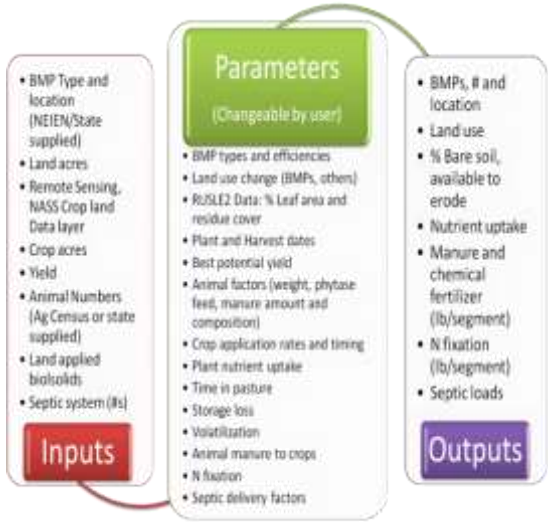
BMPs Support Development/Calibration of Partnership Models Supporting Decision Making

Chesapeake Bay Airshed

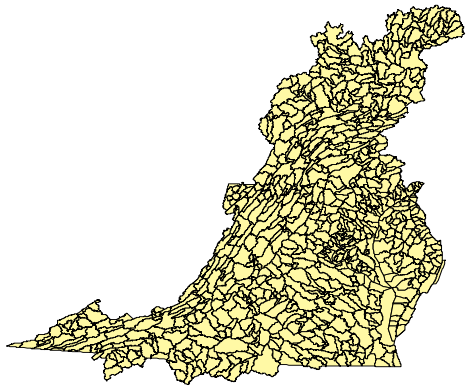


Chesapeake Bay Land Change

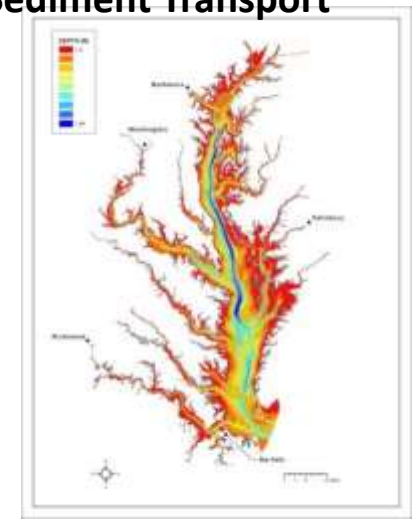
Chesapeake Bay Scenario Builder



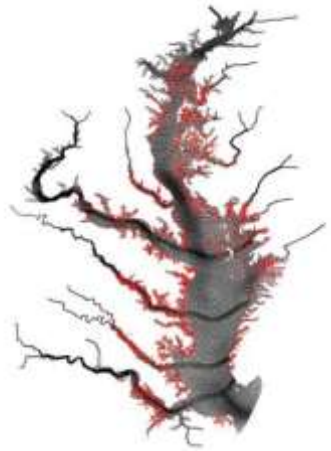
Chesapeake Bay Watershed



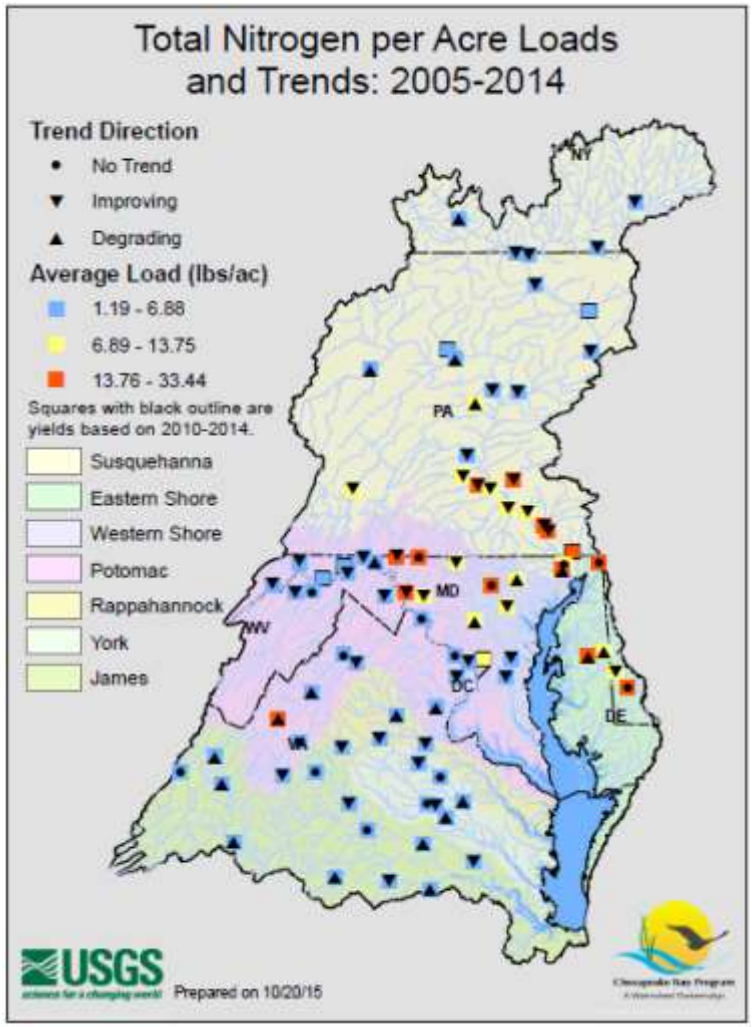
Chesapeake Bay Water Quality and Sediment Transport

