CONSOLIDATED TMDL IMPLEMENTATION PLAN & REVISED MONITORING FRAMEWORK

(STAKEHOLDER GROUP MEETING)

MEETING MINUTES

Meeting Date: February 9, 2015

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
Nicoline Shulterbrandt	DDOE	Y
Collin Burrell	DDOE	Y
Sarah Levine	DDOE	Y
Mohsin Siddique	DC Water	Y
Anouk Savineau	LimnoTech	Y
Dan Herrema	LimnoTech	Y
Tim Schmitt	LimnoTech	Y
Heather Bourne	LimnoTech	Y
Chancee Lundy	Nspiregreen	Y
Veronica Davis	Nspiregreen	Y
Ryan Campbell	MDB, Inc.	Y
Becky Hammer	NRDC	N
Kaitlyn Bendik	EPA Region 3	Y
Meredith Upchurch	DDOT	Y
Jenny Molloy	EPA	Y
Eva Birk	EPA	Y
Karl Berger	MWCOG	Y
Kate Rice	DC BIA	N
Sarah Rispin	Potomac Riverkeeper	N
Mike Bolinder	Anacostia Riverkeeper	N
Ross Mandel	ICPRB	Y
Hye Yeong Kwon	CWP	Y

Attendance sheet is attached (Attachment A)

2 MEETING PURPOSE

The purpose of this Stakeholder Group meeting was to provide a progress update on the Revised Monitoring Program (RMP) and present an update on the development of the Implementation Plan (IP).

3 MEETING LOCATION

Building: District Department of Environment

Conference Room: 718

4 MEETING START

Meeting Actual Start: 1:10 PM

5 AGENDA

Welcome
Mr. Jonathan Champion, DDOE, welcomed everyone to the meeting.

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

- **Overview of the Agenda:** Mr. Dan Herrema, LimnoTech, provided an overview of the meeting agenda and the purpose of the meeting. The meeting focused on the Revised Monitoring Program and the development of the Implementation Plan.

Presentation (Attachment B – Presentation)

Revised Monitoring Program (RMP)
Ms. Heather Bourne, LimnoTech, provided a brief recap of the presentations on the RMP from the August and November 2014 Stakeholder Group meetings. The goal of the RMP is to evaluate the effectiveness of the MS4 program.

The elements of the RMP are: (1) wet weather monitoring (2) receiving water monitoring, (3) trash monitoring, and (4) source identification and dry weather screening. The trash monitoring and source identification and dry weather screening are largely the same as previously implemented monitoring programs with some updates. At this Stakeholder Group meeting, Ms. Bourne focused on monitoring for wet weather and the health of receiving waters.

- **Wet Weather Outfall Monitoring:** Ms. Bourne provided an overview of the existing DDOE water quality monitoring program and where it intersects with the RMP. The wet weather outfall monitoring in the RMP is designed to monitor wet weather loadings and provide data to help assess progress towards meeting WLAs.
    - **Statistical Analysis:** The project team conducted a statistical power analysis to determine the probability of detecting a difference in pollutant concentrations when it exists. The power analysis is based on the number of rain events per year, number of monitoring stations across the District, difference from the mean, and the number of years to reach significance. Ms. Bourne provided an example of the monitoring power analysis for phosphorus. In this example, there is no significant difference in detection of a trend in phosphorus concentrations when evaluating 3 events per year versus 6 events per year. There is little statistical significance in detecting trends in phosphorus concentrations by increasing the number of samplings per year. In addition, small changes in concentrations are difficult to detect over time.
    - **Site Selection:** Ms. Bourne stated that project team recommends 3 wet weather outfall monitoring sites per watershed for each permit cycle. One monitoring site would be from previous sampling efforts to maintain the ability to conduct historical trend analysis. The remaining two monitoring sites for each watershed would be randomly selected using the Generalized Random Tesselation Stratified (GRTS) statistical methodology, which takes into account factors such as drainage areas, land use, imperviousness of the area that drains to that outfall, and number of pollutants associated with that outfall. In addition, the project team recommends special “study sites” where a need for additional data has

been determined. For example, there is a need to collect data to provide updated Event Mean Concentration (EMCs) specific to the land uses in the District.

- **Sample Collection Methodology:** Where possible, the project team recommends flow weighted sampling. Per the permit requirements, the minimum parameters for monitoring are total nitrogen, total phosphorus, total suspended solids, lead, zinc, trash, E.coli, and copper. The team is also conducting a prioritization process to selected additional parameters. The sample collection methodology is a work in progress.
- **Discussion:**
  - Mr. Karl Berger asked if the team looked at E. coli and fecal coliform for sampling parameters. Ms. Bourne stated that no decision has been made regarding fecal coliform, however, E. coli is included because it is required by the MS4 permit.
  - Dr. Moshin Siddique asked if toxics would be included in the sample parameters and if there is targeted monitoring for areas near new legacy uses. Using PCBs as an example, Dr. Siddique wanted to know if it was possible to monitor near sites where there were transformers in the past. Ms. Jenny Malloy stated the District has fifteen years of toxics monitoring data, including PCBs. Many of the monitors were removed because of non-detects. Ms. Nicoline Shulterbrandt stated that the proposed methodology is for wet weather monitoring. DDOE collects samples for toxics during dry weather monitoring to focus on source identification.

- **Receiving Water Monitoring:** As discussed at previous Stakeholder Group meetings, a new requirement of the MS4 permit is to evaluate the health of the receiving waters. This portion of the RMP will be developed to coordinate with DDOE's Ambient Monitoring Program.
  - **Data collection:** Ms. Bourne stated the project team proposes using a number of environmental indicators to evaluate receiving water health including macroinvertebrates, habitat, and fish, geomorphology, and water quality.
  - **Site Selection:** The considerations for evaluating potential tributary monitoring sites are looking at existing sites, random sampling locations using GRTS approach, and additional sites for "special studies" such as stream restoration projects.
  - **Statistical Analysis:** Ms. Bourne stated the project team conducted a statistical analysis focused on TSS because this was the most complete dataset for this parameter. TSS also serves as a surrogate for other parameters.
  - **Findings:** Ms. Bourne stated a significant trend in concentration was identified at only 5 of 30 monitoring stations between 2002 and 2013. This high variability indicates that water quality data alone will not be sufficient to evaluate the quality of receiving waters. The project team recommends using multiple indices.
  - **Discussion:**
    - Mr. Berger asked Ms. Bourne to discuss the locations of the dots on the site selection map (Slide 16). Ms. Bourne clarified that this map was an example and does not reflect the sites that were selected for tributary monitoring.
    - Mr. Berger asked if it was possible to overlay site selection with monitoring being conducted by others outside of the District. For

example, Prince George's and Montgomery counties in Maryland have tributary monitoring programs. Mr. Berger also mentioned USGS' monitoring program in the District. Ms. Shulterbrandt confirmed that USGS added three stations in the District last year. Mr. Champion stated the monitoring efforts by other jurisdictions would inform the development of the RMP in DC. Ms. Bourne added the project team has benchmarked the USGS program in Fairfax County, Virginia.

        - Dr. Siddique asked how the monitoring data informs the TMDL implementation plan. Mr. Tim Schmitt, LimnoTech stated that water quality data is only one component of tracking progress towards meeting TMDL WLAs. The water quality data would be used to improve EMCs for the District. The IP will include tracking progress via water quality, monitoring, and programmatic updates. Mr. Jeff Seltzer stated the data would also be used to validate the models. Dan Herrema mentioned that where there is not enough water quality data, modeling will be used to show progress made to meet the WLAs. Where the data supports adaptive management, the progress can be evaluated on a concurrent basis.

- **Next Steps:** The RMP draft except for receiving water and wet weather monitoring sections will be available in late February 2015. The receiving water and wet weather monitoring sections will be available in March 2015.

Implementation Plan (IP) Development

Mr. Schmitt provided an overview of the IP, which is being developed to ensure continuous progress toward meeting WLAs that have been established for the District. The IP will meet the MS4 permit requirements, and includes milestones, benchmarks, and a method for tracking progress. Trash and PCBs will have individual IPs.

- **Value added approach:** Mr. Schmitt stated the value added approach leverages existing programs and stormwater management practices.
- **IP for all pollutants except PCB and Trash:** The IP relies on BMP implementation from stormwater regulations, BMP implementation from other programs, and ongoing programmatic and source control efforts to meet the WLAs.
    - **Existing stormwater regulation:** Mr. Schmitt stated that implementation of the existing stormwater regulations via development and redevelopment are projected to account for about 80% of the expected load reductions in the future. Historically, the regulations have been a major driver of BMP implementation and they are expected to be a major component of the IP. The project team projected redevelopment/development between 2015 and 2040 using data from the District Office of Planning. After 2040, the team extrapolated existing data to project to the future.
        - **Discussion:** Mr. Berger asked for more details about how the development and development was forecasted. Veronica O. Davis, Nspiregreen, provided an overview of what was included in the development/redevelopment projections. Mr. Berger asked if there was an economic component to adjust for changes in the market. Mr. Seltzer stated that the project team had to make some reasonable assumptions.
    - **Other Drivers of BMP Implementation:** Mr. Schmitt stated the project team developed an estimated annual rate of implementation and treatment based on

BMP implementation programs not related to stormwater regulations. These programs include, for example, DDOE's RiverSmart program, stream restoration, and DDOT programs.
    - **On-going Programmatic Source Control:** The IP includes ongoing source control program such as street sweeping, the coal tar ban, and phosphorus fertilizer legislation.
- **PCB IP:** PCBs have an individual IP, because the original TMDLs indicate that PCBs should not be tracked to achieve numerical limits. The IP focuses on identifying potential sources and developing recommendations for specific controls. Data sets from DC Water and other DDOE programs are included in the database on pollutant sources. A first step is to identify the largest sources of pollutants.
    - Dr. Siddique asked if the PEPCO sites in are in the database as sources of PCBs. Mr. Schmitt confirmed that PEPCO is in database. The project team has been focused on identifying the large sources first.
- **Trash IP:** DDOE is required to meet trash WLAs within this MS4 permit cycle. The IP strategy for trash load reductions is based on Anacostia River Watershed Trash TMDL Implementation Strategy (December 2013).

