DISTRICT DEPARTMENT OF THE ENVIRONMENT

CONSOLIDATED TMDL IMPLEMENTATION PLAN & REVISED MONITORING FRAMEWORK

MEETING MINUTES

Meeting Date: May 6, 2014

Meeting Location: DDOE

Approval: FINAL

1 ATTENDANCE

Name	Organization	Present
Jeff Seltzer	DDOE	Y
Jonathan Champion	DDOE	Y
Brian Van Wye	DDOE	Y
Martin Hurd	DDOE	Y
Mary Searing	DDOE	Y
Mohsin Siddique	DC Water	Y
Anouk Savineau	Limnotech	Y
Dan Herrema	Limnotech	Y
Mike Sullivan	Limnotech	Y
Veronica Davis	Nspiregreen	Y
Chancee` Lundy	Nspiregreen	Y
Ryan Campbell	MDB, Inc.	Y
Becky Hammer	NRDC	Y
Kaitlyn Bendik	EPA Region 3	Y
Meredith Upchurch	DDOT	Y
Jenny Molloy	EPA	Y
Karl Berger	MWCOG	Y
Kate Rice	DC BIA	Y
Sarah Rispin	Potomac Riverkeeper	Y

Attendance sheet is attached (Attachment A – Sign in Sheet)

2 MEETING PURPOSE

The purposes of this Stakeholder Group meeting were to provide an update on the development of the implementation plan modeling tool (IP Modeling Tool) and the draft baseline conditions analysis.

3 MEETING LOCATION

Building: District Department of Environment

Conference Room: 612

Conference Line: Call In #: 8668305784 Participant code: 6971510

Web Address: NA

4 MEETING START

Meeting Actual Start: 1:06 PM

5 AGENDA

Welcome

Jonathan Champion, DDOE, welcomed everyone. He stated the purpose of the meeting was to provide an update on the development of the IP Modeling Tool and decisions that have been made to develop the baseline conditions.

- **Introductions:** Everyone stated their name, title, and the organization they represent.

- **Overview of the Agenda:** Dan Herrema from LimnoTech provided an overview of the agenda.

Presentation – Draft Baseline Conditions Analysis (Attachment B – Presentation)
Mr. Herrema stated the agenda today is to discuss the decisions that have been made to develop the IP Modeling Tool, present the draft baseline conditions analysis, and provide a timeline for next steps.

There were no questions or comments.

- **Modeling Tool**: Mr. Herrema stated that the project team is developing an IP Modeling Tool with a consolidated approach to calculate pollutant loads in the Municipal Separate Storm Sewer System (MS4) area. The IP Modeling Tool is being developed using the best available data, and uses new watershed delineations and drainage areas. One feature of the tool is that as new data becomes available it can be used to update the tool.

  The IP Modeling Tool was applied to develop the baseline conditions, which represents the runoff and pollutant loads generated by the MS4 area without any BMPs or stormwater controls. The baseline condition results will be presented to the stakeholders at this May 6 Meeting. After the baseline conditions are developed, the current stormwater Best Management Practices (BMPs) will be incorporated into the model as part of the comprehensive baseline conditions. The pollutant loads calculated under the comprehensive baseline analysis will be compared to the individual waste load allocations (WLA), and a gap analysis will be undertaken to determine how much additional load reduction will be needed to meet the WLAs The baseline conditions with BMPs and the gap analysis will be included in the draft comprehensive baseline conditions report and be presented to the Stakeholder Group in late June.

- **TMDL Review:** Mr. Herrema stated that the project team developed a database of the all the TMDLs in the District. For each TMDL the team noted assumptions and methodologies such as the modeling approaches, precipitation events, and drainage areas. Across all TMDLs, there were a wide range of models and inputs used. The review highlighted the need for a consolidated model with inputs based on best available science. In total, 26 TMDLs documents were reviewed for 23 pollutants and 45 separate water bodies totaling 379 WLAs.

  Since the IP Modeling Tool will use a consistent methodology and assumptions, the model will produce outputs that are different than some of the TMDLs.

- **Modeling Methodology and Approach:** Anouk Savineau from Limnotech walked the stakeholders through the development of the IP Modeling Tool, which includes modules for runoff, pollutant load and BMPs. Although this was presented at the stakeholder meeting in March 2014, Ms. Savineau provided a brief overview of the modules and the input decisions that have been made since the last meeting. There are three main components of the modeling, including the runoff module, the pollutant load module, and the BMP module.

1. **Runoff Module:** Ms. Savineau stated that the project team would apply the "Simple Method" to calculate runoff. The inputs for the Simple Method include area (land), runoff coefficients, and precipitation.
    - ***Precipitation*** can be expressed annually, seasonally, or daily. The IP Modeling Tool will be adaptable to express precipitation to the different terms of the WLAs. For the purposes of the baseline conditions analysis, the project team will use the long-term annual average of 40 inches.