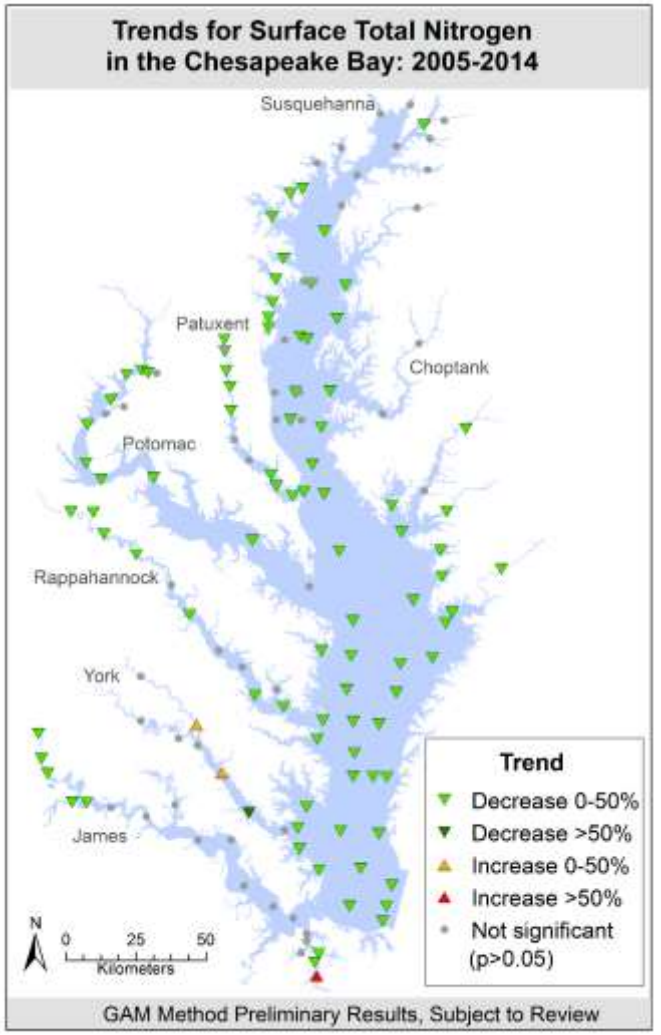


Chesapeake Bay Filter Feeder

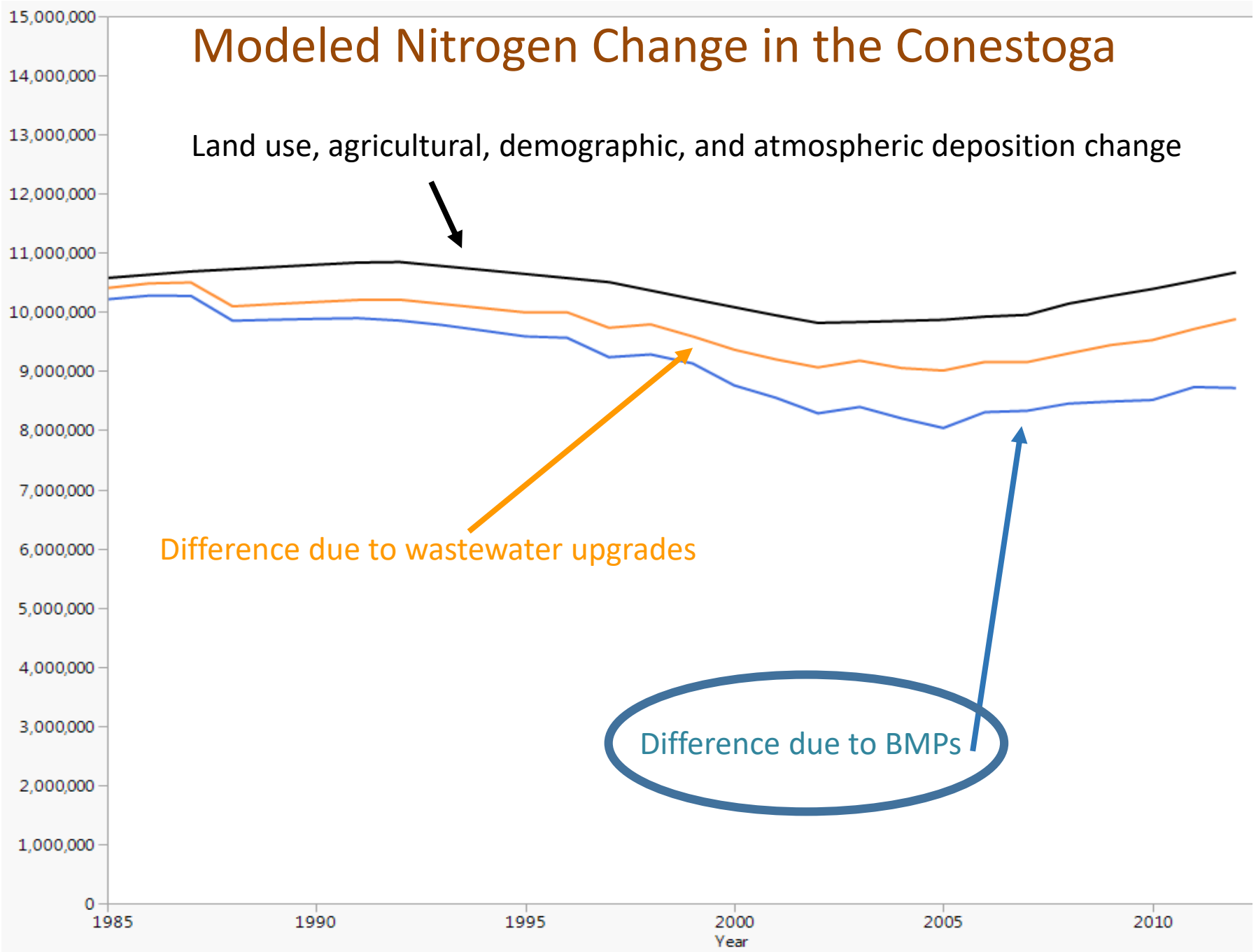


