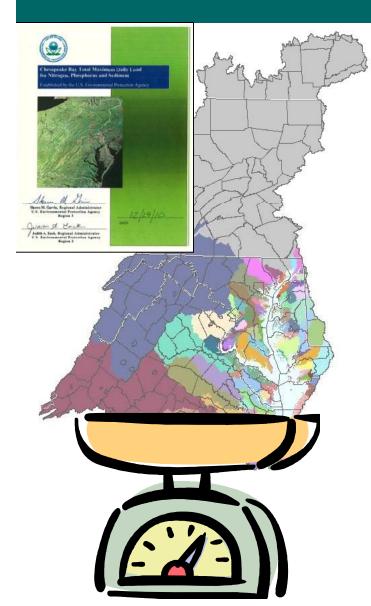
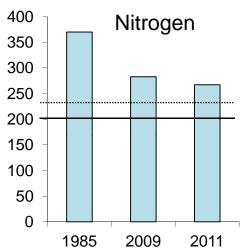
BMP Verification: Building Confidence in Delivering on Pollution Reductions to Local Waters

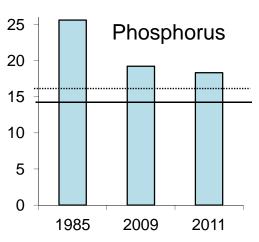
Rich Batiuk
Associate Director for Science
U.S. EPA Chesapeake Bay Program Office
Annapolis, Maryland

Chesapeake Bay TMDL: Pollution Diet for All Sectors and Sources

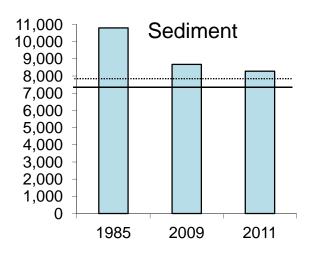


Pollution Delivered to the Bay (million pounds/year)











Chesapeake Bay Watershed 2009-2011 Milestones



Interim Progress Assessment/Fact Sheet - June 2011

During the 2009 Chesapeake Executive Council (EC) meeting, the governors and mayor of the Bay watershed jurisdictions - Maryland, Virginia, Pennsylvania, Delaware, West Virginia, New York and the District of Columbia - set short-term goals to reduce pollution to the Bay and dramatically accelerate the pace of restoration. The collective jurisdictional commitments will result in reducing nitrogen by 15.8 million pounds and phosphorus by 1.05 million pounds during the three-year period, 2009-2011. An interim assessment of pollution control practices being implemented to achieve these reductions fol-

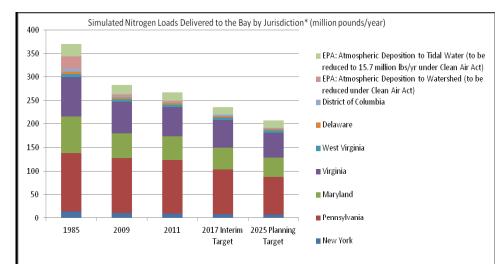
This interim progress assessment compares 2008 (the baseline year prior to the start of the milestone period) and 2010 (the most recent reporting period, which covers practices implemented July 2009-June 2010). Bay jurisdictions have reported on the practices they

committed to implement in their "2011 Milestones to Reduce Nitrogen and Phosphorus" factsheets and provided a calculation of percent completion to date. This assessment looks at progress for approximately two-thirds of the 2009-2011 milestones period. Therefore, jurisdictions who have implemented practices that are approximately two-thirds of the way to meeting their commitments are considered to be "on track." Progress that was significantly more than two-thirds is reported as "ahead of schedule" while results that were significantly less are noted as "behind schedule."

As of June 2010, the jurisdictions are generally on-track to implement pollution control practices necessary to achieve load reduction commitments. In instances where they are behind, contingencies are being implemented. A final assessment of load reductions achieved during the entire three year period will be available at next year's EC meeting.

Snapshot: How are the jurisdictions doing on meeting their commitments?			
Jurisdiction	Status	Notes	
VA, DE	Generally on-track	In instances where a jurisdiction is behind on specific practices, they have substituted other practices (here called "contingencies") to meet their pollu- tion reduction commitments.	
PA, WV	Generally ahead of schedule.		
NY	Generally ahead of schedule for some practices, behind for others.		
MD	Generally ahead of schedule.	More current information on MD's progress (through May 2011) is docu- mented and available on BayStat	
DC	Generally ahead of schedule.		

