



**Department of the Environment**

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# **Sources of Water Quality Impairments and the TMDL Process**

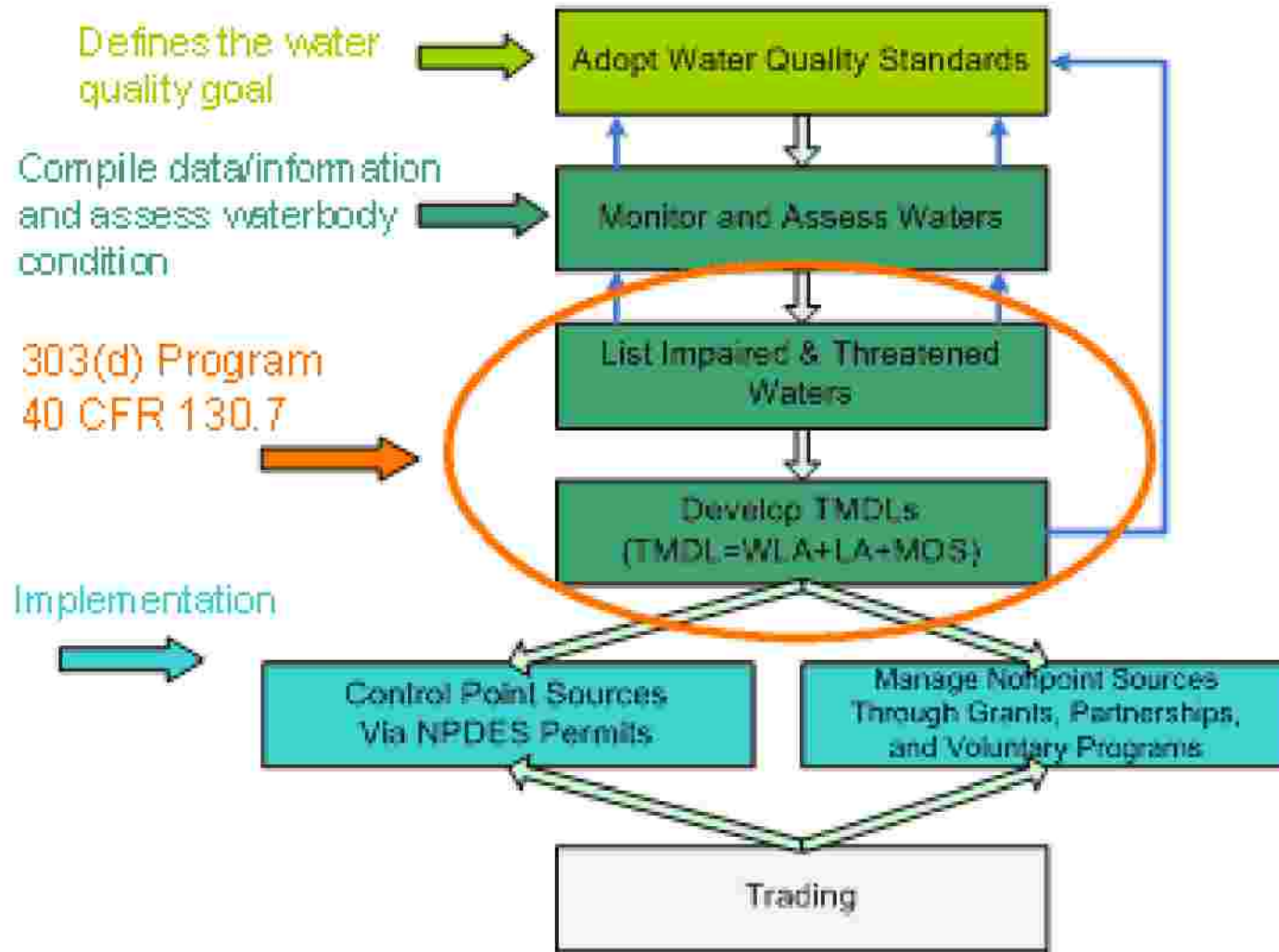
**Briefing to the Anne Arundel County Delegation**