Implementation Plan Modeling Tool (IP Modeling Tool)

Ms. Anouk Savineau provided an overview of the IP Modeling Tool the project team developed to track MS4 pollutant loads and load reduction in a consistent way.

- **WLAs:** The District had 406 annual WLAs:
    - 206 are modeled and evaluated in the IP Modeling Tool.
        - 37 require non-numeric management actions.
        - 163 were removed, replaced, or no action needed. Some were removed after additional data collected by TetraTech deemed there were no impairments to waterbodies. Some older TMDL WLAs were replaced with newer ones.
        - **Discussion:** Dr. Siddique asked if any of the 206 WLAs examined are coming from other sources, such as the air. Mr. Schmitt stated that IP includes source identification to determine where these pollutants can be coming from. Mr. Seltzer stated that DDOE is aware that some of the TMDLs need to be updated. For example, since we have better data, the watershed delineations have been modified from the original TMDLs. Mr. Collin Burrell stated that some of the sources of pollution might be coming from upstream outside of the District. Note for clarification: All of the WLAs evaluated in the Consolidated TMDL IP are for MS4 sources coming from the District; therefore, questions about upstream sources are not relevant to the IP.
- **Percent load reduction:** 29 WLAs are being met, however more than 50% need more than an 80% load reduction to meet the WLA.
- **Approach for Load Reductions:** The IP projects approximately 30% of the MS4 area would be retrofitted with structural BMPs by 2040.
    - **Programmatic and Source Control:** There are some source controls that were quantifiable and included in the IP Modeling Tool, such as street sweeping, trash removal, coal tar ban, and phosphorus fertilizer ban. However, other source controls, such as catch basin cleaning, pet waste removal, and public outreach were not included in the IP Modeling Tool, but could be included in the future if better or additional data tracking occurs to quantify the impact of these controls.

- **Implementation of Existing Regulations:**The project team used OP data to project development and redevelopment in the MS4 area between 2015 and 2040 that will trigger the stormwater regulations. Since OP data did not include residential land uses (R1-R4), the BMP implementation from development and redevelopment of R1-R4 parcels was projected based on historic rates of BMP implementation on R1-R4 parcels from DDOE's BMP database. By 2040, the IP projects 5,500 acres of land would be developed/re-developed and trigger the stormwater regulations in the MS4 area.
- **BMPs through other Drivers:** There are other BMP implementation programs such as the RiverSmart program, DDOE-funded programs, DDOT's green alley program, University initiatives, and Federal mandates for agencies. The IP estimates 21 acres/year or 525 acres through 2040 will be controlled through these programs.

- **2040 Projected Results:** The IP Modeling Tool assumes the area controlled by BMPs will retain 1.2 inches of runoff at 83% volume reduction efficiency. In addition, the model calculates volume and load reduction for each TMDL segment in five-year increments starting in 2015.
  - Results: the models projects that 44 WLAs out of 206 will be attained by 2040. The WLAs that will be attained represent a variety of pollutants. Ongoing and continued progress will be occurring prior to meeting all the WLAs.
  - Discussion:
    - Ms. Malloy asked if the modeling results show that the District will meet the WLAs for nitrogen, phosphorus and TSS by 2025. Ms. Savineau stated that the District will meet the TSS WLA in the Potomac by 2025, but most other WLAs won't be met until after 2025.
    - One reason that the IP does not show that the Bay TMDL WLAs will be met by 2025 is that the project team only modeled existing BMPs for which adequate modeling data exists. This represents only subset of the BMPs that are reported to the Chesapeake Bay Program. This effort on tracking BMP credits is more conservative compared to the Chesapeake Bay efforts to date.
    - Mr. Berger stated that the jurisdictions in the Chesapeake Bay are not going meet the WIP targets by 2025. He asked if acres redeveloped was a surrogate for load reduction since the load reduction strategies for the IP are not pollutant specific in the same way as they are for other jurisdictions, like for example counties in Maryland that focus on agriculture to reduce specific nutrient pollution. Ms. Savineau stated that area is a surrogate but also that there are watershed specific EMCs, so load reductions are not always equal across the entire MS4. She also mentioned that stream restoration projects are included, which are not based on area and those load reductions are specific to TSS and nutrients only. Mr. Schmitt stated the District has WLAs and MS4 pollutants that are distributed over the entire MS4 area, so targeted BMP implementation makes less sense for DC's MS4 area.
    - Dr. Siddique asked if the effects of climate change were included in the IP Modeling Tool. Ms. Savineau stated potential impacts of climate change were evaluated, but the results were inconclusive and they will not be discussed in the IP.
- **Projecting Beyond 2040**

- The MS4 permit requires DDOE to provide a date for when all WLAs will be attained. Beyond 2040, the IP includes a projected retrofit rate of 241 acres/year.
- Ms. Savineau stated that 29 WLAs are being met currently. By 2040, 30% of the MS4 area will have BMP retrofits and 44 WLAs will be met. All 206 WLAs are projected to be attained by 2140. The project team is confident about development/redevelopment projections through 2040. Beyond that 2040, the uncertainty increases quite a bit.
- **Discussion:**
  - **Aggressiveness of the Plan vs WLAs:** Ms. Malloy noted that in 25 years, the model projects only 15 new WLAs would be attained. She wondered if the plan is not aggressive enough or if the WLAs are unrealistic. Ms. Savineau stated that it is a mixture of challenges. She noted that the pollutants that require greater than 80% load reduction to meet WLAs are mostly toxics or bacteria and these WLAs might be unrealistic. In addition, current BMP technology has a maximum efficiency of approximately 80%. Ms. Malloy stated that a retrofit rate of 30% in 25 years is good, but questions if the District is prepared to deal with another 100 years of impaired waters.

    Mr. Brian Van Wye stated that although 150 years seems like a long timeline to meet the WLAs, the rivers have been impaired since logging began many centuries ago. Ms. Malloy stated that if 150 years is the timeline, then the IP should provide adequate justification for that timeline.

    Mr. Ross Mandel provided history on the development of the TMDLs. They were developed based on the most conservative numbers to make sure no jurisdiction underestimated what needed to be done to meet water quality standards.

  - **Shorten the Timeline to 50 years:** Dr. Siddique asked what is needed to meet the WLAs in 50 years. Mr. Herrema stated an implementation of BMPs to 2 inches across the entire MS4 would get the District close to meeting WLAs in 50 years. He stated that it would not be a wise use of resources, especially when there is uncertainty in the WLAs for the pollutants that that need more than 70% load reduction. Ms. Malloy questioned if a 2-inch standard over the entire MS4 area is feasible. She reiterated that EPA wants to meet water quality standards, but the current WLAs may or may not be appropriate to move towards that goal. Mr. Herrema stated some of the TMDLs need to be revisited. However, the current permit requires a date for which the existing WLAs can be achieved.

  - **WLA Attainment Timeline:** Mr. Champion clarified that the implementation plan is required to track WLA attainment, not load reduction – and this may be misleading, because at every milestone, the District is projected to achieve significant load reductions. Ms. Malloy requested a breakdown for when each WLA is projected to be attained.

- **New Technologies:** Mr. Herrema added that the implementation plan modeling does not include the possibility of new technologies. The IP Modeling Tool only accounts for existing BMP technology.

- **Summary of Results:** Ms. Savineau provided example of tables that show at a more detail level of when and where WLAs are expected to be attained. At the next Stakeholder Group meeting the group will discuss the results and how they relate to milestones, benchmarks, and progress tracking.

- **Next Steps:** The IP will not be available for a few weeks. The Scenario Analysis Report, which has the development/redevelopment projections and BMP implementation for other programs, will be available soon.

General Discussion

- Dr. Siddique asked if the implementation plan and revised monitoring program requires a public comment period. Mr. Seltzer responded the public comment period would be concurrent to the EPA review period.

Next Steps

- February 2015: The Scenario Analysis Report will be available for review.
- March 2015: If there is interest from the Stakeholders, DDOE will conduct a half-day workshop to have a more in-depth conversation about the Implementation Plan or Revised Monitoring Program.
- May 2015: Draft Implementation Plan and Revised Monitoring Program will be submitted to EPA by May 9, 2015.