      At the March 2014 Stakeholder meeting there was a discussion on climate change and its impact on the modeling. ICPRB provided the project team with studies for the DC Region after the meeting. The results were inconclusive on climate change. Based on all the studies, the project team noted that precipitation could increase or decrease by up to 4 inches. The implication is the project team can use plus or minus 4 inches as an envelope to analyze pollutant loads.

    - ***Runoff Coefficients*** are a representation of land cover and land use. Ms. Savineau presented a table that shows the coefficients that are in the IP Modeling Tool.

    - ***Drainage Areas*** new drainage areas were delineated in the MS4 areas based on more up-to-date geospatial information. The TMDLs, especially the earlier ones, did not have access to the geospatial technology to delineate the drainage area. Ms. Savineau provided examples of the differences between the drainage area in the IP Modeling Tool and the TMDLs.

      Discussion: Meredith Upchurch from DDOT asked how refined is the drainage area in the IP Modeling Tool. Ms. Savineau stated that the drainage areas are divided by outfalls. There are additional refinements by the piped MS4 area versus the direct drainage area. Mohsin Siddique from DC Water asked about the implications of differences between the IP Modeling Tool and the TMDLs drainage areas. Ms. Savineau stated about a third had different areas (+/-10%). Over the entire MS4 two-thirds have similar areas.

- **Pollutant Load Module:** Ms. Savineau provided an overview of the calculations for the pollutant loads. For Total Suspended Solids (TSS), Total Nitrogen (TN), Total Phosphoros (TP), the load is equal to the land-based load and the stream bank erosion load. The land-based load is a function of runoff and Event Mean Concentrations (EMCs). Erosion is a function of stream conditions and the percent impervious surface. For all other pollutants except trash, the pollutant load is based on the land-based load, which is a function of runoff and EMCs. For trash, the pollutant load is based on the land-based loads, which is a function of land use loading rates.

- **EMC Calculations:** EMC is the concentration of the pollutant in the stormwater. The project team used three major data sources to develop EMCs.
    1. *DC TMDLs:* These were based on different sources such as monitoring data from DC Water, DDOE, Metropolitan Washington Council of Governments (MWCOG), and Nationwide Urban Runoff Program (NURP). Some of the EMCs used were based on a limited number of events or datasets, and on data that was collected outside of the District.

    2. *MS4 outfall wet weather monitoring program:* DDOE has more than10 years of MS4 outfall monitoring data across the city, upon which EMCs can be calculated. However, for toxics, organics, and some metals, there were many "non-detects."

       Discussion: Mohsin Siddique asked if EPA had criteria or guidance for when a pollutant cannot be detected by equipment. Jeff Setlzer from DDOE stated the overarching problem is the District's water quality standards for some pollutants are below what can be detected by equipment. However, DDOE cannot assume the pollutant is not present just because it was not detected. DDOE is exploring the possibility of delisting pollutants. Mr. Herrema stated where the sample data had non-detects, the project team will use the EMCs in the TMDLs.

    3. *Land use based EMCs from literature:* The project team conducted a literature review. The result was the EMCs from literature do not adequately represent the local DC conditions.

- **EMC Recommendations:** Where available, the project team used EMCs developed from the wet-weather monitoring program. In situations where pollutants could not be detected, the project team used the EMCs from the original TMDLs. The other recommendation was to apply one EMC per pollutant over the entire MS4 area, although the project team is currently evaluating if the data supports developing "watershed-specific" EMCs for Rock Creek, the Potamac and Anacostia Rivers.Ms. Savineu talked the stakeholders through the table of EMCs by pollutant.

    - Discussion: Jenny Molloy from EPA stated that EMCs across the entire MS4 makes sense for some pollutants. However, for other pollutants it may not be an issue in some parts of the MS4 area. Ms. Savineau clarified that the EMCs are only being applied across the MS4 area in areas where we know there is a TMDL for that pollutant.
    - Mohsin Siddique stated that despite the number of non-detects for toxics, some type of criteria should be considered for those pollutants.

- **Stream Bank Erosion:** In-stream erosion contributes sediments and nutrients to stormwater. The project team is examining stream bank erosion as a function of overall watershed load, imperviousness, and stream condition. This will be considered as part of the MS4 area WLA. Ms. Savineau noted a reason to include stream bank erosion in the IP Modeling Tool is that stream restoration is an accepted method by the Chesapeake Bay Program to reduce sediment and nutrients, and this reduction can be credited towards the waste load allocation reduction.
- **Trash loads:** Rather than use EMC, the project team will use a loading rates (lbs/acre) and land use. This is independent of any runoff calculation. The project team will use the same loading rates as used in the Anacostia Trash TMDL and the most recent land use data published by DC OCTO.