**January 23, 2009**





# Water Quality Attainment





# Designated Uses

- **Use I: Water Contact Recreation, and Protection of Nontidal Warmwater Aquatic Life**
- **Use I-P: Water Contact Recreation, Protection of Aquatic Life, and Public Water Supply**
- **Use II: Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting**
  - **- Shellfish Harvesting Subcategory**
  - **- Seasonal Migratory Fish Spawning and Nursery Subcategory (Chesapeake Bay only)**
  - **- Seasonal Shallow-Water Submerged Aquatic Vegetation Subcategory (Chesapeake Bay only)**
  - **- Open-Water Fish and Shellfish Subcategory (Chesapeake Bay only)**
  - **- Seasonal Deep-Water Fish and Shellfish Subcategory (Chesapeake Bay only)**
  - **- Seasonal Deep-Channel Refuge Use (Chesapeake Bay only)**
- **Use II-P: Tidal Fresh Water Estuary – includes applicable Use II and Public Water Supply**
- **Use III: Nontidal Cold Water**
- **Use III-P: Nontidal Cold Water and Public Water Supply**
- **Use IV: Recreational Trout Waters**
- **Use IV-P: Recreational Trout Waters and Public Water Supply**





# Water Quality Standards

26.08.02.03-3

## **.03-3 Water Quality Criteria Specific to Designated Uses.**

A. Criteria for Use I Waters—Water Contact Recreation and Protection of Nontidal Warmwater Aquatic Life.

(1) Bacteriological.

(a) Table 1. Bacteria Indicator Criteria for Frequency of Use.

Indicator	Steady State Geometric Mean Indicator Density	Single Sample Maximum Allowable Density			
		Frequent Full Body Contact Recreation (Upper 75% CL)	Moderately Frequent Full Body Contact Recreation (Upper 82% CL)	Occasional Full Body Contact Recreation (Upper 90% CL)	Infrequent Full Body Contact Recreation (Upper 95% CL)
	All Areas				
	Freshwater (Either apply)				
Enterococci	33	61	78	107	151
E. coli	126	235	298	410	576



# What is a TMDL?

- **Total Maximum Daily Load**
- **Requirement under the federal Clean Water Act**
- **Establishes the maximum amount of an impairing substance or a stressor that a waterbody can assimilate and still meet water quality standards**
- **Allocates load among pollution contributors (i.e., point and non-point sources)**





# Which Waterbodies Require TMDLs?

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- **State waters that do not or are not expected to meet water quality standards after all technology-based controls and/or other required pollutant controls are in place (MD 303(d) List)**
- **May develop more than one TMDL per waterbody if multiple impairing substances identified (i.e., more TMDLs than number of impaired waters)**





# Which Waterbodies (cont.)

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- **303(d) List based upon 305(b) Report of water quality status of State waters**
- **MD 303(d) List of impaired waterbodies first developed in 1996; updated in 1998, 2002, 2004, 2006 and 2008**
- **MD Draft Final 2008 303(d) List of impaired waterbodies has been approved.**

