Implementing the Anacostia River Trash TMDL: The Nation's First Inter-jurisdictional Trash TMDL

Matt Robinson

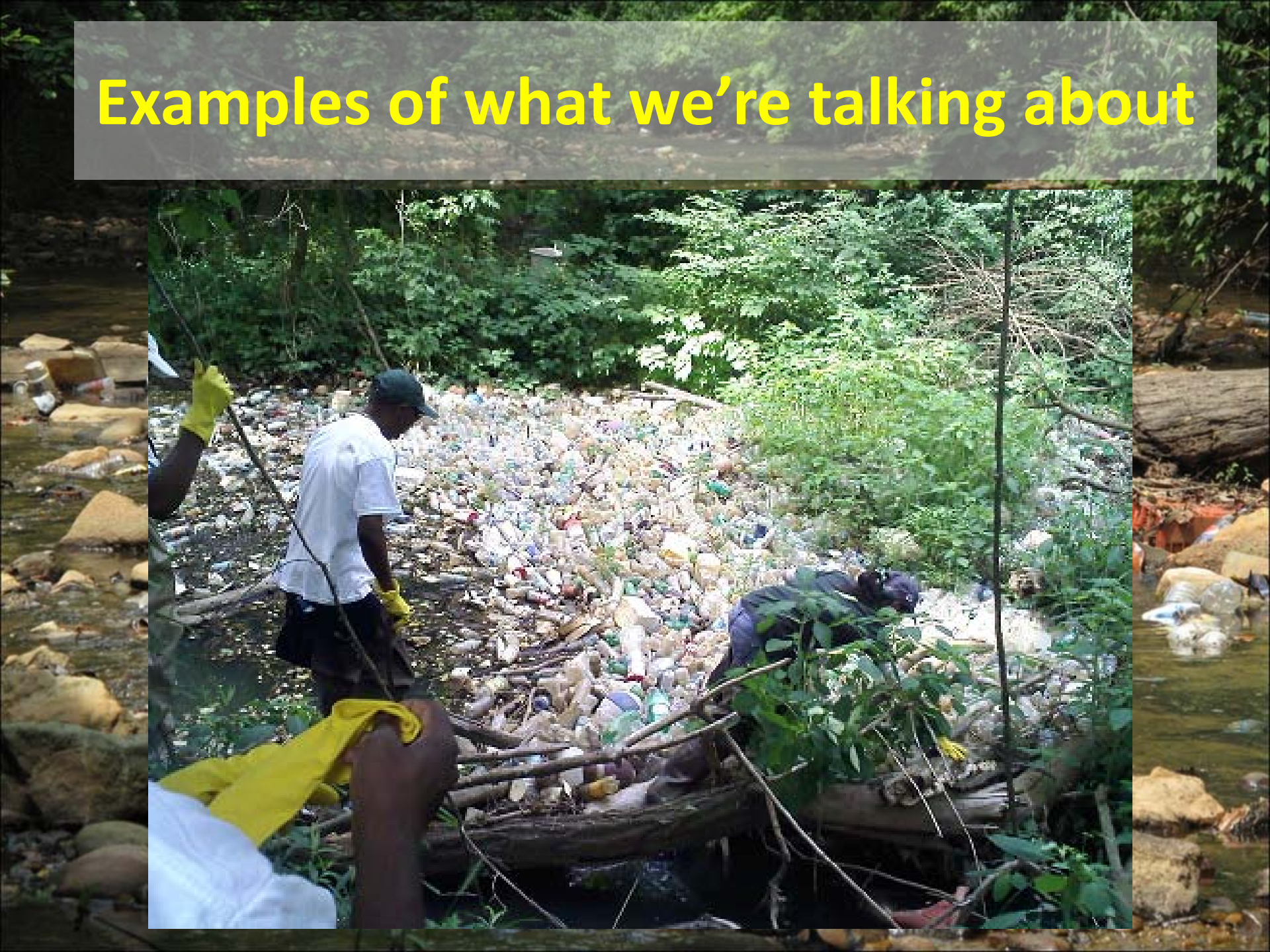
Stormwater Management Division

District of Columbia Department of the Environment

The Nation's Capital is Trashed!!!

