



TMDL Data Center

A New Resource for Developing SW-WLA Implementation Plans

June 11, 2014

MDE Science Services Administration
Jeff White — jeff.white@maryland.gov
Greg Busch — gregory.busch@maryland.gov





Steps for Developing an SW-WLA implementation plan

- 1 Identify applicable TMDLs, WLAs, and required reductions
 - TMDL/WLA database
- 2 Identify where the WLAs apply/reductions need to occur
 - Interactive maps and GIS resources
 - TMDL watersheds, Bay TMDL segment-sheds, regulated stormwater delineation, land-cover data, etc.
- 3 If WLAs are aggregate, calculate individual WLA for jurisdiction/permit
 - Stormwater Toolkit
 - Methodology for disaggregating SW-WLAs
- 4 Create a plan that outlines the management strategies that will be taken to meet the WLAs/required reductions
 - Guidance documents for developing SW-WLA implementation plans

<http://www.mde.state.md.us/programs/Water/TMDL/DataCenter/Pages/index.aspx>

Note: Although this guidance focuses specifically on SW-WLAs, these methods could also be applied to urban LAs and non-regulated local jurisdictions and urban stormwater sources





Step 1: Identify TMDLs and WLAs

- Use TMDL Data Center searchable database
 - “TMDL Search”
 - If trying to find a list of TMDLs for a given geographic area, i.e., county
 - “WLA Search”
 - If trying to find allocation information

TMDL Search

Search for approved TMDLs by county, by watershed or for the entire state

WLA Search

Find the stormwater or wastewater waste load allocations for an NPDES permit

TMDL Maps

View the geographic extents of existing TMDLs and download GIS shapefiles

Stormwater Toolkit

Tools to assist in applying stormwater WLAs to regulated stormwater systems

Stormwater Documents

Guidance documents to assist stormwater permittees in implementing TMDLs

Glossary

Definitions of terms and abbreviations in the TMDL Data Center



Step 1: Identify TMDLs



1. Search by geographic area, pollutant, and/or waterbody type
2. Returns list of TMDLs
 1. No allocation information
 2. Basic info: location, substance, waterbody type, report name, approval date, etc.





Step 1: Identify TMDLs

HOME MARYLANDER BUSINESS RESEARCH CENTER NEWSROOM email friend print page

Water Programs

- Chesapeake Bay TMDL
- TMDL Documents A-Z
- Draft TMDL for Public Comment
- TMDL Implementation
- TMDL Resource Links
- Signup to Receive TMDL Updates

Search By TMDL

Search By: Statewide County 8-Digit Watershed Chesapeake Bay Segment Please Select County:

Pollutant: Waterbody Type:

Find... 1 of 3 70%

Main Report

TMDLs for All Pollutants in Montgomery County for All Waterbody Types

Page 1 of 3

Location	Substance	Waterbody Type	Report Name	TMDL Map	GIS ID	Approval Date
Anaostia River - Non-Tidal	BOD	Non-Tidal Rivers	Anaostia River Nutrients	Map	G2349	June 5, 2008
8 Digit WS 02140207 / Cabin John Creek	E.coli	Non-Tidal Rivers	Cabin John Creek Bacteria	Map	G1083	Mar. 14, 2007
8 Digit WS 02140302 / Lower Monocacy River	E.coli	Non-Tidal Rivers	Lower Monocacy River Bacteria	Map	G1127	Dec. 3, 2009
Lower Monocacy River	E.coli	Non-Tidal Rivers	Lower Monocacy River Bacteria	Map	G2394	Dec. 3, 2009
Patuxent River Upper	E.coli	Non-Tidal Rivers	Patuxent River Upper Bacteria	Map	G2374	August 9, 2011
Anaostia River, Upstream of Confluence of Northwest Branch and Northeast Branch	Enterococci	Non-Tidal Rivers	Anaostia River Bacteria	Map	G2348	March 14, 2007
Rock Creek	Enterococci	Non-Tidal Rivers	Rock Creek Bacteria	Map	G2553	July 30, 2007
Anaostia River - Non-Tidal	Nitrogen	Non-Tidal Rivers	Anaostia River Nutrients	Map	G2349	June 5, 2008
Segmentshd ANATF_MD / Anaostia River Tidal Fresh Maryland	Nitrogen	The Chesapeake Bay	The Chesapeake Bay TMDL	Map	G1002	Dec. 29, 2010
Segmentshd PAXTF / Upper Patuxent River Tidal Fresh	Nitrogen	The Chesapeake Bay	The Chesapeake Bay TMDL	Map	G1039	Dec. 29, 2010
Segmentshd POTTf_DC / Upper Potomac River Tidal Fresh DC	Nitrogen	The Chesapeake Bay	The Chesapeake Bay TMDL	Map	G1049	Dec. 29, 2010
Segmentshd POTTf_MD / Upper Potomac River Tidal Fresh Maryland	Nitrogen	The Chesapeake Bay	The Chesapeake Bay TMDL	Map	G1050	Dec. 29, 2010
Anaostia River - Non-Tidal - Northeast Branch	PCBs	Non-Tidal Rivers	Non-Tidal Anaostia River PCBs	Map	G2353	Sept. 30, 2011
Anaostia River - Non-Tidal - Northwest Branch	PCBs	Non-Tidal Rivers	Non-Tidal Anaostia River PCBs	Map	G2354	Sept. 30, 2011
Anaostia, Tidal Portion	PCBs	Estuaries	Tidal Potomac and Anaostia River PCBs	Map	G2517	Oct. 31, 2007

Substance Waterbody Type Report Name

Export

File Format:

- Crystal Reports (RPT)
- PDF
- Microsoft Excel (97-2003)
- Microsoft Excel (97-2003) Data-Only
- Microsoft Excel Workbook Data-only
- Microsoft Word (97-2003)
- Microsoft Word (97-2003) - Editable
- Rich Text Format (RTF)
- Character Separated Values (CSV)
- XML





Step 1: Identify WLAs

HOME MARYLANDER BUSINESS RESEARCH CENTER NEWSROOM email friend print page

WLA Search

Search By
 Process Water WLA Stormwater WLA
Select county and type of stormwater permit
County: Allegany County Permit Type: County Submit

County
Federal
Industrial
Other
SHA
State
Town or City

Main Report

Find... 3 of 7 70%

Baltimore County Phase I MS4 MD0068314

Substance	Allocation Units	Reduction %	Allocation Type	Baseline Year	Equation Description	Eqn Location	MS4 Allocation Notes	Report Name
Phosphorus	120.82 EOS pounds/year	51.0%	Individual Planning Target	2003	Annual Average (EOS)	Segmentshed CB1TF / Northern Chesapeake Bay Tidal Fresh	Phase II WIP Targets. Reduction from 2009 progress.	The Chesapeake Bay
TSS	153.70 tons/day	61%	Individual	2001	MDL	8 Digit WS 02130906 / Patapsco River Lower North Branch		Patapsco River Sediment
TSS	488.50 tons/day	see report	Aggregate	2002	MDL	8 Digit WS 02130905 / Gwynn's Falls		Gwynn's Falls
Phosphorus	882.00 pounds/year	see report	Aggregate	2001	Annual Average	8 Digit WS 02130808 / Prettyboy Reservoir		Loch Raven Sediment
TSS	1,632.30 tons/year	see report	Individual	1998	Annual Average	8 Digit WS 02130904 / Jones Falls		Jones Falls
TSS	3,942.10 tons/year	15%	Individual	2001	Annual Average	8 Digit WS 02130906 / Patapsco River Lower North Branch		Patapsco River Sediment
Phosphorus	5,773.38 EOS pounds/year	48.1%	Individual Planning Target	2003	Annual Average (EOS)	Segmentshed BACOH / Back River Oligohaline	Phase II WIP Targets. Reduction from 2009 progress.	The Chesapeake Bay
Phosphorus	10,289.92 delivered pounds/year	45.5%	Individual Planning Target	2003	Annual Average (Delivered)	Segmentshed PATMH / Patapsco River Mesohaline	Phase II WIP Targets. Reduction from 2009 progress.	The Chesapeake Bay
E. coli	18,217.00 billion MPN/year	see report	Aggregate	2002	Annual Average	8 Digit WS 02130805 / Loch Raven Reservoir		Loch Raven Reservoir
Phosphorus	20,493.67 EOS pounds/year	42.9%	Individual Planning Target	2003	Annual Average (EOS)	Segmentshed PATMH / Patapsco River Mesohaline	Phase II WIP Targets. Reduction from 2009 progress.	The Chesapeake Bay
Nitrogen	71,380.70 delivered pounds/year	33.9%	Individual Planning Target	2003	Annual Average (Delivered)	Segmentshed BACOH / Back River Oligohaline	Phase II WIP Targets. Reduction from 2009 progress.	The Chesapeake Bay