For more, contact Margaret Enloe (410) 267-5740, menloe@chesapeakebay.net



f Watershed Model and wastewater discharge data reported by Bay jurisdictions..



COMMONWEALTH of VIRGINIA

Chesapeake Bay TMDL Phase I Watershed Implementation Plan Revision of the Chesapeake Bay Nutrient and Sediment Reduction Tributary Strategy November 29, 2010

Overview Agriculture Wastewater TMDL Tracking 2009-2011 Milestones Tracking and Accounting System (BayTAS) d Accounting System (BayTAS) was developed to inform EPA, the Bay Juristictions, and the public on progress in balv Load (Hav THDL). Future versions of BayTAS will exclude reporting of Best Hanagement Practice (BMF) nore about BayTAS and the terminology of the TMDL in the glossary found in Section 13. Get answers to frequently Click on a map feature or select from the options below to view TMDL information by State All States **Total Allocation** 201,631,405 ■ Total Load ■ Load Allocation ■ Wasteland Allocation

- BMP Type and location (NEIEN/State supplied)
- Land acres
- Remote Sensing, NASS Crop land Data layer
- Crop acres
- Yield
- Animal Numbers (Ag Census or state supplied)
- Land applied biolsolids
- Septic system (#s)

Inputs

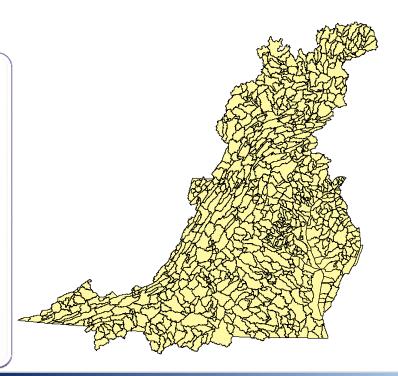
Parameters

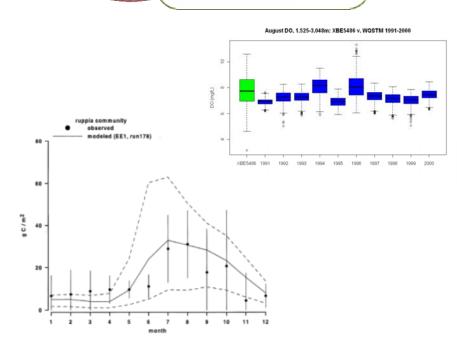
(Changeable by user)

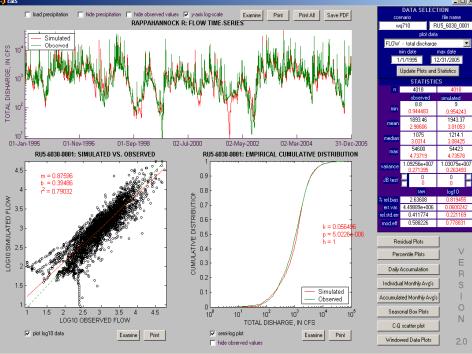
- BMP types and efficiencies
- Land use change (BMPs, others)
- RUSLE2 Data: % Leaf area and residue cover
- Plant and Harvest dates
- Best potential yield
- Animal factors (weight, phytase feed, manure amount and composition)
- Crop application rates and timing
- Plant nutrient uptake
- Time in pasture
- Storage loss
- Volatilization
- Animal manure to crops
- N fixation
- Septic delivery factors

