



# Stream Restoration: Program and Permitting Considerations

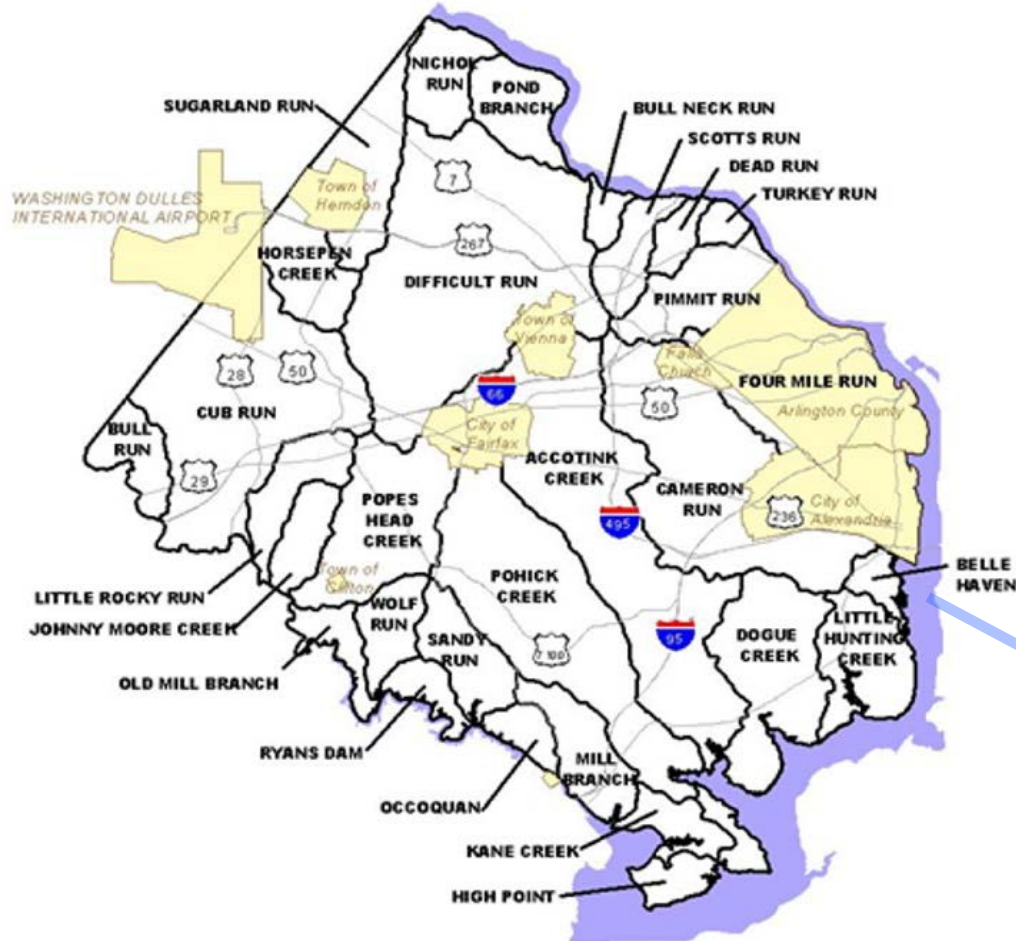


Matt Meyers, Chief  
Watershed Project Implementation Branch  
Department of Public Works and Environmental  
Services