- Sort of. But, we do have new federal regulatory requirements for reducing trash loads.
- In 2010, EPA promulgated an inter-jurisdictional trash TMDL for the Anacostia River (the first of its kind).
- Will require the District to reduce trash loads on annual basis of ~ 211,000 lbs/yr (from point sources)

Examples of what we're talking about



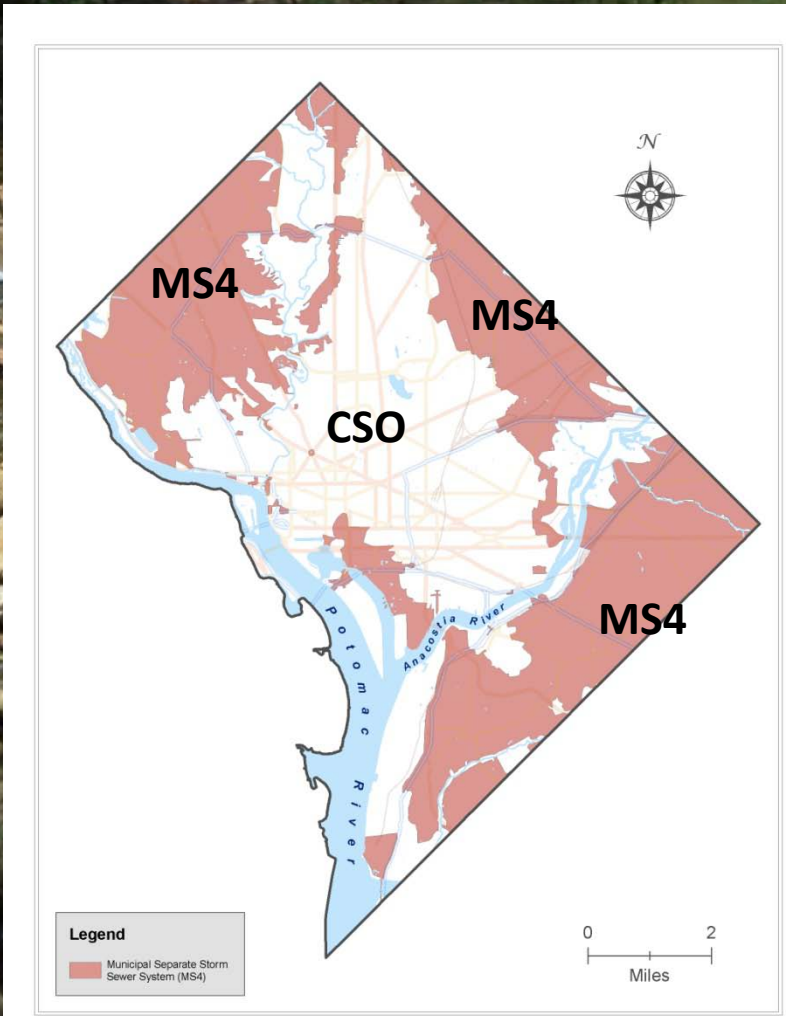
Trash leaving an MS4 Outfall

A Beautiful Scene Along the Anacostia

History of Trash Efforts in the District

- 2005 – Signing and execution of the Trash Free Potomac Watershed Treaty
- 2006 – District's upper and lower segments first listed for floatables.
- 2008 – District finalizes the Anacostia Trash Reduction Strategy
- 2010 – District, MD and EPA finalize a Trash TMDL for the Anacostia

Total Source Loads



- ~1/3 of the District is served by a CSO (estimated to produce ~94,000 lbs/yr)
- ~2/3 served by an MS4 (estimated to produce ~103,000 lbs/yr)
- Total non-point source load → 20,048 lbs/yr

The TMDL

Waste Load Allocation + Load Allocation + MOS = TMDL

The Goal: Reduction of 100% of the baseline load

Determining the Baseline Load

- Baseline load for the CSO was determined using monitoring of a trash trap located at an outfall along the lower Anacostia.
- Baseline load for the MS4 was determined by monitoring 10 outfalls in the District.
- Loading coefficients were then developed for the land use types which dominate those sewersheds.
- The total MS4 load for the entire area was then calculated based on weighted loading coefficients developed for each of the MS4's major sewersheds.
- Non-point source loads were developed using data from stream and river transect monitoring.

