Modeling Stormwater WLA Implementation Scenarios

Using the TMDL Data Center, MAST and other tools to show achievement of TMDLs

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Impetus

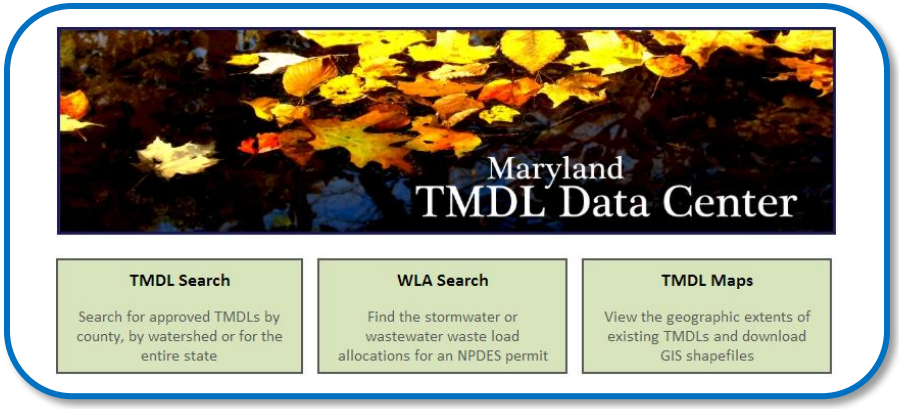
- In 2013 & 2014 Maryland will renew ten Phase I MS4 permits
  - Within one year of permit approval, the jurisdictions must develop plans to meet their TMDL stormwater WLAs
  - Jurisdictions have asked MDE for guidance

Challenges

- Complex patchwork of TMDLs
  - For nutrients and sediments this includes:
    - “Local” tidal and non tidal TMDLs
    - Chesapeake Bay tidal TMDLs
    - Overall there are 817 nutrient and sediment stormwater WLAs assigned to Phase I MS4s, and many of these overlap spatially
- In general, the model that was used to develop the TMDL probably doesn’t include an implementation component
  - TMDL Model vs. Implementation Model
  - Also possible to have a separate Reporting Model

Managing complexity

- Organization
  - Approved TMDLs and WLAs have been catalogued in a database
- Clarity for stakeholders
  - Online access through the Maryland TMDL Data Center
  - Users can …
    - Search for TMDLs by pollutant or location
    - Search for WLAs by permitted discharger
    - View and download Maps of TMDLs & stormwater WLA footprints



  - These resources provide the basic regulatory information for MS4s to develop their stormwater WLA Implementation Plans

TMDL Data Center WLA Search

WLA Search

Search By

- ○ Wastewater/Process Water WLA
- ◉ Stormwater WLA

Select county and type of stormwater permit

County: Baltimore County | Permit Type: County | Submit

Find... | 3 of 6 | 50%

Main Report

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Baltimore County Phase I MS4 — **MD0068314**

Substance	Allocation	Units	Reduction	Allocation Type	Baseline Year	Equation Description	Eqn Location	MS4 Allocation Notes	Report Name	TMDL Map	GIS ID
Nitrogen	233,317.13	delivered pounds/year	26.4%	Individual Planning Target	2009	Annual Average (Delivered)	Segmentshed GUNOH / Gunpowder River Oligohaline	Phase II WIP Targets. Reduction from 2009 progress.	The Chesapeake Bay TMDL	Map	G1024
Nitrogen	492,888.94	EOS pounds/year	21.2%	Individual Planning Target	2009	Annual Average (EOS)	Segmentshed GUNOH / Gunpowder River Oligohaline	Phase II WIP Targets. Reduction from 2009 progress.	The Chesapeake Bay TMDL	Map	G1024
Nitrogen	523,771.33	EOS pounds/year	23.2%	Individual Planning Target	2009	Annual Average (EOS)	Segmentshed PATMH / Patapsco River Mesohaline	Phase II WIP Targets. Reduction from 2009 progress.	The Chesapeake Bay TMDL	Map	G1036
PCBs	127.60	grams/year	53.4%	Aggregate	2001	Annual Average	Segmentshed BACOH / Back River Oligohaline		Back River PCBs	Map	G1003
PCBs	27.60	grams/day	91.5%	Aggregate	2004	Annual Average	Bear Creek		Baltimore Harbor PCBs	Map	G2516
PCBs	28.94	grams/day	91.5%	Aggregate	2004	Annual Average	8 Digit WS 02130903 / Baltimore Harbor Embayment		Baltimore Harbor PCBs	Map	G1072
Phosphorus	740.00	pounds/month	15%	Aggregate	1995	Low Flow (May 1 - Oct 31)	8 Digit WS 02130901 / Back River		Back River Nutrients	Map	G1071
Phosphorus	10,550.00	pounds/year	15%	Aggregate	1995	Annual Average	8 Digit WS 02130901 / Back River		Back River Nutrients	Map	G1071
Phosphorus	16,662.00	pounds/growing season	see report	Aggregate	1995	Growing Season (May 1 - Oct 31)	Baltimore Harbor		Baltimore Harbor Tidal Nutrients	Map	G2390
Phosphorus	39,279.00	pounds/year	15%	Aggregate	1995	Annual Average	Baltimore Harbor		Baltimore Harbor Tidal Nutrients	Map	G2390
Phosphorus	524.00	pounds/year	49%	Individual	2009	Annual Average	8 Digit WS 02130907 / Liberty Reservoir		Liberty Reservoir Phosphorus and Sediments	Map	G1112
Phosphorus	862.00	pounds/year	15%	Aggregate	1995	Annual Average	8 Digit WS 02130806 / Prettyboy Reservoir		Loch Raven Reservoir Nutrients and Sediment	Map	G1165
Phosphorus	20,753.00	pounds/year	15%	Aggregate	1995	Annual Average	8 Digit WS 02130805 / Loch Raven Reservoir		Loch Raven Reservoir Nutrients and Sediment	Map	G1121