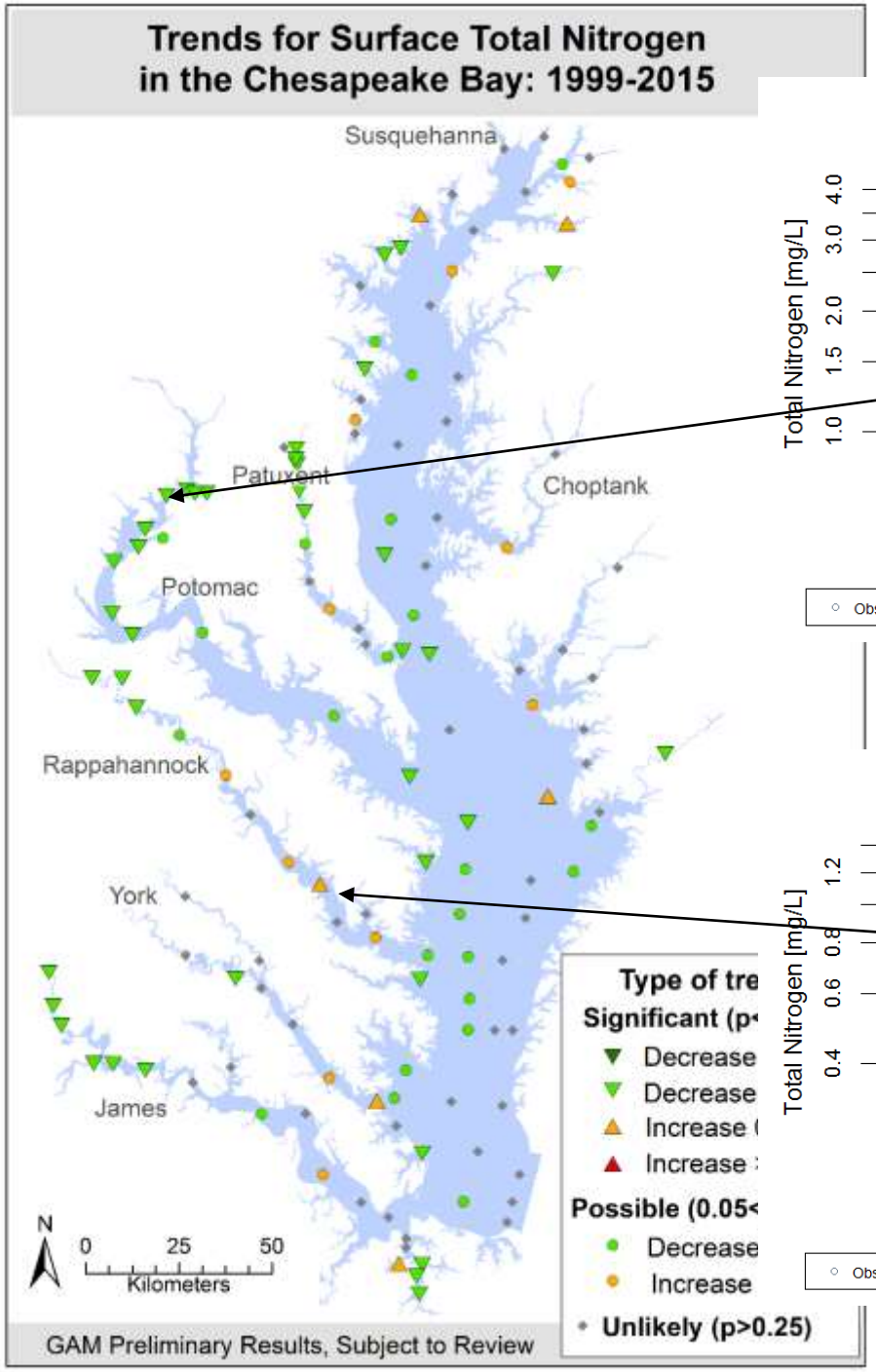
Used in Explaining Trends in Water Quality

