Anacostia River TMDL Effort Review Meeting
Meeting Summary
July 11th, 2005

Meeting Attendance:

Scott Macomber – Maryland Department of the Environment
Dr. Mow-Soung Cheng – Prince George's County Department of Environmental Resources
Monir Chowdhury – District of Columbia Department of Health
Diane Cameron – Audubon Naturalist Society
Neal Fitzpatrick – Audubon Naturalist Society
Cherie Schultz – Interstate Commission on the Potomac River Basin
Meo Curtis – Montgomery County Department of Environmental Protection
Marian Norris – National Park Service
Melanie Shepherdson – Natural Resources Defense Council
Ken Yetman – Maryland Department of Natural Resources
Lee Currey – Maryland Department of the Environment
Jim George – Maryland Department of the Environment
Elichia Venso – Salisbury University
Mark Frana – Salisbury University
Tom Arrasmith – Anacostia Watershed Citizen's Advisory Committee
Brian Vanwye – Anacostia Riverkeeper at Earth Conservation Corps
John Galli – Metropolitan Washington Council of Governments
Ted Graham – Metropolitan Washington Council of Governments
Kate Levendosky – Metropolitan Washington Council of Governments

I. Welcome and Introductions

Mr. Scott Macomber (MDE) began the meeting promptly at 9:00am. He briefly outlined the goals of the meeting, which were to 1) Provide specific information on the bacteria Total Maximum Daily Load (TMDL) for the non-tidal Maryland portion of the Anacostia watershed, which is scheduled to be submitted to Environmental Protection Agency (EPA) for approval by 9/30/05, and 2) Provide an overview of upcoming TMDLs. All present were asked to introduce themselves to the group.

II. Overview of Bacteria Source Tracking Methodology

Mr. Mark Frana and Ms. Elichia Venso (Salisbury University) presented a PowerPoint presentation on the methodology used to identify sources of bacteria present in local waterways. Mr. Frana began the presentation by presenting an overview of the history of Bacteria Source Tracking (BST) and the various methodologies that can be used, including:

1.) Genotypic Techniques
2.) Biochemical or Phenotypic Techniques
3.) Chemical Techniques (non-bacterial)
4.) Fecal Indicators / Microbial Techniques

There is no one method of BST that is considered 'standard' and the various techniques range in cost, accuracy, and data specificity (some techniques can identify the source of bacteria to the species level, while others are only able to distinguish between more general management categories or between human and non-human sources).

The technique used by Mr. Frana and Ms. Venso at Salisbury University for the BST effort is a phenotypic technique called Multiple Antibiotic Resistance (MAR). MAR, is 'library' based, meaning it requires the establishment of a library of bacteria from known sources that is used in statistical comparisons with bacteria from unknown sources that are isolated from water samples. The MAR technique is able to identify bacteria from different management groups of organisms including: humans, domestic animals (primarily dogs), livestock, and wildlife. The MAR technique differentiates between groups due to the different levels of antibiotic resistance the management groups have to various types and concentrations of antibiotics.

The MAR analysis involves comparing 'profiles' of antibiotic resistance from unknown sources to known sources. This specifically entails inoculating bacteria from unknown sources onto antibiotic plates which contain 35 different combinations of concentrations using12 different antibiotics and then comparing the bacterial growth from those plates to plates containing bacteria from known sources that were given the same treatment. The results of the various antibiotic treatments by the bacteria from the unknown sources is entered into a statistical classification model and compared to the antibiotic resistance of the bacteria from known sources. Using statistical methods, the modeling software predicts the classification of the bacteria from unknown sources. The rates of correct classification for the different management categories are:

- Pet: 93%
- Human: 97%
- Livestock: 93%
- Wildlife: 70%

III. Review of TMDL Analysis/Technical Review

Mr. Lee Currey (MDE) delivered a PowerPoint presentation on the development of bacteria TMDLs for Maryland's impaired non-tidal watersheds with a focus on the Anacostia watershed TMDL. There are currently 22 non-tidal watersheds that do not meet the bacteria water quality criteria. For freshwaters in Maryland, the maximum steady state geometric mean density is 33 MPN/100ml for enterococci and 126 MPN/100 ml. for E. coli.

The methodology for developing the bacteria TMDL for the Anacostia involved using a load duration curve to assess bacteria loads at different levels of flow, assessing sources of bacteria and identifying maximum practicable reductions. Fifteen years of flow data from three USGS monitoring stations (2 on Northwest Branch, 1 on Northeast Branch) were used to create flow duration curves for each non-tidal Anacostia subwatershed. Water samples were collected at six monitoring stations in the following Anacostia subwatersheds:

- Upper Beaverdam Creek
- Indian Creek
- Paint Branch
- Northeast Branch
- Upper Northwest Branch
- Lower Northwest Branch (downstream of confluence with Sligo Creek)

Levels of enterococci were analyzed from water samples collected at each monitoring station two times per month from November 2002 to October 2003. The bacteria monitoring results were used to create load duration curves for each of the monitored Anacostia subwatersheds. The load duration curves identified the differences in bacteria levels during high flows and low flows.