6 POST MEETING ACTION ITEMS

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

7 DECISIONS MADE

- None

8 NEXT MEETING

Next Meeting: TBD

9 MEETING END

Meeting End: 2:52 pm

10 ATTACHMENTS

- Presentation with Agenda

Revised Monitoring Program and IP Development

District Consolidated TMDL Implementation Plan and Monitoring Program

February 9, 2015

DISTRICT DEPARTMENT OF THE ENVIRONMENT

GOVERNMENT OF THE DISTRICT OF COLUMBIA

PURPOSE OF MEETING

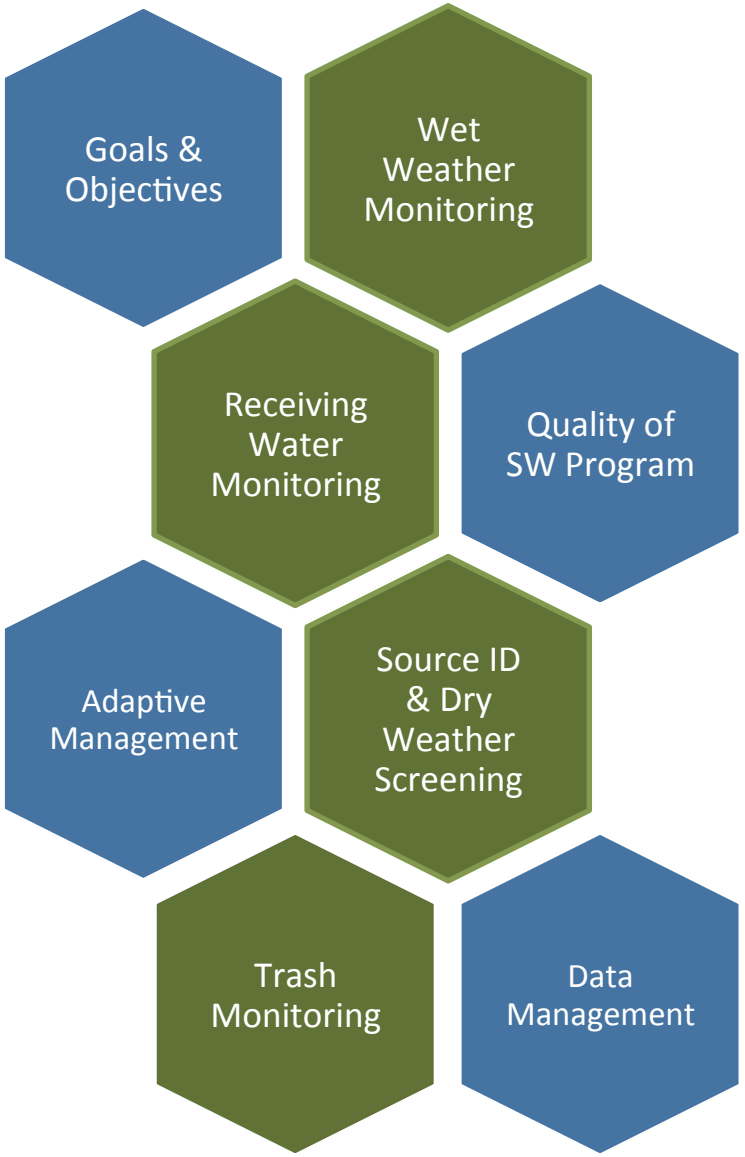
- Revised monitoring program
- Implementation plan development