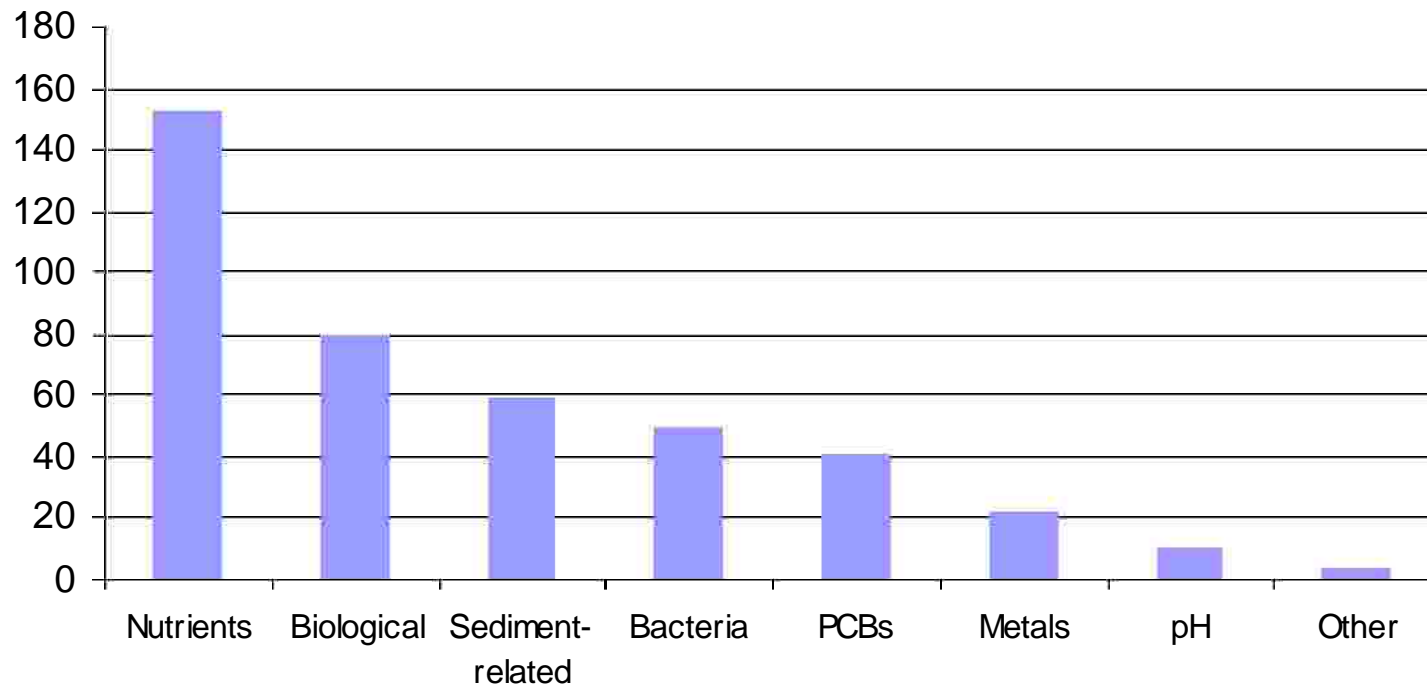




# Statewide Impairments

## (Final 2008 Integrated Report)

Number of Listings on Part 5 of the Integrated Report







# MDE's TMDL Responsibilities

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- **303(d) List**
  - Development
  - Review process, forward for EPA approval
- **TMDL analyses**
  - Development
  - Review process, forward for EPA approval
- **Implementation**
  - Institutionalize TMDLs
  - NPDES permitting
  - TMDL Implementation Guidance Document for Local Governments





