Stormwater management and habitat restoration for the benefit of the District and the Bay

Peter Hill

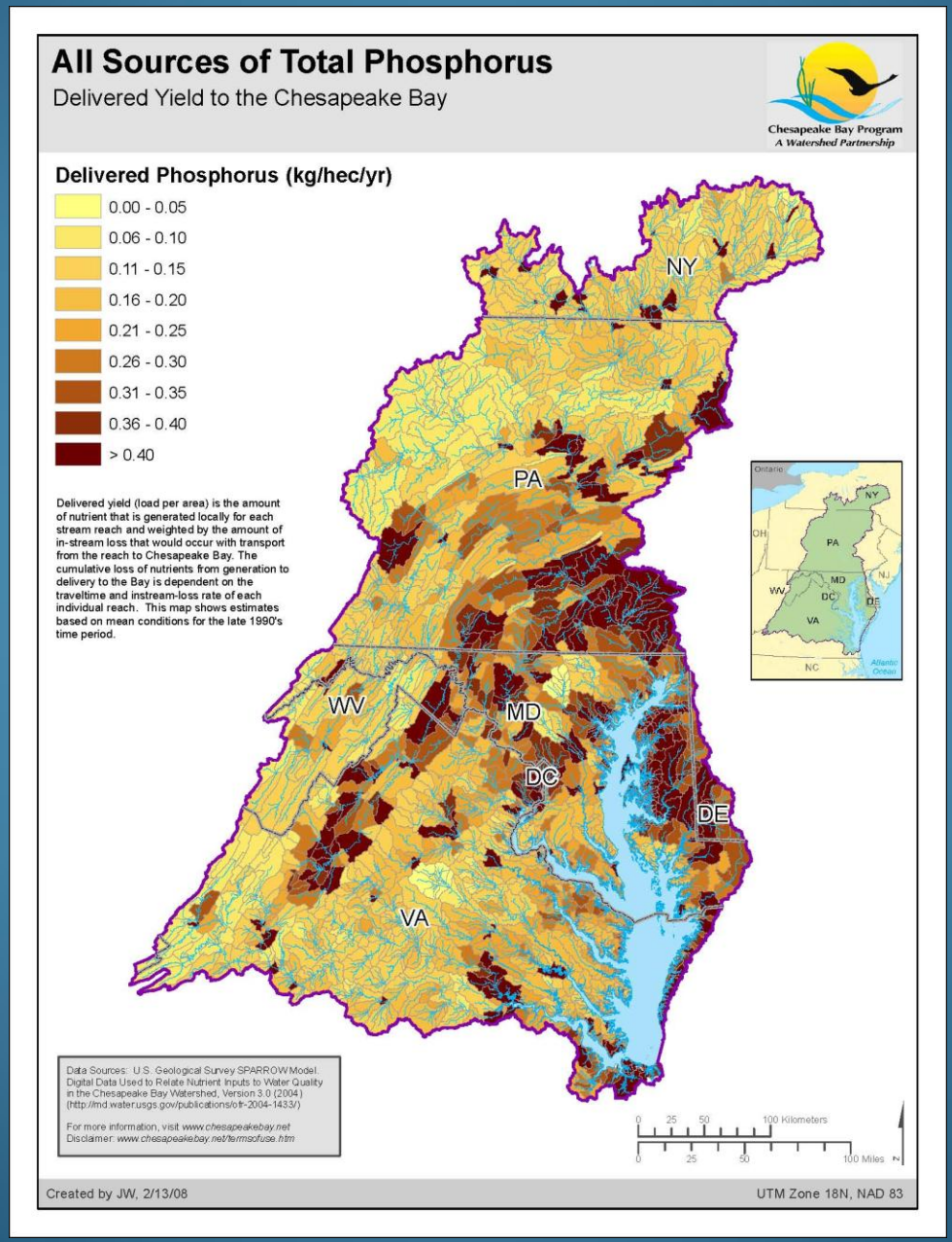
District Department of the Environment

Planning and Restoration Branch

GOVERNMENT OF THE DISTRICT OF COLUMBIA
Vincent C. Gray, Mayor

DISTRICT DEPARTMENT OF THE ENVIRONMENT
green forward

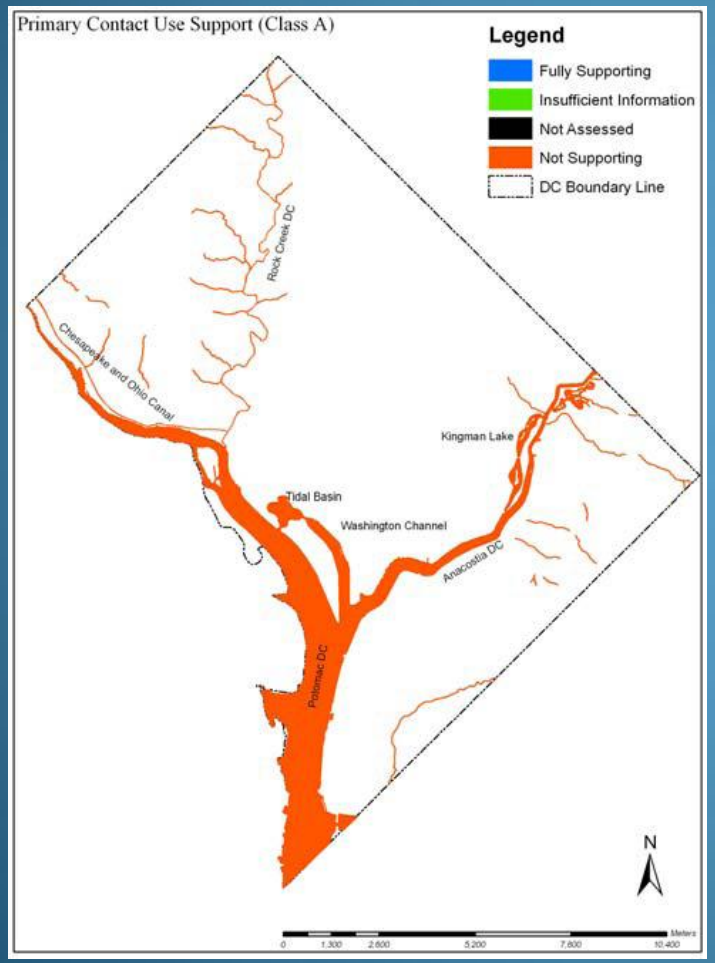
30,000 ft. view prioritization



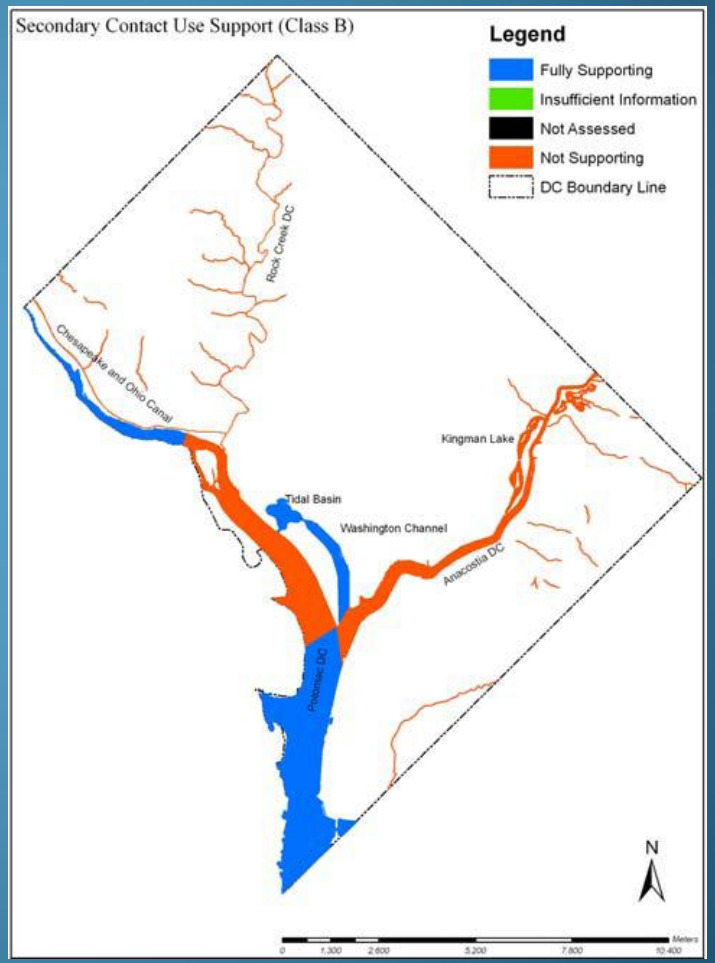
How does the 69 sq. mile jurisdiction fit into a broader 64,000 sq mile watershed?