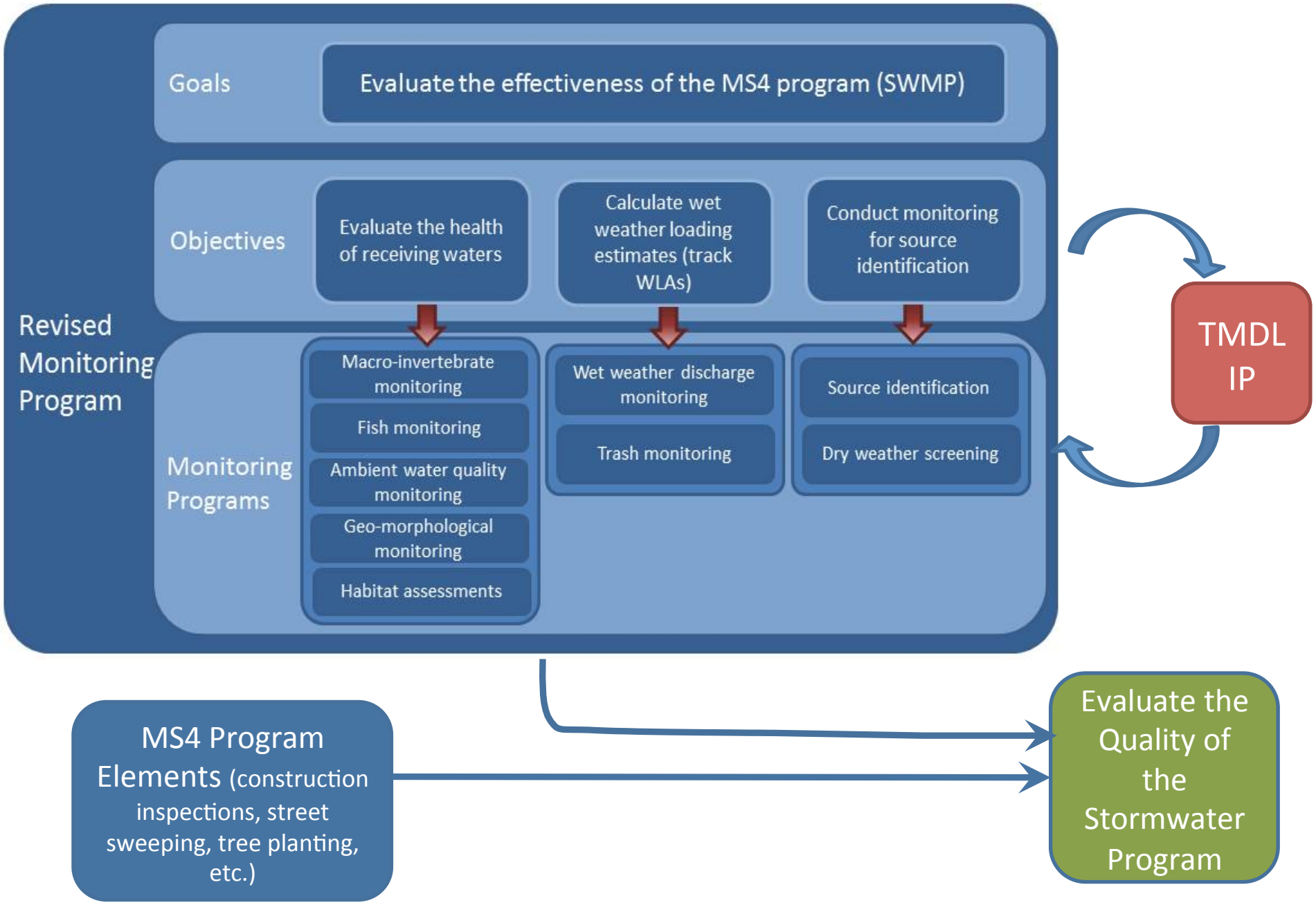
REVISED MONITORING PROGRAM

DISTRICT DEPARTMENT OF THE ENVIRONMENT

GOVERNMENT OF THE DISTRICT OF COLUMBIA

Recap: Building Blocks of the Revised Monitoring Program



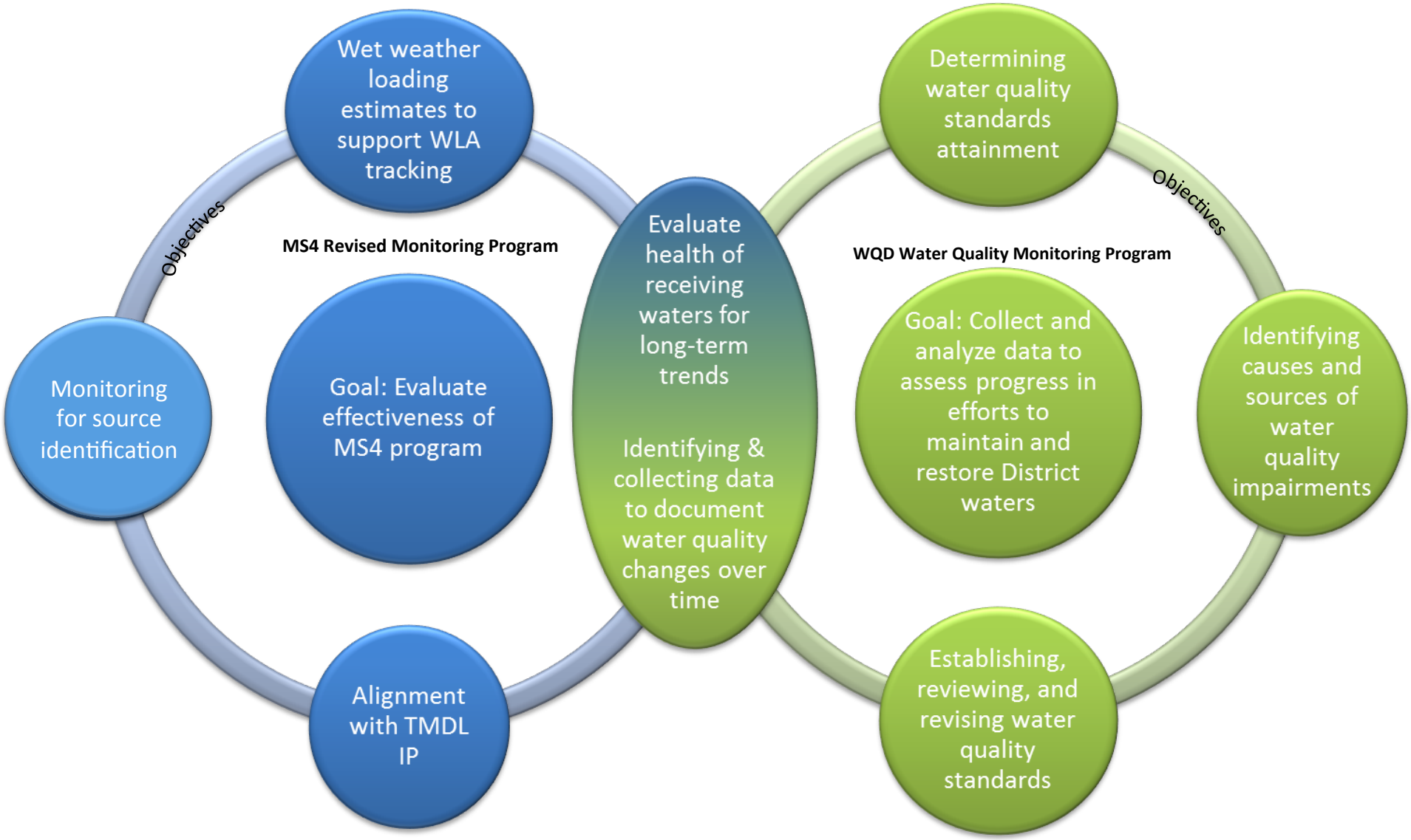

Revised Monitoring Program
Goals
Evaluate the effectiveness of the MS4 program (SWMP)
Objectives
Evaluate the health of receiving waters
Calculate wet weather loading estimates (track WLAs)
Conduct monitoring for source identification
Monitoring Programs
Macro-invertebrate monitoring
Fish monitoring
Ambient water quality monitoring
Geo-morphological monitoring
Habitat assessments
Wet weather discharge monitoring
Trash monitoring
Source identification
Dry weather screening
TMDL IP
MS4 Program Elements (construction inspections, street sweeping, tree planting, etc.)
Evaluate the Quality of the Stormwater Program

Recap of Monitoring Elements

- Wet weather monitoring
- Receiving water monitoring
- Trash Monitoring
- Source identification and dry weather screening

The two latter elements are based upon existing programs. While they have been updated where necessary, they are largely the same core programs as previously implemented.

Integrate Existing DDOE Monitoring



Wet Weather Outfall Monitoring

Objectives

- Wet weather loadings
- Progress toward meeting WLAs

Elements

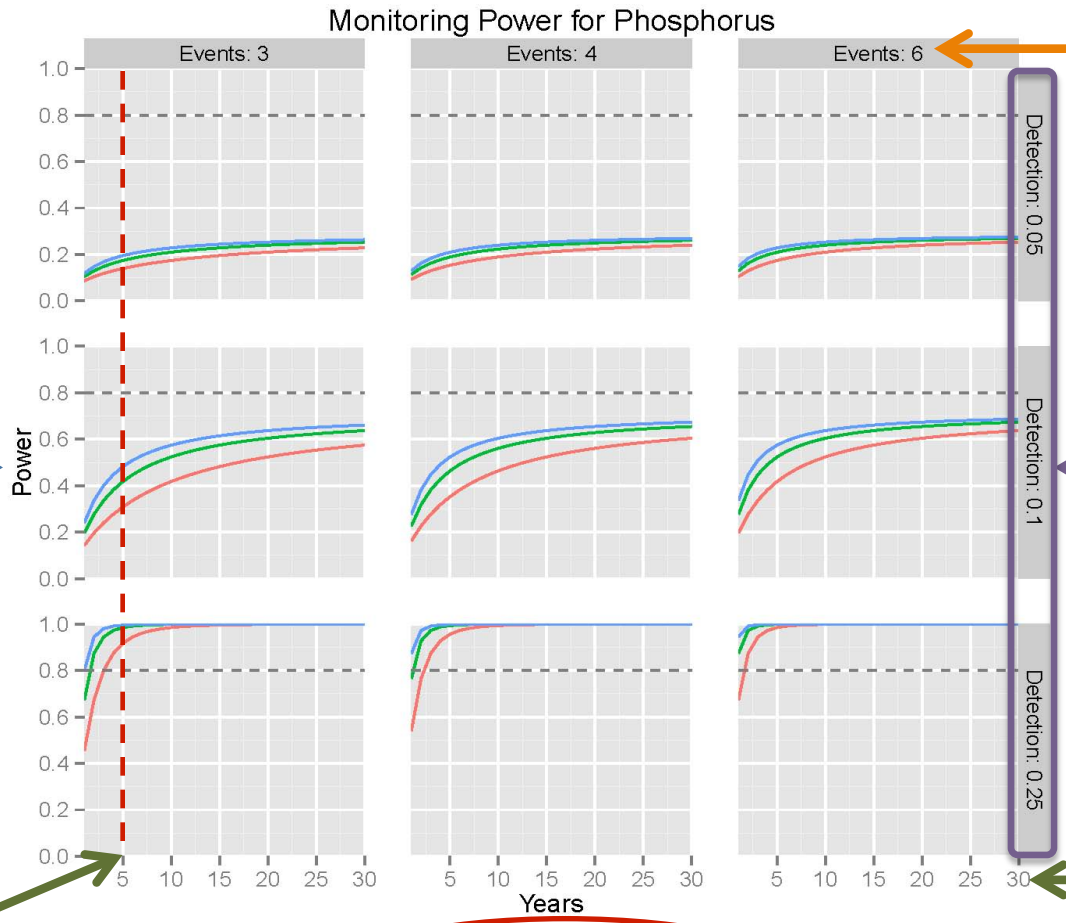
- Statistical analysis
- Site selection
- Sample collection methodology

Statistical Analysis

Power Analysis

- Events per year
- Number of stations
- Difference from the mean
- Number of years to reach “significance”

Example: Power Analysis



Events / year

Power
(probability of detecting a difference when it exists)

Difference from mean (5%, 10%, 25%)

Years

One permit cycle

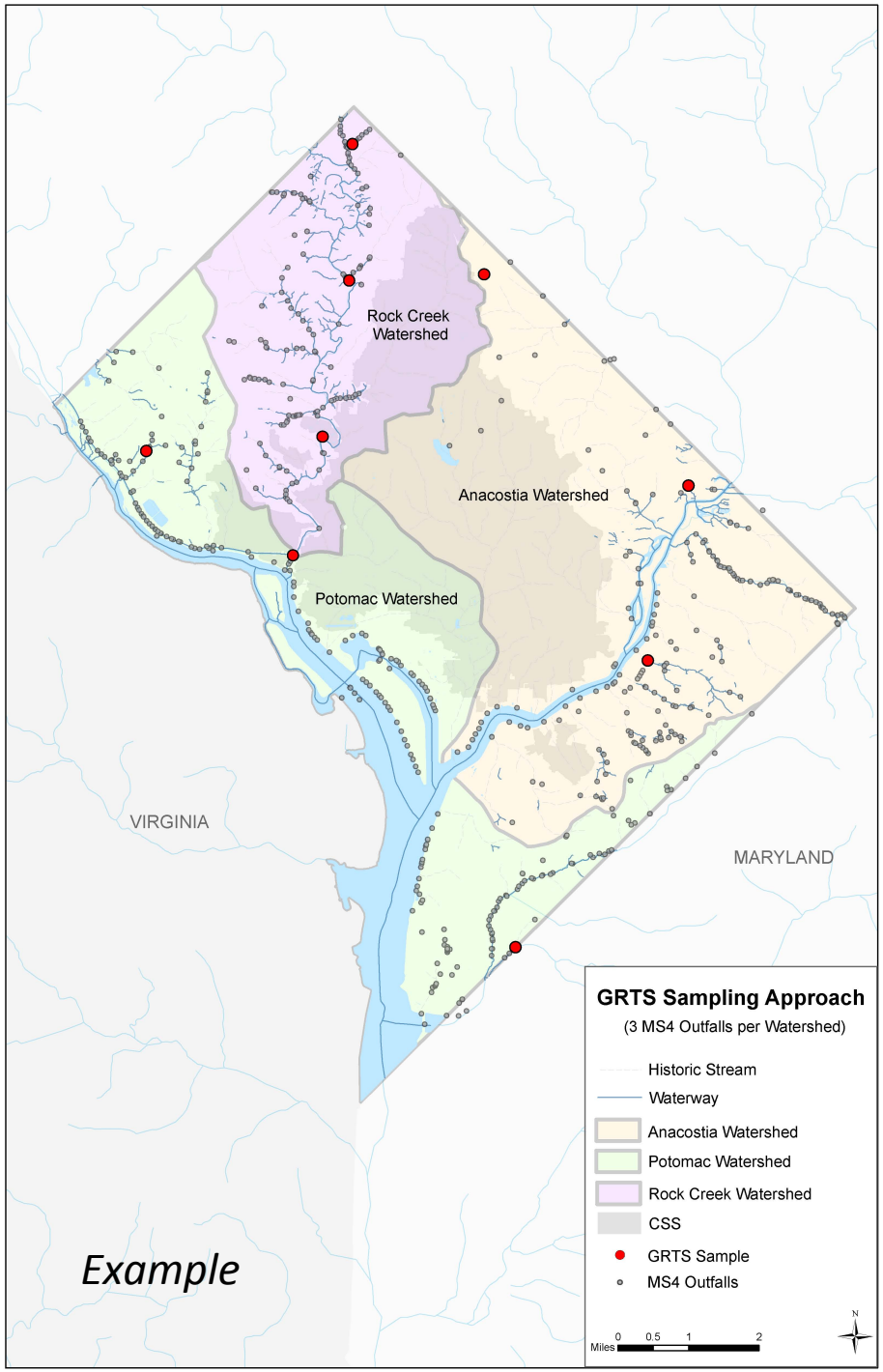
Sites across District

Findings

- Little statistical power or significance is realized by increasing the number of sampling events per year
- Small changes in concentration (5% or 10%) are difficult to detect over time
- Some parameters (e.g., bacteria) have substantial inherent variability
- Decisions on monitoring program design are guided by the analysis of those parameters with less variability