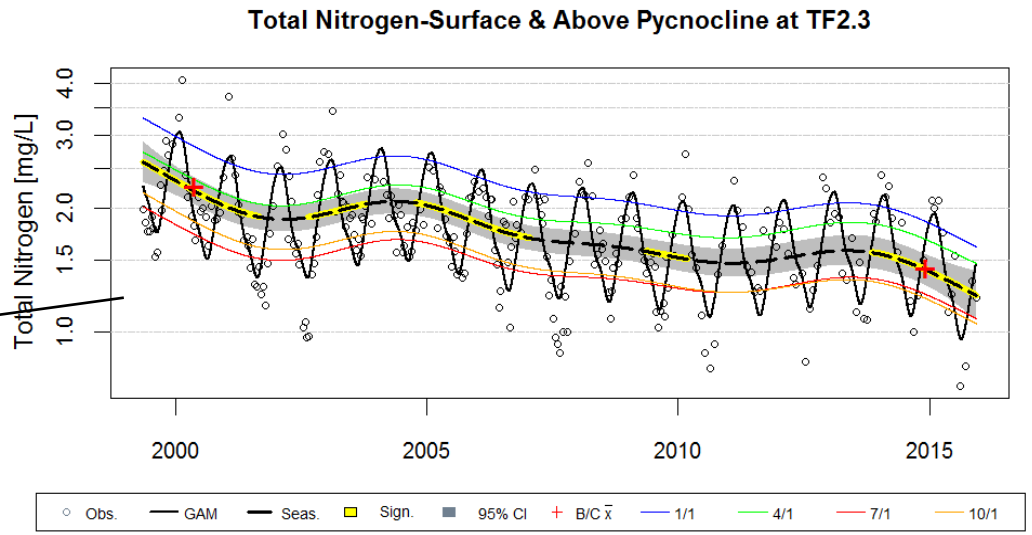




Modeled Nitrogen Change in the Conestoga




Trends for Surface Total Nitrogen
in the Chesapeake Bay: 1999-2015
Susquehanna
Patuxent
Choptank
Potomac
Rappahannock
York
James
N
0
25
50
Kilometers
Type of tre
Significant (p<
Decrease
Decrease
Increase (
Increase :
Possible (0.05<
Decrease
Increase
Unlikely (p>0.25)
GAM Preliminary Results, Subject to Review


Total Nitrogen-Surface & Above Pycnocline at TF2.3
Total Nitrogen [mg/L]
1.0
1.5
2.0
3.0
4.0
2000
2005
2010
2015
Obs.
GAM
Seas.
Sign.
95% CI
B/C x̄
1/1
4/1
7/1
10/1