The waste load allocation presented above represents the allocation that was assigned to this discharger in the associated EPA-approved TMDL. The state of Maryland expressly reserves the right to allocate the loads among different sources in any manner that is reasonably calculated to achieve water quality standards.

1. Search by county and permit type
2. Returns allocation, location, description, substance, units, type, notes, **baseline year**, and **reduction %**





Step 2: Identify where WLAs and reductions apply

- Use the interactive maps of TMDL watersheds per pollutant
 - Shapefiles also available for download
- Other interactive maps and data available for download
 - Bay TMDL segment-sheds
 - Phase 5.3.2 Chesapeake Bay watershed model segments
 - MD 8 and 12-digit watersheds
 - MDE regulated stormwater delineation
 - Informs phase 5.3.2 watershed model
 - USGS 2006 land-cover
 - Informs phase 5.3.2 watershed model
- Data descriptions for all shapefiles

TMDL Search Search for approved TMDLs by county, by watershed or for the entire state	WLA Search Find the stormwater or wastewater waste load allocations for an NPDES permit	TMDL Maps View the geographic extents of existing TMDLs and download GIS shapefiles
Stormwater Toolkit Tools to assist in applying stormwater WLAs to regulated stormwater systems	Stormwater Documents Guidance documents to assist stormwater permittees in implementing TMDLs	Glossary Definitions of terms and abbreviations in the TMDL Data Center





Step 2: Identify where WLAs and reductions apply

TMDL Maps

This page provides links to online maps and GIS downloads to assist in implementing TMDLs. The resources below include maps of every approved TMDL (categorized by pollutant) as well as shapefiles relating to the implementation process. Two separate TMDL maps are provided for nitrogen, phosphorus and sediment; one map for those TMDLs that address impairments to the Chesapeake Bay, and one map for those that address localized or non-Chesapeake Bay impairments. All downloads are provided as zipped shapefiles.

TMDL Maps by Pollutant

Nutrients	Bacteria
Nitrogen: Local, Non-Chesapeake Bay (view download)	E. coli (view download)
Phosphorus: Local, Non-Chesapeake Bay (view download)	Enterococci (view download)
Nitrogen & Phosphorus: Chesapeake Bay (view download)	Fecal Coliform (view download)
BOD: Biochemical Oxygen Demand	Trash
BOD / CBOD / NBOD (view download)	Trash (view download)
Low pH	Sediment
Calcium Carbonate Equivalents (view download)	Sediment: Non-Chesapeake Bay (view download)
pH Surrogates (view download)	Sediment: Chesapeake Bay (view download)
Metals	Organochlorine
Aluminum (view download)	Chlordane (view download)
Iron (view download)	PCBs: Polychlorinated Biphenyls (view download)
Mercury (view download)	

Additional geographic resources for TMDL implementation

Watershed Delineations

- Chesapeake Bay Segments ([view](#) | [download](#))
- Chesapeake Bay Land-River Segments ([view](#))
- Maryland 8-Digit Watersheds ([view](#) | [download](#))
- Maryland 12-Digit Watersheds ([info](#) | [download](#))

