

# Pohick Creek Watershed Management Plan

Watershed Advisory Group Meeting #2:  
March 4, 2009

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**Fairfax County Department of Public Works  
and Environmental Services**

Presented by Watershed Planning & Assessment Branch,  
Stormwater Management



A close-up photograph of a dense field of blue and purple flowers, likely Salpiglossis, with vibrant green foliage. The flowers are bell-shaped and hang from thin stems. The background is filled with more of the same plants, creating a lush, textured appearance.

# Welcome and Meeting Agenda

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**Beth Offenbacher, Waterford, Inc.**

# Welcome and Meeting Agenda

1. **Welcome and Overview** (7-7:15 pm) – Beth Offenbacher, Waterford, Inc.
2. **Presentation of Countywide Goals and Objectives for Watershed Plan** (7:15-7:30 pm) –Shannon Curtis, Fairfax County
3. **Questions:** Are there any questions about the goals and objectives? (7:30-7:45pm)
4. **Problem Areas Identified by Subwatershed Characterization and Ranking** (7:45-8:00 pm) – Trish Hennessy-Webb, PBS&J
5. **Break & Discussion** (8:00 -8:10pm) – Members may further familiarize themselves with subwatershed ranking maps
6. **Watershed Restoration Strategies: Problem Areas and Possible Solutions** (8:10-8:30 pm) – Trish Hennessy-Webb, PBS&J
7. **Questions:** Are there any questions about the restoration strategies and/or types of solutions presented? (8:30-8:55 pm)
8. **Next Steps** (8:55-9 pm) – Trish Hennessy-Webb, PBS&J
9. **Meeting Adjournment** (9pm)

# Group Expectations

- Show your respect for group members by listening and taking everyone's ideas seriously.
- Expect, respect, and accept different interests, perspectives, and opinions.
- Participate actively-share all relevant information, ideas, and concerns.
- Keep the discussion focused on the task or issue at hand. You can help keep the discussion focused by only one person talking at a time, and avoiding side conversations and interruptions.
- Be fully present, turn off or put on vibrate your cell phones, Blackberries, and WiFi, and do not multi-task.

A close-up photograph of a dense field of blue and purple flowers, likely Virginia Bluebells, with vibrant green foliage. The flowers are bell-shaped and hang from thin stems. The background is filled with more of the same plants, creating a lush, textured appearance.

# Countywide Goals and Objectives

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**Shannon Curtis, Fairfax County**

# Goals and Objectives

- Developed to improve efficiency of the Watershed Management Planning Process
- Promote consistency in the watershed plans that are to be developed by the county's various consultants.
- Allow for a countywide evaluation that addresses stakeholder concerns while providing an efficient and effective means of assessment.

# Terminology

- **Goals**- a general statement about the desired outcome of a watershed management strategy
- **Objectives**- more specific statements that define how the goals are accomplished
  - cannot be directly measured, so indicators that are directly linked to the objectives are needed
- **Indicators** –yardsticks for measuring how well the objectives are met (environmental conditions)
  - a quantifiable endpoint to measure the watershed conditions

# The First Round

## Initial set of six Watershed Management Plans

- Each plan had own goals and objectives
  - Developed independently, non-standard format, no indicators
- Issues from this approach
  - Implementation, tracking, inconsistency
  - Time Consuming Public Process
    - Less time devoted to project selection and evaluation

# Lesson Learned

- The county needed consistent goals and objectives to develop a systematic approach for countywide watershed management

# The Second Round

## The final seven Watershed Management Plans

- Overarching goals and objectives
  - Consolidated from all first round plans
- Solutions for a range of problems
  - Implementation, tracking, inconsistency issues
- Streamlined Public Process
  - More time devoted to project selection and evaluation

# Goals and Objectives

- **Countywide watershed planning goals**
  1. Improve and maintain watershed functions in Fairfax County, including water quality, habitat, and hydrology.
  2. Protect human health, safety, and property by reducing stormwater impacts.
  3. Involve stakeholders in the protection, maintenance and restoration of county watersheds.
- **Watershed Planning Objective Categories\***
  1. Hydrology
  2. Habitat
  3. Stream Water Quality
  4. Drinking Water Quality
  5. Stewardship