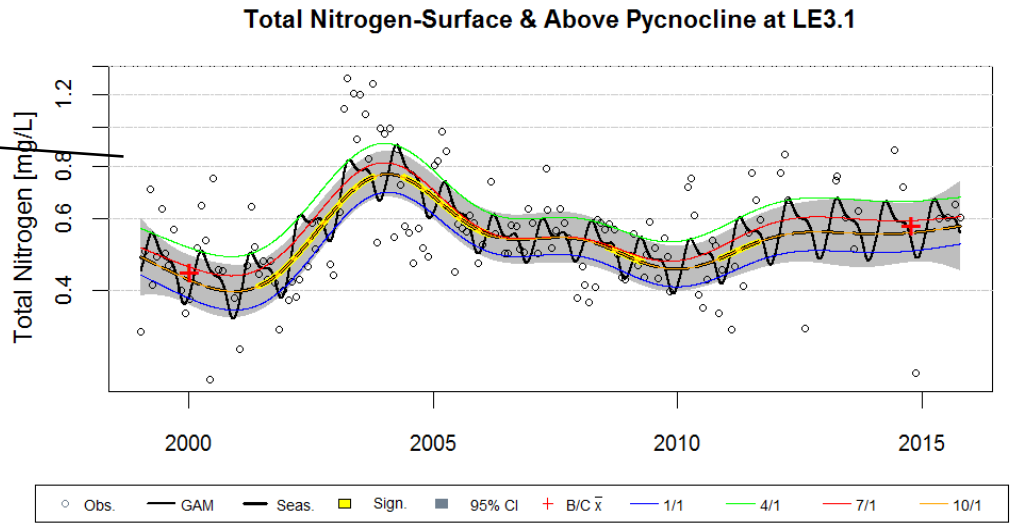
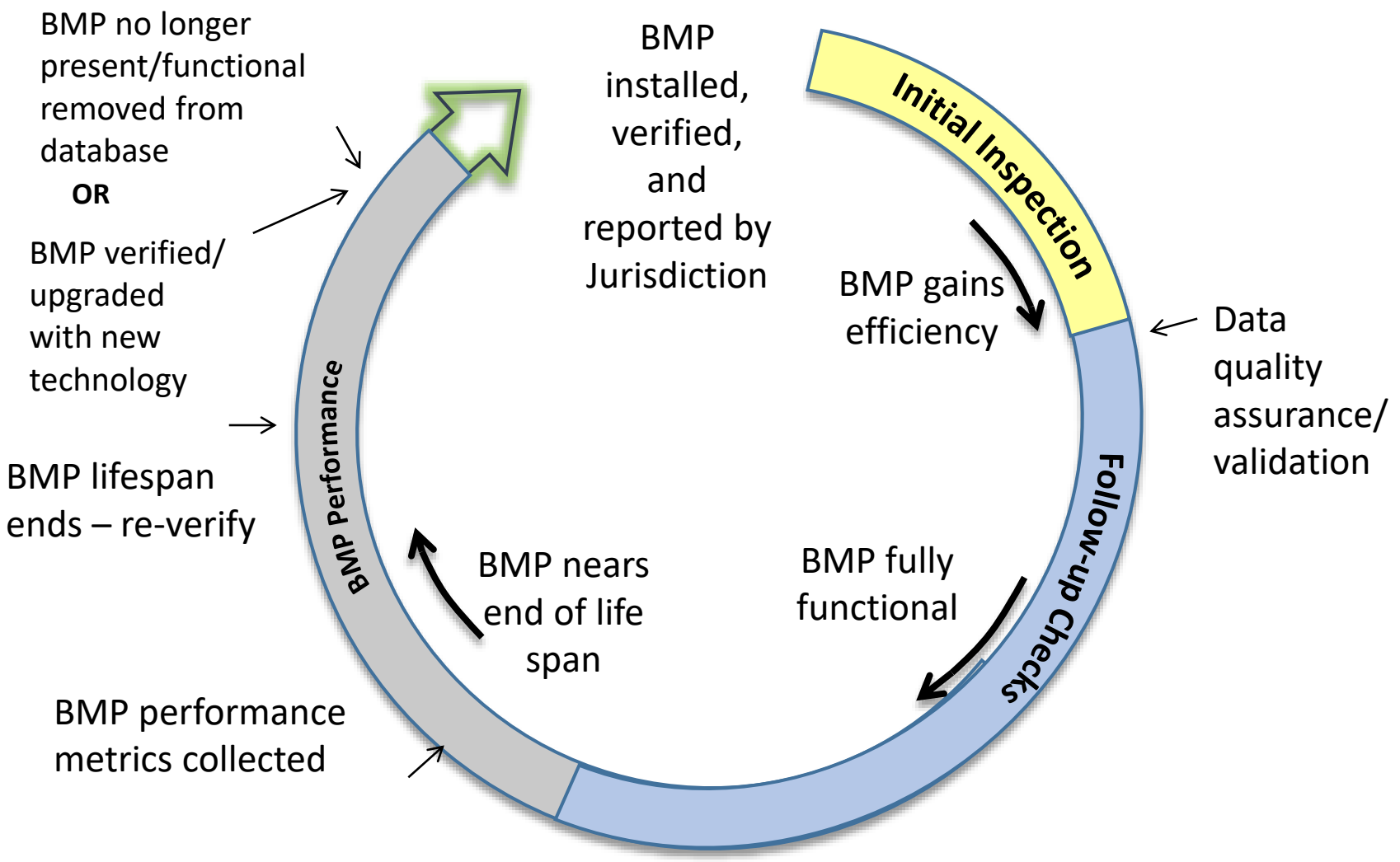

Total Nitrogen-Surface & Above Pycnocline at LE3.1
Total Nitrogen [mg/L]
0.4
0.6
0.8
1.2
2000
2005
2010
2015
Obs.
GAM
Seas.
Sign.
95% CI
B/C x̄
1/1
4/1
7/1
10/1

Table B-3. Jurisdictional Agriculture Verification Protocol Design Table: Visual Assessment BMPs—Single Year
Chesapeake Bay Program Agriculture Workgroup