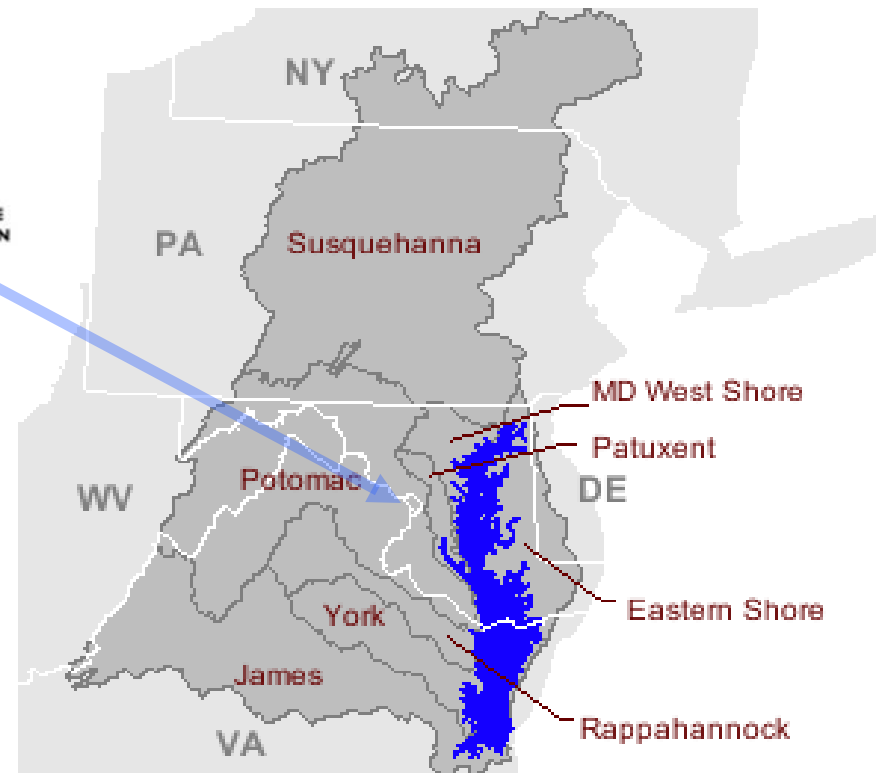
Stormwater Management

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## Chesapeake Bay Watershed



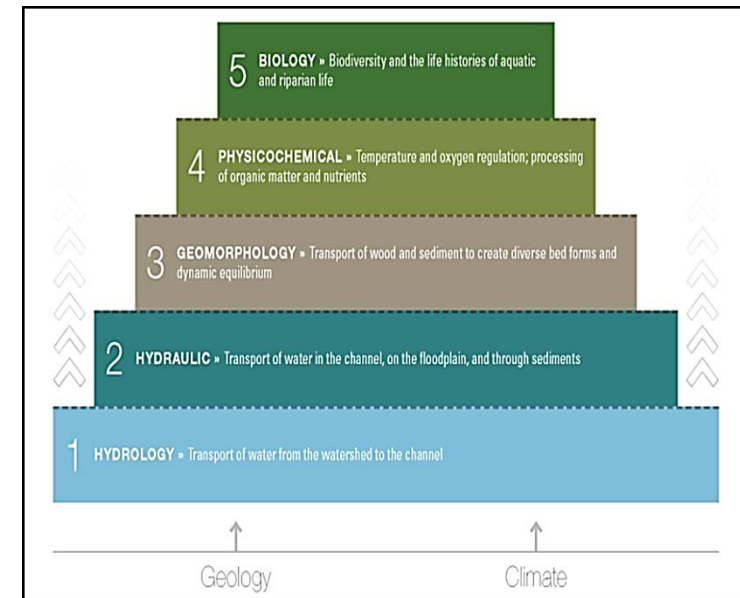
Size: 395 sq. miles

Population: 1.1 million

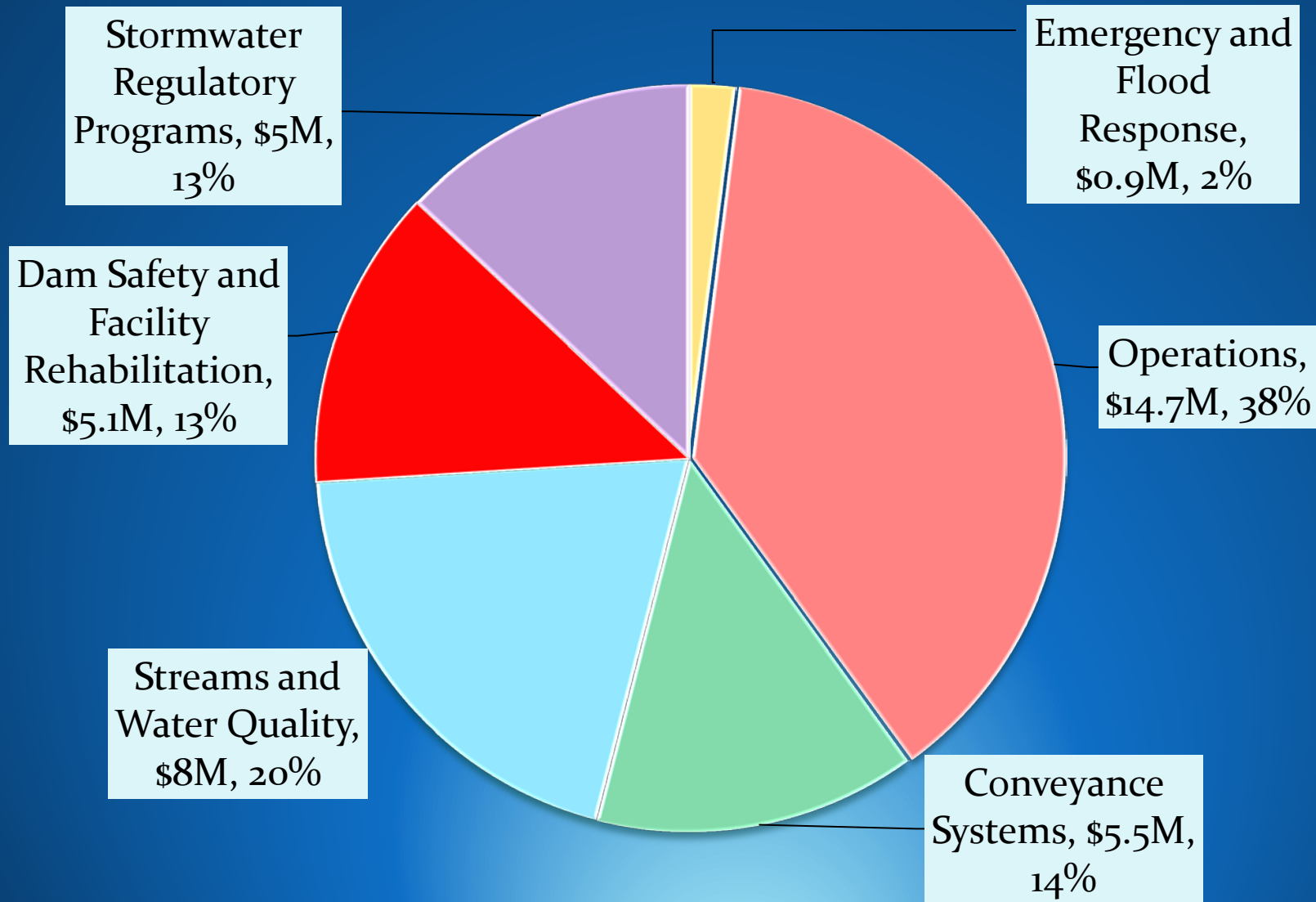
MS4 - Phase 1 Community

# Stream Restoration Management Considerations

- Watershed-based Approach
- MS4 vs. Stream
- Local vs. Chesapeake Bay Benefits
- Design Techniques
- Cost Effectiveness
- Monitoring and Maintenance



# Stormwater FY13 Budget





- 72 Impaired Waters (2010)