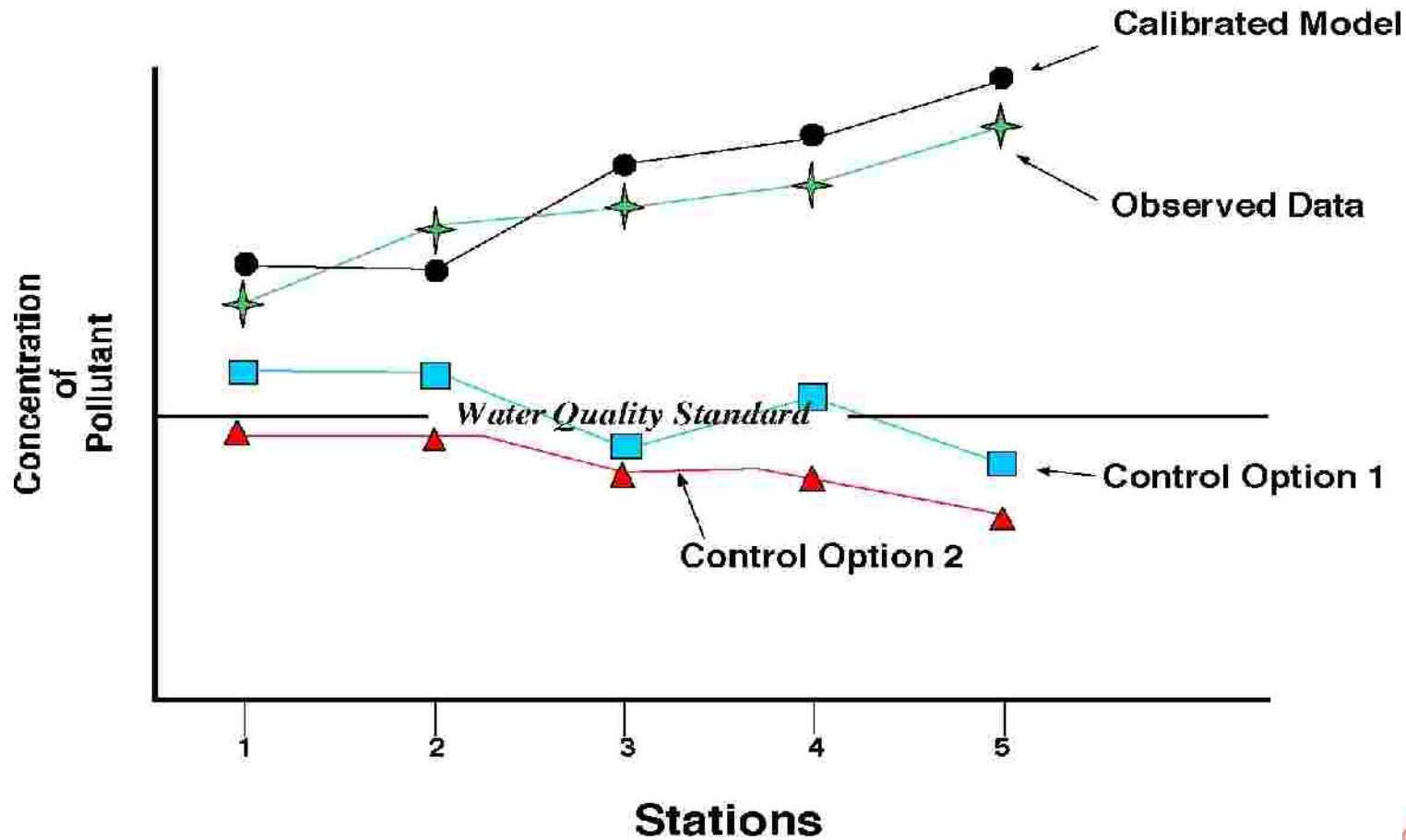
# TMDL Development Process

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- **Data collection**
  - **Five-year cycling strategy, additional sampling for TMDL purposes, data solicitation**
- **Data analysis**
- **Selection of an assessment tool**
  - **Depends upon system, complexity of problem, available data, etc**
- **Evaluation of various load reduction scenarios**



## TMDL Modeling Process





# Development Process (cont.)

- **TMDL = WLA + LA + MOS (+ FA)**  
**WLA = Point Source Load Allocation/Urban Non-point source (MS4 Stormwater Permits)**  
**LA = Non-point Source Load Allocation**  
**MOS = Margin of Safety**  
**FA = Future Allocation (included when applicable)**
- **Currently expressed as a “mass per unit time, toxicity, or other appropriate measure” (40 CFR 130.2(i))**
- **Documentation**





# TMDL Review Process

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- **Internal MDE review**
- **Interagency review**
- **Preliminary EPA review**
- **Stakeholder/public review**
- **Submission to EPA for review and approval**