A. BMP Priority	B. Data Grouping	C. BMP Type	D. Initial Inspection (*Is the BMP there?*)				E. Follow-up Check (*Is the BMP still there?*)			F. Lifespan/ Sunset (*Is the BMP no longer there?*)	G. Data QA, Recording & Reporting
			Method	Frequency	Who inspects	Documentation	Follow-up Inspection	Statistical Sub-sample	Response if Problem		
High / Low	Visual Assessment: Single Year	Non-Cost Shared BMPs	On-Site Visual Assessment (Limited Statistical Sampling)	100% of All Tracked & Reported BMPs	Trained and certified technical agency/NGO field staff or engineers	BMPs meet appropriate government and/or CBP practice standards	Single Year	10% / 5% QA of All Tracked & Reported BMPs (within the year)	Bring into compliance within one year or less, or remove from reported BMPs	Single Year	Document inspections/follow-up checks, prevent double counting, and QA reported data
High / Low	Visual Assessment: Single Year	Cost-Shared Programs	On-Site Visual Assessment Only	100% of All Tracked & Reported BMPs	Trained and certified technical agency/NGO field staff or engineers	BMPs meet appropriate government and/or CBP practice standards	Single Year	10% / 5% QA of All Active Contractual BMPs (within the year)	Bring into compliance within one year or less, or remove from reported BMPs	Single Year	Document inspections/follow-up checks, prevent double counting, and QA reported data
High / Low	Visual Assessment: Single Year	Permit-Issuing Programs	On-Site Visual Assessment Only	100% of All Tracked & Reported BMPs	Trained and certified technical agency field staff or engineers	BMPs meet the appropriate government and/or CBP practice standards	Single Year	20% Annually of All Active Permits	Bring into compliance within one year or less, or remove from reported BMPs	Single Year	Document inspections/follow-up checks, prevent double counting, and QA reported data
EXAMPLE BMP	Visual Assessment: Single Year	Cost-Shared Programs: Traditional Cover Crop-Early Drilled Rye	On-Site Visual Assessment: Cover Crop Establishment	100% of All Active Contracts	County Conservation District USDA-NRCS Certified Field Technician	Cost-Share Program BMP Certification Form	On-Site Visual Assessment: Cover Crop Termination	10% QA of All Active Contractual BMPs	Cost-Share Program Contract Compliance Policy	Contract Year	Cost-Share Program Documentation / 10% QAQC Compliance Checks by State Agency / Tracking & Reporting Protocol

The BMP Lifecycle



- **BMP lifecycles/credit durations will be applied within the Phase 6 Chesapeake Bay Program Model (2017)**
- **Currently in a 2-year verification ramp-up period**
- **2018 Progress Run submission must report verified BMPs**

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Phase 6.0 CBWM Credit Durations

- **Credit duration --** the length of time a practice may exist in the Bay Model until verification is necessary
  - Credit may be renewed based on the verification that the practice still exists and is functioning

- NRCS Practices
  - Credit durations in the CBP Model mirror NRCS Practice Lifespans

e.g. NRCS (313) Waste Storage Facilities and CBP Animal Waste Management Systems = 15 years

- Resource Improvement (RI) Practices
  - Credit durations in the CBP Model are shorter than NRCS Practice Lifespans
  - Typically 3-5 years
  - Same amount of credit as NRCS Practices, but less time between verification

e.g. RI-1 Dry Waste Storage Structure = 5 years

http://www.chesapeakebay.net/documents/Complete%20CBP%20BMP%20Verification%20Framework%20with%20appendices.pdf

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Phase 6.0 CBWM Credit Durations

Example Credit Durations:

Sector	Practice	Credit Duration
Urban Stormwater	E&S Control	1 year
	Stormwater Retrofits	10 years
	New PCSM Practices	10 years
	Homeowner BMPs	5 years
	Street Cleaning	1 year
Agriculture	Nutrient Management BMPs	1 year
	Conservation Plan/SCWQ BMPs	Varies depending upon Practice (1 year to 15 years)
	Cover Crop	1 year
	Conservation Tillage	1 year
	Manure Transport	1 year
	Roof Runoff Structure- NRCS 558	10 years
	Barnyard Clean Water Diversion – RI-16	5 years

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CBP Credited Practices

- Single-Year, Non-visual
- Single-Year, Visual
- Multi-Year, Visual

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CBP Credited Practices – Non-visual assessment

- Nutrient Management BMP Implementation
  - Core and Supplemental N and P Credits -- based upon plan implementation
  - Act 38 NMP, NRCS 590 – credited
  - Manure Management Plans – To be credited
- SCWQP/Conservation Plans (Includes Ag E&S Plans)
  - NRCS Conservation Plans – credited
  - Ag E&S Plans – credited if it is developed and/or has oversight of a conservation district technician or certified planner
  - Many structural practices fall under this category and are credited indirectly as SCWQP/Cons Plan elements (grassed waterways, rock lined waterways, terraces, diversions, field borders, etc.)
- Manure Transport

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CBP Credited Practices – Visual Assessment, Single Year

- Cover Crop
  - Traditional and Commodity Crops
  - Early, Normal, Late Season Planting
  - Manure or no manure applied
- Conservation Tillage
  - Conventional tillage
  - Conservation Tillage (30-60% residue)
  - High Residue Management (60%+ residue)

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CBP Credited Practices – Visual Assessment, Multi-Year

CBP Structural Agriculture Practices	
Animal Waste Management Systems	**Stream Restoration**
Lagoon Covers	**Off-Stream Watering w/o fencing**
Mortality Composters	**Stream Access Control with Fencing**
Barnyard Runoff Control	**Prescribed Grazing**
Loafing Lot Management	**Precision Intensive Rotational Grazing**
Forest and Grass Buffers	**Horse Pasture Management**
Tree Planting	**Pasture Alternatate Watering Systems**
Land Retirement	**SCWQP Plan Elements (in essence, all practices that are not identified in this list)**
Wetland Restoration	**Water Control Structures**
CBP Resource Improvement (RI) Practices -- Dry Waste Storage Structure, Animal Compost Structure, Watercourse Access Control, Grass/Forest Nutrient Exclusion on Watercourse, Grass/Forest Buffer, Vegetative Environmental Buffer for Poultry - Grass/Trees, Conversion to Pasture or Hayland, Rotational Grazing, Barnyard Clean Water Diversion, Water Control Structure, Watering Trough	