- **Draft Baseline Analysis**
  - Ms. Savineau stated the IP Modeling Tool will be applied across the MS4 area. The runoff/loads are computed in a consistent and transparent manner using one modeling approach, consistent delineations, and consistent EMCs. BMPs are not incorporated yet. They will be incorporated before the late June Stakeholder Group meeting.
  - Results: The IP Modeling Tool runoff volumes are typically more conservative (higher) than TMDL reported runoff volumes. The differences range from a few percentage points to several orders of magnitude.
    - Discussion: Mohsin Siddique is concerned the IP Modeling Tool will show nothing has changed since the first TMDLs in 1990. For example, some pollutants like PCBs will decay overtime. Mr. Champion stated there is a separate effort to collect data. Ms. Savineau stated that the IP Modeling Tool is developed to be adaptable, so it can be updated if better data becomes available. Mary Searing from DDOE asked if the EMCs were the same across all water bodies. Ms. Savineau stated the IP Modeling Tool currently uses the same EMCs across all the water bodies but that there is ongoing research to see if there are any differences between the three major watersheds (Anacostia, Potomac, Rock Creek). Mr. Herrema stated that if the data supports it, the EMCs could be different across water bodies.
  - Implications: The modeled loads from the IP Modeling Tool will differ from the TMDL baseline, but the WLAs will remain the same. The WLA is based on meeting water quality standards. The gap analysis will be conducted using the baseline loads as calculated by the IP Modeling Tool, and the implementation plan will be developed to close the gap between the baseline loads and the WLAs.
  - The next phase of the modeling effort will center around incorporating existing BMPs to to account for potential improvements. Additionally, currently one EMC value per pollutant is used across the MS4 area; the project team is exploring if the sampling data would support using different EMCs across different watersheds or smaller water bodies. The stream bank erosion methodology is also currently being refined to better represent the sediment and nutrient load from this source.

Discussion

- Mohsin Siddique asked if all the allocated pollutant sources within a TMDL (e.g., CSO, MS4, direct drainage and upstream) reduced their allocated baseline loads the same amount across the board. Ms. Savineau stated that Tim Schmitt from LimnoTech could answer that question. She stated she would follow up and further clarification will be provided at the next meeting.
- Mohsin Siddique asked if the project team would be looking at volume reduction and associated pollutant reductions when BMPs are inputted into the IP Modeling Tool. Ms. Savineau confirmed we will look at volume reduction and the BMP efficiencies.
- Ms. Molloy suggested the project team think about how pollutants can best be grouped. In addition, she stated that the project team should keep in mind the MS4 permit renewal is coming up and this process will inform it. From EPA's perspective this is an element of the permit. Mr. Champion stated that the stormwater management plan development will start before this process is complete. It will be important for DDOE to make sure we are talking with EPA to determine how to work through the timing issues.

Next Steps

- Timeline:
    - Today: This meeting was to provide an update on the development of the IP Modeling Tool.
    - May: The project team will incorporate BMPs into the model and determine the gap between current loads and WLAs (gap analysis)
    - Late June: The project team will present a draft comprehensive baseline report. While the stakeholders are reviewing the report, the project team will begin its scenario analysis to meet WLA. Stakeholder group update meetings will be scheduled along the way.

- DDOE stated that they received the draft document that outlines the assumptions and decisions for developing the IP Modeling Tool. Similar to the implementation plan methodology, the stakeholders will receive a draft of this document, and have an opportunity to provide comments. Ms. Savineau stated that results of the gap analysis will be presented at the next meeting, but due to the sheer number of WLAs (almost 400), it will not be possible to show the gap analysis results of each and every pollutant and water body combination. She requested that the stakeholders communicate if they have a particular interest in seeing results for specific pollutants and waterways of interest.

- Project Website: The project website should be up by the time the stakeholders receive the meeting minutes. All project documents, including meeting minutes, will be uploaded on the website. There is a calendar feature.

6 POST MEETING ACTION ITEMS

Action	Assigned To	Deadline
Send the meeting minutes, presentation, and list of attendees out to participants	Chancee` Lundy	

7 DECISIONS MADE

- The document that outlines the decisions and assumptions for developing the IP Modeling Tool will be shared with the stakeholders if they express interest in reviewing

8 NEXT MEETING

Next Meeting: Late June 2014

9 MEETING END

Meeting End: 2:40 PM

10 ATTACHMENTS

- A – Sign-in Sheet
- B – Presentation with Agenda

Draft Baseline Condition Analysis

District Consolidated TMDL Implementation Plan and Monitoring Program

Stakeholder Meeting

May 06, 2014

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Agenda

- Context and Purpose
- IP Modeling Tool Development
- Draft Baseline Analysis
- Next Steps