303d Water quality impairments in DC

- Where to start?
- What results are meaningful to residents and the natural resources?



Waters that support swimming (primary contact)



Waters that support boating (secondary contact)

Bingham Ford & Milkhouse Run Regenerative Stormwater Conveyances

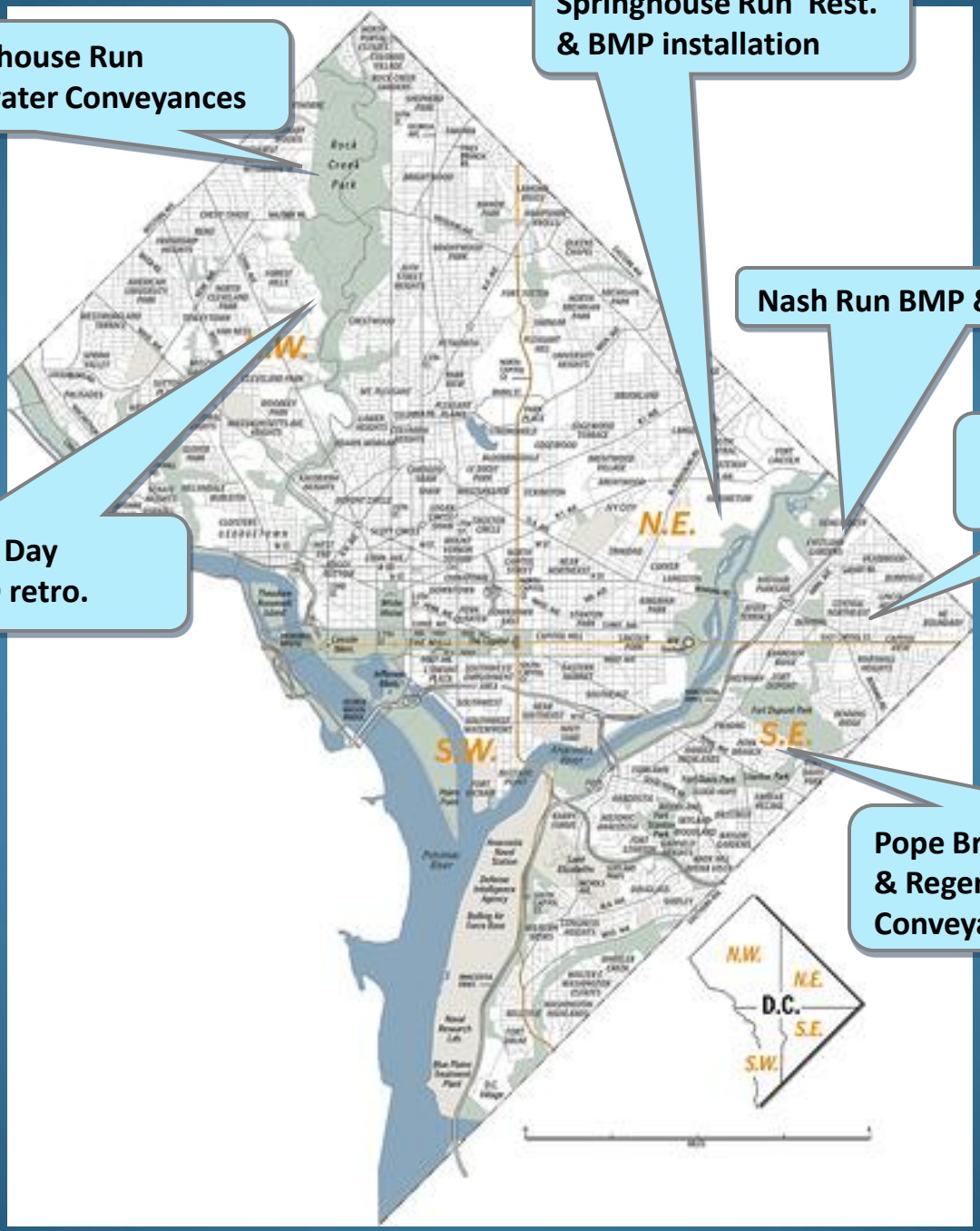
Springhouse Run Rest. & BMP installation

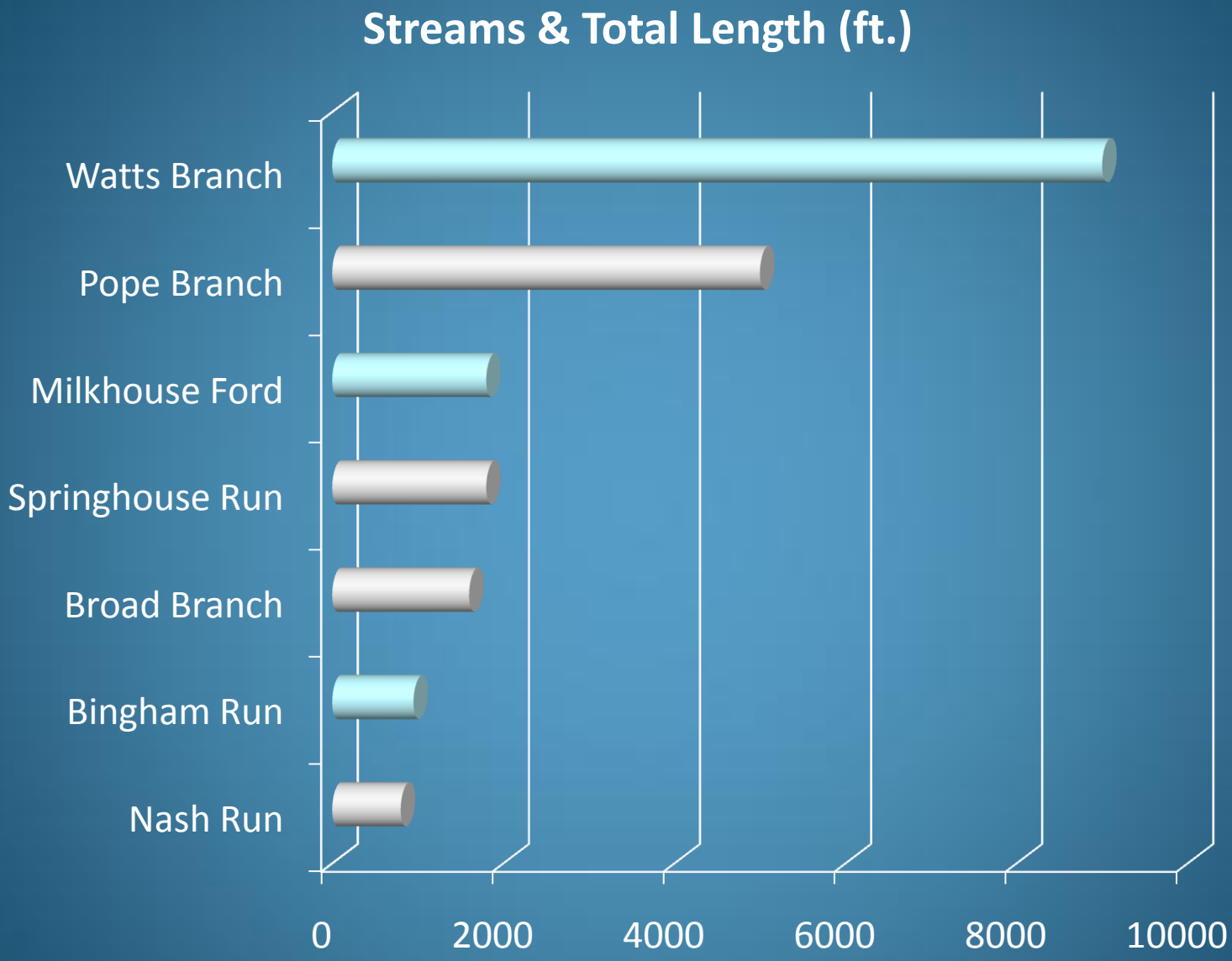
Nash Run BMP &Stream Restoration

Watts Branch Stream Restoration

Broad Branch Stream Day Lighting Project & LID retro.