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PA BMP Verification Program Plan

- Developed to address CBP Verification Requirements
  - Final draft released in March 2016
  - Approved by EPA in May 2016

- Focus on High and Medium Priority BMPs
- Based on current data sources
- “Living” Document – Subject to adaptation as needed

http://files.dep.state.pa.us/Water/ChesapeakeBayOffice/PADEP%20BMP%20Verification%20Program%20QAPP%20Addendum_FINAL.pdf

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PA BMP Verification Program Plan

- High and Medium Priority BMPs
  - **Agriculture** – Animal Waste Management Systems; Conservation Plans/Soil Conservation and Water Quality Plans and Plan Elements; Nutrient Management; Manure Transport; Riparian Buffers; Wetland Restoration; Conservation Tillage; Cover Crops; Land Retirement/Environmental Planting
  - **Urban Stormwater** – Erosion and Sediment Control; Post-Construction Stormwater
  - **Tree Canopy**
  - **Stream Restoration**
  - **Legacy Sediment Removal and Aquatic Ecosystem Restoration**
  - **Wastewater Treatment**
  - **Forest Harvesting Practices**

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BMP Data Management

- Worldview PracticeKeeper
  - BMP planning and implementation tracking
  - Data collection tool for efficient and consistent reporting
  - Ease of pulling reports for follow-up verification needs, once populated
  - Visualize where you've been and where you need to go

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Verification Methods

- Suite of methods needed in order to verify BMPs on 33,000+ farms
- Alternative and innovative verification methods—
  - Capital RC&D Transect Survey
  - Penn State Farm Conservation Inventory Survey
  - NRCS Remote Sensing Potomac Pilot Study
- On-the-ground “spot checks” for quality assurance needed regardless of verification protocol
  - May include statistical sub-sampling of total population of reported BMPs

http://www.chesapeakebay.net/documents/Complete%20CBP%20BMP%20Verification%20Framework%20with%20appendices.pdf

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Verification Methods

- Capital RC&D Transect Survey – Conservation Tillage and Cover Crop
  - Data collection procedures are based in part on the Conservation Technology Information Center (CTIC) procedures for cropland roadside survey
  - Survey in the fall and spring for cover crop planting and residue cover
    - Fall data includes – harvested crop, cover crop, planting method, cover crop density, days from planting, and manure application
    - Spring data includes – confirmation of cover crop species planted, termination information (traditional or commodity cover crop, harvested or burned down, etc.)
  - Route and points established are re-used for each survey

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Verification Methods

- Penn State Farm Conservation Inventory Survey – Plans and BMPs
  - Surveys were provided to 20,000+ producers
  - 6,780 completed surveys were received by Penn State
  - 40+ Penn State Extension agents were trained by DEP, SCC, and Lancaster County Conservation District
    - Ag Workgroup guidelines for Resource Improvement Practice verification and the administrative completeness checklists for Ag E&S/Conservation Plans and Manure Management Plans
    - Nutrient Management Plans were noted – no completeness verification necessary since that is accomplished by District/SCC staff (Act 38) and NRCS staff (NRCS 590)
  - Penn State Extension agents visited 10% of the survey respondents to verify the reliability of the survey as completed by the farmer as well as verify the existence and functionality of the BMPs.
    - Structural BMPs were verified following the Resource Improvement (RI) criteria (3-5 year credit duration)

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Verification Methods

- Penn State Farm Conservation Inventory Survey – Plans and BMPs

Practice	Amount Implemented			
NMPs/MMPs	350,103 ac row crops	40,769 ac pasture	115,514 ac hay	
Enhanced NM	82,303 acres			
Manure Storages	2,113 dairy storages	299 beef storages	318 swine storages	207 poultry storages
Barnyard Runoff Controls	2,364 systems			
Ag E&S Plans	60,380 ac row crops	13,068 ac pasture	26,521 ac hay	
NRCS Conservation Plans	229,636 ac row crops	23,818 ac pasture	59,450 ac hay	
Stream Bank Fencing	2.3 million linear ft.			
Watercourse Access Controls	Grass 10-35 ft. width: 705 ac	Grass >35 ft. width: 1024 ac		
Riparian Buffers	Grass 10-35 ft. width: 342 ac	Grass >35 ft. width: 620 ac	Forest 10-35 ft. width: 850 ac	Forest >35 ft. width: 4,958 ac