CONTEXT AND PURPOSE

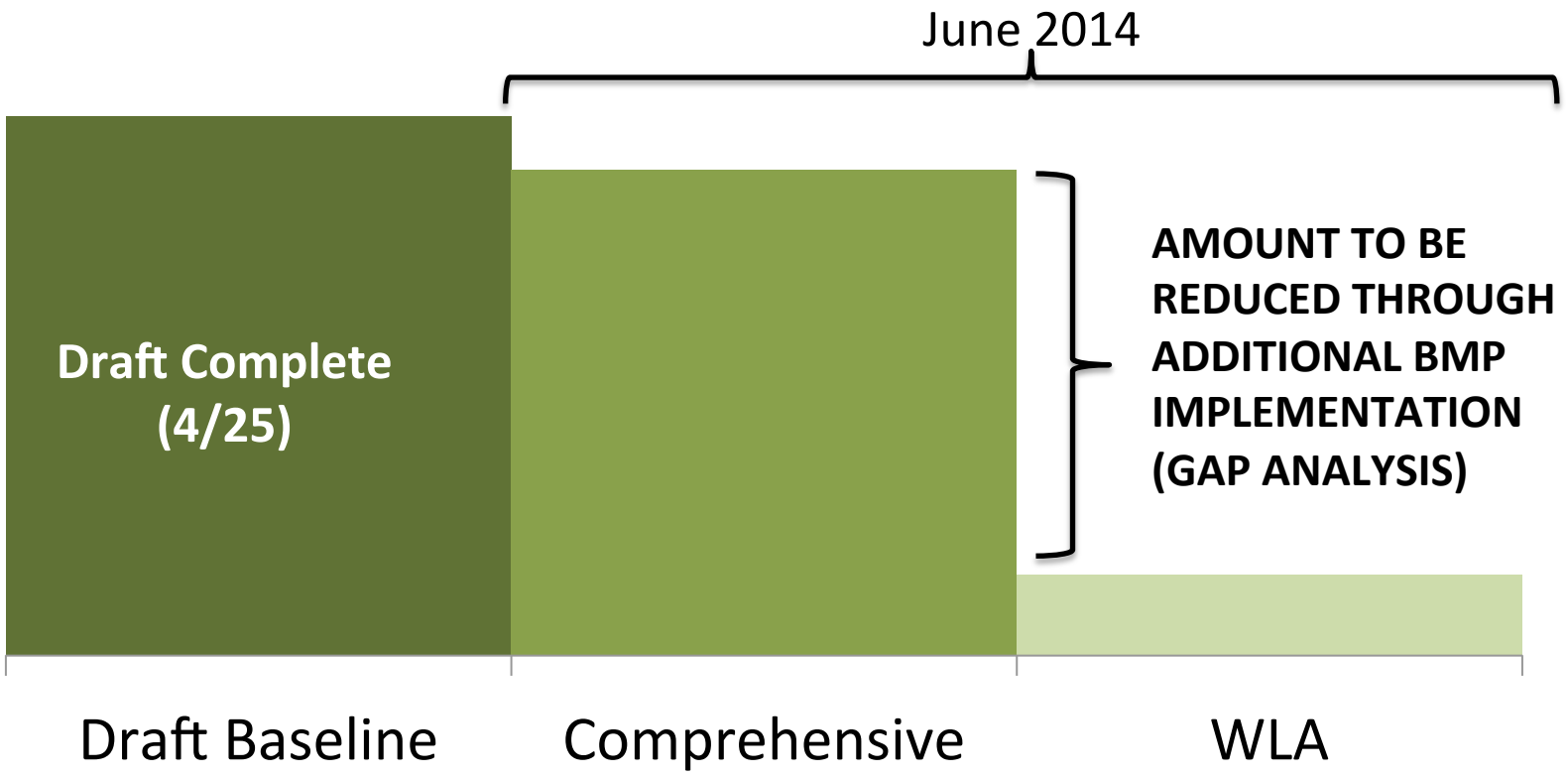
Context and Purpose

- IP Modeling Tool constructed
  - Best possible representation of MS4 area using best available data and science
  - Based on newer and more robust data set
  - Geared towards adaptive management

Context and Purpose

- Baseline loads calculated
  - Applied IP Modeling Tool consistently across entire MS4 area
  - Draft baseline loads (no BMPs) calculated
  - Modeled baseline loads differ from TMDL baseline loads
  - Intent of meeting is to share and show major inputs and results

Context/Purpose: Gap Analysis



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IP MODELING TOOL DEVELOPMENT