County Boundaries

- Maryland County Boundaries ([info](#) | [download](#))

Stormwater Delineations

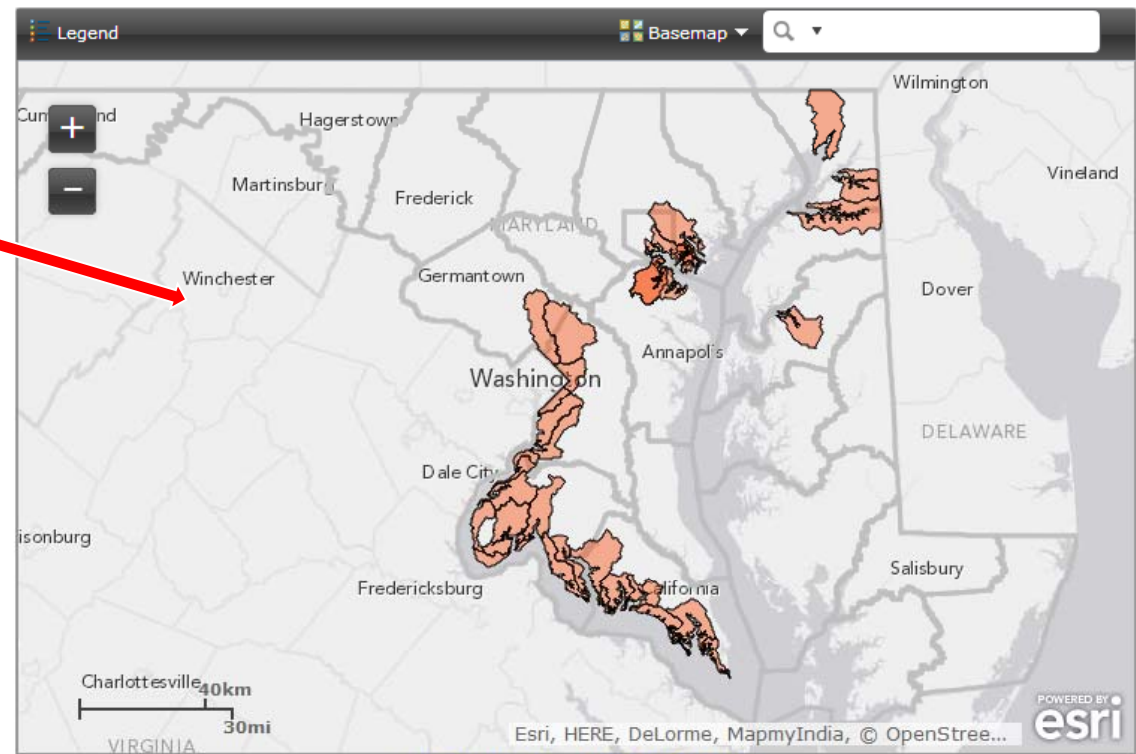
- NPDES-Regulated Stormwater Systems ([info](#) | [pdf map](#) | [download](#))

Land Cover

- 2006 USGS-CBP Land-Cover ([info](#) | [download](#))

Map of Approved TMDLs in Maryland: PCBs

Please note that it may take several seconds for the map to load and refresh.



[View Larger Map](#) [Download Shapefile](#)





Step 3: Calculate individual WLAs for jurisdiction

- Use the methodology provided by MDE for disaggregating SW-WLAs
 - Most TMDLs assign aggregate SW-WLAs
 - Include loads from county, municipal, SHA, state/federal, and industrial areas
 - Methodology describes how to break out allocations to these individual entities
 - Requested by local jurisdictions