Loading Coefficients

Aggregated land use category	Acres	Unit loading rate (lbs/acre)	Annual load (lbs/yr)
Upper Anacostia			**79,874.1**
Low-Density Residential	1,697.57	4.52	7,667.8
Low-Medium-Density Residential	1,267.54	3.96	5,023.2
Medium-Density Residential	657.71	13.84	9,101.7
High-Density Residential	19.31	7.93	153.1
Commercial	431.04	22.08	9,519.1
Industrial	259.86	18.90	4,911.0
Institutional	585.69	25.45	14,905.8
Major Roads, Transport, Communication, Utilities	624.51	31.12	19,433.5
Public Facilities (Local Public, Quasi Public, Institutional)	304.92	25.45	7,760.2
Federal Facilities	67.84	12.78	867.2
Parking	12.22	6.84	83.6
Parks and Open Spaces	1,401.13	0.32	447.8
Lower Anacostia			**23,313.8**
Low-Density Residential	204.38	4.52	923.2
Low-Medium-Density Residential	158.16	3.96	626.8
Medium-Density Residential	263.00	13.84	3,639.5
High-Density Residential	46.05	7.93	365.0
Commercial	155.67	22.08	3,437.9
Industrial	33.00	18.90	623.6
Institutional	69.41	25.45	1,766.4
Major Roads, Transport, Communication, Utilities	81.09	31.12	2,523.5
Public Facilities (Local Public, Quasi Public, Institutional)	243.73	25.45	6,202.9
Federal Facilities	240.17	12.78	3,070.3
Parking	0.00	6.84	0.0
Parks and Open Spaces (parks and open spaces + undetermined)	421.81	0.32	135.0

Implementing the TMDL

Two major policy pieces pushing compliance

1) District's recently issued MS4 Permit – Requires the District to have , by 2017, the controls in place to reduce 103,188 lbs/yr from the MS4.

2) The Long Term Control Plan for the CSO – DC Water is constructing large underground tunnels to store CSO effluent for eventual piping to the local STP, Blue Plains.

MS4 Permit

- **MS4 Permit allows the District to use structural and non-structural controls to either remove trash from the MS4 (end-of-pipe) or directly from local waterways.**

- **DC is working to implement new and innovative methods above and beyond what we're currently doing to take care of that 103,188 lbs.**

Structural Control

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Non-Structural Controls

- Intuitively, littering is a behavioral issue.
- Are there ways we can stop it?
- How do we communicate to people that trash is destroying our local watersheds, and decreasing their quality of life?

Getting to the Source

- DDOE funded the Alice Ferguson Foundation to conduct a behavioral study of "litterers" in the District
- They used the results from that study to develop a concentrated education and outreach campaign for the Deanwood neighborhood.
- Campaign included messages and several visual tools to help get the message out.

Campaign Research

- **Focus Groups among Active Litterers**
  - Deanwood neighborhood (April 20, 2010; 2 groups)
  - U Street corridor (November 29, 2010; 1 group)
- **In-Depth Citywide Telephone Survey**
  - 700 interviews, citywide; July 21-28, 2010
  - Balanced by ward, race/ethnicity, gender, age, educational attainment
  - Max sampling error ±4.0%
- **Survey of D.C. Businesses**
  - 51 businesses interviewed in-person and by telephone, Fall 2010
  - Focus on businesses charged with implementing bag fee
  - On-site owners/managers interviewed

Littering is a Widespread Problem

- 68% in D.C. often/sometimes *see* someone littering.
- 67% believe litter contributes to “filth and bacteria” and would “worry” about that.
- This problem crosses demographic lines.
- 66% region-wide would like to see government commit more resources to this problem.
- 69% believe “individual people need to help.”