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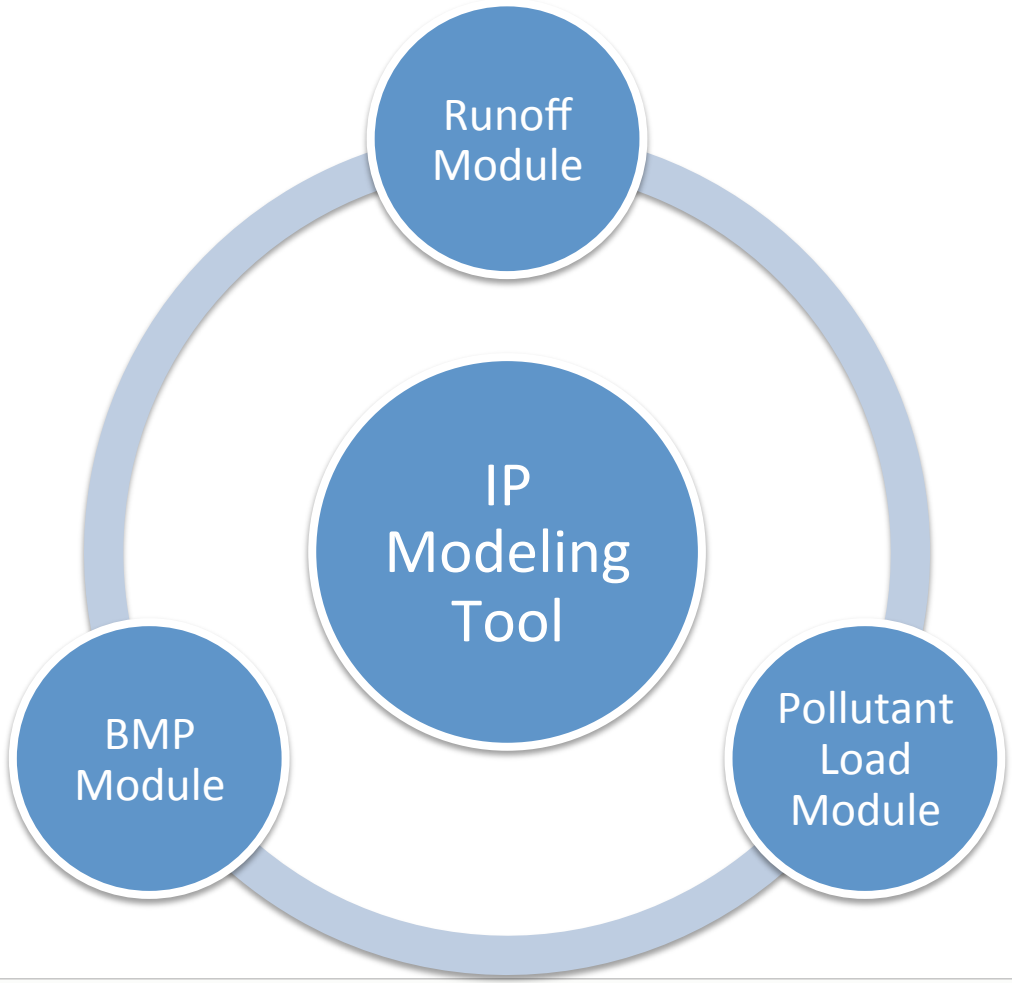
TMDL Review

- TMDLs reviewed to understand and appreciate what was done
- Wide range of models and inputs used
- No one model or approach is “better”
- Review highlights need for consolidated model, with inputs based on best available science.



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IP Modeling Tool Development

RUNOFF MODULE

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Runoff Method: Simple Method

- Appropriate as general planning tool at scale of development site, catchment, or subwatershed
- Recommended by many states including MD, VA, NY, NH

Simple Method Equation

$$R = 0.9 * P * Rv * A$$

- Precipitation (P)
- Runoff Coefficients (Rv, ~level of imperviousness)
- Drainage Areas (A)

Precipitation (P)

- Annual, seasonal, or daily
  - Annual long term average is 40”
- DC climate change models show +/- 4”

Runoff Coefficients (Rv)

- Use coefficients from the Modified Version of Simple Method

Runoff Coefficients (Rv) by Landcover and Soil Type			
	Open/Turf	Forest	Impervious
HSG A Soils	0.15	0.02	0.95
HSG B Soils	0.20	0.03	0.95
HSG C Soils	0.22	0.04	0.95
HSG D Soils	0.25	0.05	0.95

Drainage Areas (A)

- Delineated MS4 areas based on most up-to-date information
- Refined to distinguish between WLA/LA
- Some differences compared to TMDL areas