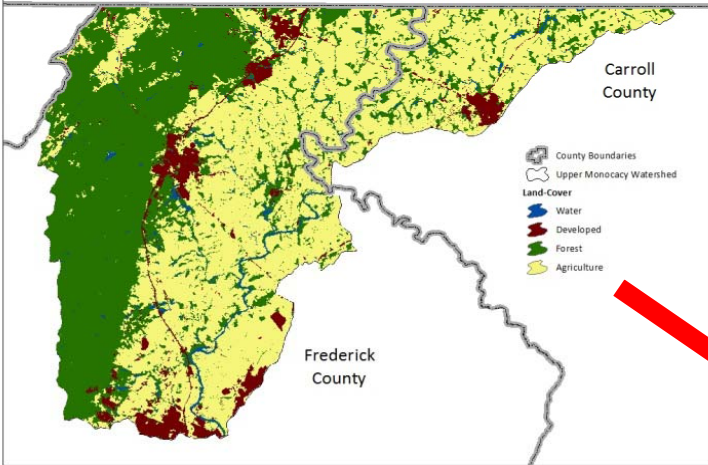
TMDL Search Search for approved TMDLs by county, by watershed or for the entire state	WLA Search Find the stormwater or wastewater waste load allocations for an NPDES permit	TMDL Maps View the geographic extents of existing TMDLs and download GIS shapefiles
Stormwater Toolkit Tools to assist in applying stormwater WLAs to regulated stormwater systems	Stormwater Documents Guidance documents to assist stormwater permittees in implementing TMDLs	Glossary Definitions of terms and abbreviations in the TMDL Data Center