Creative Message Summary

KEY MESSAGE:

By choosing to take care of trash, I am protecting myself and my family's health, happiness and safety

SUPPORT:

Improperly disposed *trash contributes to filth, disease causing bacteria, and toxins* harmful to you and those you love

OBJECTIVE:

Overcome unconscious rewards and desires to dispose of trash (outside their own backyard) by helping trashers feel *empowered and important as caretakers for those they love.*

TRASH FREE POTOMAC WATERSHED

ALICE FERGUSON FOUNDATION

Piece by Piece, litter adds up, and
Makes the places we go to every day
Unsafe and unhealthy.

Take Control.
Take care of your trash.

Clean Land. Safe Water. Healthy Lives.

YOUR LITTER HITS CLOSE TO HOME.

Piece by piece, litter adds up, and makes the places we go to every day unsafe and unhealthy.

Take control.
Take care of your trash.
www.trashfreepotomac.org

CLEAN LAND. SAFE WATER. HEALTHY LIVES.

Logo here

A campaign brought to you by Alice Ferguson Foundation, Metropolitan Washington Council of Governments, the District of Columbia Government, the Montgomery County Government, the Prince George's County Government, the Fairfax County Government, the City of Arlington Government, the Charles County Government, and the City of Rockville Government.


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Trash Free Deanwood

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ALICE FERGUSON FOUNDATION

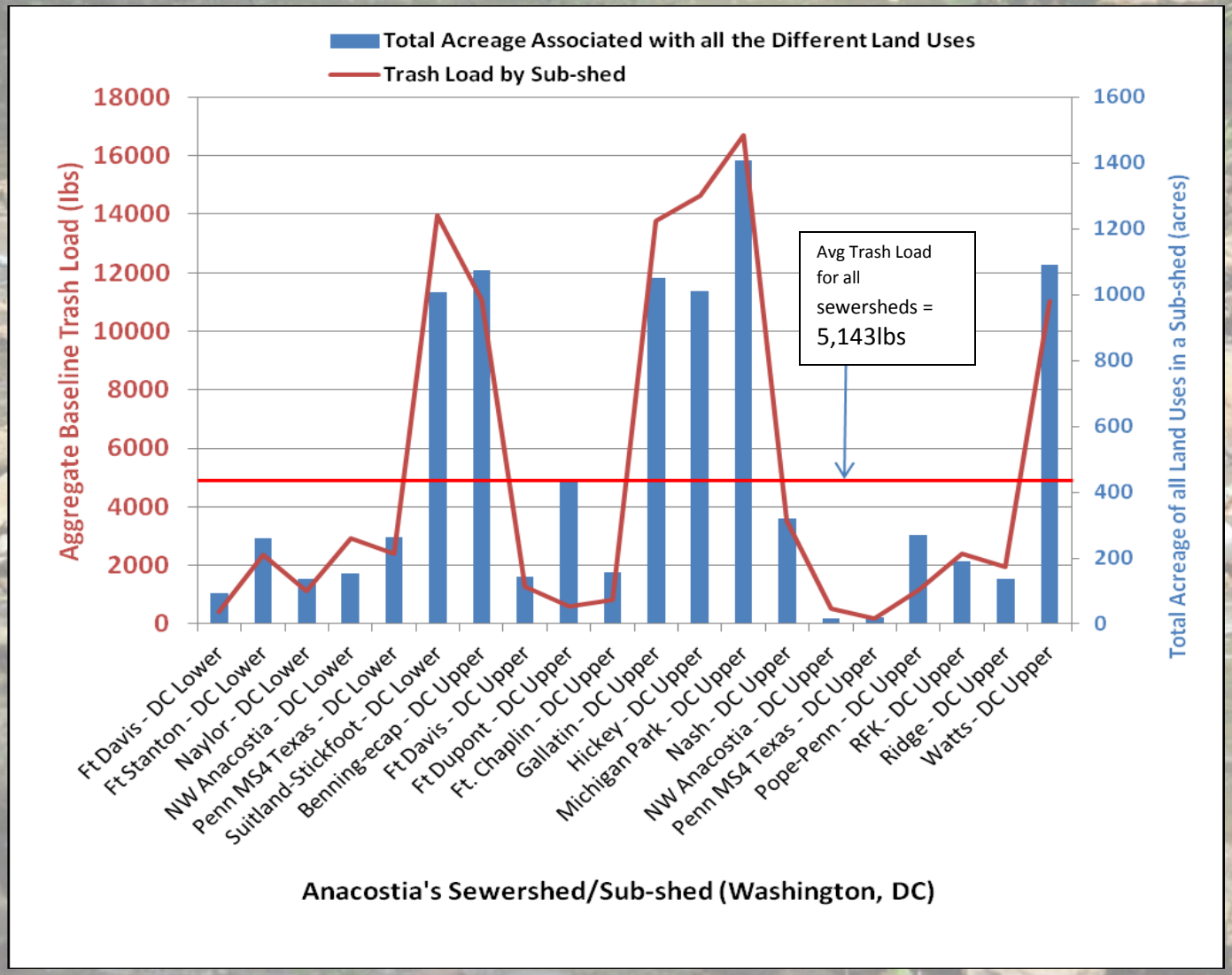
CLEAN LAND.
SAFE WATER.
HEALTHY LIVES.