\*each category has one or more specific objectives associated with it

# Objectives

Objective	Linked to Goal(s)
<b>CATEGORY 1. HYDROLOGY</b>	
1A. Minimize impacts of stormwater runoff on stream hydrology to promote stable stream morphology, protect habitat, and support biota.	1
1B. Minimize flooding to protect property, human health, and safety.	2
<b>CATEGORY 2. HABITAT</b>	
2A. Provide for healthy habitat through protecting, restoring, and maintaining riparian buffers, wetlands, and instream habitat.	1
2B. Improve and maintain diversity of native plants and animals in the county.	1
<b>CATEGORY 3. STREAM WATER QUALITY</b>	
3A. Minimize impacts to stream water quality from pollutants in stormwater runoff.	1, 2
<b>CATEGORY 4. DRINKING WATER QUALITY</b>	
4A. Minimize impacts to drinking water sources from pathogens, nutrients, and toxics in stormwater runoff.	2
4B. Minimize impacts to drinking water storage capacity from sediment in stormwater runoff.	2
<b>CATEGORY 5 STEWARDSHIP</b>	
5A. Encourage the public to participate in watershed stewardship.	3
5B. Coordinate with regional jurisdictions on watershed management and restoration efforts such as Chesapeake Bay initiatives.	3
5C. Improve watershed aesthetics in Fairfax County.	1, 3



# Indicators

## Watershed Impact Indicators

Benthic Communities

Road Hazards

Fish Communities

Building Hazards

Aquatic Habitat

Flood Complaints

Channel Morphology

In-stream Sediment

Hydrology

Nitrogen Loading

Phosphorous Loading

Headwater Riparian Habitat

Wetland Habitat

Sediment Loading

## Source Indicators

Channelized/Piped Streams

Stream Buffer Deficiency

Impervious Area

Nutrient Loading

Stormwater Outfalls

Sediment Loading

Parcels served by septic

Urban Land Cover

Population density

VPDES Point Sources

Erosion and Sediment  
permits

Sanitary Sewer Crossings

Other Hot Spots

# How does it work?

- **Goal**- Improve and maintain watershed functions in Fairfax County, including water quality, habitat and hydrology
  - **Objective**- Minimize impacts to stream water quality from pollutants in STW runoff
    - **Indicators**- Fish Community Rating, Nutrient Loads, Habitat Quality, Sediment, etc.



# Expectations

- Extensive work was done in developing goals and objectives during 1<sup>st</sup> Round
- We are open to new ideas on watershed specific goals & objectives not yet considered
- WAG time is to be primarily devoted to assisting with project identification and selection
- WAG members are encouraged to help generate community support for the plan

A close-up photograph of a dense field of blue and purple flowers, likely Salpiglossis, with vibrant green foliage. The flowers are bell-shaped and hang from thin stems. The background is filled with more of the same plants, creating a lush, textured appearance.

## Questions on Goals & Objectives

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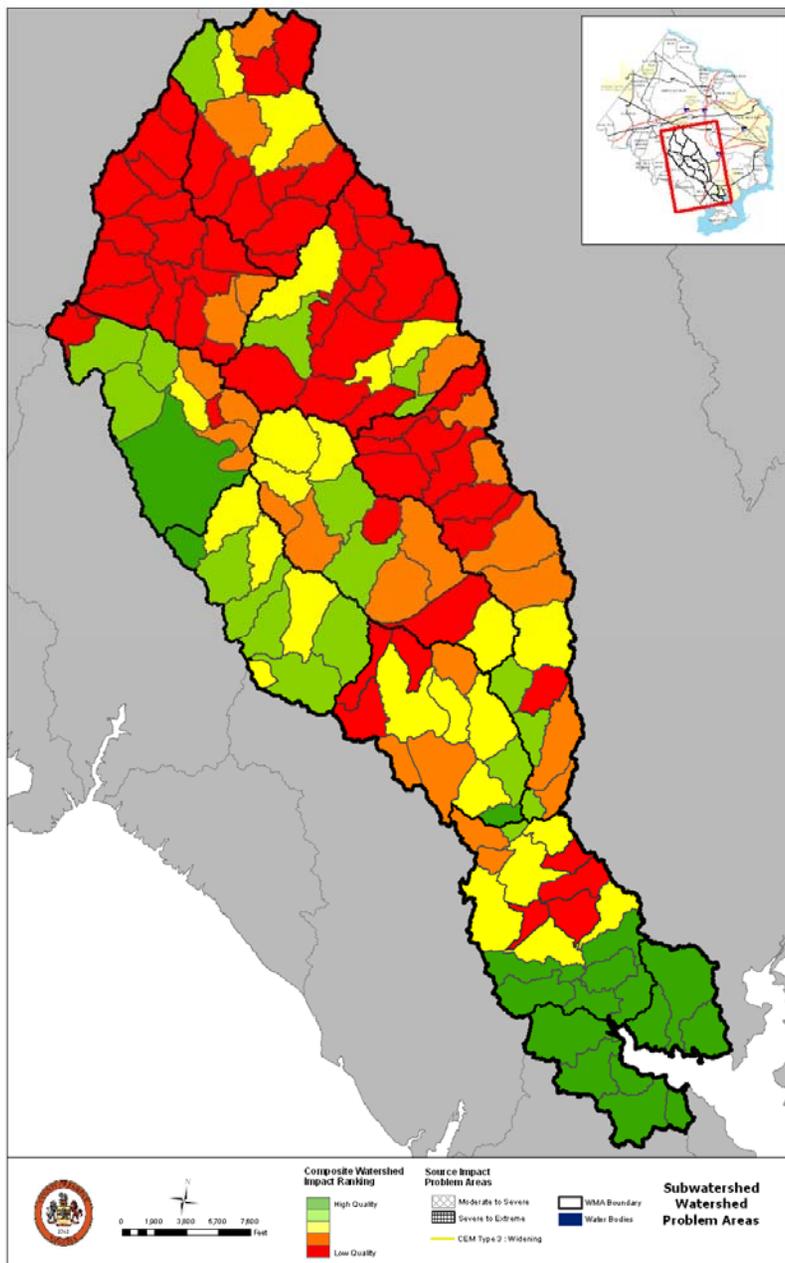
**Beth Offenbacher, Waterford, Inc.**