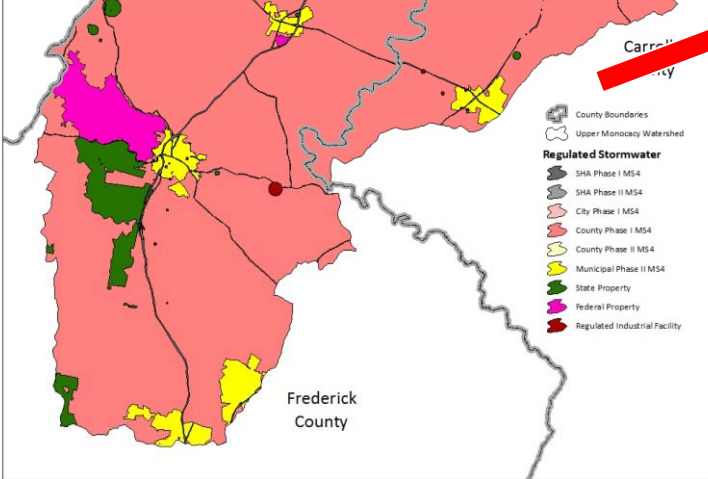


Step 3: Calculate individual WLAs for jurisdiction

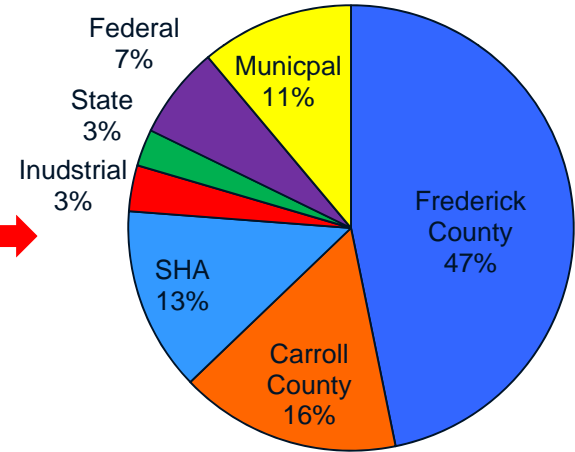
Land-Use: urban footprint



NPDES Regulated SW Areas



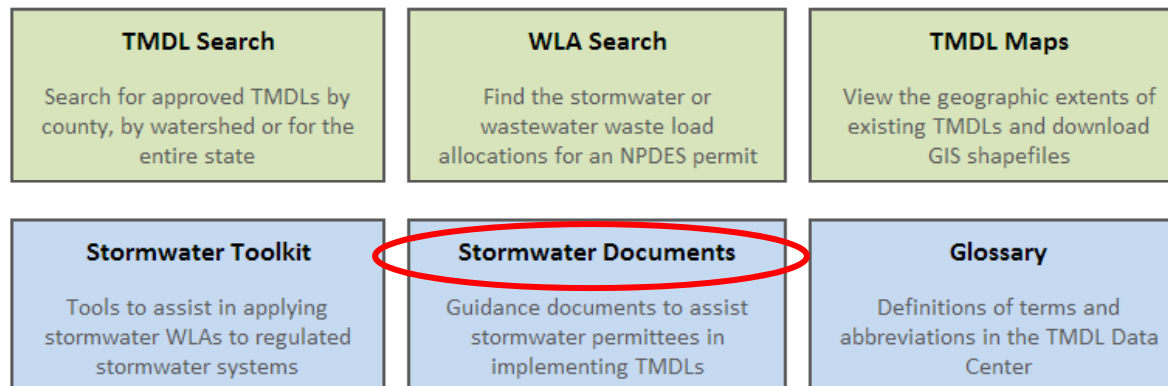
Intersect





Step 4: Create SW-WLA implementation plan

- Can use guidance documents to help develop SW-WLA Implementation plans
 - Recommendations only
 - Recommended management strategies for achieving SW-WLAs
 - Modeling recommendations to account for reductions
- Documents
 - General
 - Nutrients/Sediments
 - Includes guidance on using MAST and BayFAST to account for load reductions
 - Bacteria
 - Trash
 - Mercury
 - PCBs





Step 4: Create SW-WLA implementation plan

HOME MARYLAND BUSINESS RESEARCH CENTER NEWSROOM email friend print page

Water Programs

- Chesapeake Bay TMDL
- TMDL Documents A-Z
- Draft TMDL for Public Comment
- TMDL Implementation
- TMDL Resource Links
- Signup to Receive TMDL Updates
- Approved Final TMDLs
- Water Quality Assessment Report
- Water Quality Standards
- TMDL Data Center
- TMDL Home

TMDL Stormwater Implementation Resources

General Guidance

Maryland's Stormwater Management Program website provides guidance on accounting for stormwater waste load allocations (SW-WLAs) and implementing environmental site design practices. A good starting point for developing a stormwater implementation plan is the Stormwater Management Program's guidance document, [Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated](#).

Additional guidance has also been developed by Maryland Department of the Environment's Science Services Administration, which expands upon and provides recommendations for many of the technical aspects included in the accounting for SW-WLAs document.

- [Guidance for Developing Stormwater Wasteload Allocation Implementation Plans](#)

Nutrients and Sediment TMDL Guidance

- [Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated](#)

Maryland's Stormwater Management Program provides specific guidance on developing stormwater implementation plans for nutrient and sediment TMDLs.

- [MAST - Maryland Assessment Scenario Tool](#) This link will take you to a website not managed by MDE.

This online watershed model allows users to develop watershed implementation plans to address nitrogen, phosphorus and sediment TMDLs.

PCBs TMDL Guidance

- [MDE Recommendations for Addressing the PCB SW-WLA](#)

This guidance applies to any approved PCB TMDL for which a SW-WLA Implementation Plan needs to be developed under an municipal separate storm sewer system (MS4) permit. It provides recommendations for PCB source identification, source monitoring, accounting for WLA credit and consideration of alternative or adaptive approaches. A slideshow presentation on MDE's PCB guidance, as it relates to Montgomery County, is provided [here](#).

Intended to be brief

MARYLAND Department of the Environment

MDE Recommendations for Addressing the PCB SW-WLA

This guidance applies to any approved PCB TMDL for which a SW-WLA Implementation Plan needs to be developed under an MS4 permit. This guidance provides recommendations for PCB source identification, source monitoring, accounting for WLA credit and consideration of alternative and/or adaptive approaches.