Wet Weather Outfall Site Selection

- Three sites per watershed (for permit cycle)
  - One from previous monitoring efforts
  - Two randomly selected (GRTS sampling approach)
- “Special study” sites (shorter term sites)



Sample Collection Methodology

- Flow weighted sampling where possible
- Automated samplers
- Minimum parameters
  - Total nitrogen
  - Total phosphorus
  - TSS
  - Lead
  - Zinc
  - Trash
  - *E. coli*
  - Copper
- Select parameters for TMDL WLA tracking & modeling data needs (e.g., EMC refinements)

Receiving Water Monitoring

Objective

- Evaluate the health of the receiving waters
- Identify trends
- “Statistically significant and interpretable”

Elements

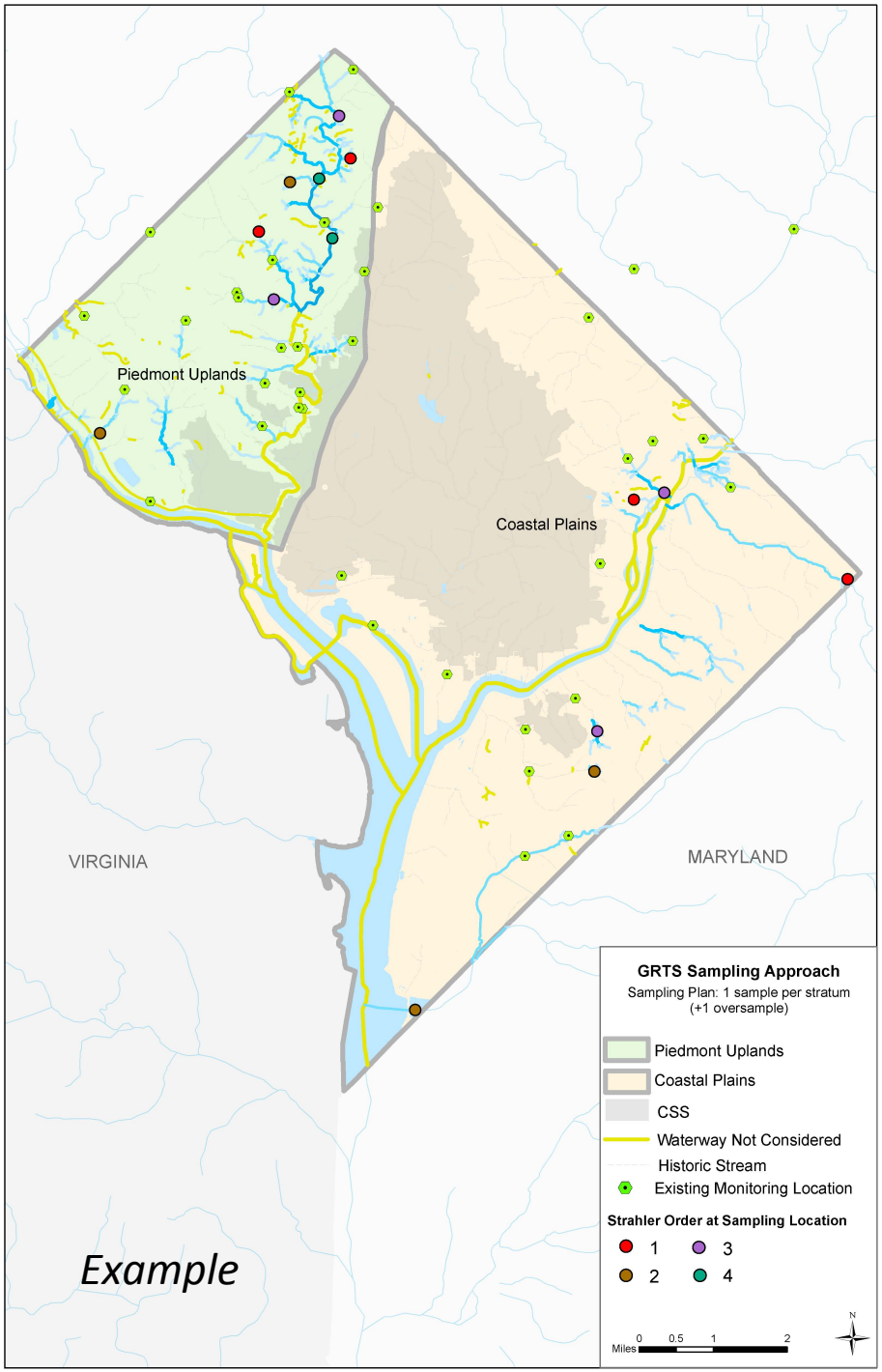
- Data collection methodology
- Site Selection
- Statistical analysis

Data Collection Methodology

- Considering various indices
  - Macroinvertebrates
  - Habitat
  - Geomorphology
  - Ambient Water Quality
  - Fish

Site Selection

- Considerations of tributary monitoring sites a combination of:
  - Existing sites
  - Randomized samples (GRTS approach)
    - Stream order
    - Physiographic region
  - Sites chosen for “special studies” (i.e., drainage areas undergoing restoration)



Statistical Analysis

- TSS was used for statistical analysis
  - The most complete parameter in existing datasets
  - Many sampling stations in each watershed
  - TSS commonly serves as a surrogate for other parameters
  - TMDLs in place for TSS

Findings

- A significant trend in concentration was identified at only 5 of 30 stations between 2002 and 2013
- High variability in receiving water data indicates:
  - Water quality data alone will not be sufficient to evaluate the quality of receiving waters
  - The importance of use of multiple indices

Next Steps

- Draft available in February

- Receiving water and wet weather monitoring sections available in March

IP DEVELOPMENT

IP Overview

- Ensures continuous progress
- Meets permit requirements
- Includes individual plans for different pollutants
  - Pollutants other than PCBs and trash
  - PCBs
  - Trash

Value Added Approach

- Leverages existing programs and stormwater management practices
- Builds on foundation of existing BMPs
- Accounts for progress on an ongoing basis

Plan for all Pollutants other than PCBs and Trash

- BMP implementation resulting from compliance with the existing stormwater regulations;
- BMP implementation resulting from other programs and drivers; and
- Ongoing programmatic and source control efforts.

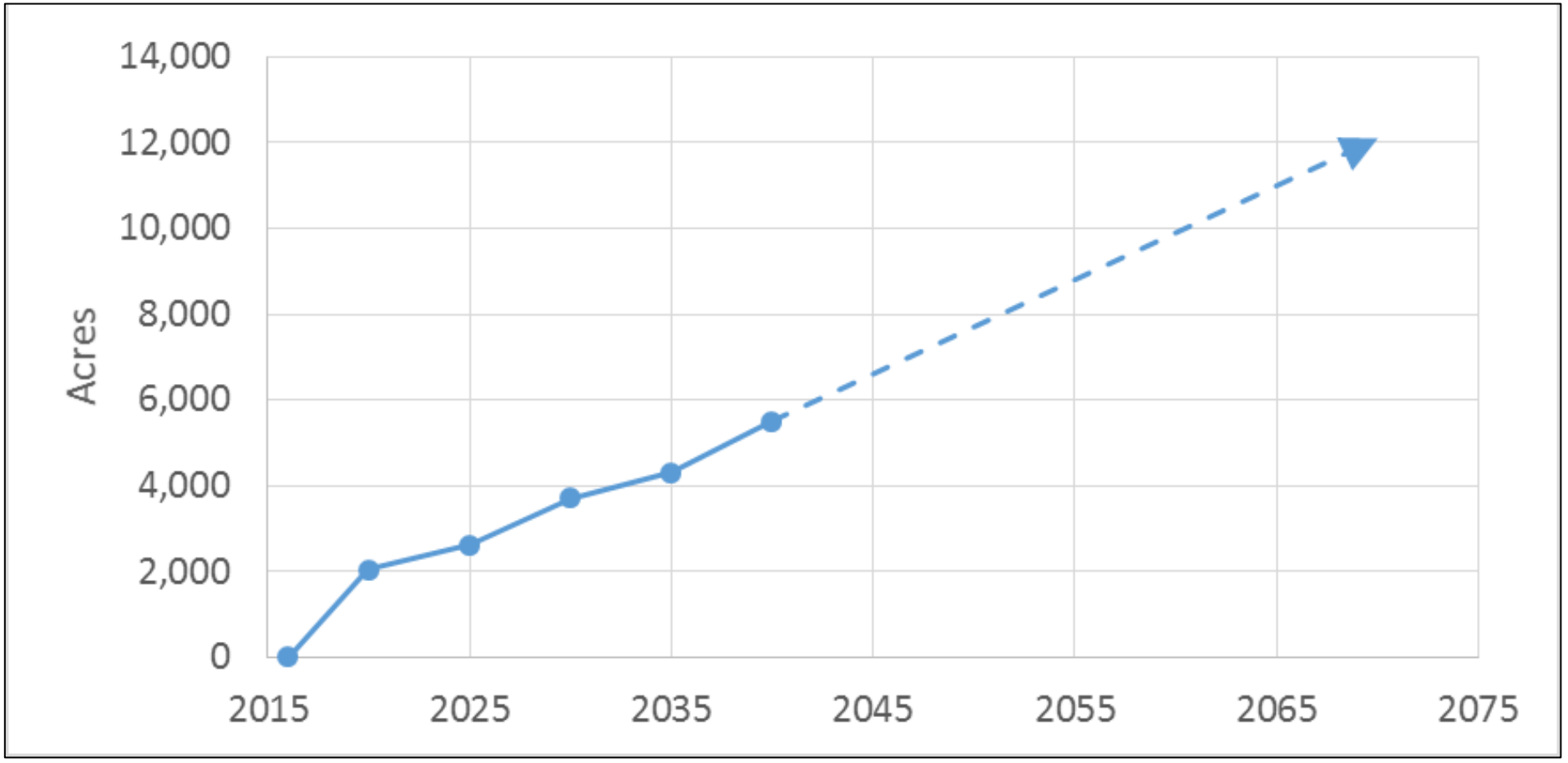
Existing Stormwater Regulations

- Major component of IP
- Historical analysis shows existing regs drove BMP implementation
  - Load reduction should increase in future with increase in retention requirements

