

Total Maximum Daily Load Implementation Plans

Baltimore County Department of Environmental
Protection and Sustainability



Presentation Outline

1. TMDLs of Baltimore County

- Completed TMDL Implementation Plans by watershed
- Future TMDLs

2. Timeline

- Timeline for meeting TMDL targets
- Milestones
- Reporting

3. Approach and Monitoring

- Approach by pollutant type
- Uncertainties
- Monitoring by pollutant type

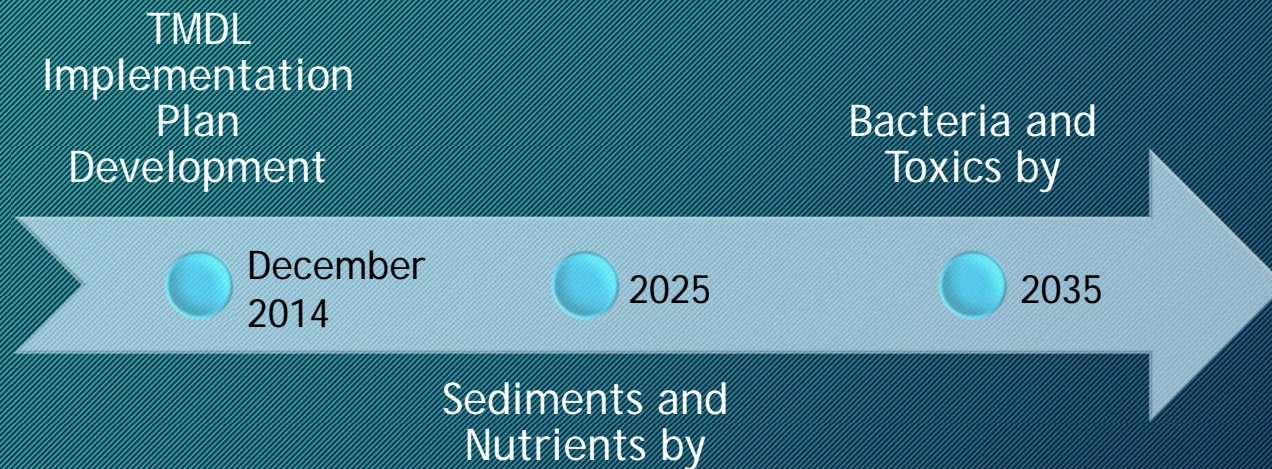
TMDL Implementation Plans in Baltimore County

- 22 TMDL Implementation Plans (In review by MDE and EPA Region 3)
- 3 Plans In Development
 - Liberty Reservoir Phosphorus and Sediment
 - Trash TMDL Implementation Plan in Development (Gwynns Falls and Jones Falls)

Prettyboy Reservoir	Loch Raven Reservoir	Liberty Reservoir (Phosphorus and Sediment in development)	Lower North Branch Patapsco	Gwynns Falls	Jones Falls	Back River	Baltimore Harbor
Phosphorus	Phosphorus	Phosphorus	Bacteria	Bacteria	Bacteria	Nutrients	Nutrients
Bacteria	Sediment	Sediment	Sediment	Sediment	Sediment	Bacteria	PCBs
Mercury	Bacteria	Bacteria			PCBs	PCBs	Chlordane
	Mercury					Chlordane	

Timeline

- All Sediment and Nutrient TMDL Implementation Plans are consistent with Bay TMDL timeline



Timeline

- Will prepare 2 year Milestones for each TMDL in accordance with Chesapeake Bay TMDL 2 year milestones
- Must account for lag times when measuring progress
- Sediment Interim Milestones

Measure	Year					
	2017	2020	2023	2025	2026	2029
Implementation of Reduction Actions		50%		100%		
Mean BIBI Score	2.23	2.46	2.70		2.97	3.27

Timeline

- Bacteria Interim Milestones

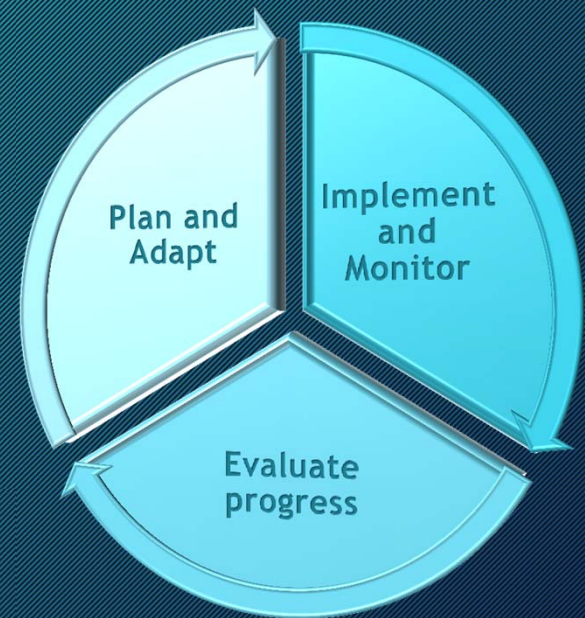
Single Sample Target (MPN/100 ml)				
Weather Condition	2020	2025	2030	2035
Dry	576	410	298	235
Wet	NA	NA	NA	NA
Geometric Mean Target (MPN/100 ml)				
Dry	477	360	243	126
Wet	6,880	4,630	2,380	126