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Verification Methods

- NRCS Remote Sensing Potomac Pilot Project
  - Determine if remote sensing could be utilized to identify and inventory conservation practices
  - Develop a baseline inventory of conservation practices applied in the Pennsylvania portion of the Potomac River Watershed
    - Adams, Franklin, Fulton, Bedford and Somerset Counties
  - Pennsylvania NRCS staff and NRCS East Remote Sensing Lab (ERSL) in Greensboro, NC
  - Collected data on 26 conservation BMPs using a grid approach
  - Field verification “spot checks” were done by experienced NRCS staff using the standard USDA NRCS 5% quality assurance/quality control sample
    - 5% of farms were field verified in Adams, Fulton, Bedford, and Somerset
    - 10% of farms were field verified in Franklin
    - 201 farms were field verified

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Vision for the Future

Potential Opportunities:

- Act 38 Status Reviews – Act 38 Plan Implementation
  - 100% inspected annually (District Technicians already doing this!)
- Initial Ag Inspections – Manure Management Plan Implementation
  - 10% of all farms to be inspected annually
- Remote Sensing – Multi-Year Structural Practices
  - Conservation Plan Implementation (Grassed Waterways, Diversions, Terraces, etc.), Riparian Forest Buffers…
- Farmer Completed Surveys – Multi-Year Structural Practices
  - Animal Waste Management Systems, HUAPs, Stream Fencing…
- Transect Survey – Single-Year Practices
  - Cover Crop, No-till

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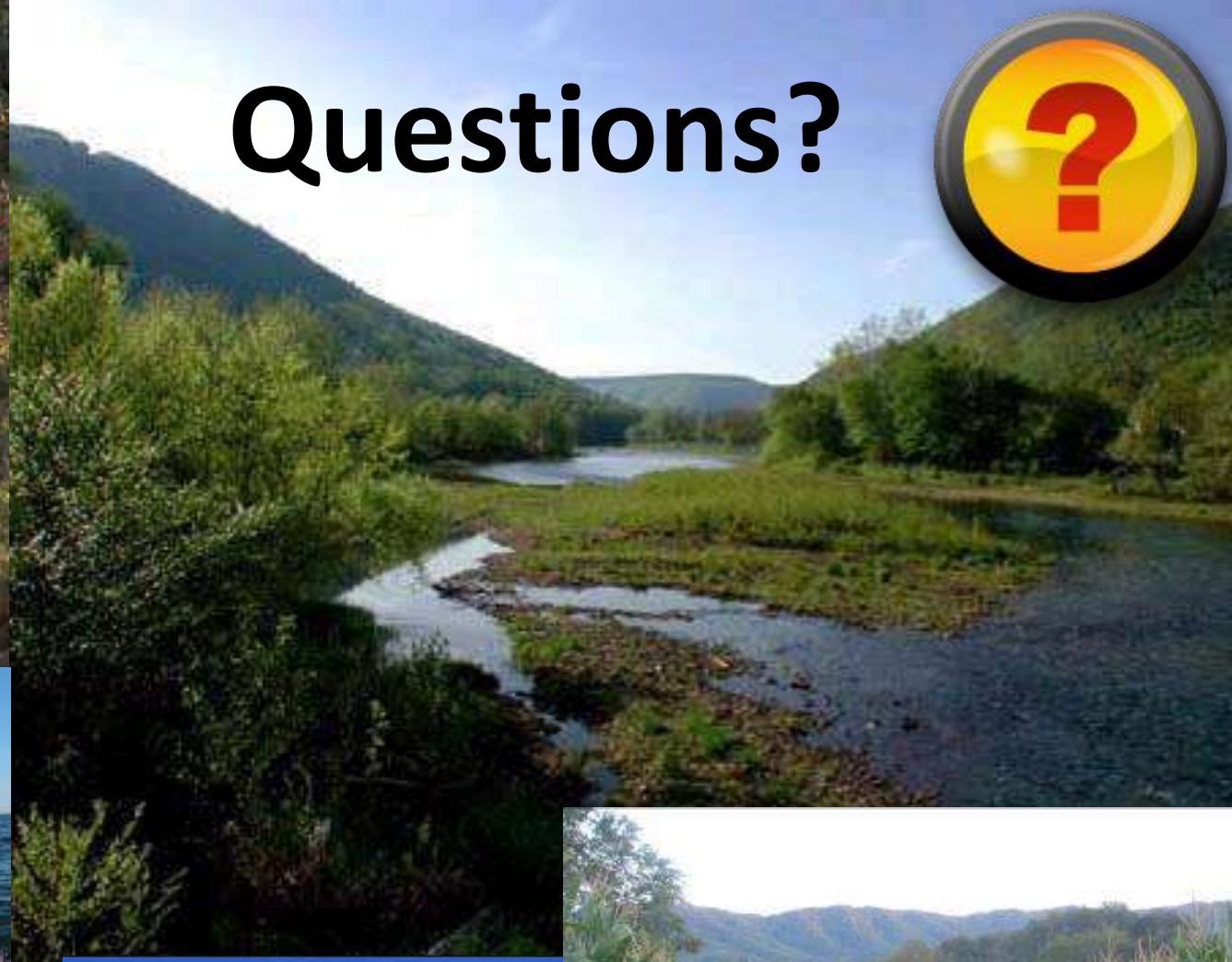

Questions?



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