Pope Branch Stream Restoration & Regenerative Stormwater Conveyances




Streams & Total Length (ft.)
Watts Branch
Pope Branch
Milkhouse Ford
Springhouse Run
Broad Branch
Bingham Run
Nash Run
0
2000
4000
6000
8000
10000

Community involvement

Environmental conditions and restoration potential

Ground level Implementation Prioritization

Regulatory Ease *(Legal Agreements, Permits, Logistics)*

Infrastructure conditions and needs

Community Involvement

Active civic groups or watershed groups

Nonprofit advocacy involvement

Underserved communities

Potential for good public access

Environmental Conditions and Restoration Potential

- Water Quality
- Aquatic Habitat
- Terrestrial Habitat
- Vegetation
- Stream Bank Conditions
- Fish Passage

Infrastructure Condition and Needs

- Stormwater Outfalls
- Sewer Lines
- Bridges & Roads
- Upland Impervious Surface

Regulatory and Administrative ease

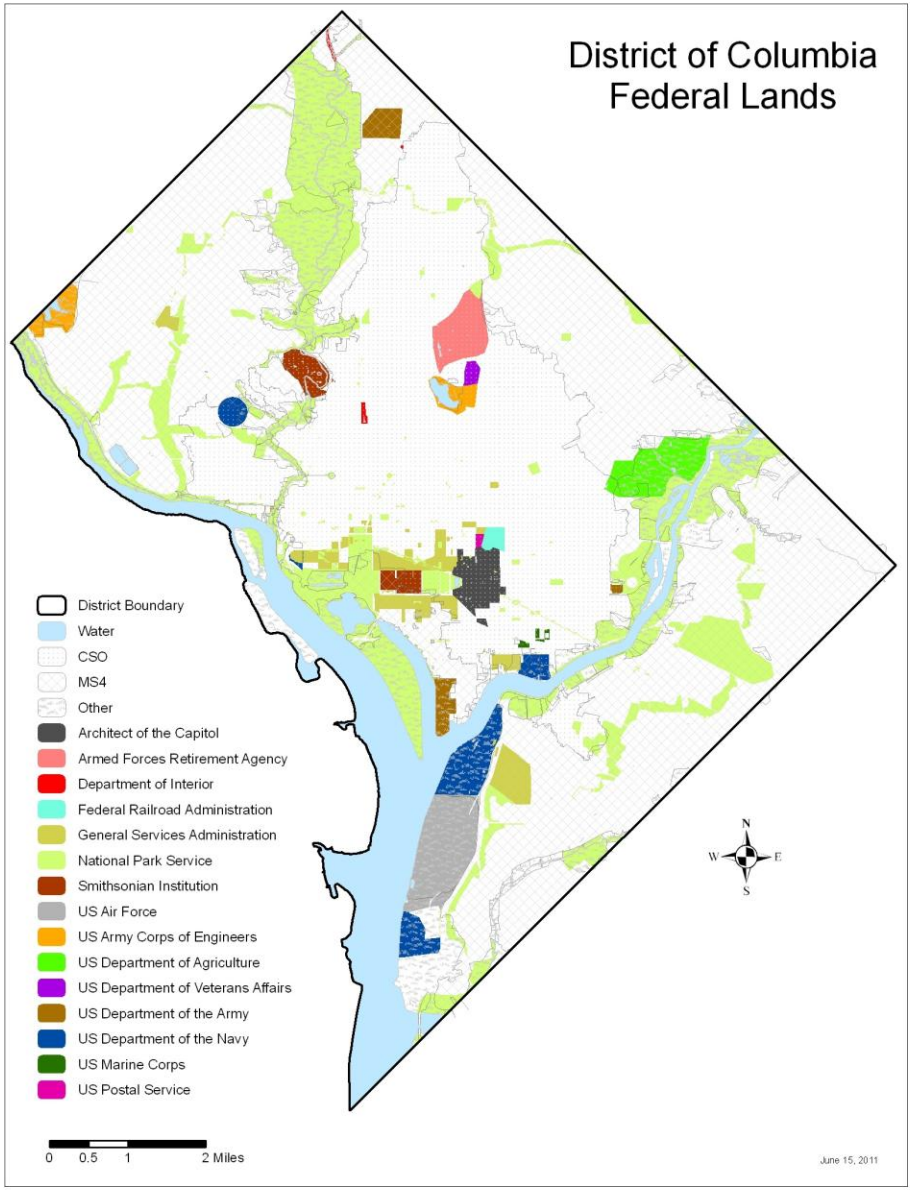
Preferences:

DC land

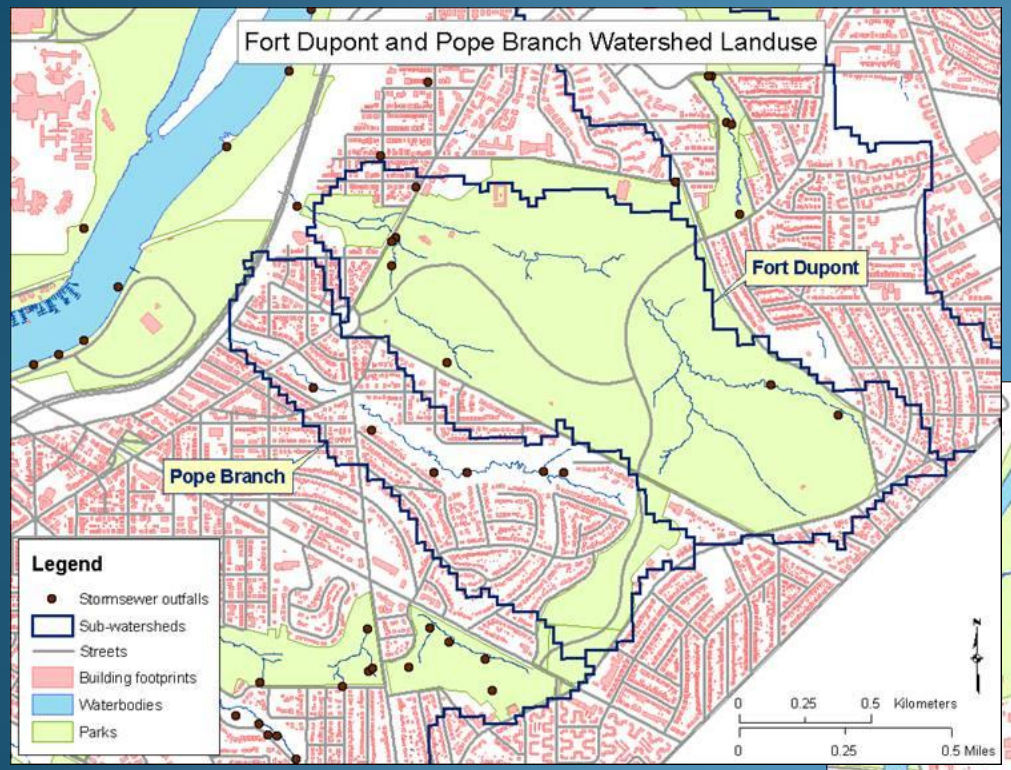
MOUs not needed

Fewer permits needed

No maintenance agreements required

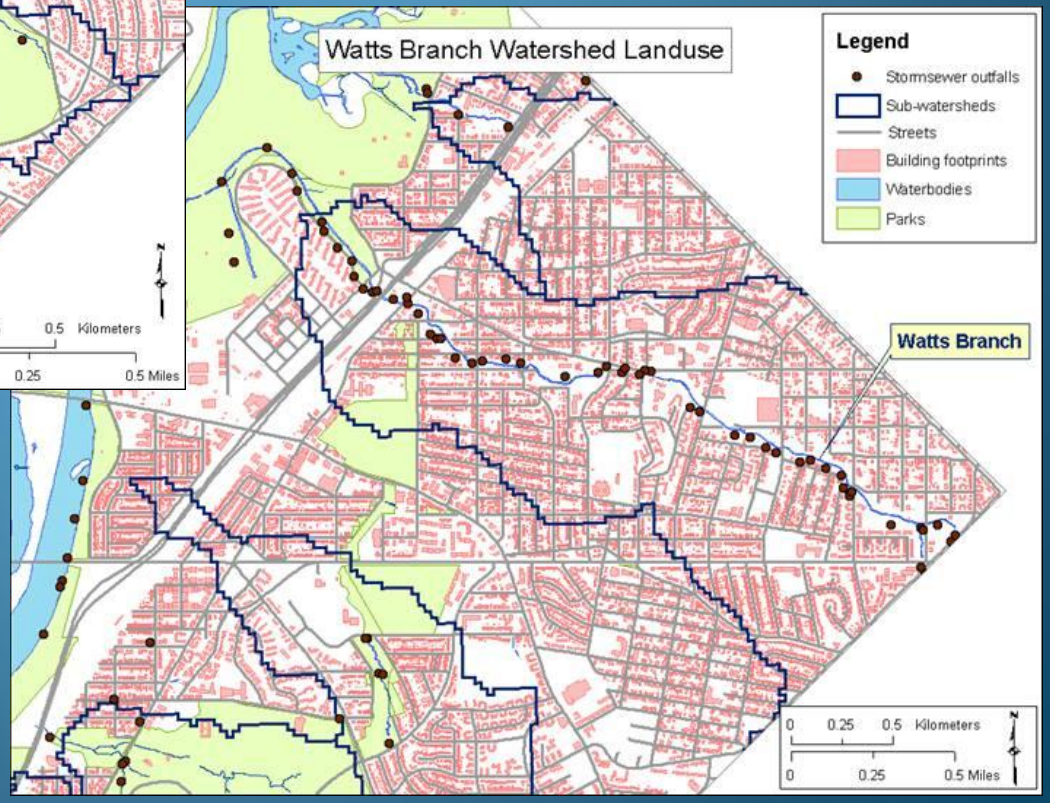


Prioritization strategies for focused restoration and stormwater retrofits



Ft. Dupont watershed

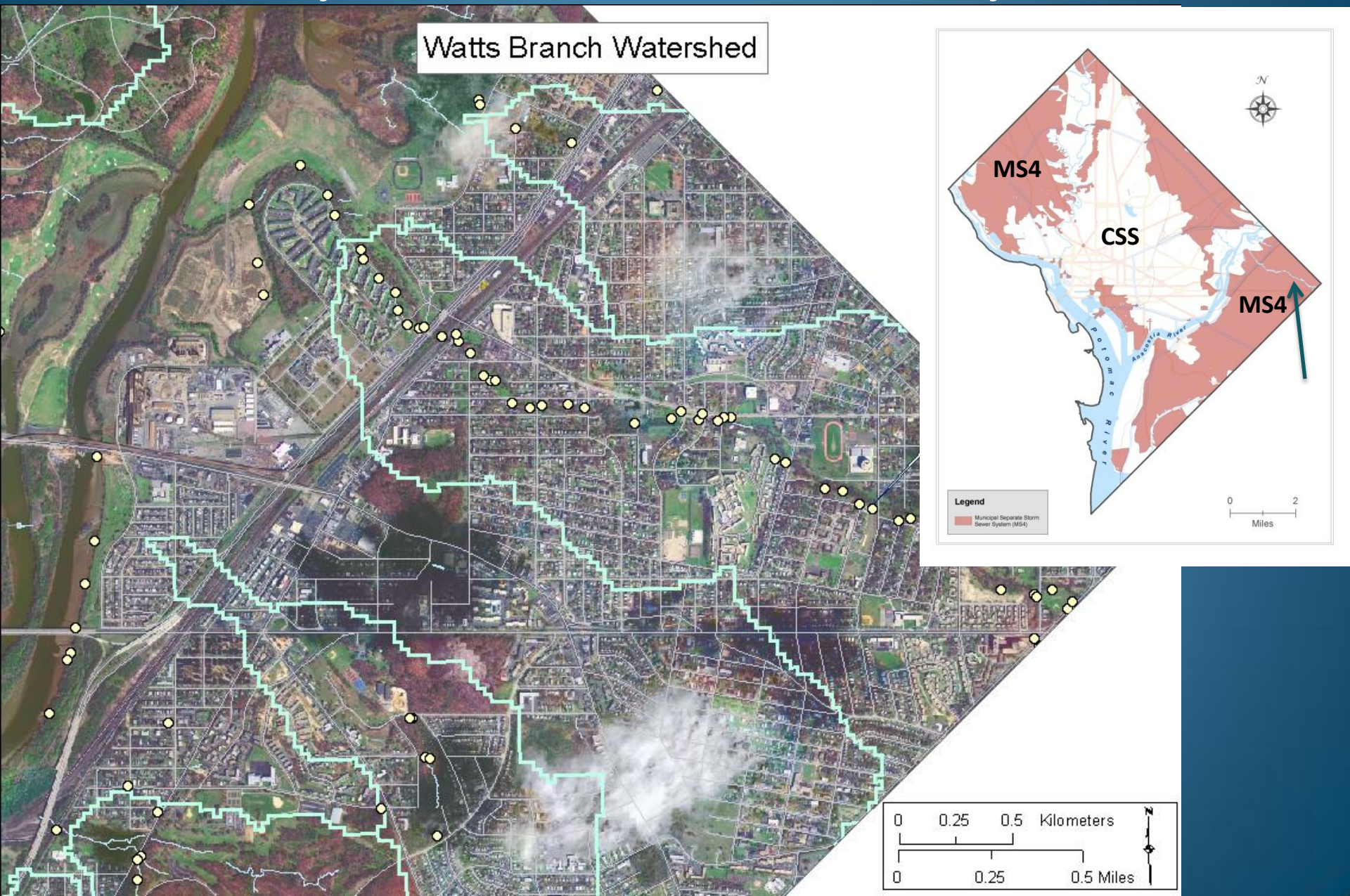
- 85% NPS land
- 64% forest cover
- 13% impervious
- 0.72 sq. mi.