- 52 Streams
- 3 Reservoirs
- 17 Tidal Embayments

- 10 TMDLs to Date

- 6 Bacteria
- 3 Sediment
- 1 PCB



## USACE Norfolk District & Virginia DEQ

- NWP 27 - Aquatic Habitat Restoration, Establishment, and Enhancement Activities
- NWP 3 – Maintenance
- NWP 13 – Bank Stabilization
  - 500 feet along the bank
  - 1 cubic yard per running foot

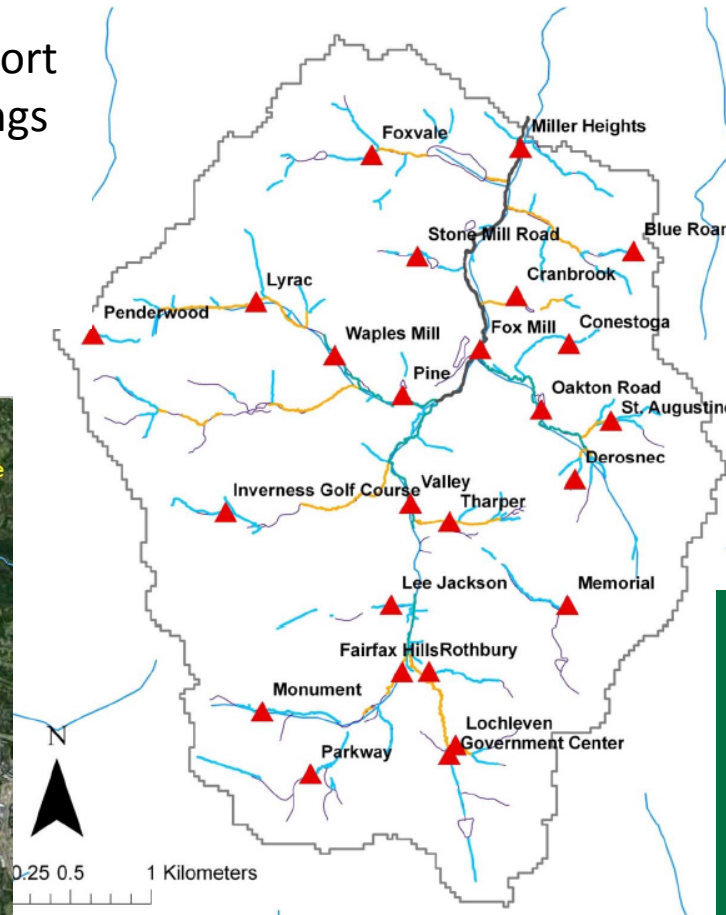
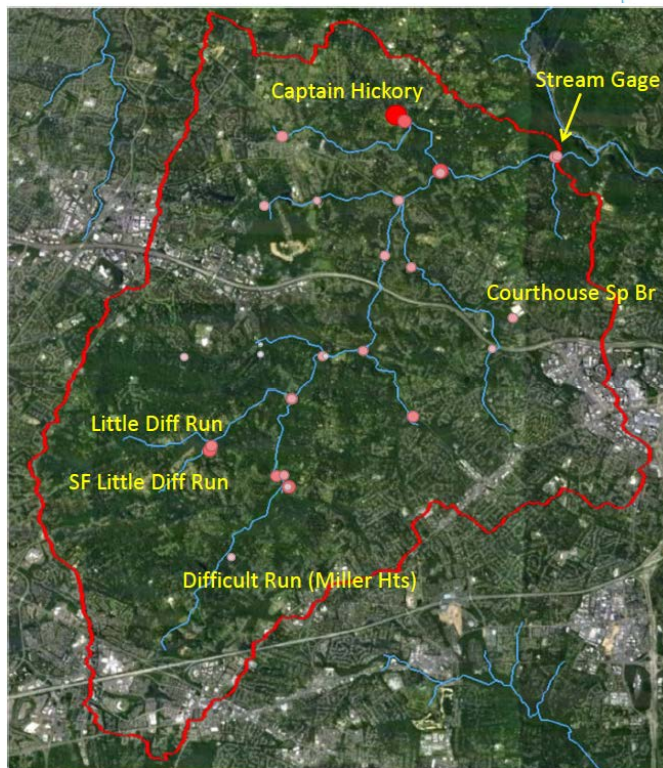
- MS4 Outfall improvement
  - Approximately 7,000 outfalls
  - Regenerative stormwater conveyance system
  - Approve standard alternatives
- Headwater vs. Higher Order Streams
  - Focus on 1, 2, and 3 order streams
  - Drainage area less than 1 square mile
  - Challenges with higher order streams