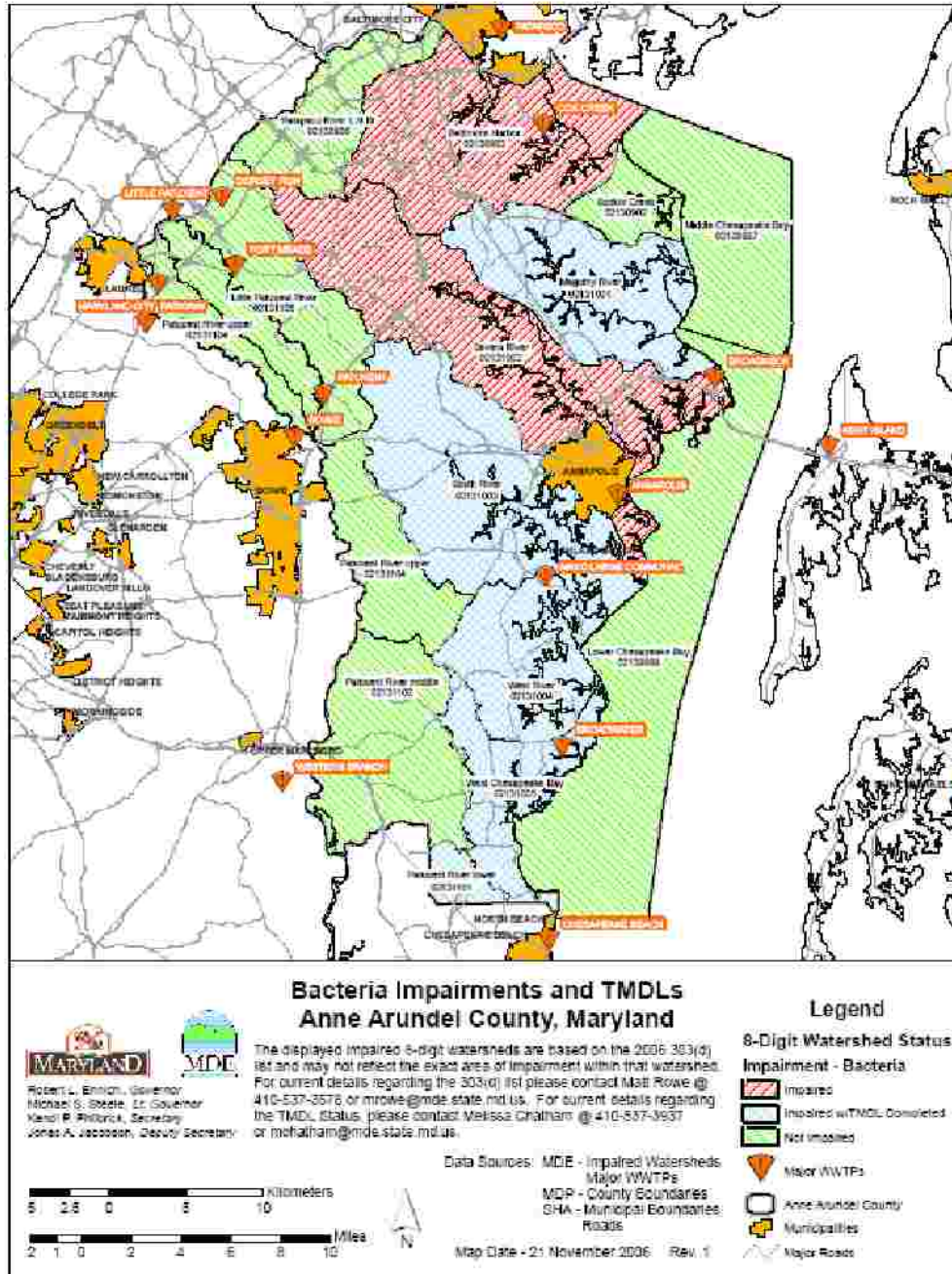


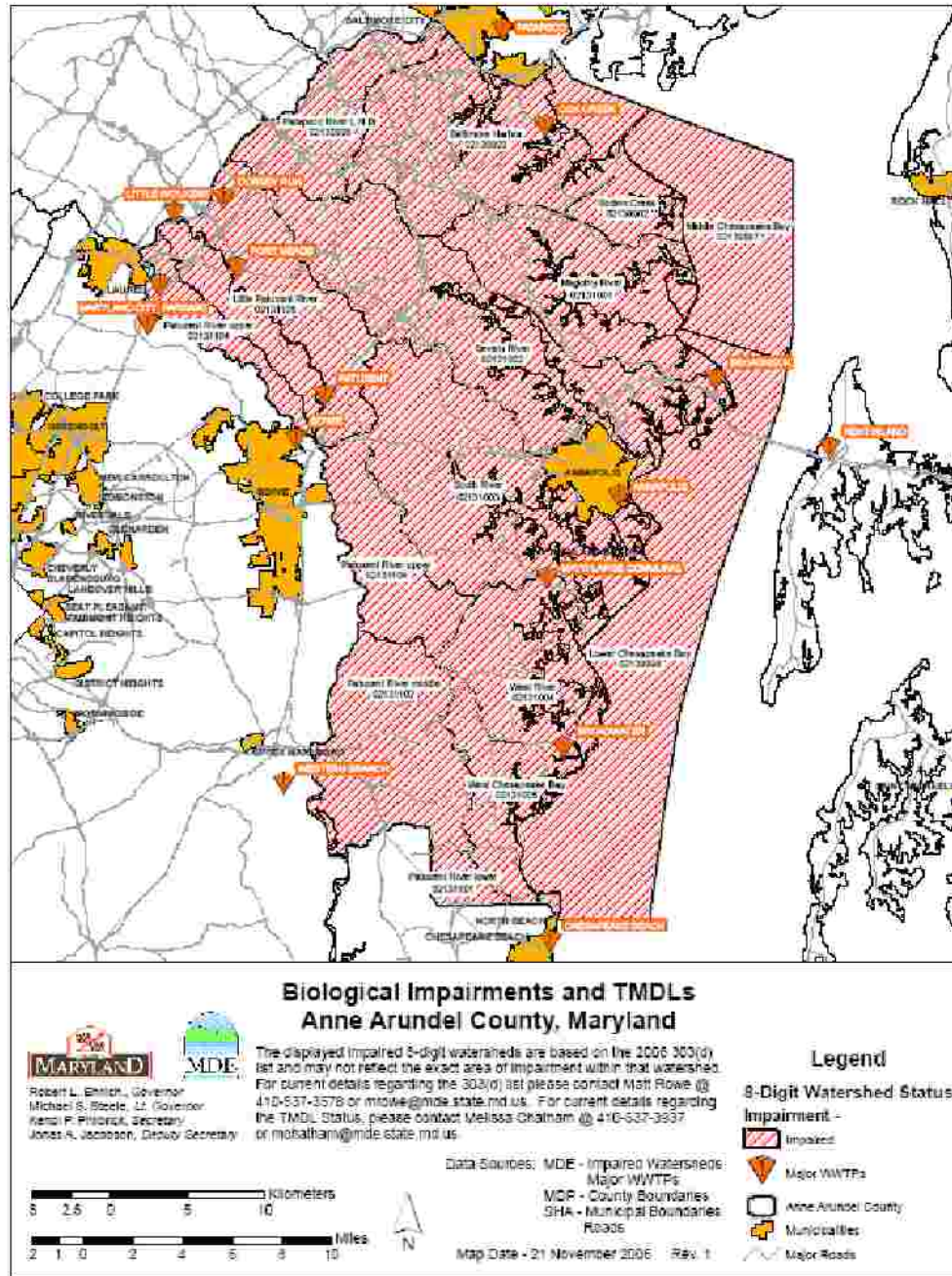
# TMDL Outreach

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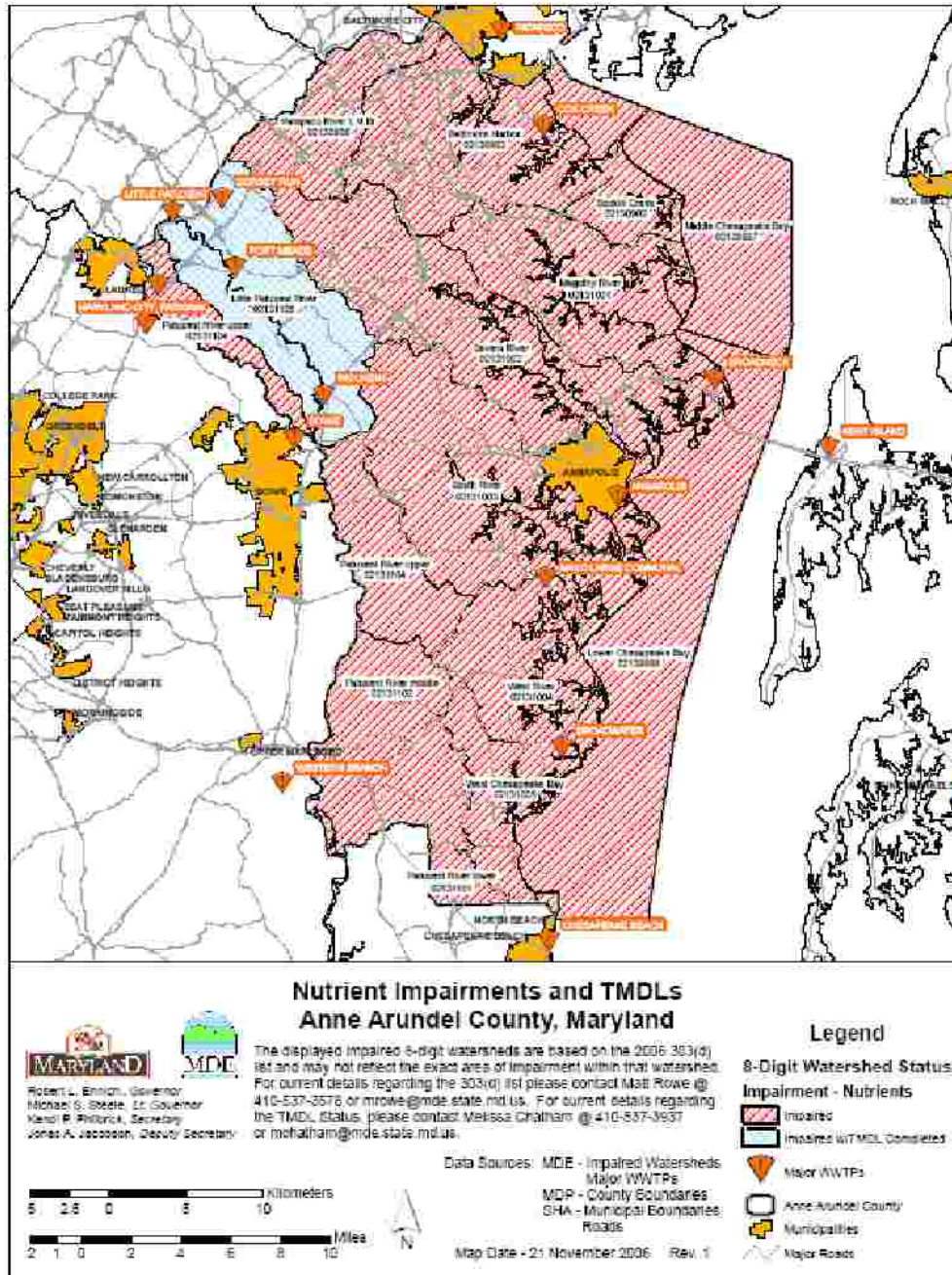
- **Notice of Intent to Develop TMDL**
- **Pre-release Notification**
- **30-day Public Comment Period**
- **Notifications of Submittal and Approval**
  