Existing Stormwater Regulations (continued)

- Projected to occur across all District watersheds
- Applies to any type of property (residential, commercial, public right of way) and owner (private, city, federal) that meets criteria

Total Projected Area of Development/Redevelopment in the MS4 Over Time



BMP Implementation From Other Programs and Drivers

BMP Type	Projected Annual Rate of Implementation/ Treatment	Units
Permeable Pavement	2,800	Square Feet
Rain Barrel	667	Count
Standard Bioretention	31,799	Square Feet
Cistern	3,900	Square Feet
Impervious Surface Removal	10,367	Square Feet
Green Roofs	20,499	Square Feet
New Trees	4,150	Count
Undefined (DDOT)	100,108	Square Feet
Schools	3 schools/year @2,500 cubic feet treated	-
Stream Restoration	1,500	Feet

Ongoing Programmatic and Source Control Efforts

- Existing efforts under standard MS4 permit compliance
  - Street sweeping
  - Coal tar ban
  - Phosphorus fertilizer legislation

PCB Plan

- TMDLs acknowledge PCBs should not be tracked to meet numeric limits
- Focus on source control activities
  - Identify potential sources
    - Potential source database
  - Recommend specific controls

Trash Plan

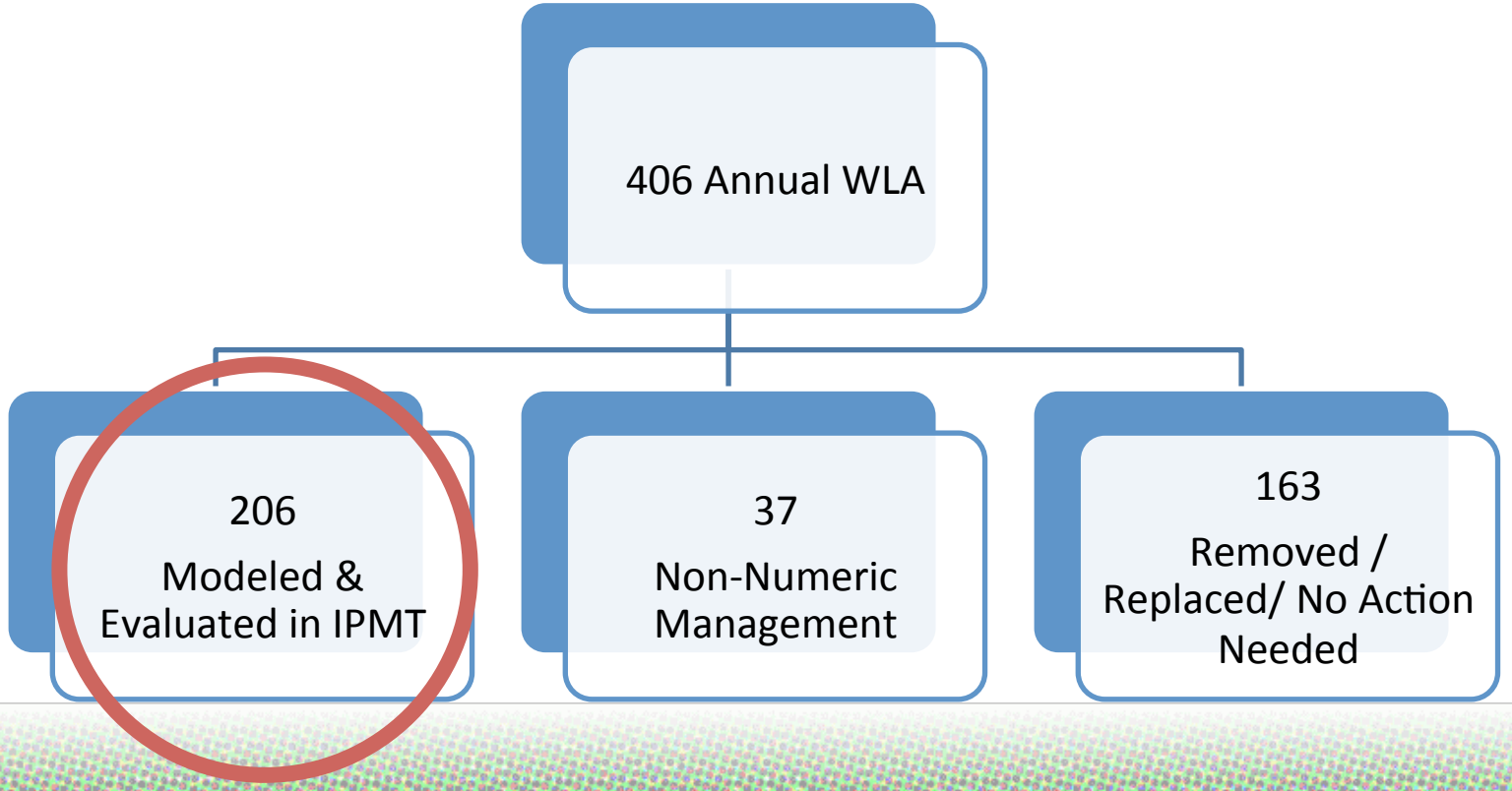
- DDOE required to meet trash WLAs within this permit cycle
- IP strategy based on draft Anacostia River Watershed Trash TMDL Implementation Strategy (December 2013)
  - Existing BMPs
  - New BMPs

MODELING THE IP

Brief Modeling Recap

- An IP Modeling Tool was developed to track MS4 pollutant loads and load reduction in a consistent manner across the District.
- The IP Modeling Tool was applied to determine the “gap” between current conditions and the MS4 WLAs

Annual WLA Inventory



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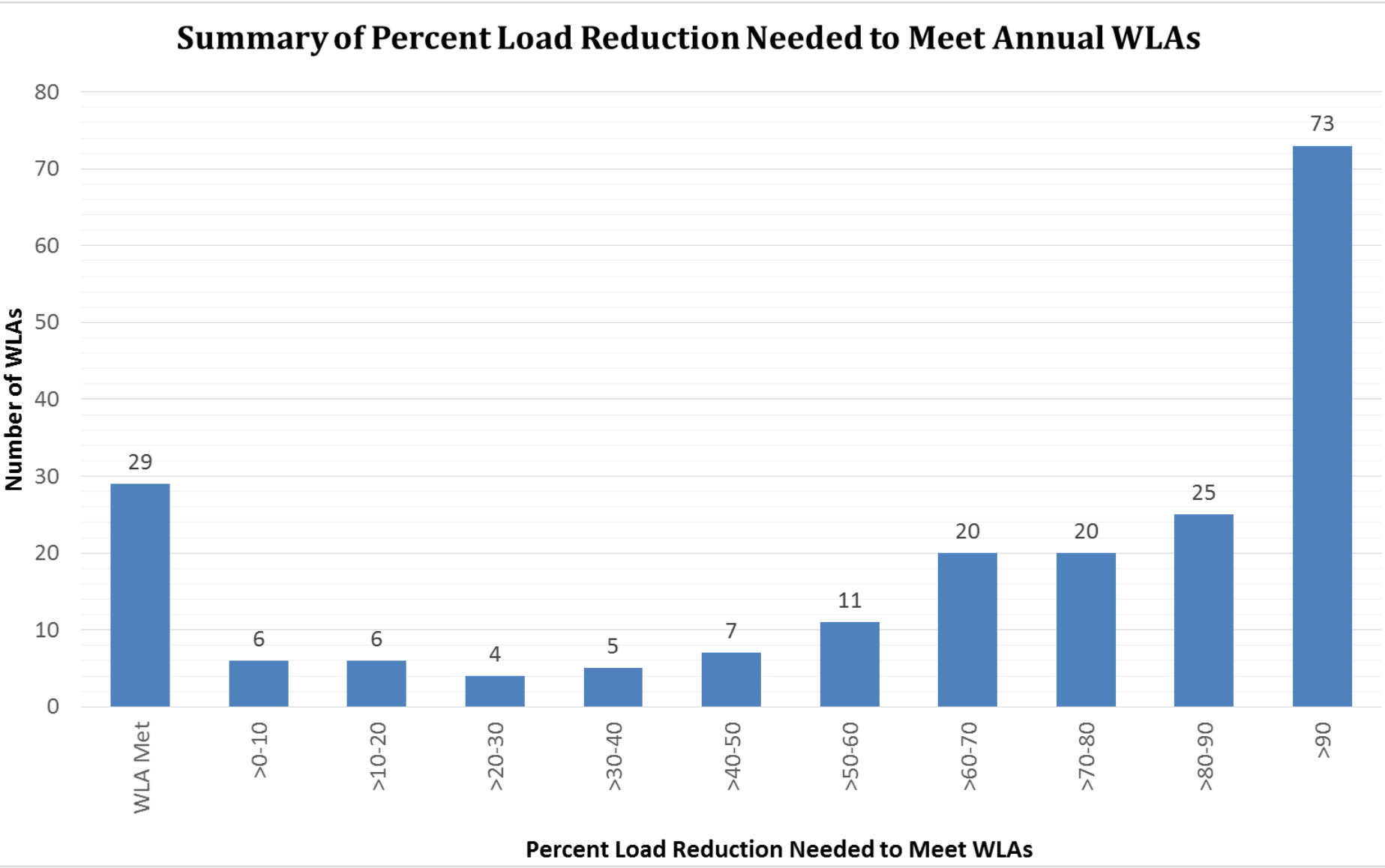