- Design Challenges
  - Restoration techniques
  - Priority 1 to 4
  - Channel sizing
- Design Support
  - MBRT vs NWP Reviewer
  - Pier review process
  - Regional data



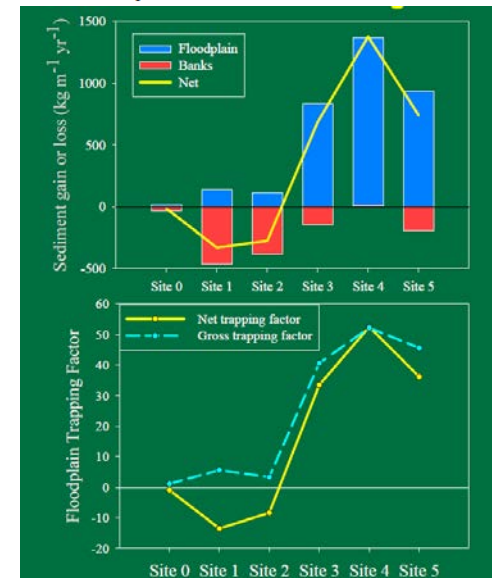
# USGS Studies

- Sediment sources and transport
- Sediment and nutrient loadings
- Management strategies
- Restoration potential and effectiveness