TEXAS AVENUE & FORT DAVIS WATERSHEDS

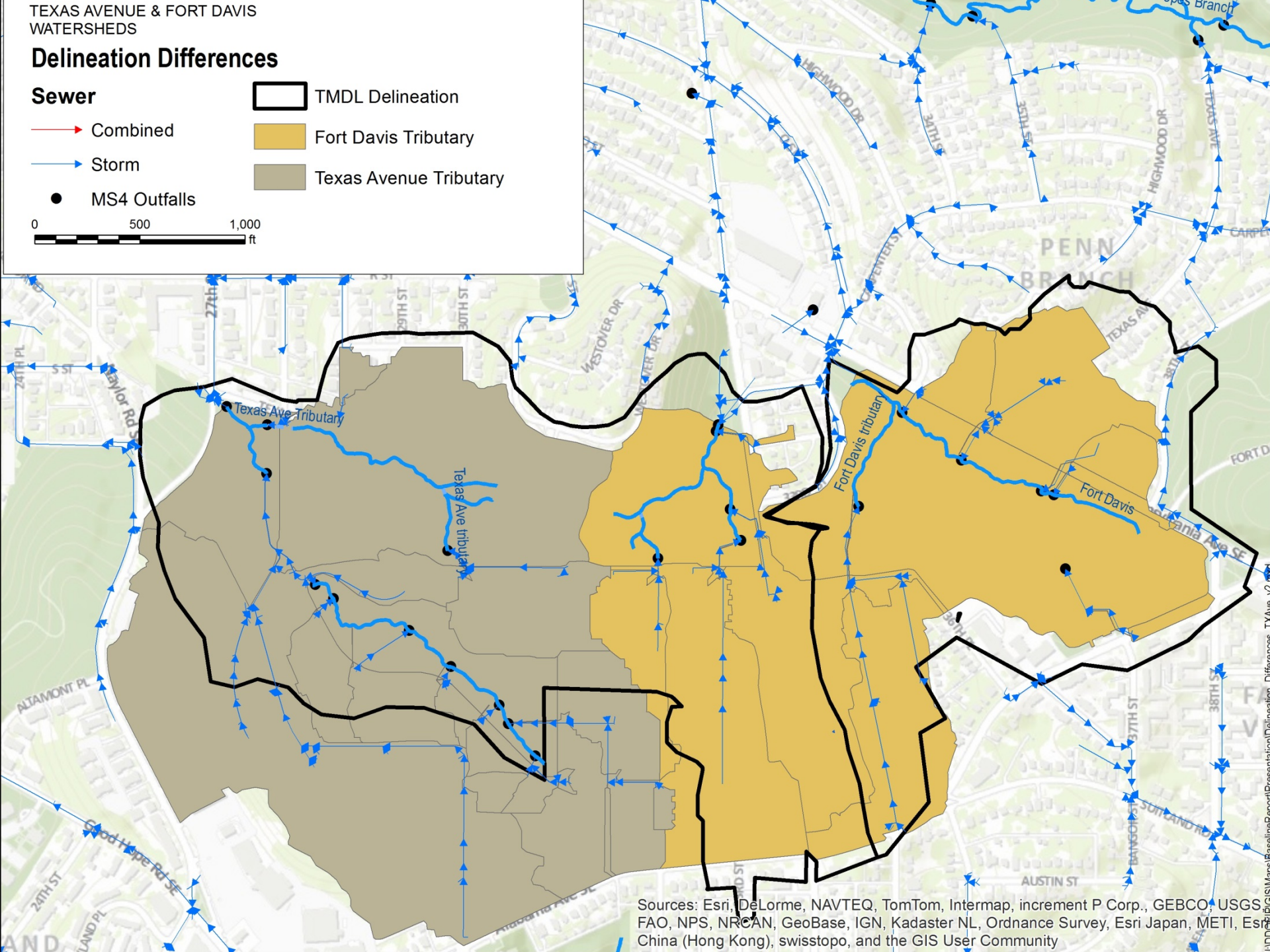
Delineation Differences

Sewer

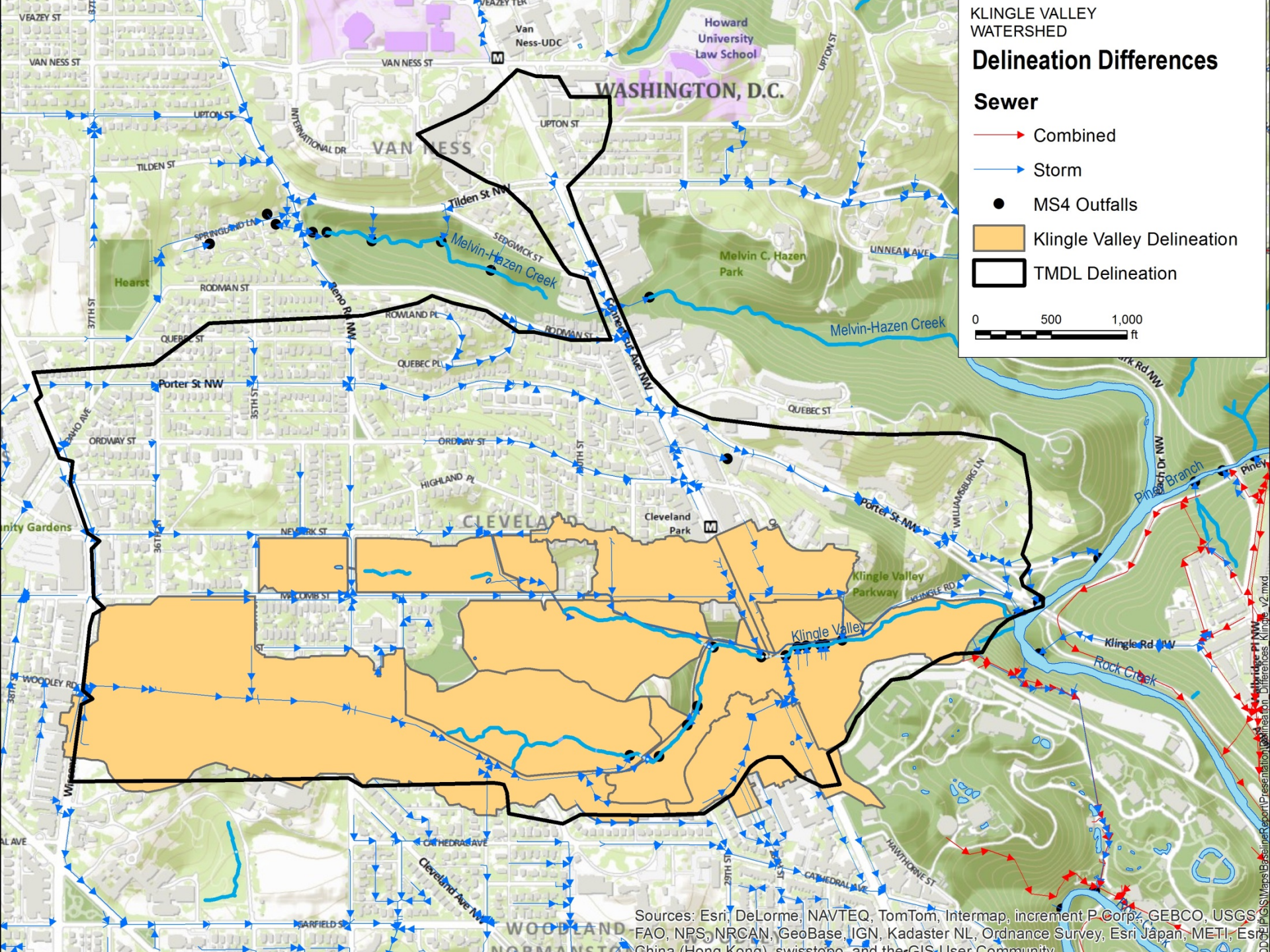
- Combined
- Storm
- MS4 Outfalls

- TMDL Delineation
- Fort Davis Tributary
- Texas Avenue Tributary

0 500 1,000 ft



Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community


KLINGLE VALLEY
WATERSHED
Delineation Differences
Sewer
Combined
Storm
MS4 Outfalls
Klingle Valley Delineation
TMDL Delineation
0
500
1,000
ft
WASHINGTON, D.C.
VAN NESS
CLEVELAND
WOODLEY
Howard University Law School
Van Ness-UDC
Melvin-Hazen Creek
Melvin C. Hazen Park
Hearst
Cleveland Park
Klingle Valley Parkway
Klingle Valley
Rock Creek
Pinehurst Branch
Porter St NW
Tilden St NW
Klingle Rd NW
Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community
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Drainage Areas (A)

- 1/3 of catchments have significant differences in areas (more than +/- 10%)
- 2/3 of catchments have similar areas
- Has implications for runoff and load calculations

IP Modeling Tool Development

POLLUTANT LOAD MODULE

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Load Calculation

- For TSS, TN, TP:
  - Load = land-based load + stream bank erosion load
  - Land-based load function of runoff, EMCs
  - Erosion loads function of stream condition, %imp
- For all other pollutants except trash
  - Land-based loads only, function of runoff and EMCs
- For trash:
  - Land-based loads only, function of landuse loading rates

EMCs: Data Sources

- DC TMDL
- MS4 outfall wet-weather monitoring program
- Land use based EMCs from literature

EMCs: Recommendations

- Use EMCs from wet-weather monitoring if available. Otherwise use EMCs from original TMDLs.
- Apply one EMC per pollutant over entire MS4 area