Summary of Percent Load Reduction Needed to Meet Annual WLAs
Number of WLAs
80
70
60
50
40
30
20
10
0
29
6
6
4
5
7
11
20
20
25
73
WLA Met
>0-10
>10-20
>20-30
>30-40
>40-50
>50-60
>60-70
>70-80
>80-90
>90
Percent Load Reduction Needed to Meet WLAs

Approach for Closing the Gap

- Programmatic and source control efforts
- Implementation of BMPs resulting from compliance with the existing stormwater regulations
- Implementation of BMPs through other drivers

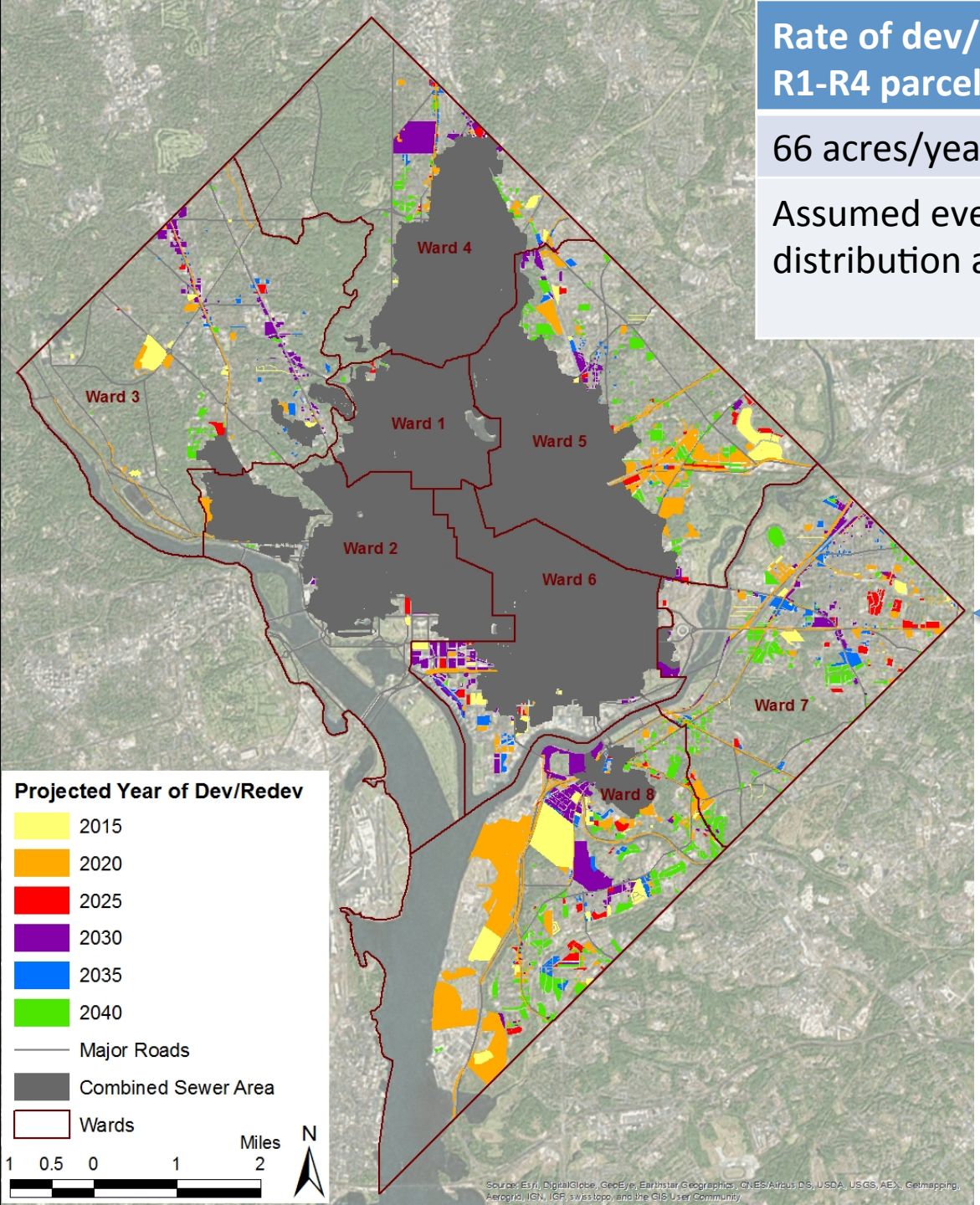
Programmatic and source control efforts

Quantifiable (modeled)	Non-Quantifiable (not modeled)
Street sweeping	Catch basin cleaning
Coal tar ban/sealant removal	Pet waste removal
Phosphorus fertilizer ban	Public outreach
Trash removal	IDDE
	Others

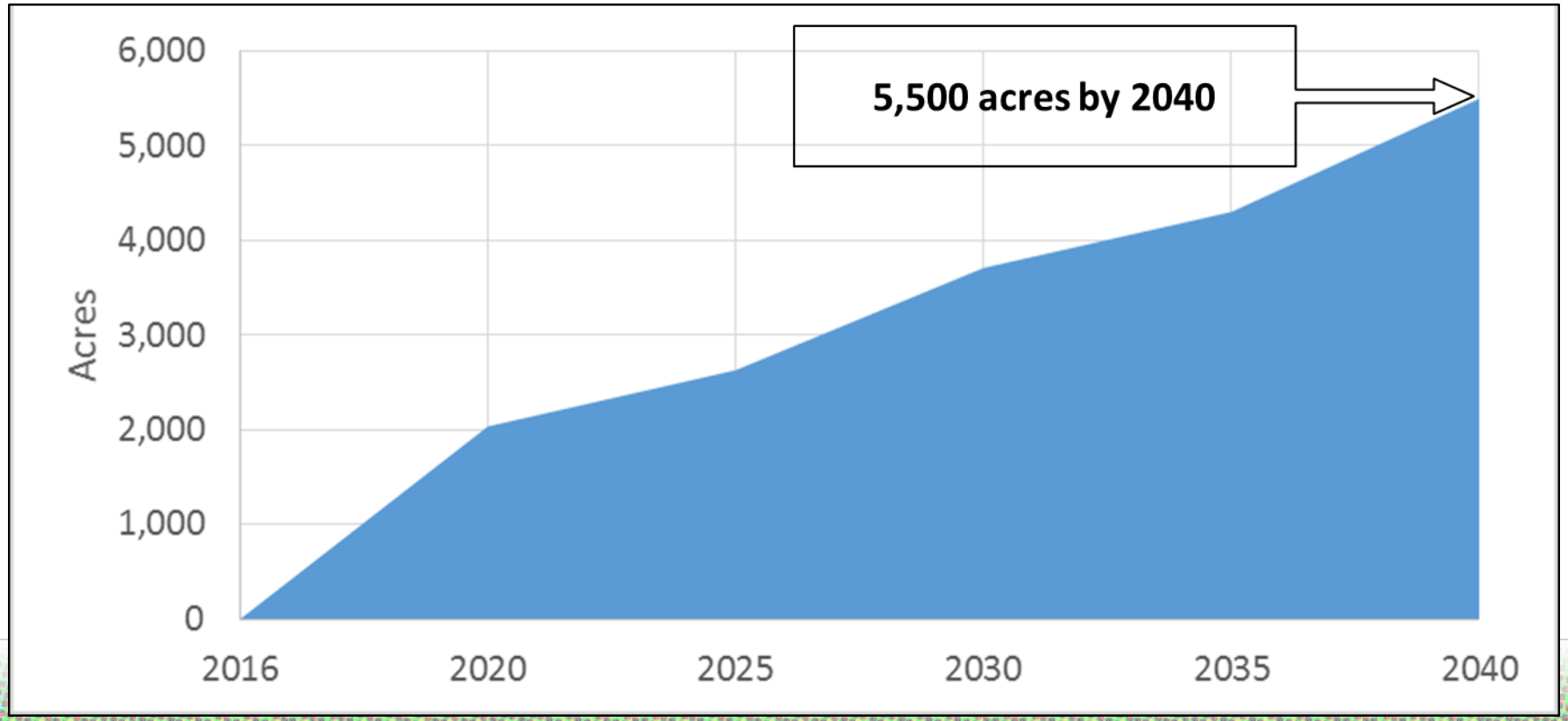
Implementation of BMPs resulting from compliance with the existing stormwater regulations