GROUNDWORK
CHANGING PLACES
CHANGING LIVES

Non-Structural Control

- Anacostia River Restoration & Protection Act of 2009 (the Bag Law)
- Requires a $0.05 fee on all bags distributed as part of purchases in DC
- DDOE actively inspects and enforces against local businesses found not to be in compliance

Targeting


Total Acreage Associated with all the Different Land Uses
Trash Load by Sub-shed
Aggregate Baseline Trash Load (lbs)
Total Acreage of all Land Uses in a Sub-shed (acres)
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
1600
1400
1200
1000
800
600
400
200
0
Avg Trash Load for all sewersheds = 5,143lbs
Ft Davis - DC Lower
Ft Stanton - DC Lower
Naylor - DC Lower
NW Anacostia - DC Lower
Penn MS4 Texas - DC Lower
Suitland-Stickfoot - DC Lower
Benning-ecap - DC Upper
Ft Davis - DC Upper
Ft Dupont - DC Upper
Ft. Chaplin - DC Upper
Gallatin - DC Upper
Hickey - DC Upper
Michigan Park - DC Upper
Nash - DC Upper
NW Anacostia - DC Upper
Penn MS4 Texas - DC Upper
Pope-Penn - DC Upper
RFK - DC Upper
Ridge - DC Upper
Watts - DC Upper
Anacostia's Sewershed/Sub-shed (Washington, DC)

Targeting

- Being a city, the District is very piped.
- The MS4 area is divided up into sewersheds.
- Using the loading coefficients, we estimated trash loads leaving those sewersheds
- We will target implementation in sewersheds with above average trash loads

Targeting

- **Total load for those sewersheds is approximately ~81,000 lbs, or 78% of the MS4 WLA.**
- **We'll target end-of-pipe and in-stream traps first.**
- **Next, we'll employ non-structural approaches to make up the difference, including stream clean-ups.**

No.1 Goal - Need to Change Behavior!!!