- **Briefings**
  - **Involvement at request of stakeholders**













# Bacteria Source Tracking

**Table 2.4.1: Distribution of Fecal Coliform Source Loads in the Bear Neck Creek Basin**

<b>Fecal Coliform Source</b>	<b>Loading Counts/day</b>	<b>Loading Percent</b>
Livestock	2.55E+11	46.3%
Pets	1.87E+11	33.9%
Human	7.63E+08	0.1%
Wildlife	1.08E+11	19.7%
<b>Total</b>	<b>5.51E+11</b>	<b>100.0%</b>

**Table 2.4.2: Distribution of Fecal Coliform Source Loads in the Cadle Creek Basin**

<b>Fecal Coliform Source</b>	<b>Loading Counts/day</b>	<b>Loading Percent</b>
Livestock	0.00E+00	0.0%
Pets	7.07E+10	80.2%
Human	2.94E+08	0.3%
Wildlife	1.72E+10	19.5%
<b>Total</b>	<b>8.82E+10</b>	<b>100.0%</b>





# Bacteria Source Tracking

**Table C-1: Summary of Nonpoint Sources**

Category	Source
Wildlife	Beaver, deer, goose, duck, swan, muskrat, raccoon, and wild turkey
Human	Septic
Pets	Dog
Livestock	Cattle, sheep, chicken, and horse





# Bacteria TMDL

**Table 4.7.2: Summary of Load Allocations and Reductions**

Watershed	Baseline Category	Baseline Load (counts per day)	TMDL Category	Allowable Load (counts per day)	Reduction
Whitehall and Meredith Creeks	Non-point Source Load	$3.55 \times 10^{11}$	LA	$3.55 \times 10^{10}$	90%
	Stormwater Load	$1.37 \times 10^{11}$	Stormwater WLA	$1.37 \times 10^{10}$	90%
Mill Creek	Non-point Source Load	$8.81 \times 10^{11}$	LA	$1.23 \times 10^{11}$	86%
	Stormwater Load	$8.99 \times 10^{11}$	Stormwater WLA	$1.26 \times 10^{11}$	86%
Severn River Mainstem	Non-point Source Load	$3.17 \times 10^{12}$	LA	$2.57 \times 10^{12}$	19%
	Stormwater Load	$2.88 \times 10^{12}$	Stormwater WLA	$2.33 \times 10^{12}$	19%
	WWTP Load	$2.41 \times 10^{10}$	WWTP WLA	$2.41 \times 10^{10}$	0%





# TMDL Implementation

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- **Maryland views TMDL implementation as having two parts:**
  - **Institutionalization to communicate existence of approved TMDLs**
  - **Planning and execution to reduce excess pollutants, off-set new sources, and protect healthy waters**