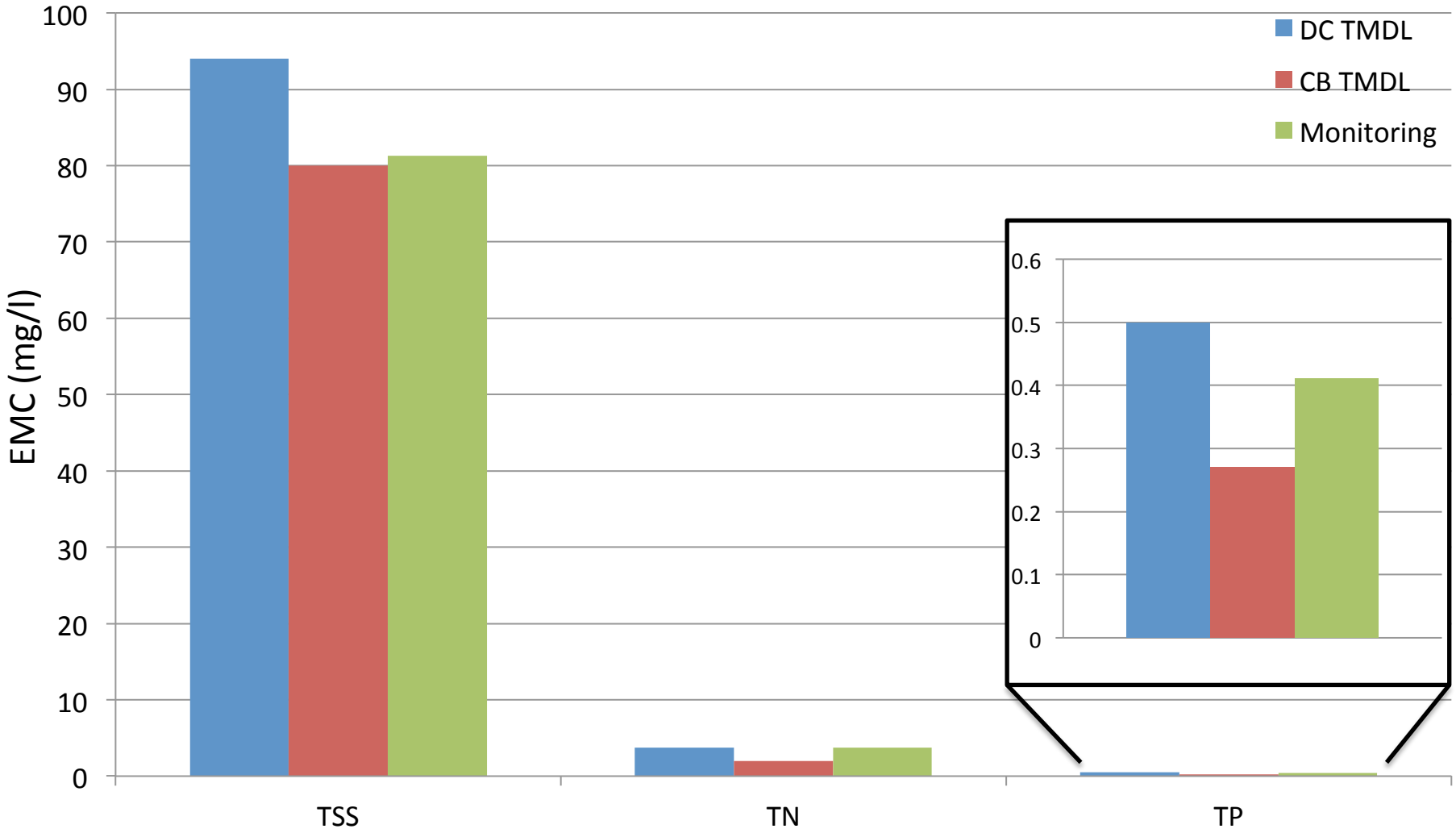
EMCs: Results

	TSS (mg/l)	TN (mg/l)	TP (mg/l)	Fecal Coliform Bacteria (MPN/ 100ml)	BOD (mg/l)	Oil and Grease (mg/l)	Copper (ug/l)	Lead (ug/l)	Zinc (ug/l)
EMCS used in TMDLs	35 60 80 94 227	3.7 2.0	0.50 0.27	28,265 17,300	27 43	3.6 10	78 57	36 29	183 173
Average EMCs from wet weather sampling	81	3.7	0.41	22,963	29.3	5.2	65	25	118

EMCs: Results

	As (ug/l)	Hg (ug/l)	Chlor-dane (ng/l)	DDD (ng/l)	DDE (ng/l)	DDT (ng/l)	Diel-drin (ng/l)	Hepta-chlor Epoxide (ng/l)	PAH1 (ug/l)	PAH2 (ug/l)	PAH3 (ug/l)	TPCB (ug/l)
EMCS used in TMDLs	1.4	0.19	9.83	3.0	13.3	34.2	0.29	0.96	0.66	4.16	2.68	0.08
Average EMCs from wet weather sampling	N/A (too many non-detects)											

EMCs: Results (graph)



Stream Bank Erosion

- Stream bank erosion contributes sediment and nutrients
- Contribution calculated as a function of overall watershed load, imperviousness, and stream condition
- Considered part of MS4 load (WLA)

Trash Load Calculation

- Based on a loading rate (lbs/acre) and landuse
- Independent of runoff
- Use same loading rates as TMDL and most recent landuse data

DRAFT BASELINE ANALYSIS

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Draft Baseline Analysis

- Apply IP Modeling Tool across entire MS4 area
- Runoff/loads are computed in a consistent and transparent manner, incorporating the best and most current data and science available
- No BMPs (yet)

Draft Baseline Results

- Predicted runoff volumes typically more conservative (higher) than TMDL reported runoff volumes
- Individual pollutant loads are sometimes higher, sometimes lower than TMDL reported loads

Draft Baseline Results

- 90% of catchments predict more runoff
- 41% of catchments predict less load, 59% of catchments predict more load
- Differences range from a few percentage points to several orders of magnitude

Note that these results apply only to catchments for which the TMDL baseline values were found (40-80% of catchments)

Baseline Implications

- Modeled loads will differ from TMDL baseline
- WLAs remain the same
  - Some gaps will be larger
  - Some gaps will be smaller

NEXT STEPS

Upcoming Deliverables and Timing

May	• Incorporate BMPs, gap analysis • WQ data analysis
Early June	• Comprehensive baseline report
Late June	• Next stakeholder meeting
Summer/Fall	• Scenario analysis to meet WLA

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Questions/ Comments?