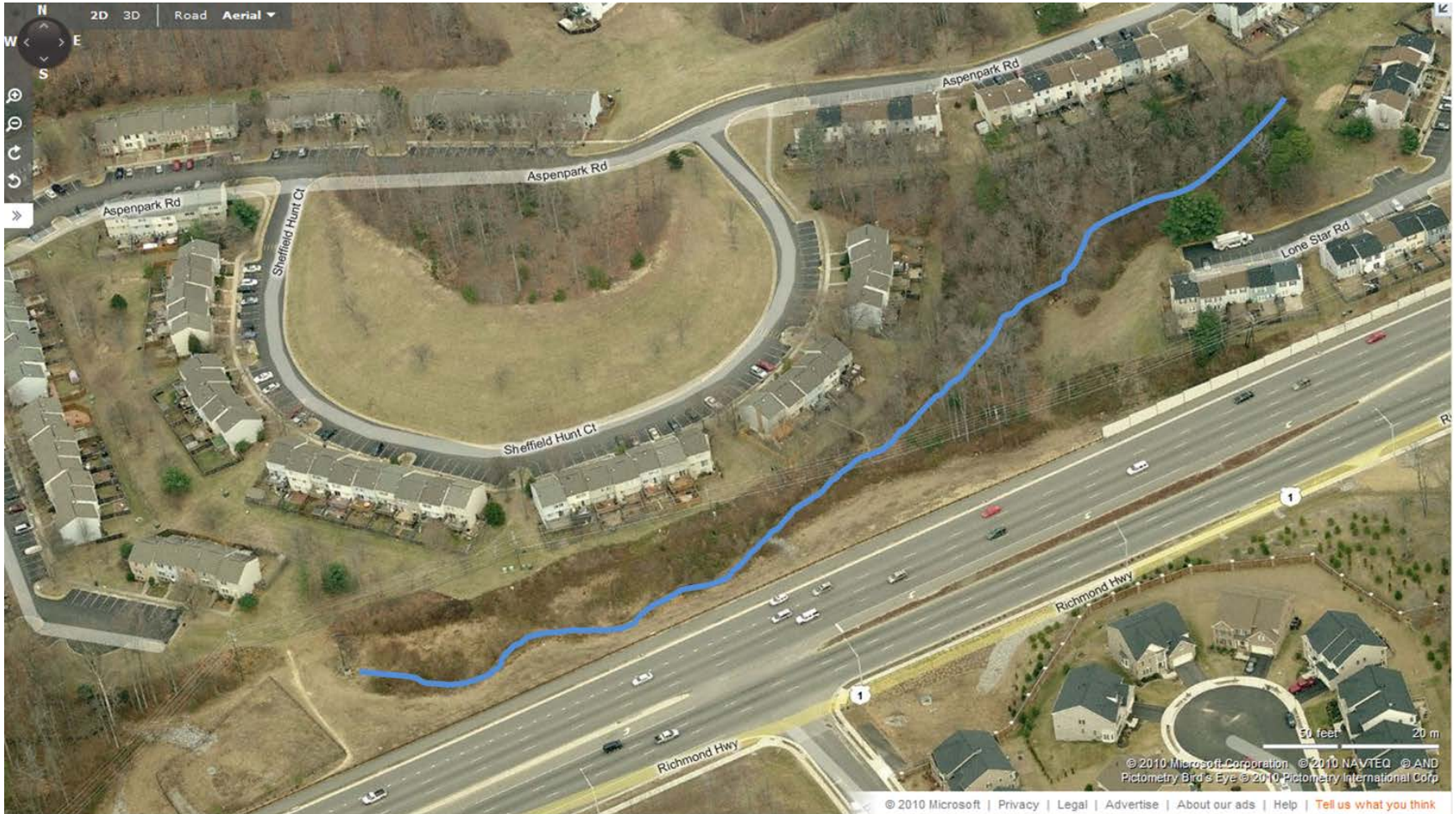
38 Reaches to document channel change  
-Each reach 2- 4 cross sections

- 482 pins to quantify bank erosion, bar deposition





# Pohick Creek Tributary



- ☒ Protocol 1: Preventing Sediment
- ☐ Protocol 2: Hyporheic Zone

- ☐ Protocol 3: Floodplain reconnection
- ☐ Protocol 4: Dry channel RSC



# Pohick Creek Tributary





# Pohick Creek Tributary

**Sanitary Sewer**



**Before: Exposed sanitary sewer line and highly eroded channel.**

**Approximate location of Sanitary Sewer**



**After: Before trees and shrubs were planted**



# Pohick Creek Tributary



First Spring – June 2013



# Dead Run



## Project Overview:

Approximately 1,400 liner feet of Dead Run stream that runs through McLean Central Park was stabilized with various practices including encapsulated soil lifts, toe protection, stone vanes, compost berms, and fiber log rolls. The stormwater outfall from Dolley Madison library was restored to include a sand filter step-pool system and wetland feature. The entire site was re-vegetated with extensive native plantings of trees, shrubs, grasses and wildflowers. This restoration will substantially mitigate bank erosion and improve water quality.

- ☒ Protocol 1: Preventing Sediment
- ☐ Protocol 2: Hyporheic Zone

- ☒ Protocol 3: Floodplain reconnection
- ☒ Protocol 4: Dry channel RSC



# Dead Run





# Stream Restoration

## Poplar Springs - Before & After



Drainage Area (acres)	Phosphorous Removal (lbs/yr)	Nitrogen Removal (lbs/yr)	Sediment Removal (tons/yr)
230.4	7.5	141	1.25



# Stream Restoration

Poplar Springs - Now





# Stream Restoration

Government Center - Before & After



Drainage Area (acres)	Phosphorous Removal (lbs/yr)	Nitrogen Removal (lbs/yr)	Sediment Removal (tons/yr)
150	10.7	202	1.6



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