Last Updated: 7/7/2014

The stormwater WLA Search on the TMDL Data Center allows permitted stormwater dischargers to find all of the WLAs that have been assigned to them in approved TMDLs. For each WLA, it provides the basic information that they will need to show achievement of their loading targets

Other TMDL Data Center resources

- Stormwater Toolkit
  - Provides instructions and GIS resources so that jurisdictions can disaggregate stormwater WLAs that are assigned to multiple dischargers
- Stormwater Guidance Documents
  - A library of generalized and pollutant-specific guidance documents to assist stormwater dischargers in developing implementation plans

Accounting for model differences

- Often, different models will be used for TMDL implementation and TMDL development
  - Loading estimates from different models are not necessarily compatible
    - *100 lbs-TN/yr in CBWM P4.3 ≠ 100 lbs-TN/yr MAST*
  - When using different models, target loads can be converted using equivalent Levels of Effort (LOEs)
    - *A 25% reduction from a 2005 baseline scenario in CBWM P4.3 = a 25% reduction from 2005 in MAST*
- When implementing based on LOE, each stormwater WLA can be defined by four elements:
  (1) pollutant
  (2) regulated watershed footprint = *overlapping area of TMDL footprint and MS4 boundary*
  (3) reduction percentage
  (4) baseline year
- For example:

  Anne Arundel County will need to develop an implementation plan that shows a 20.5% reduction in urban stormwater TSS loads from a baseline year of 2005 in the Anne Arundel County portion of the Little Patuxent River Watershed

MAST implementation planning

Steps for developing a stormwater implementation plan for a local TMDL

(1) Develop a MAST baseline scenario

(2) Calculate a MAST target load for urban stormwater

(3) Find the watershed's current loading in MAST

(4) Develop an implementation scenario that shows the achievement of the MAST target load

These steps are spelled out in the following slides, or in even more detail on the MAST Documentation page

MAST Step 1

- Develop a baseline scenario to calculate a MAST baseline load for urban stormwater using the MAST scenario year that matches the local TMDL baseline year
  - Select the watershed-county combination that corresponds to the stormwater WLA. MAST now includes the following scales:
    - MD 8-Digit Watershed – County overlap *(e.g., 02120202-Baltimore Co)*
    - Chesapeake Bay Segmentshed – County overlap *(e.g., BACOH-Baltimore Co)*
  - Select the MAST scenario that corresponds to the local TMDL baseline year *(e.g., 2003 Local TMDL Base scenario)*.

    In addition to annual Progress scenarios, MAST now provides baseline scenarios for Maryland for years 2000 through 2008.

MAST Step 2

- Calculate a MAST target load
  - For the MAST baseline scenario from Step 1, find the watershed loading for urban stormwater pertaining to the relevant MS4 jurisdiction
  - Apply the WLA reduction % to the baseline load to obtain the MAST target load

MAST Steps 3 & 4

- **Step 3:** Find the current stormwater loading using the most up-to-date Progress scenario (e.g., 2013 Progress)
- **Step 4:** Build upon the Progress scenario by adding BMPs until the MAST target loading has been achieved.
  - This new Stormwater WLA implementation scenario can be used to show achievement of a jurisdiction's stormwater WLA allocation

Comparing stringency of allocations

- Jurisdictions could use MAST to compare all of their TMDL target loads in one model
  - This would show which TMDLs are more stringent
  - Jurisdictions might determine that achieving full Bay TMDL implementation will also satisfy implementation requirements for some of their local TMDLs
- Jurisdictions could use this information to develop comprehensive stormwater WLA implementation plans for nutrients and sediments
  - These would show full implementation of the Bay TMDL, as well as any implementation of local TMDLs scheduled to take place by 2025
  - Comprehensive plans could be submitted directly to scenario builder for future WIP submissions
- Challenges …
  - TMDLs are frequently developed on different spatial scales making stringency comparisons difficult
  - Stormwater WLA implementation plans can have different target years
    - The Bay WIP is scheduled to be fully implemented by 2025, but local jurisdictions have flexibility in scheduling local TMDL implementation

Benefits of using MAST

- Uses a commonly agreed upon set of inputs
- Continuously updated to match the science that informs the CBWM
- Allows jurisdictions to develop comprehensive stormwater WLA implementation plans for nutrients and sediment that address multiple TMDLs
  - Comprehensive scenarios could potentially be used to inform future statewide implementation plans
- Allows jurisdictions to easily compare stringency of different TMDLs
- Drawbacks
  - Doesn't allow flexibility in defining local conditions like land use and loading rates
  - Impractical to use at a TMDL scale smaller than the MD 8-Digit Watershed or Chsapeake Bay segmentshed

Advantages of using BayFAST

- For certain TMDLs, BayFAST might be more appropriate for developing implementation plans
  - It can be applied at nonstandard watershed scales
  - Users have the flexibility to define their own baseline, current and target land uses
- Drawbacks
  - More complicated then MAST since users would need to develop land use estimates and BMP implementation figures for three scenarios;
    - Baseline Scenario
    - Current Scenario
    - Target Scenario
  - Implementation plans cannot be brought into MAST, making target comparisons more difficult
    - These plans could not be easily incorporated into future WIP submissions

Summary

- Stormwater WLA implementation information for MS4s is available through MD's TMDL Data Center
- Stormwater WLA Implementation Plans can be developed and reported to MDE through MAST and BayFAST
- A variety of additional online resources are available through MAST and the TMDL Data Center to assist stormwater dischargers in their implementation efforts