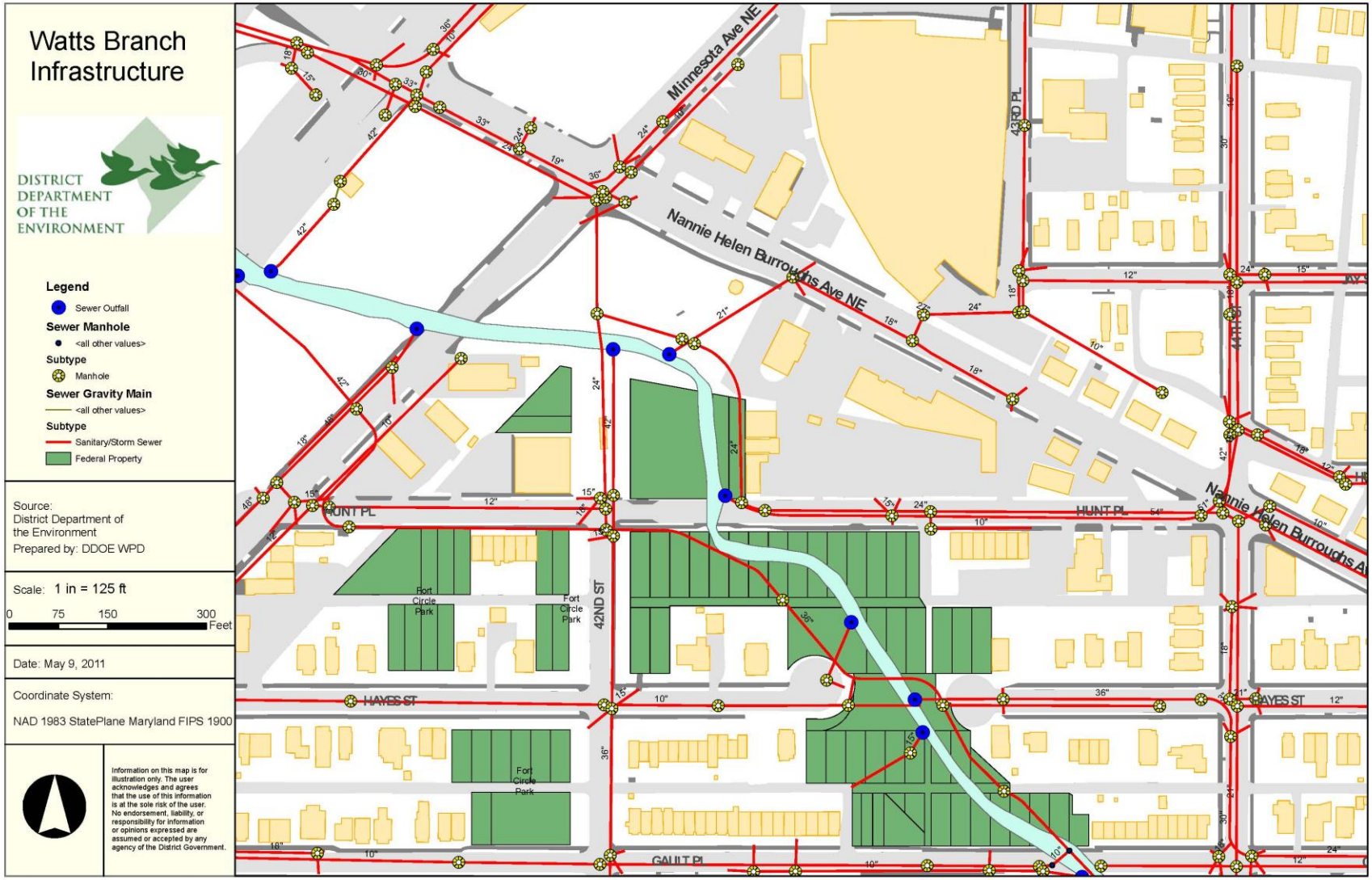
Watts Branch watershed

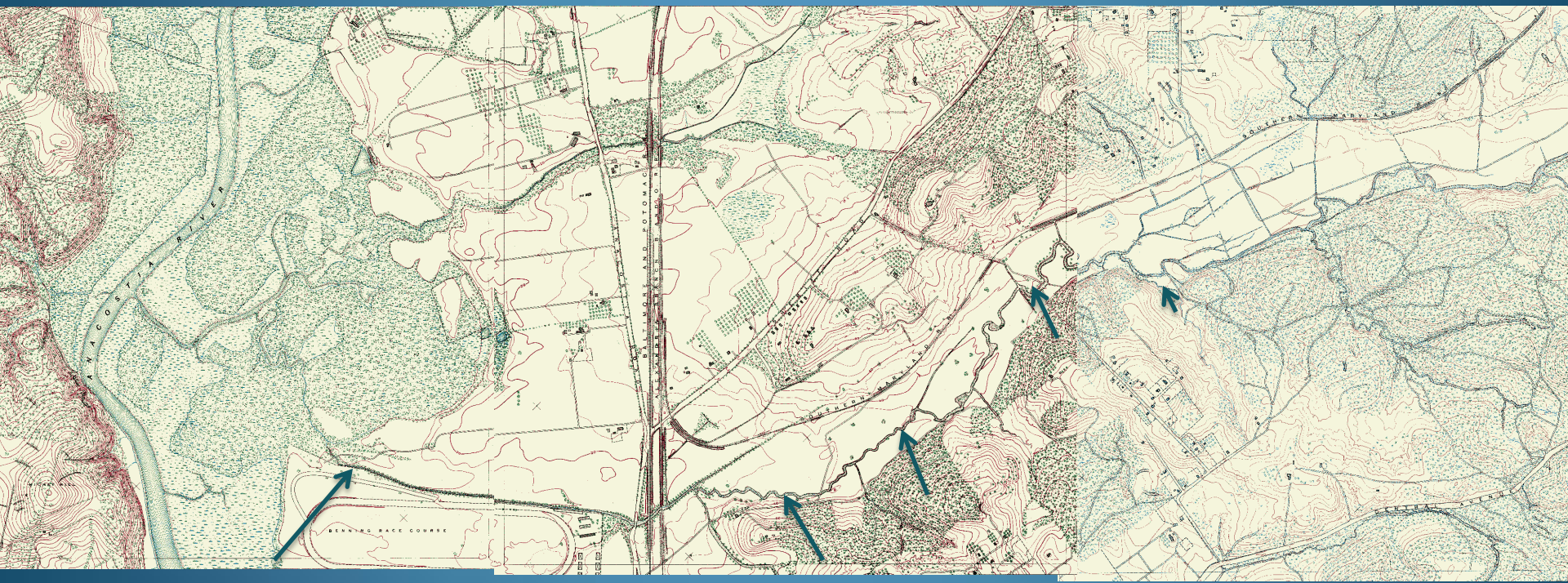
- 12% forest cover
- 29% impervious
- 3.8 sq. mi.

Priority watershed case study: Watts



Watts in 2011




ANACOSTIA RIVER
BENNING RACE COURSE
BALTIMORE AND POTOMAC R.R.
SOUTHERN MARYLAND

	TN reduction (lbs/yr)	TP reduction (lb/yr)	TSS reduction (lb/yr) **2.55lb/lf**	%age of ***TSS TMDL*** goal	TSS reduction **3.58lb/lf ***	%age of **TSS TMDL ***
Stream restoration (20K ln ft)	**400**	**70**	**51,000**	**32.86%**	**71,600**	**46.13%**
Reductions from comprehensive school retrofits (listed in WIP)	**73.5**	**11.68**	**5,328**	**3.43%**		
Reductions realized from additional SW retrofits in (roadways, parking lots listed in WIP)	**134.4**	**18.64**	**10,063**	**6.48%**		
Reductions realized from tree planting	**134.1**	**21.8**	**5,532.1**	**3.56%**		
Reductions realized from RS Homes **(75 RB, 50 RG, 75 ST, 10 PP, 50 BS)**	**21.3**	**3.0**	**850.1**	**0.55%**		
Total reductions from all programs/practices	**763.3**	**111.4**	**72,773 lbs/yr** **(36.39 Tons/yr)**	**46.88%**		**60.15 %**
Reduction needed to meet TMDL	**No TMDL**	**No TMDL**	**155,200 lbs/yr** **77.6 Tons/yr** **(61.2 SR + 16.4 SW)**	**100%**		
Shortfall to meeting TMDL			**82,427lbs/yr** **(41.21 Tons/yr)**	**53.12%**		**39.85 %**

Multiplying efforts: "Leverage" is a great word but WHAT and HOW?