Reporting

- Progress reporting will be through the Annual NPDES-MS4 Permit Report
- <http://www.baltimorecountymd.gov/Agencies/environment>

Adaptive Management

- Note:
- All of the County's TMDL Implementation Plans follow an **adaptive approach** to meeting reductions.
- An adaptive management assessment will be developed for the plans to enhance actions as needed.
- Loading rates and reduction credits have been calibrated to the current Chesapeake Bay Model



Approach by Pollutant Type



Sediment



Nutrients (Phosphorus and Nitrogen)



Bacteria



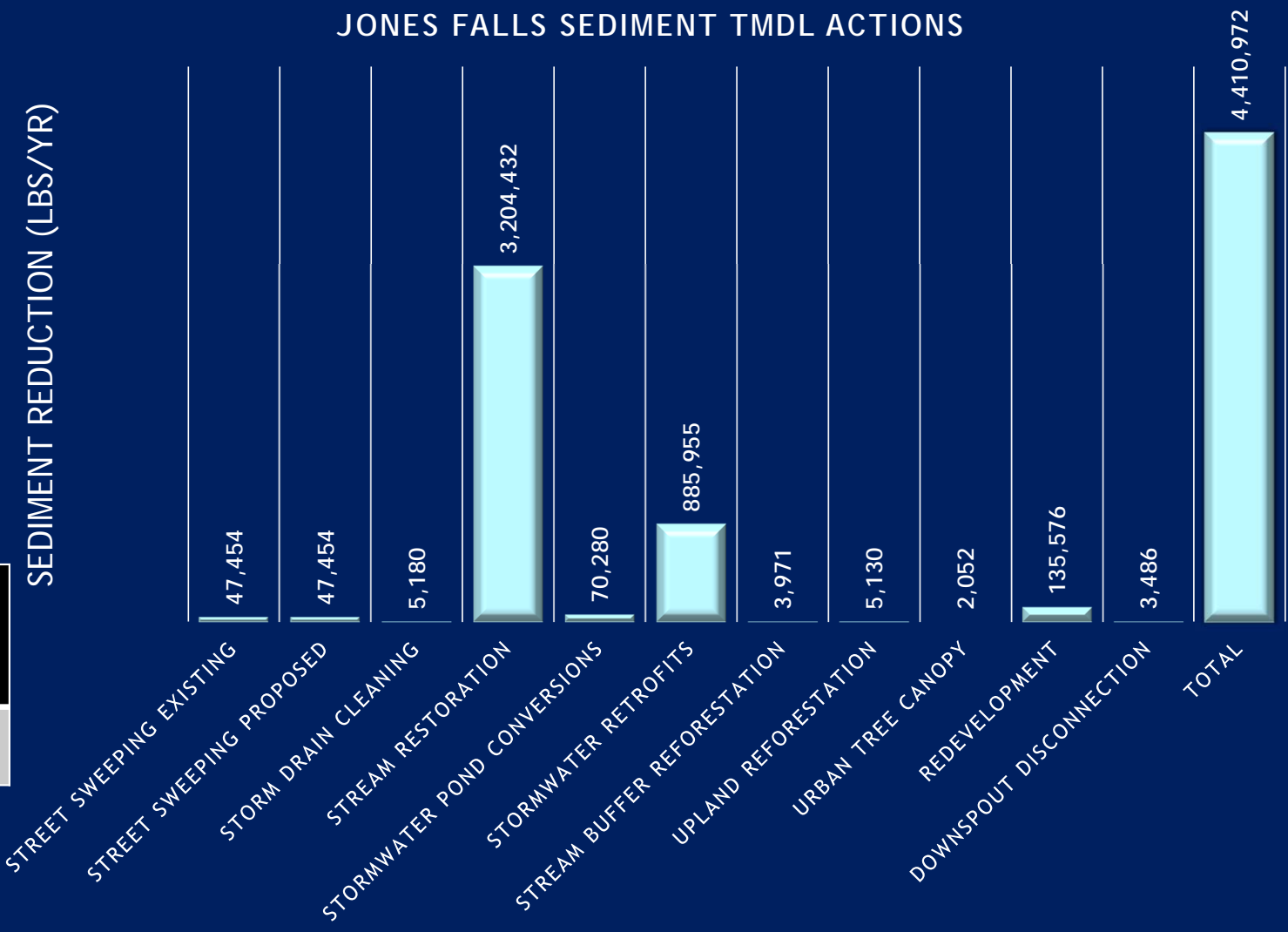
Toxics (PCBs, Mercury and Chlordane)