A close-up photograph of a dense field of blue and purple flowers, likely Virginia bluebells, with vibrant green foliage. The flowers are in various stages of bloom, and the background is a soft-focus expanse of similar plants.

# Pohick Creek Watershed Problem Areas Subwatershed Characterization and Ranking

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**Trish Hennessy-Webb, PBS&J**



# Results of Subwatershed Watershed Characterization

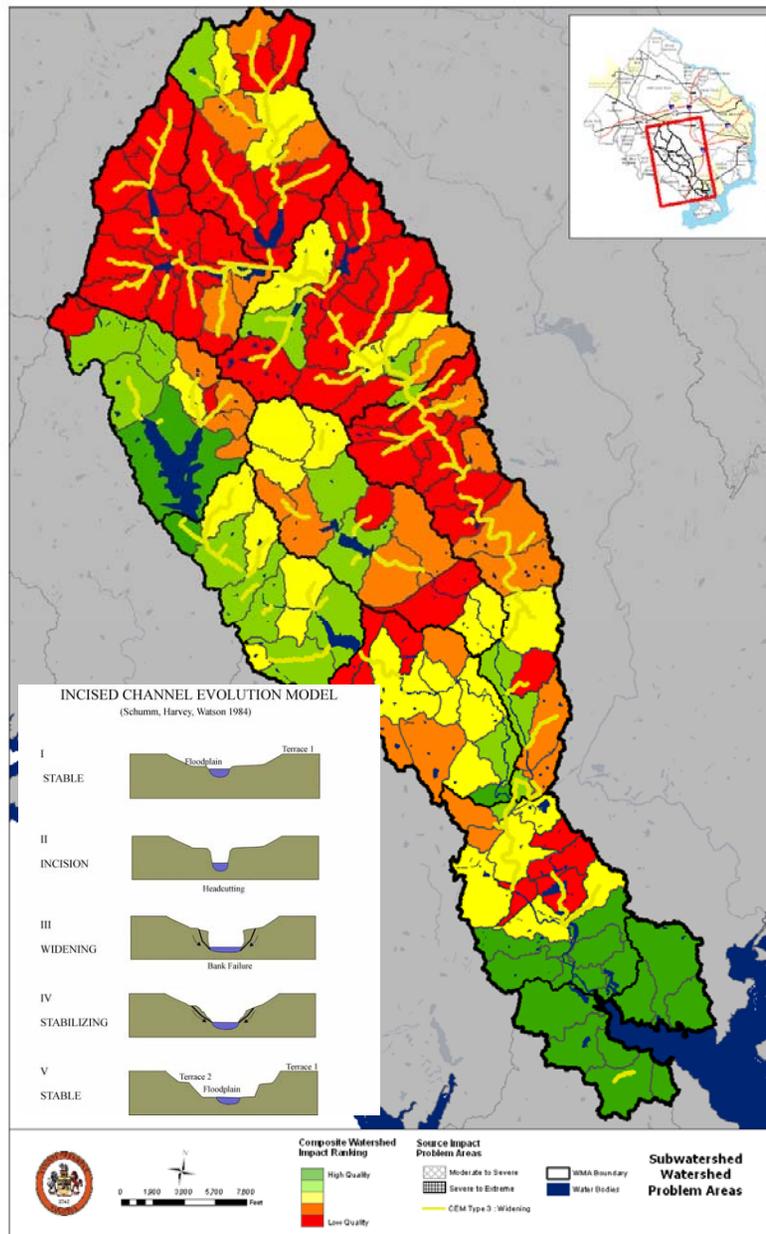
## Composite Watershed Impact Score

- Environmental Conditions of the watershed
  - Water Quality
  - Habitat Health
  - Pollutant Loads



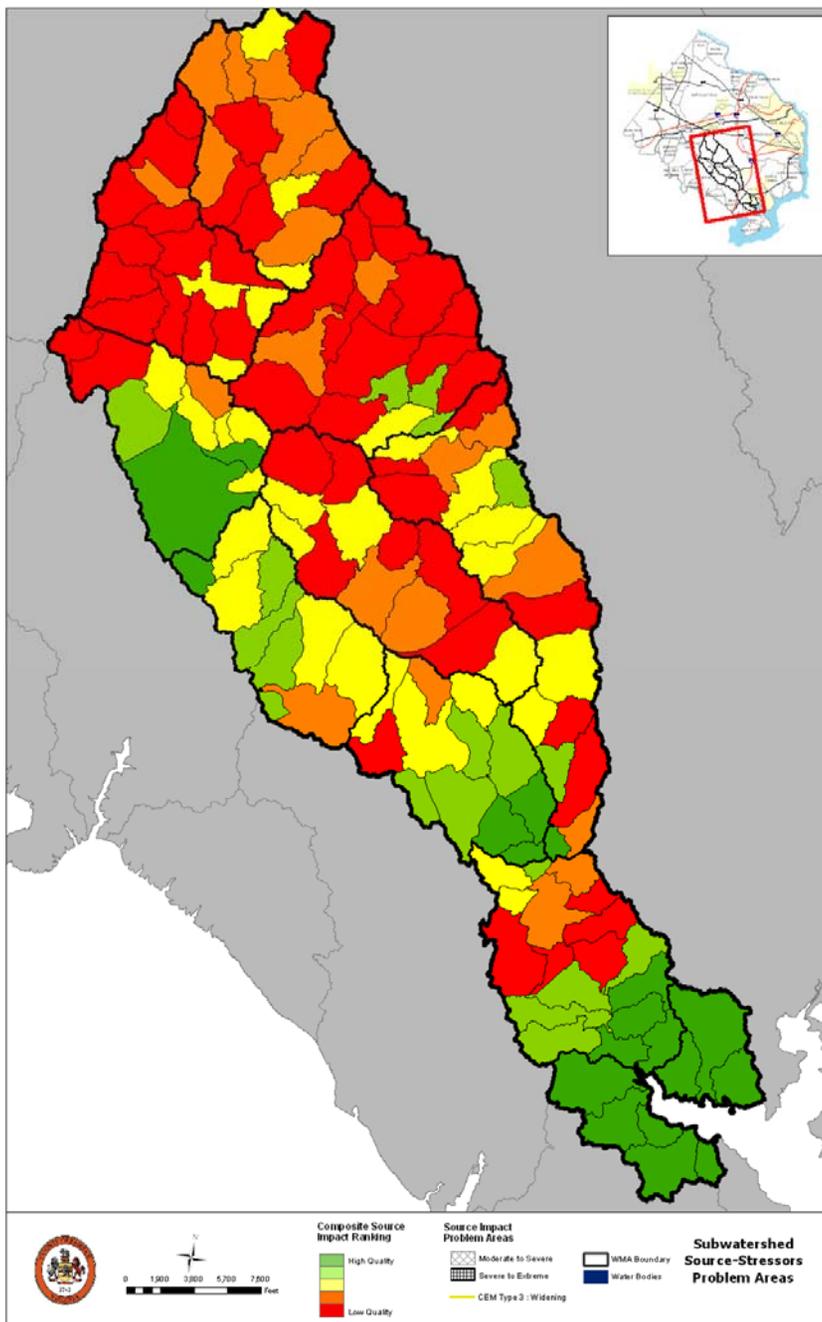
# Results of Subwatershed Watershed Characterization