- **Structural controls are not sustainable long-term. Maintenance is costly.**
- **We are striving to take a more holistic approach by changing behavior using education/outreach and policy solutions.**

Current Progress

Activity Category	Activity	Load Reduced before Reduction Factors Are Applied (lbs)	Load Reduced After Reduction Factors Are Applied (lbs)	Calculation Methodology
End-of-Pipe and In-Stream BMPs	Watts Branch Bandalongs	4,143	4,143	Based on empirical data collected. Data for the lower Watts Branch Bandalong was collected between January & September 2012. Data on the upper Bandalong was collected between December 2011 and November 2012.
	Nash Run Trash Trap	1.894	1,894	Annual average (2009-2012) based on empirical data.
	Hickey Run BMP	10,000	2,000	Based on assumed efficiency of 100% capture for design capture of device. A reduction factor of 20% is then applied since glass and plastic bottles may not be emptied of water.
	James Creek Bandalong	327	327	Based on empirical data collected.
Road-way and Block Cleanups	Adopt-A-Block Program	NA	NA	Collaborating with Office of the to collect empirical clean-up data.
Sweeping Environmental Hotspots	Sweeping Environmental Hotspots	144,768	72,384	Total amount of trash removed was estimated based on trash loading coefficients for roadways. The trash load was then multiplied by the total area of roadways swept within the environmental hotspots. The resulting load was then divided by two because roughly half of the roadway (the middle of the road) is swept in these areas because they are unsigned. Environmental hotspots within the Anacostia watershed are swept twice per month, 8 months out of the year, in addition to other signed and unsigned areas throughout the MS4 area. Total amount of trash calculated using the methodology above is multiplied by 16. A reduction factor of 50 percent is then applied since an entire hotspot may not be swept during each sweeping event.
Clean-Up Activities	Clean-Up Events	37,647	3,825	Based on empirical data collected (see additional table for tracking of each clean-up event) during the 2012 Anacostia Watershed Society Earth Day Clean-Up. A reduction factor of 50.8% is first applied, which accounts for the District's portion of the Anacostia being served by the MS4. A second reduction factor of 20% is applied to account for the fact that not all plastic and glass bottles collected may be emptied of water before trash is weighed.
	Skimmer Boats	700,000	5,877	Total amount of trash and debris removed is multiplied by 16.5%, since this represents the proportion of the watershed which lies within DC. A second reduction factor of 50.8% is applied to account for the area of the District's portion of the watershed served by the MS4. A third reduction factor of 50% is applied since not all material collected by the skimmer boats may be trash. Finally, a fourth reduction factor of 20% is applied since not all plastic and glass bottles collected are emptied of water.
Education and Outreach	Watershed Wide Anacostia Campaign	NA	NA	Efficiency being assessed.
	Trash MEWEEs	NA	NA	Efficiency being assessed.
Regulatory Approaches	Bag Law	NA	NA	Efficiency being assessed.
	Total Annual Reduction	**939,240**	**90,450**	

Monitoring

- Our MS4 Permit requires us to monitor 6 outfalls throughout the District to assess pollutant loads.
- Trash was listed as a priority to pollutant in the new permit, requiring us to monitor for it as well.
- EPA has been very flexible in allowing us to come up with a trash monitoring approach.

Monitoring

- Data will be collected from 6 outfalls in the Anacostia watershed. These have to be small outfalls with small sewersheds. Too expensive to put large trash traps where needed. Outfalls are monitored based on land use type found in sewersheds.

- Provide as much empirical data as possible to EPA on trash collected by trash traps.

- Provide data collected on stream cleanups. Data will be tracked with an on-line GIS.

Preview of Coming Attractions…

- Two new trash traps coming on-line in FY13
- Roll-out of Education and Outreach Campaign Anacostia wide
  - Follow-up with behavioral surveys to gauge effects
- Behavioral study in FY13 to gauge the effects of the Bag Bill on citizen behavior and local businesses

Recommendations…

- Engage non-profits and local governments
  - Think outside the box and engage various government agencies (e.g. Public Works, Law Enforcement)
- Establish baseline loads for point sources and non-point sources. REMEMBER: THE MORE DATA THE BETTER!!!
- Even if no TMDL, MS4 permits can still contain language in terms of trash!!!
- Get involved in the Trash Free Potomac Watershed Effort. Come to the summit next fall and sign the treaty!!!
- Get involved in the Potomac regional litter campaign.

Looking Forward to a Clean River!!!

Matt Robinson

Stormwater Management Division

District of Columbia Department of Environment

202-442-3204

matthew.robinson@dc.gov