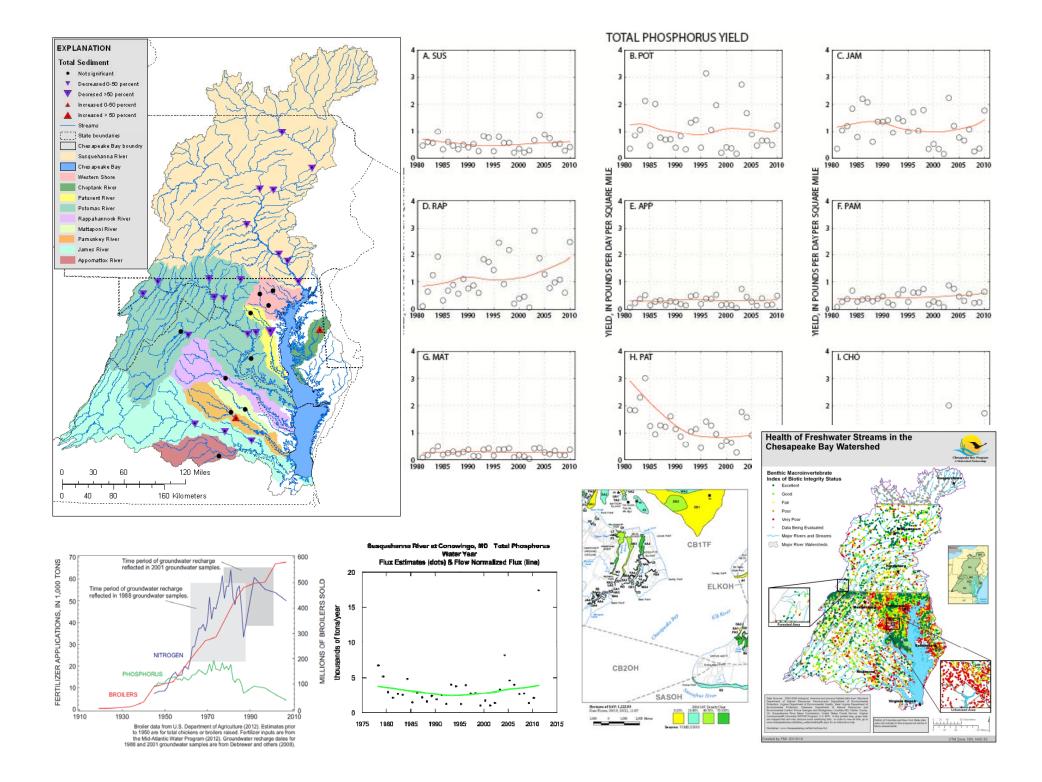
- BMPs, # and location
- Land use
- % Bare soil, available to erode
- Nutrient uptake
- Manure and chemical fertilizer (lb/segment)
- N fixation (lb/segment)
- Septic loads











"The CBP Partnership has defined verification as the process through which agency partners ensure practices, treatments, and technologies resulting in reductions of nitrogen, phosphorus, and/or sediment pollutant loads are implemented and operating correctly."





Framework Components

- Verification principles
- Verification protocols
- Eliminating double counting
- Full access to federal cost shared data
- Clean up historical practice data
- Incorporation of future practices, technologies

Verification Principles

- Practice reporting
- Scientific rigor
- Public confidence
- Adaptive management
- Sector equity

Verification Protocols

- Agriculture
- Forestry
- Stormwater
- Wastewater
- Streams
- Wetlands







Expanded Tree Canopy BMP

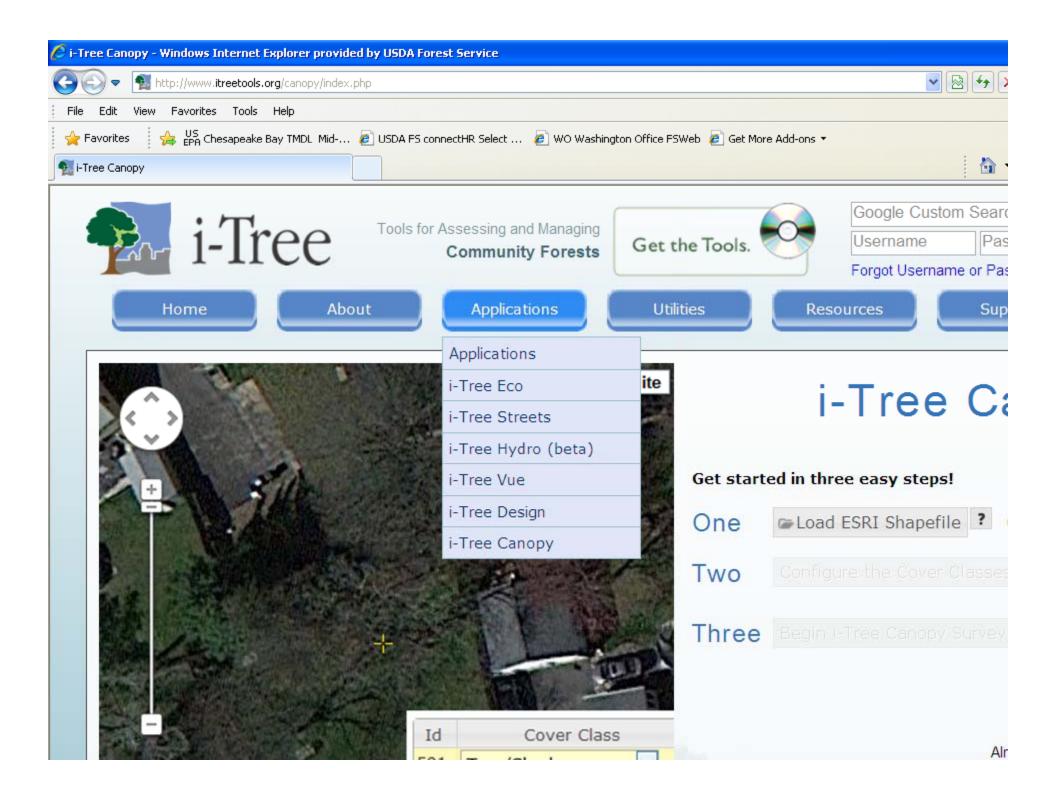
(formerly urban tree planting)