# TMDL Implementation (cont.)

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- **Institutionalization**
  - **Parties notified (e.g., State agencies, affected local governments, dischargers, public)**
  - **Documented in the State’s Continuing Planning Process (CPP)**
  - **Includes adjusting permit limits to reflect wasteload allocations (WLAs)**





# TMDL Implementation (cont.)

- **Planning and Execution**
  - **Many activities = TMDL implementation, so document any and all pollutant reduction actions**
  - **State can provide technical assistance for implementation**
  - **MDE is working with local government representatives to develop an “Interim TMDL Implementation Guidance for Local Governments”**
    - **Common sense approach**
    - **Sensitivity to existing local priorities**
    - **Build upon existing programs and forums**





# For More Information

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**<http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/implementation.asp>**

1800 Washington Boulevard | Baltimore, MD 21230-1718  
410-537-3000 | TTY Users: 1-800-735-2258  
[www.mde.state.md.us](http://www.mde.state.md.us)







# SSO/CSO Problem

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- # of systems with chronic or significant SSO's = 25
- Compliance Orders = 14
- # of annual overflows = 1380
- Gallons = 300,191,479
- Baltimore City, Thurmont, Talbot Co., Town of Accident, Hagerstown, AA County, Baltimore County, WSSC, Emmittsburg, Rising Sun, Elkton, LaPlata, Perryville all under consent orders.





# 5 Year Overflow History, Cox/Furnace/Marley Creeks

Overflow Type	Municipality/Facility	NPDES #	Date Discovers	Time Discovered	Duration			Location	Quantity in Gallons	Cause	Receiving Waters	County
					Days	Hours	Minutes					
SSO	Anne Arundel County Department of Public Works	N/A	11/9/2005	6:20:00 AM	0	0	5	8833 Wagner Station Road, Stoney Beach	1000	Electrical failure	Cox Creek	Anne Arundel
SSO	Anne Arundel County Department of Public Works	N/A	2/12/2005		0	0	45	917-919 Lauren Way	75	Mechanical failure	Cox Creek	Anne Arundel
SSO	Anne Arundel County Department of Public Works Bureau of Utility Operations	N/A	7/23/2008	10:30:00 PM	0	0	75	98 Hammerlee Rd, Twin Cove	22500	Power outage	Furnace Creek	Anne Arundel
SSO	Anne Arundel County Department of Public Works Bureau of Utility Operations	N/A	2/11/2008	10:21:00 AM	0	2	0	Hammarlee Road, Cadillac Homes	3500	Structural failure	Furnace Creek	Anne Arundel
SSO	Anne Arundel County DPW	N/A	9/20/2007	6:00:00 PM	0	3	0	103 Shoreland Drive, Point Pleasant	5000	Structural Failure	Furnace Creek	Anne Arundel
SSO	Anne Arundel County DPW	N/A	5/9/2007	10:00:00 AM	2	0	0	Cinder Cove PS, 103 Shoreland Dr, (Point Pleasant Rd, & Margate Dr.)	78000	Structural Failure	Furnace Creek	Anne Arundel
SSO	Anne Arundel County Department of Public Works	N/A	11/29/2005	11:00:00 AM				4 Phyllis Drive, Marley	1000	Blockage	Marley Creek	Anne Arundel
SSO	Anne Arundel County Department of Public Works Bureau of Utility Operations	N/A	6/9/2008	10:45:00 AM	0	0	30	Elvaton Rd, Woods Edge	700	Blockage	Marley Creek	Anne Arundel
SSO	Anne Arundel County Department of Public Works Bureau of Utility Operations	N/A	3/28/2008	11:30:00 AM	0	0	48	1605 West Way, Harundale	1500	Blockage	Marley Creek	Anne Arundel
SSO	Anne Arundel County Public Schools	N/A	8/1/2006					Point Pleasant Elementary School, 1445 Furnace Ave, Glen Burnie	10000	Mechanical failure	Marley Creek	Anne Arundel
SSO	Anne Arundel County DPW	N/A	3/13/2007	3:45:00 PM	0	3	0	445 Mystic View Turn	25000	Blockage	Marley Creek Headwater	Anne Arundel
SSO	Anne Arundel County DPW	N/A	3/12/2007	5:17:00 PM	0	2	0	7905 Ritchie Hwy.	1000	Blockage	Marley Creek Headwater	Anne Arundel