1. Source Mapping
 - a. Desktop analysis - Review existing County and State records to identify locations with significant potential PCB and contamination
 - i. Possible data sources
 1. Environmental soil contamination
 2. PCB spills
 3. Storage handling disposal of PCB containing equipment
 4. Manufacturing of PCB containing materials, etc.
 5. Local, State, or independent monitoring data
 6. Stormwater ponds
 7. Ancillary data (e.g., land use - industrial, permit info - using SIC codes with PCB discharge potential, etc.)
 - ii. Examples
 1. See USA permit for detailed examples
2. Monitoring
 - a. For any sites where there is likely a continuing environmental release of PCBs to the watershed stress system, the county should apply best professional judgment when deciding whether or not to monitor the site
 - i. If the County decides to monitor, EPA method 1661 should be applied for analysis of total PCBs.
 - ii. If PCBs are found above detection levels, but below required notification levels, the county should promptly document and justify its decision on whether remediation steps will be taken.
3. Examples of accounting for PCB load reduction
 - a. Wastewater Management Facilities - Locations in an urban watershed where PCBs can accumulate. Selection should be supported by the desktop analysis.
 - i. Before construction or sediment removal
 - ii. Take at least one sediment sample and analyze using EPA Method 1661 in an area where fine sediments have accumulated
 - iii. In consultation with the local health department, determine appropriate disposal option, taking into account the potential for bioaccumulation, contamination of clean locations, and public exposure, especially to sensitive populations
 - ii. If disposed in an unregulated or untreated facility (e.g., a land land fill), site credit is earned equal to the volume of PCB contamination equal to the product of the sediment concentration and the volume of sediment removed
 - iii. Other scientific methods that are adequately documented and validate PCB load reduction may be submitted to MDE for approval

Alternative Approaches

The county can apply a different approach in developing their implementation plan as long as the plan provides the physical action to achieve the required SW-WLA reduction.

Given the unique characteristics of PCB sources and transport, source identification methods and accounting for PCB removal can significantly vary across different watersheds and the specific implementation plan should reflect this.

100 Washington Boulevard | Baltimore, MD 21201-0718 | www.mde.maryland.gov
 MARYLAND DEPARTMENT OF THE ENVIRONMENT | 410.386.8200
 Marie O'Grady, Governor | Arthur C. Bory, Lt. Governor | Robert M. Swann, P.D., Director