- Based on projections of development or redevelopment that will trigger the SW regs
- Largely based on OP data
  - 25-year projection (to 2040)
  - OP mostly excludes R1-R4 parcels
  - Development on R1-R4 residential parcels is projected using historic data on BMP implementation

Rate of dev/redev on R1-R4 parcels	Rate of dev/redev on all other parcels
66 acres/year	154 acres/yr
Assumed even distribution across MS4	Distributed spatially according to OP projections (see figure)



Projected cumulative area of dev/ redev in the MS4 through 2040



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Implementation of BMPs through other drivers

21 acres/year
or
525 acres through the year 2040

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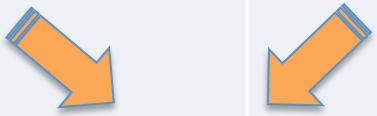
Comparison of amount of MS4 area controlled in the IP Modeling Tool

	From stormwater regulations	From other programs	Source Control
Current (2014) amount accounted for in the IP Modeling Tool	550 acres total (can't break out b/w programs)		• 50 acres of street sweeping • 3 acres of coal tar removal • All of MS4 is under phosphorus fertilizer control • Most of Anacostia is under trash control
Projected 2040 amount accounted for in the IP Modeling Tool	5,500 acres	525 acres	• Maintain current rates of source controls • Additional trash controls for the Anacostia



Approximately 30% of MS4 area is projected to be retrofitted with structural BMPs by 2040

Model Assumptions

- Area will be controlled by BMPs designed to retain 1.2 inches of runoff
  - Assumes ~83% volume reduction efficiency
- Model calculates volume and load reduction in 5-year increments for each TMDL segment

2040 Projection Results

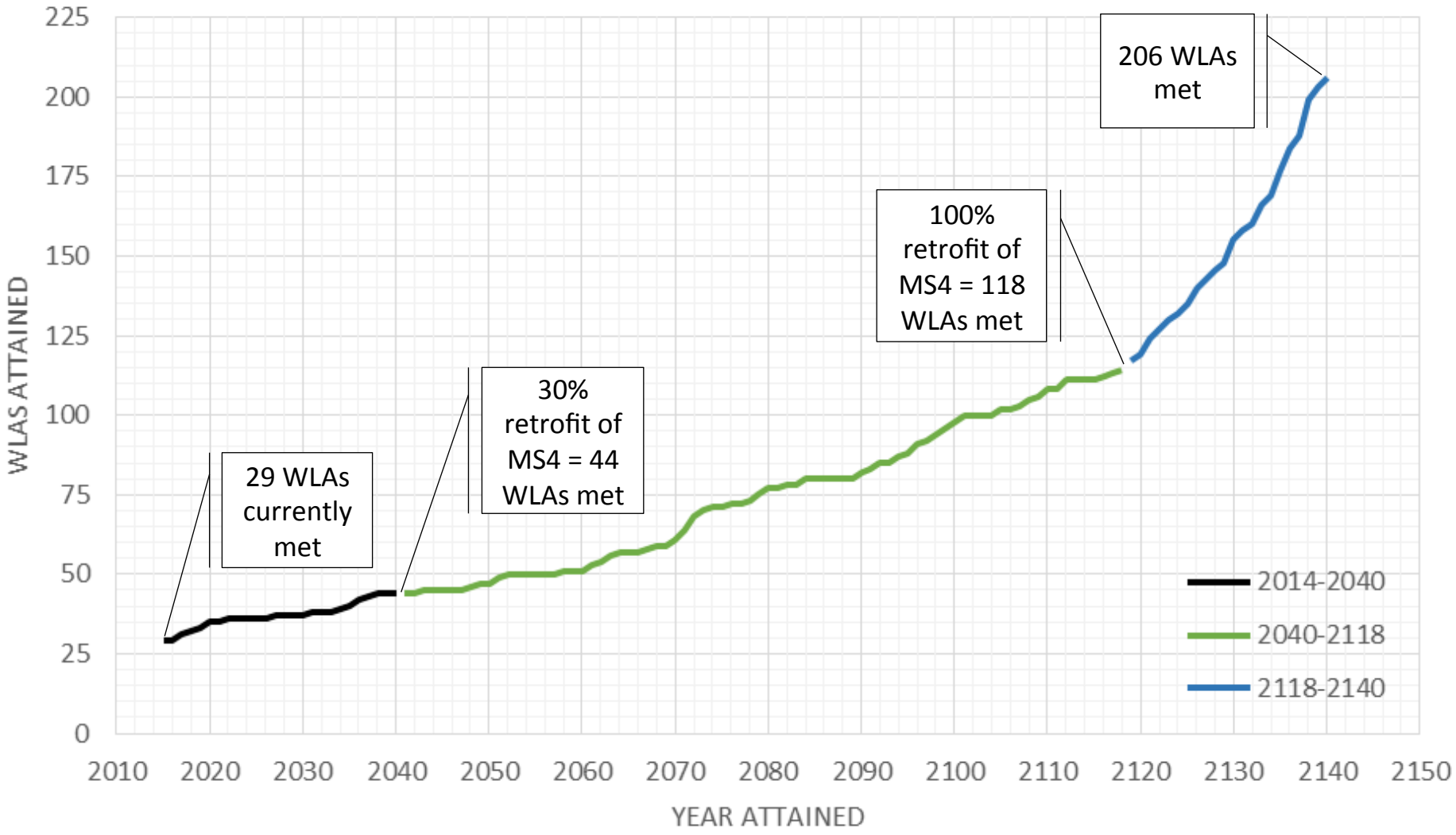
- Model results show that 44 WLAs will be met (out of 206)
  - Mix of segments and pollutants
- Continued progress towards load reductions everywhere

Projecting Beyond 2040

To determine the ultimate date of attainment of all WLA, must project MS4 retrofit rate and pollutant load reductions beyond 2040

Parcel Type	Retrofit Rate
Non R1-R4	118 acres/year
R1-R4	76 acres/year
Roads and PROW	47 acres/year
TOTAL	**241 acres/year**

Projection Results Over Time



Summary of Results

- More detailed results provided in draft IP
  - Overview of date of WLA attainment by major watershed and by pollutant category
  - Watershed-specific results

Results

Year	Total # WLAs Achieved (cumulative)	# WLAs Achieved per Major Waterbody (cumulative)			# WLAs achieved by Pollutant Type (cumulative)						
		Anacostia	Potomac	Rock Creek	Bacteria	TSS	Nutrients	Metals	Toxics	BOD	Trash
2015	29	23	5	0	2 / 20	3 / 11	3 / 19	11 / 44	10 / 105	0 / 5	0 / 2
2020	35	29	5	0	2 / 20	3 / 11	3 / 19	12 / 44	12 / 105	1 / 5	2 / 2
2025	36	29	6	0	2 / 20	3 / 11	4 / 19	12 / 44	12 / 105	1 / 5	2 / 2
…	…	…	…	…	…	…	…	…	…	…	…
2075	72	55	11	5	4 / 20	5 / 11	8 / 19	25 / 44	26 / 105	2 / 5	2 / 2
2080	77	59	11	6	4 / 20	6 / 11	9 / 19	27 / 44	27 / 105	2 / 5	2 / 2
2085	80	61	11	7	4 / 20	6 / 11	9 / 19	29 / 44	28 / 105	2 / 5	2 / 2
…	…	…	…	…	…	…	…	…	…	…	…
2130	159	99	20	39	8 / 20	11 / 11	19 / 19	40 / 44	75 / 105	4 / 5	2 / 2
2135	185	117	21	46	10 / 20	11 / 11	19 / 19	44 / 44	94 / 105	5 / 5	2 / 2
2139	206	129	25	51	20 / 20	11 / 11	19 / 19	44 / 44	105 / 105	5 / 5	2 / 2

Example Results – Watershed-Specific (Fort Chaplin)

Pollutant	TMDL Name	Baseline Load (lbs/yr)	Current Load (lbs/yr)	WLA (lbs/yr)	Year WLA Projected To be Achieved	Notes
Arsenic	DC TMDL for Organics and Metals in the Anacostia River and Tributaries (2003)	0.81	0.80	0.38	2083	
Lead	DC TMDL for Organics and Metals in the Anacostia River and Tributaries (2003)	8.38	8.31	7.67	2034	
Zinc	DC TMDL for Organics and Metals in the Anacostia River and Tributaries (2003)	63.55	63.06	135.20	2014	WLA has already been met

Overall Observations

- Current IP programs will results in 30% MS4 retrofit by 2040 (44 WLAs achieved)
- Continued load reductions and progress occurs everywhere
- More load reductions expected as technologies improve and additional program components are quantified

NEXT STEPS

Upcoming Deliverables and Timing

February

- Stakeholder meeting and follow-up debriefs
- Additional coordination with other DDOE departments
- Scenario Analysis Report available for review
- Continued development of internal drafts (RMP and IP)

March

- Provide and train DDOE staff on working version of modeling tool with a graphic user interface
- Continued review and refinement of benchmarks and milestones
- Additional opportunities for stakeholder review and input

April

- Continued review and refinement of draft final plans (RMP and IP)
- Additional opportunities for stakeholder review and input

May

- Submission of Implementation Plan and Revised Monitoring Plan by May 9th, 2015
- Additional opportunities for stakeholder review and input

Questions/ Comments?