The sources of bacteria were identified using MAR. A library of 1200 known source isolates, collected from the Anacostia during the same time period as the water samples, was used to classify the bacteria isolated from the water samples into the four management categories of bacteria sources. From each water sample that was collected, 24 isolates were analyzed. An 80% cutoff point was used for unknown classification. The contribution of each source category at each station was analyzed during low flows and high flows. During high flows there was a general increase in domestic and wildlife sources with a decrease in human sources, while livestock sources did not show a trend based on flow regime. The following table shows the relative contributions from each source by subwatershed.

Station	% Domestic	% Human	% Livestock	% Wildlife	% Total
BED0001	45%	15%	9%	32%	100.0%
INC0030	30%	23%	13%	33%	100.0%
PNT0001	29%	23%	7%	41%	100.0%
NEB0002sub	24%	9%	28%	38%	100.0%
NWA0135	28%	55%	6%	12%	100.0%
NWA0002sub	31%	17%	8%	44%	100.0%

Maximum practicable reductions were created for each of the source categories:

- Human = 95% (direct source inputs, greatest risk)
- Domestic = 75% (reflects uncertainty in effectiveness of urban BMPs)
- Livestock = 75% (based on sediment reductions from BMPs)
- Wildlife = 0% (no approach for reducing to achieve WQ standard)

Two scenarios were developed for meeting the water quality standard. Under the first scenario the maximum practicable reductions would be used in order to minimize the risk to humans. Under the second scenario, the maximum allowable reduction could be as much as 98% for all categories (including wildlife) in watersheds where the water quality standard was not met under the first scenario. In the Anacostia watershed, the water quality standard would be met under scenario one in only 2 subwatersheds (Paint Branch and Upper Northwest Branch), while the second scenario was used to develop target reductions in the other subwatersheds. The following table shows the resulting target reductions:

Station	Domestic %	Human %	Livestock %	Wildlife %	Target Reduction
BED0001	98%	97%	98%	74%	90%
INC0030	98%	98%	98%	24%	74%
PNT0001	29%	95%	68%	0%	35%
NEB0002sub	98%	98%	98%	52%	80%
NWA0135	75%	95%	18%	0%	74%
NWA0002sub	98%	98%	98%	64%	83%

MDE's final TMDL load to attain Maryland water quality standards for the non-tidal portion of the Anacostia in Maryland was compared to the load estimated by the District of Columbia (DC) during its development of a bacteria TMDL for DC portion of the Anacostia. The Maryland load is 4.943 Billion MPN/ac/yr of enterococci whereas the DC fecal coliform load value converted to enterococci load is 3.755 Billion MPN/ac/yr. The Maryland load is 1.32 times higher than the estimated DC load. Mr. Currey said that the differences in the two numbers could be due to the uncertainties associated with different TMDL development methods that were used in the Maryland and DC studies.

IV. Implementation and Policy Considerations

Mr. Jim George (MDE) continued the discussion with a PowerPoint presentation about the implementation of the Anacostia bacteria TMDL. Mr. George suggested that implementation of the bacteria TMDL should focus first on reducing human sources, as they pose the biggest threat to public health. Through conducting source assessments, raising public awareness, soliciting revenues and developing a TMDL implementation plan, human sources of bacteria could be reduced.

Neither federal nor state regulations officially require a TMDL implementation plan. However, Maryland is committed to moving forward on the development of a plan. A TMDL

implementation plan could be used as a tool to help with multiparty actions, raise awareness and to help with funding. Mr. George suggested that groups within the Anacostia community should lead the effort to develop a TMDL implementation plan and mentioned that the AWRC may want to take the lead on putting together an annotated document that points to all of the on-going and planned projects related to the implementation of the bacteria TMDL.

Ms. Meo Curtis (MC-DEP) suggested that there needs to be better targeting of areas that pose the highest threats due to high levels of bacteria contamination from human sources. She noted that areas need to be prioritized, as local governments like Montgomery County have a limited amount of resources and cannot pull money from other stream restoration projects that have been planned to deal with bacteria problems. Mr. George agreed, that as implementation of the bacteria TMDLs move forward, state agencies need to ensure that local government investments in their stream quality programs are not altered accidentally.

V. Initiation of Nutrient, Sediment and Toxics TMDL Efforts

Due to time constraints, Mr. Scott Macomber did not give his full presentation on the nutrient, sediment and toxics TMDL efforts. He briefly explained that these TMDLs will be developed in the next three years. Mr. Macomber will present a more detailed look at the initiation of these TMDLs at the next meeting.

VI. Adjourn

The meeting was adjourned at 12:30 pm. The next meeting will be scheduled for mid-September and will provide more specifics on the development of Nutrient, Sediment and Toxics TMDLs for the Maryland portion of the Anacostia watershed.