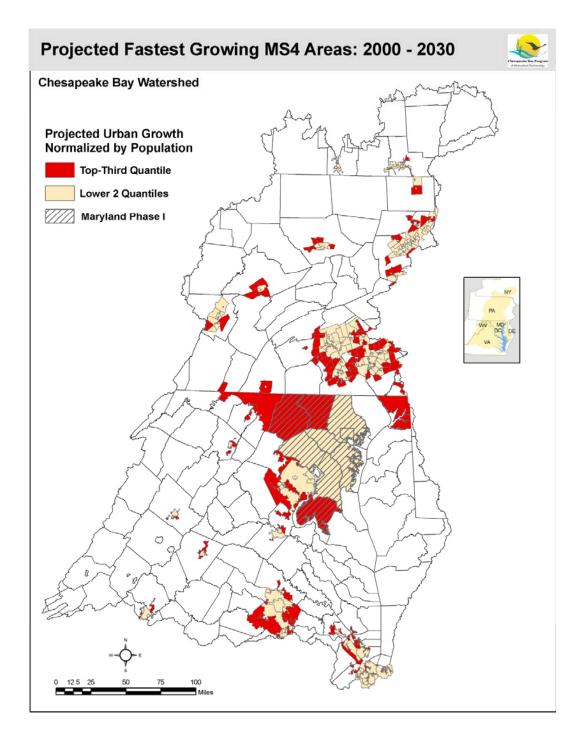


Agricultural Tree Planting BMP



Riparian Forest Buffer BMP





Stormwater Verification must operate in two worlds:

- Regulated Stormwater
- Unregulated
 Stormwater

Ability to Verify is Often Linked to Whether a community has a MS4 permit or not.