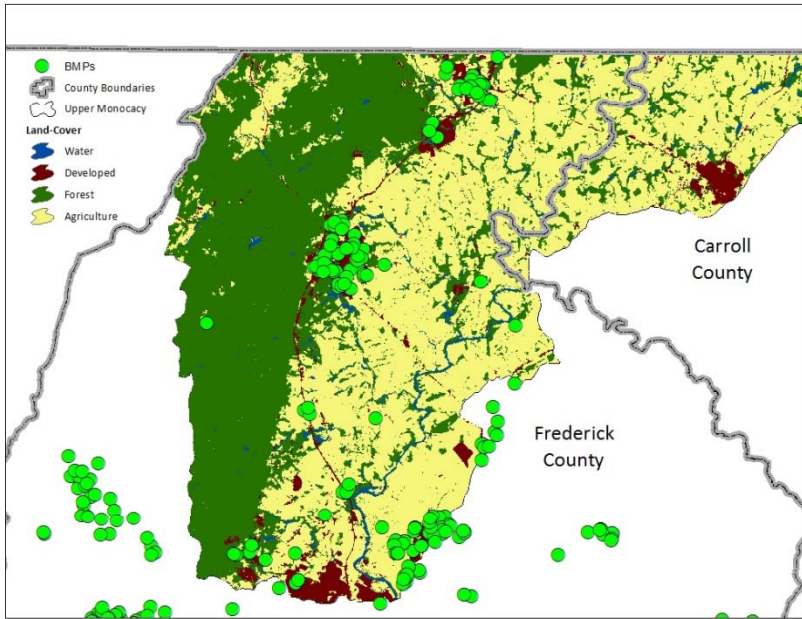
MDE-SSA's general guidance document

- Provides technical recommendations
 - Translate TMDL model loads to implementation model loads
 - Calculate the pollutant load for the baseline year (conditions) of the TMDL
 - Use best available data
 - LULC, loading rates, etc.
 - Use the TMDL SW-WLA reduction percentage to calculate target load
 - Translates TMDL SW-WLA to pollutant loading model used by local jurisdiction
 - Develop management scenarios to meet target
 - Calculate reductions (using pollutant load model)
 - For Bay TMDLs, can create consolidated countywide implementation plans
 - Compare expected (modeled) reductions to target load
 - Define schedule for implementing management strategies and include dates
 - Define how progress towards meeting targets will be evaluated
 - Include provisions for monitoring and adaptive management



Use implementation model to estimate pollutant load reductions

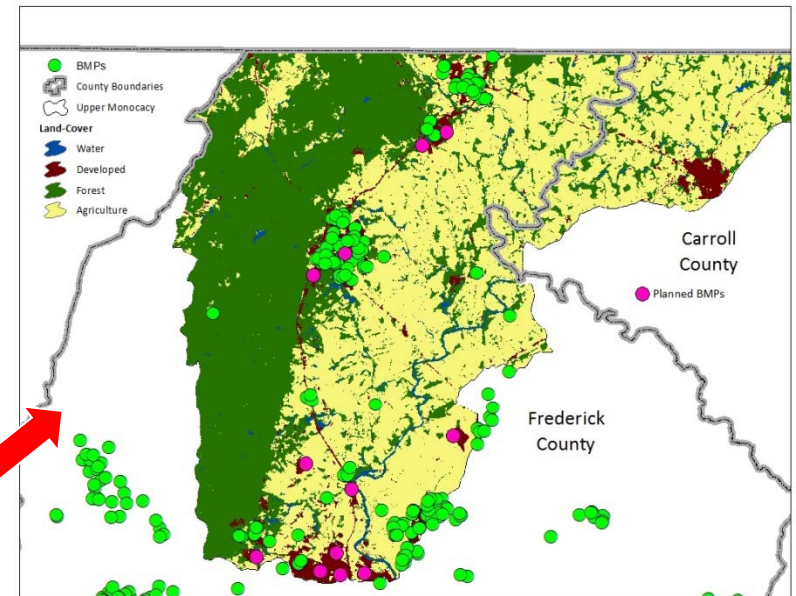
Model baseline load



Land-Use and BMPs for TMDL baseline year

Compare load to target

Model Management Strategies



Apply SW-WLA reduction % to calculate target





Address Local TMDLs and Bay TMDLs

- Many watersheds have multiple, coincident allocations
 - All watersheds in Bay drainage have allocations as part of the Chesapeake Bay TMDLs
 - Protect Chesapeake Bay water quality
 - In some instances, the same watersheds may have local nutrient and sediment TMDLs
 - Protect local water quality
 - Implementation plans should show that all SW-WLAs are met
 - Possible approach
 - Translate local and Bay TMDLs into a common currency (modeling system)
 - Options:
 - Develop individual implementation plans for each SW-WLA
 - Develop one implementation plan that shows that all coincident allocations are met



Utilize an adaptive management approach

- After a plan is in place, jurisdictions need to assess how effective the implemented management strategies are
 - Assess BMP implementation levels
 - If implementation is on schedule, then the performance of the plan can be assessed using water quality monitoring data
 - Need to consider lag times
 - If strategies are not working, need to reassess and update implementation plans



Recent updates to the TMDL Data Center

- TMDL Data Center recent updates
 - Every WLA record now has a baseline year and reduction percentage identified
 - Guidance documents posted
 - General, bacteria, trash, PCBs, and mercury
 - Guidance documents still to come
 - Nutrients and sediments
 - Using MAST to develop SW-WLA implementation plans
 - Using BayFAST to develop SW-WLA implementation plans