Activities:

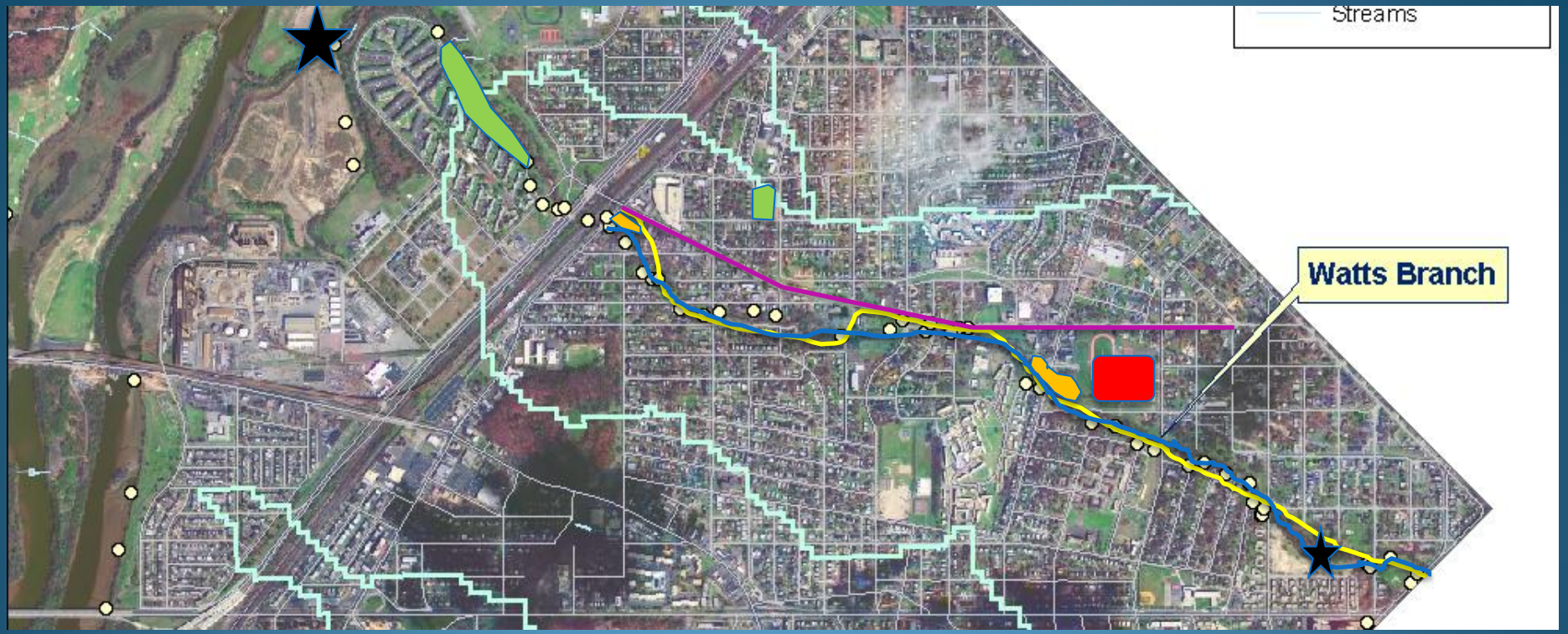
- Restoration opportunities (stream work, SW conveyance structures, canopy enhancement)
- Stormwater opportunities
- Improving public access and usage
- Educating residents and schoolkids
- Identifying trash control actions/programs

Tactics:

- Raise awareness thru planning docs
- Seek funding
- Apply pressure to other agencies
- Engage community and create expectations
- Engage other agencies
- Seek useful partnerships

Creating momentum – directing resources

Example of targeting funding in Watts



Watershed asses and plan

Advocacy group forms (WPP)

Stream design begins

Bike trail

NFWF grant

Bandalong trash trap

Park improvements

ARRA funded LID retrofits

Sewer replacement

Steam rest begins

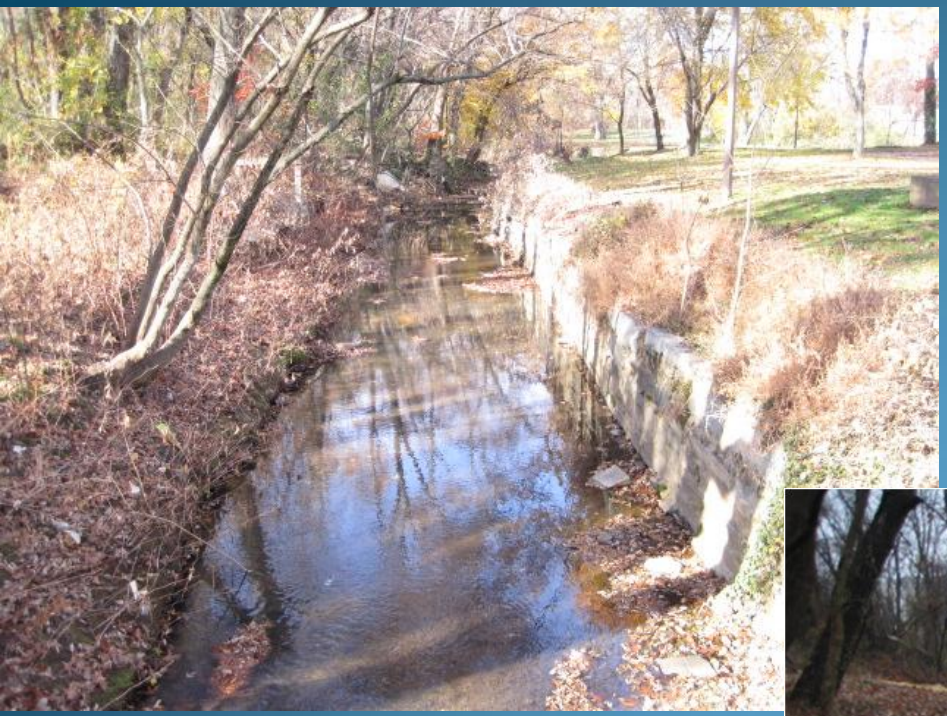
LEED gold HS

2nd trash trap

NHB Green Street

1 M for LID retrofits

2001 2006 2011 2016



Stream prior to restoration

Stream during storm after grading

Monitoring Efforts

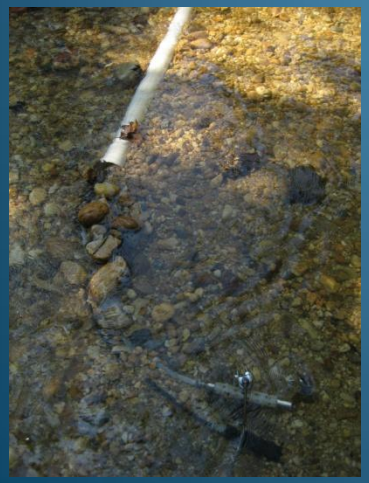
Biological

PRE-implementation (2yr)

-20 jab best habitat survey
-Macro colonization survey
-Modified RSAT III

POST-implementation (3yr)

-20 jab best habitat survey
-Macro colonization suvery
-Modified RSAT III
-Annual 2pass electrofish survey (2 sites)



Chemical (WQ)

PRE-implementation

-ongoing ambient WQ monitoring (15+years)
-16 Storm events with 24 intervals (ISCO unit) with control at Oxon (1 year)

POST-implementation

-Ongoing ambient WQ monitoring
-14-20 stormevents with 24 intervals (ISCO unit) with control at Oxon Run