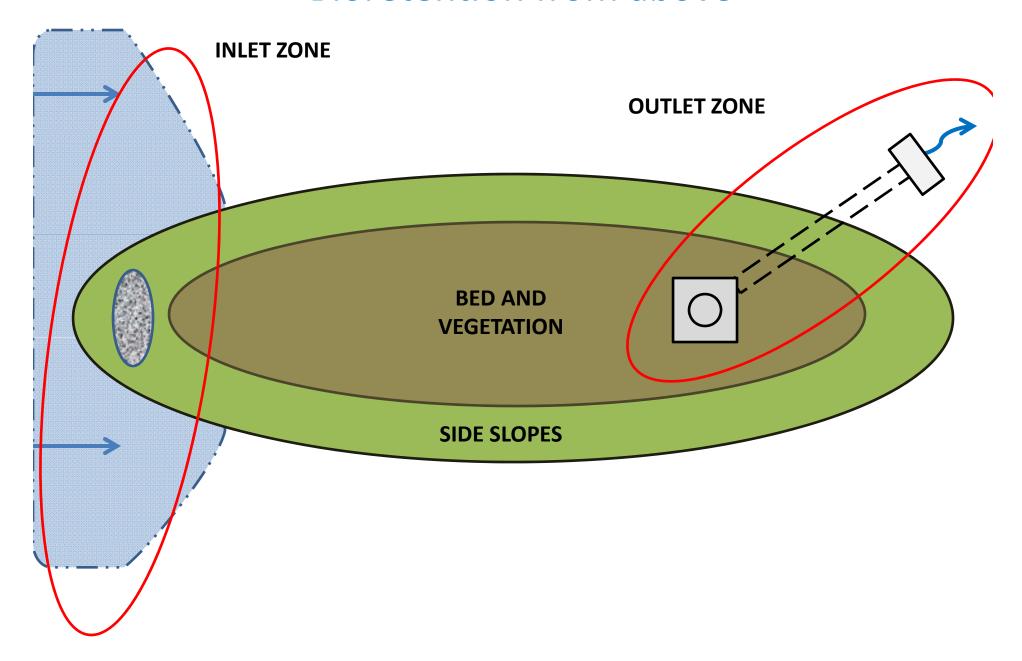




Visual Inspection Framework



Bioretention from above

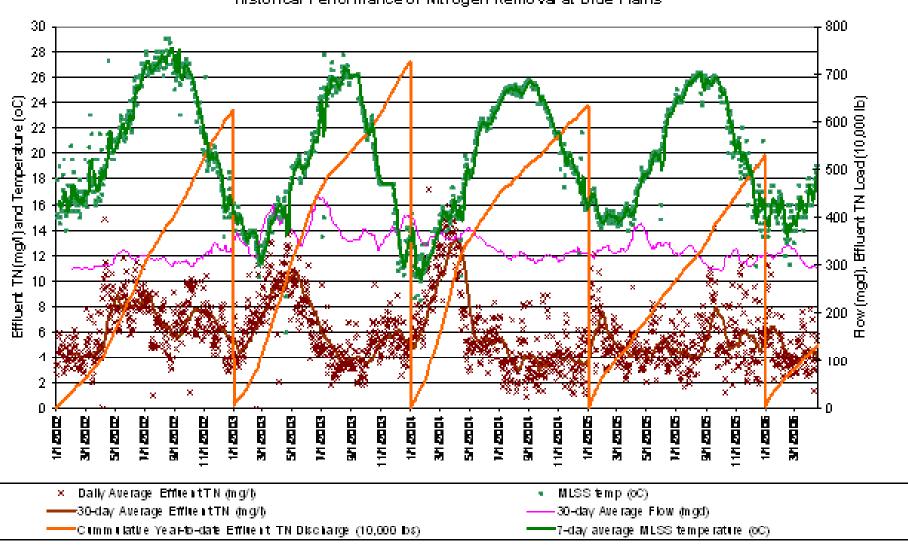


Visual Indicators Sequence

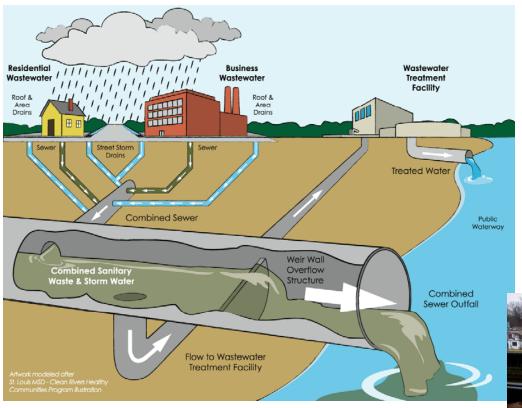
No.	Zone	INDICATOR	
1	Inlet	Inlet Obstruction	
2	Inlet	Erosion at Inlet	INLET ZONE
3	Inlet	Pretreatment	
4	Inlet	Structural Integrity, Safety Features	
5	Perimeter	Surface Area	
6	Perimeter	Side slope Erosion	PERIMETER ZONE
7	Perimeter	Ponding Volume	
8	Bed	Bed Sinking	
9	Bed	Sediment Caking	
10	Bed	Standing Water	
11	Bed	Ponding Depth	BED ZONE
12	Bed	Mulch Depth/Condition	
13	Bed	Trash	
14	Bed	Bed Erosion	
15	Vegetation	Vegetative Cover	
16	Vegetation	Vegetative Condition	VEGETATION ZON
17	Vegetation	Vegetative Maintenance	
18	Outlet	Outlets, Underdrains, Overflows	OUTLET ZON