Sediment Reductions Approach

- The County developed a **potential implementation scenario**,
- The TMDL Targets were **adjusted for change in load since the baseline year** of the TMDL
- The County's Small Watershed Action Plans (**SWAPs**) were used to inform the potential for actions in each watershed
- The total actions in the scenario were **not to exceed actions identified for achieving the Bay TMDL**

Sample Reduction Scenario

Watershed	TMDL Reduction Required	Baltimore County Scenario Reductions
Jones Falls	4,378,000 lbs/yr	4,410,972 lbs/yr

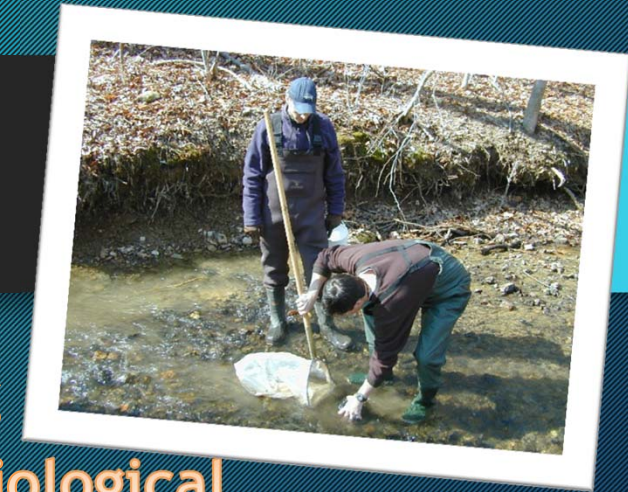


Nutrient Reduction Approach

- Nutrient Reduction Approach was similar to Sediment
- Also developed a **potential reduction scenario**
- These actions combined with sediment actions were also not to exceed actions designated to meet the Bay TMDL
- Sediment reducing actions also reduce nutrients
- Potential reduction scenarios were adjusted, as needed, to meet both sediment and nutrient TMDLs

Sediment and Nutrient Monitoring

- Continue **Random Point Biological Monitoring**
- Currently collecting data for **Subwatershed Biological Condition Monitoring**- determine progress on watershed basis
- Continue **Chemical Monitoring** - Tests for Chlorides, Sulfates, and TSS
- Explore the utility of deploying **Continuously Recording Turbidity Meters** - Currently in pilot
- Continue **SAV monitoring**



Bacteria Reduction Approach

Unknown:

- There is no established loading rate for bacteria by land use for Baltimore County
- Available literature supports that actions included in the implementation approach will lead to reductions, but exact numbers are still unknown

Approach:

- Achieve water quality standards and percent reductions for each monitoring station
- Implement actions that are known to have reduction effect
- Human inputs are prioritized, but actions are included to target each source

How the Reductions Will Be Achieved

The following are just some of the actions that will be utilized to achieve reduction requirements:

- Continue to meet requirements of the consent decree
- Continue to assist land owners in addressing failing septic systems
- Investigate and convert existing dry detention ponds
- Implement an awareness campaign to spread information about pet waste
- Design and implement stormwater retrofits
- Continue stream restoration projects
- Street sweeping
- Storm drain inlet cleaning



Reductions Required by Trend Monitoring Station

MDE Station Code	County Code		E. coli Baseline Load (BillionMPN/year)	Target Load Reduction (BillionMPN/year)	Long-Term Average E. coli TMDL Load (BillionMPN/year)	% Required Reduction
JON0184	JON-3	County	1,206,325	1,115,075	91,250	92.4%
UQQ0005	JON-4	County	133,955	123,370	10,585	92.1%
JON0082sub	JON-2	County	887,315	845,340	41,975	95.3%
JON0039sub	JON-1	City	3,340,480	1,184,260	156,220	95.3%
SRU0005	JON-5	City	636,560	622,960	13,870	97.8%
Total			6,204,270	5,890,735	313,900	94.4%

The County will measure success by following the reductions achieved at bacteria monitoring stations within the watershed