Geomorpological

PRE-implementation

-As built survey
-Erosion assessment by USFWS

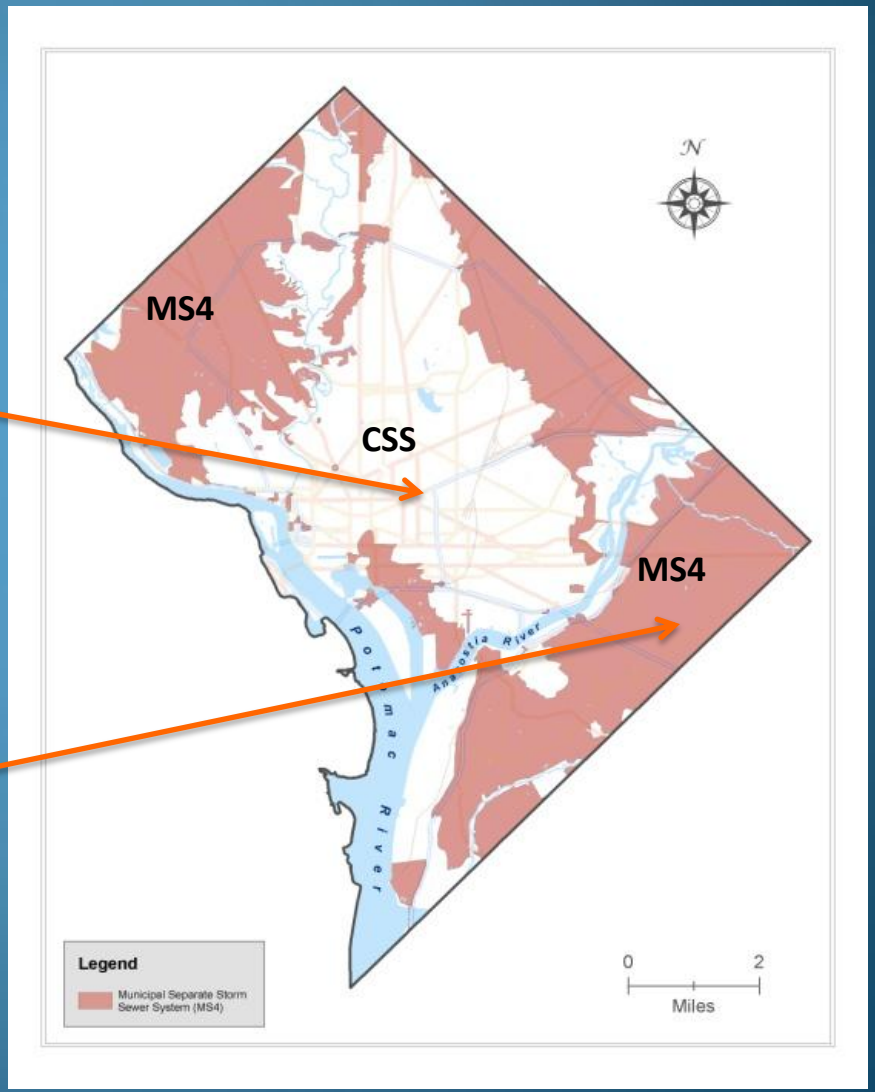
POST-implementation

-Photo-documentation
- Limited surveying

Stormwater controls and development trends in DC

Redeveloping rapidly

Developed prior to the existence of SW regs – developing less rapidly



Long term SW strategy: Scale of Development

- Total area subject to District SWM Regulations annually.

10 x

- Total area retrofitted with retention via DDOE incentives, subsidies, etc. annually.

- Annual regulated area is only about 1% of the District.
- Most sites have little retention & no plan to retrofit.
- SRC Trading potential to create SW retrofit market.

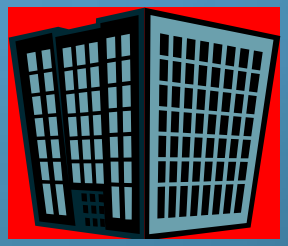
Stormwater retention trading system

- Scenario A: On-Site Retention Only

1.2” retention on site 1

- Scenario B: Mix of On-Site & Off-Site Retention

0.75” retention on site 1



0.45” retention on site 2

Comparing Stormwater Retention

- A:

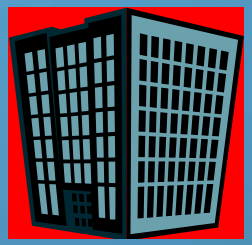
1.2” retention on site 1

Single 1.2” Storm Retention = 7,739 gal.

Annual Retention (’09 rain data) = 280,280 gal.

- B:

0.75” retention on site 1



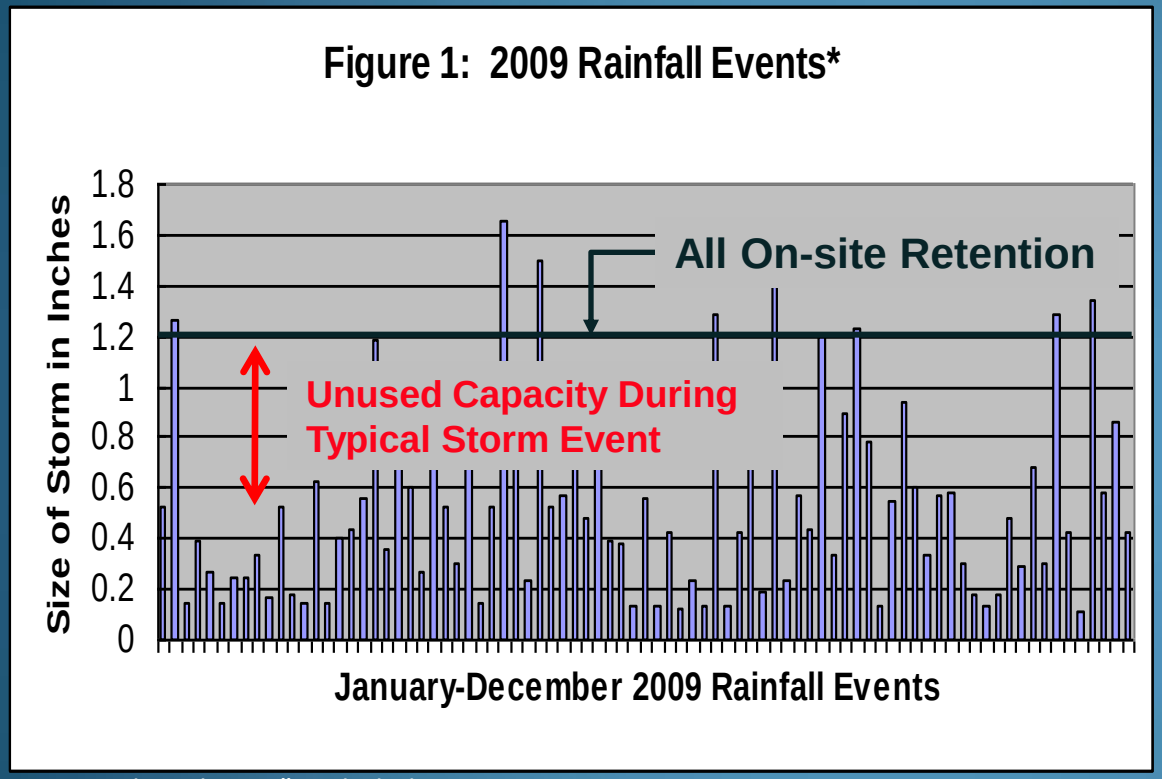
0.45” retention on site 2

Single 1.2” Storm Retention = 7,739 gal.

Annual Retention (’09 rain data) = 428,675 gal.