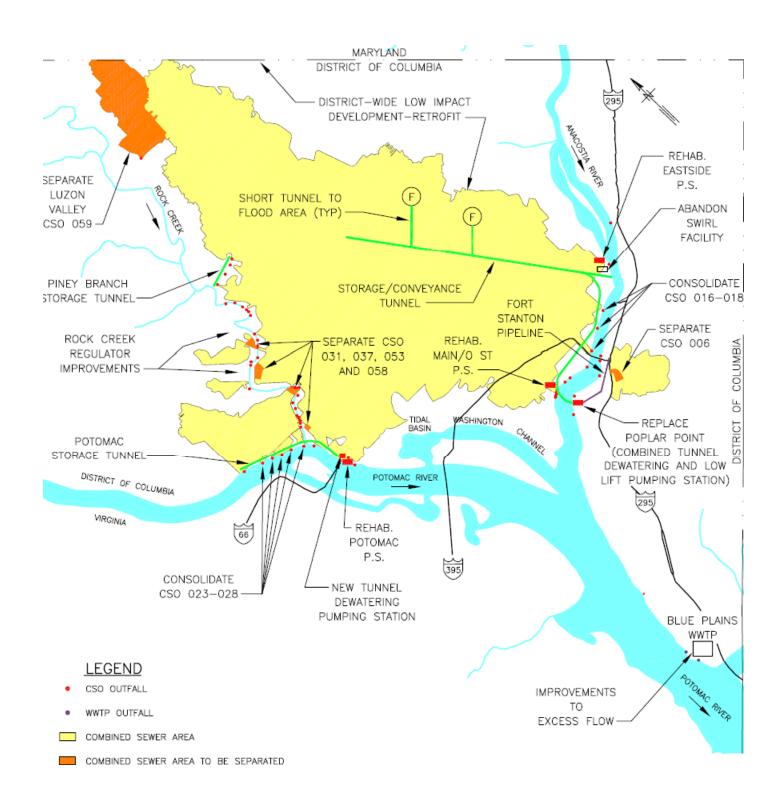
Figure 3 Historical Performance of Nitrogen Removal at Blue Plains



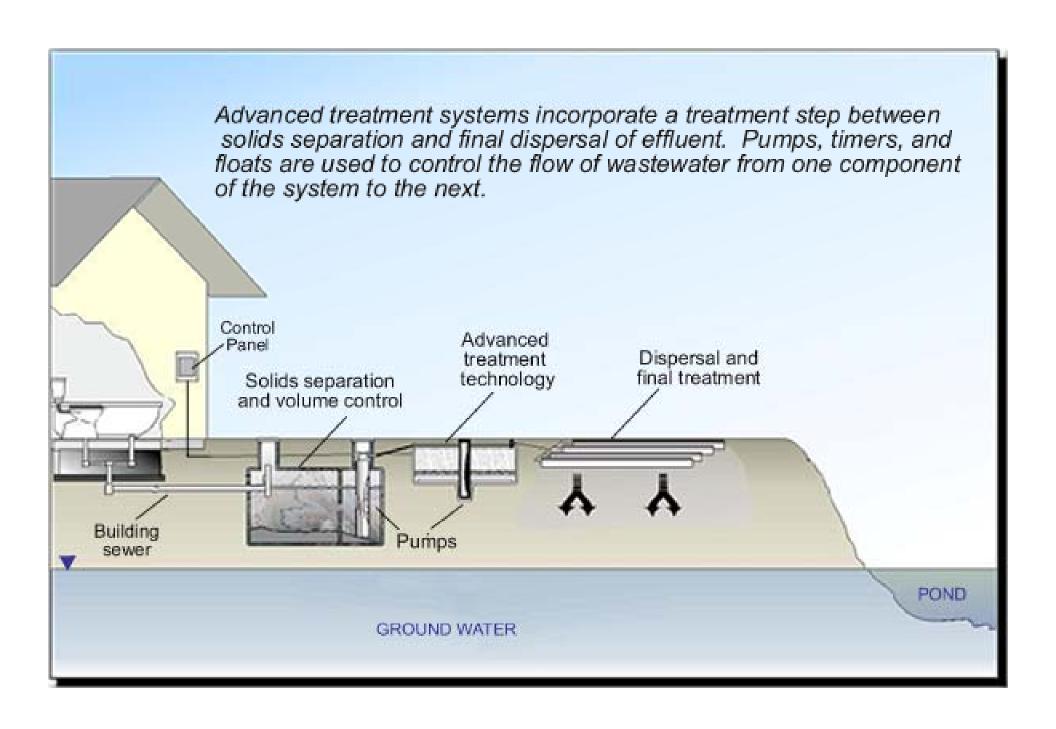
CSO







DC CSO LTCP













Before



Completed

Eastern Brook Trout Joint Venture

During



Areas of Focus

- ✓ Non-cost shared agricultural conservation practices
- ✓ Urban forestry BMPs (tree cover, RFBs)
- ✓ Non-regulated stormwater
- ✓ Homeowner practices
- ✓ On-site treatment systems
- ✓ Non-significant wastewater facilities
- ✓ Habitat restoration projects