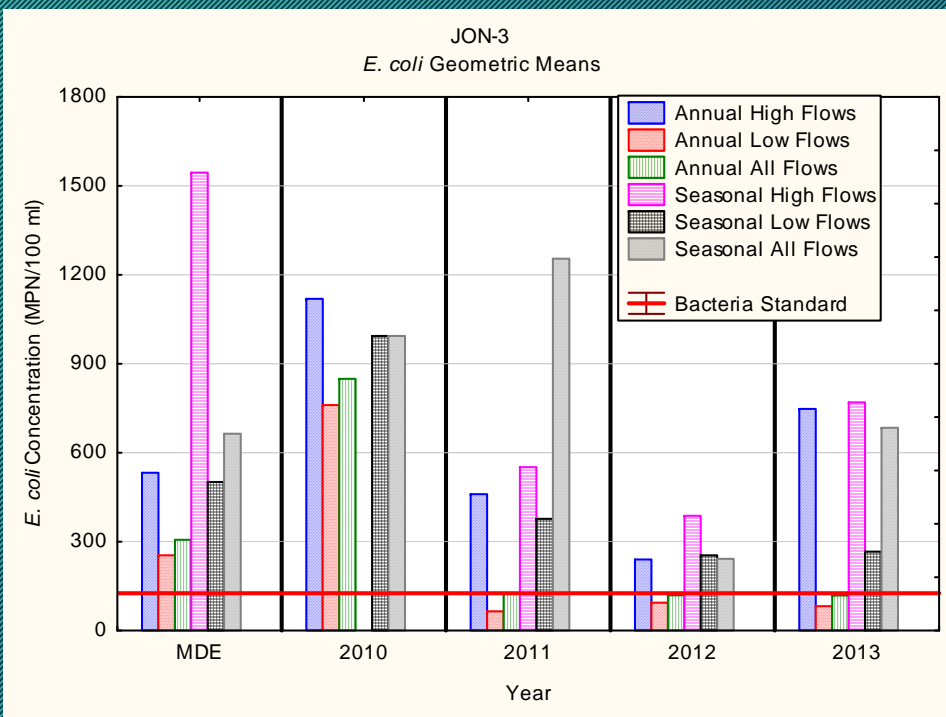
Bacteria Monitoring

- Initially **Trend Monitoring** done in conjunction with Carroll County and Baltimore City

Future Monitoring Plans:

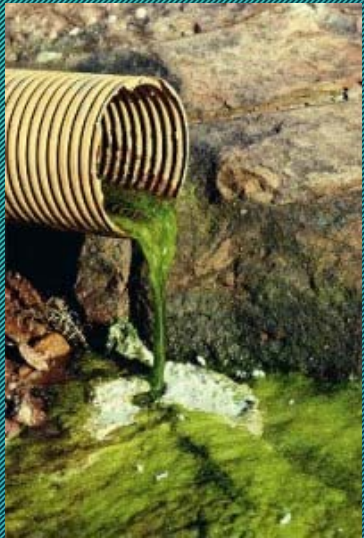
- **Sub-watershed Prioritization Monitoring**
- **Bacteria Source Location Tracking** implemented based on these results
- **Bacteria Source Relative Contribution Tracking** (species tracking): Human, Pet Waste, Wildlife, Livestock

Bacteria Monitoring



- *E. coli* Geometric Mean Concentrations at Site JON-3 for both Annual and Seasonal Flow Periods Stratified by Flow Condition, MDE Results Added for Comparison

Toxics Reduction Approach



Unknown:

- Awaiting data from MDE on the results of 2014 fish tissue studies
- Sources of PCBs and Mercury need to be identified
- Will require additional monitoring
- Unknown relationship between toxics and sediment transport
- Lag times

Toxics Reduction Approach

Approach:

- Education of proper disposal methods of hazardous materials is an action proposed for all three toxic pollutants
- As a practice, adding sand organic filters to all SWM pond conversions

PCBs

- PCBs adsorb to sediments, so initial actions include those that reduce sediment
- Baltimore County will work with MDE to develop a load reduction calculation for PCBs that will link sediment reductions to PCB reductions
- Monitoring results will allow more targeted actions

Toxics Reduction Approach

Approach:

Mercury

- The County is not proposing any additional restoration actions for mercury reduction other than what is being proposed to reduce nitrogen and phosphorus
- The Maryland Healthy Air Act required a 90% reduction of mercury emissions from 2002 levels by 2013, this may have a major impact on mercury levels in reservoirs

Chlordane

- Management and restoration actions of chlordane will be determined based on the findings of the fish tissue monitoring results

Toxics Monitoring and Reporting

- Awaiting results of **2014 fish tissue monitoring** from MDE
- Baltimore County plans to develop a program to **monitor fish tissue** on a three year cycle
- The County expects to develop a program to monitor the **bioavailability of toxics using caged bivalves**
 - Could help focus future efforts in identifying toxics sources