+53%

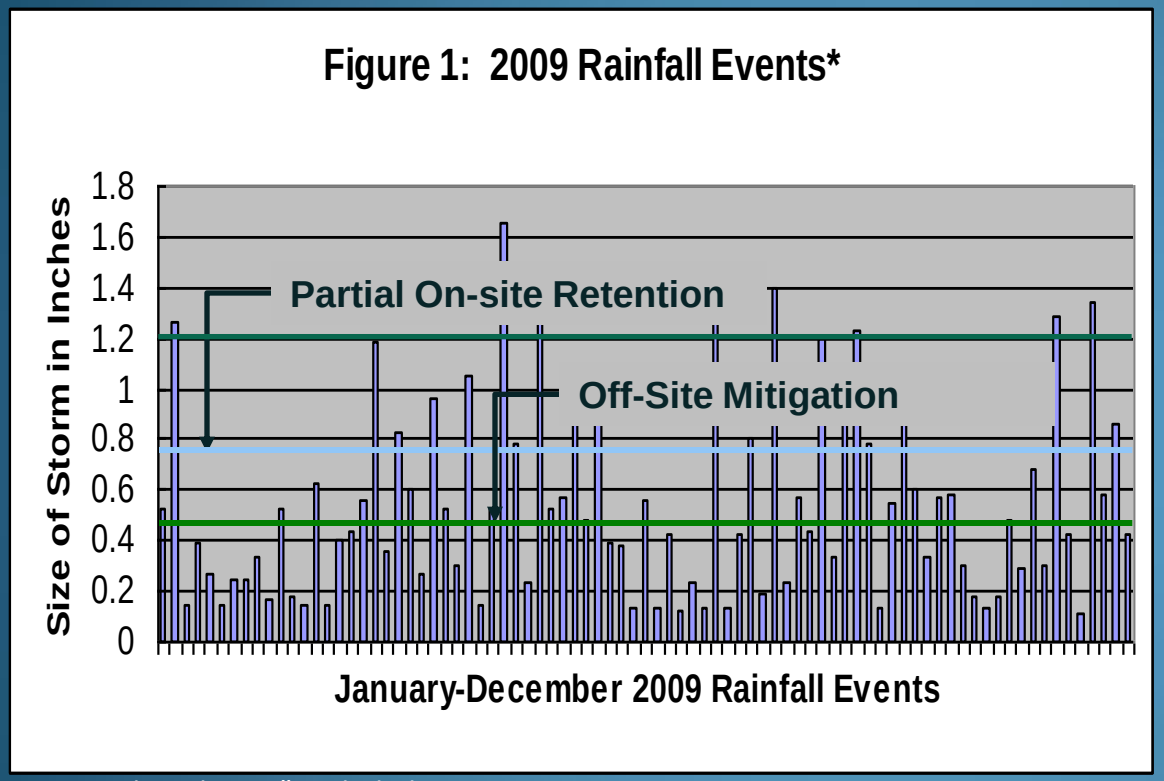
Why is annual retention greater under Scenario B?



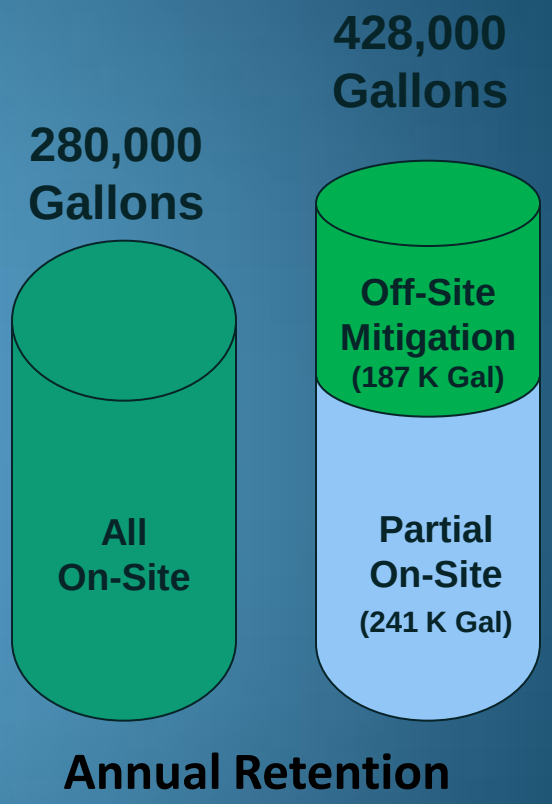
events less than .1" excluded.

Because many of the storms in a year are less than 1.2”

Why is annual retention greater under Scenario B?

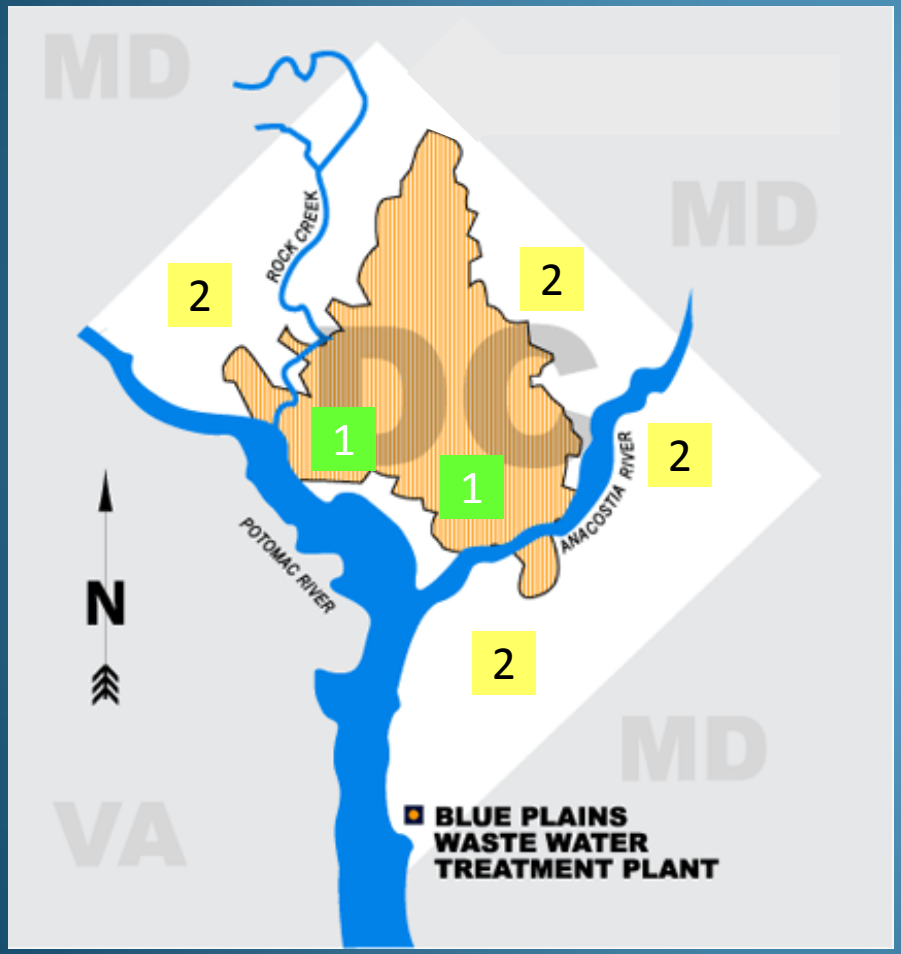


events less than .1" excluded.



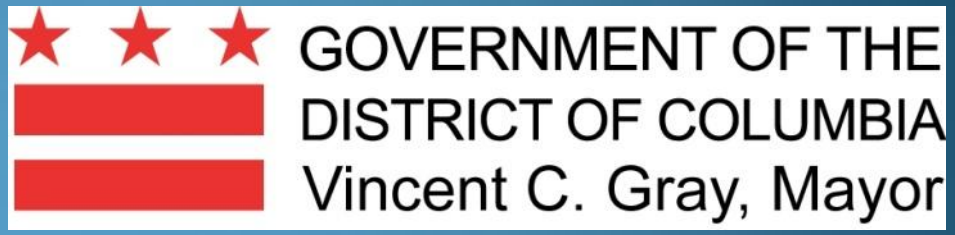
Smaller SMPs on two sites use their full retention capacity more frequently, providing greater annual retention.

Stormwater Retention Trading: Win-Win

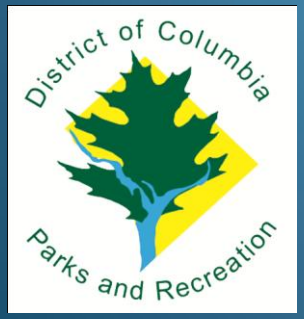


- Increase the annual stormwater retention District-wide
- Creating market for stormwater retrofits at sites with little or no retention and no plans to redevelop
- Greater flexibility for development.

Funding agencies: Stream restoration



Partnering agencies




Questions?
Peter.hill@dc.gov
202-535-2241