Current BMPs

Agriculture

- Alternative Crops
- Animal Waste Management
- Barnyard Runoff Control
- Biofilters
- Commodity Cover Crops
- Traditional Cover Crops
- Conservation Tillage
- Continuous No Tillage
- Dairy Precision Feeding
- Decision Agricultur
- Dirt & Gravel Road Erosion
- & Sediment Control
- Enhanced NutrientManagement
- Forest Buffers
- Grass Buffers
- •Horse Pasture Management
- Lagoon Covers

- •Land Retirement
- Loafing Lot Management
- Mortality Composters
- Stream Restoration
- •Nutrient Management
- Off-Stream Watering
- Poultry Litter Treatment
- Poultry Phytase
- Precision Intensive Rotational Grazing
- Prescribed Grazing
- •Shoreline Erosion Control
- Soil Conservation & Water Quality Plans
- •Stream Access Control with Fencing
- Streamside Forest Buffers
- Streamside Grass Buffers
- •Streamside Wetland Restoration

- Swine Phytase
- •Tree Planting; Veg. Environmental Buffers
- Water Control Structures
- Wetland Restoration

Forest

- Dirt & Gravel Road Erosion
- & Sediment Control
- Forest Harvesting Practices
- Stream Restoration
- •Shoreline Erosion Control

Septic

- Septic Connection
- Septic Denitrifcation
- Septic Pumping



Current BMPs

<u>Urban</u>

- •Abandoned Mine Reclamation
- •Bioretention/Raingardens
- Bioswales
- •Dirt & Gravel Road Erosion
- & Sediment Control
- Dry Detention Ponds
- •Dry Extended Detention Ponds
- Erosion & Sediment Control
- Forest Conservation
- •Impervious Urban Surface Reduction
- •MS4 Permit Stormwater Retrofit
- Permeable Pavement
- •Regenerative Stormwater Conveyance

- MD StormwaterManagement by Era
- Street Sweeping
- Urban Filtering Practices
- Forest Buffers
- Grass Buffers
- Growth Reduction
- Infiltration Practices
- Nutrient Management
- Stream Restoration
- •Tree Planting/Tree Canopy
- Vegetated Open Channels
- Wet Ponds/Wetlands



BMPs Under Review/Planned for Review

- State Stormwater Performance Standards (Recently Approved, not yet Credited)
- Stormwater Retrofits (Recently Approved, not yet Credited)
- Nutrient Management
- Conservation Tillage
- Cover Crops
- Poultry Litter
- Urban Stream Restoration
- Urban Nutrient Management
- On-Site Watewater Treatment (Septics)
- Riparian Buffers (grass and forest)
- Urban Tree Planting/Tree Canopy
- Erosion and Sediment Control
- Illicit Discharge Elimination
- Algal Turf Scrubbers

- Manure Transport Technologies
- Impervious Disconnect
- Animal Waste Storage Systems
- Liquid Manure
 Injection/Incorporation
- Forest Management
- Urban Filter Strips and Stream Buffer Upgrades
- Urban Shoreline Erosion Control
- Floating Wetlands
- Street Sweeping
- Cropland Irrigation Management
- MS4 Minimum Management Measures

Schedule

- Spring: Six technical workgroups finalizing their verification protocols
- Summer: Jurisdictional reviews of all the framework components
- Fall: Independent Panel, Partnership review
- Early winter: State cabinet secretaries, EPA
 Regional administrator final approval

Expectations

- Build on existing programs
- Build into how we all implement our programs
- Make verification integral to construction, installation, operation and maintenance
- It's all about ensuring continued performance, reducing pollution to local waters, and increasing transparency in implementation





Source of Information on BMP Verification within the Chesapeake Bay Program Partnership

http://www.chesapeakebay.net/groups/group/best management practices bmp verification committee

- CBP BMP Verification Committee
- CBP BMP Review Panel
- Approved BMP verification principles
- Draft BMP verification protocols
- Links to verification related mtgs/conf calls since 1/2012

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www.chesapeakebay.net

www.epa.gov/chesapeakebaytmdl