- WMAs ranking...
  - Rabbit Branch
  - Sideburn Branch
  - Middle Run
  - Upper
  - Middle
  - Lower
- Tributaries
  - Rabbit Branch
  - Sideburn Branch
  - Pohick Creek



*CEM 3- heavy erosion begins to widen the channel bottom until stream bank failure occurs*



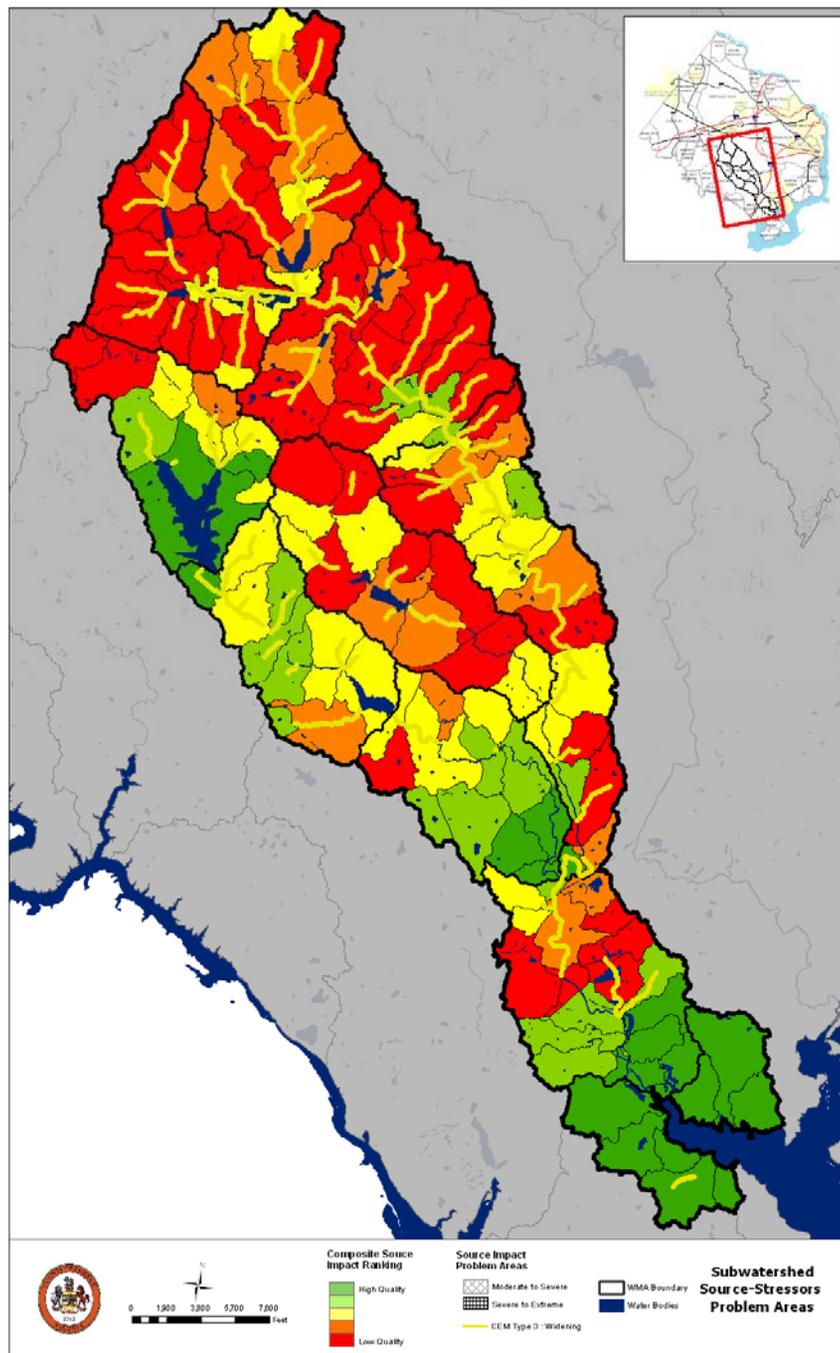


# Results of Subwatershed Source Characterization

## Composite Source Indicators

- Source indicators assist in the evaluation of the sources and stressors that impact these watershed endpoints.
  - Impervious Area
  - Channelized/ piped streams
  - Pollutant loads





# Results of Subwatershed Source Characterization

## WMAs

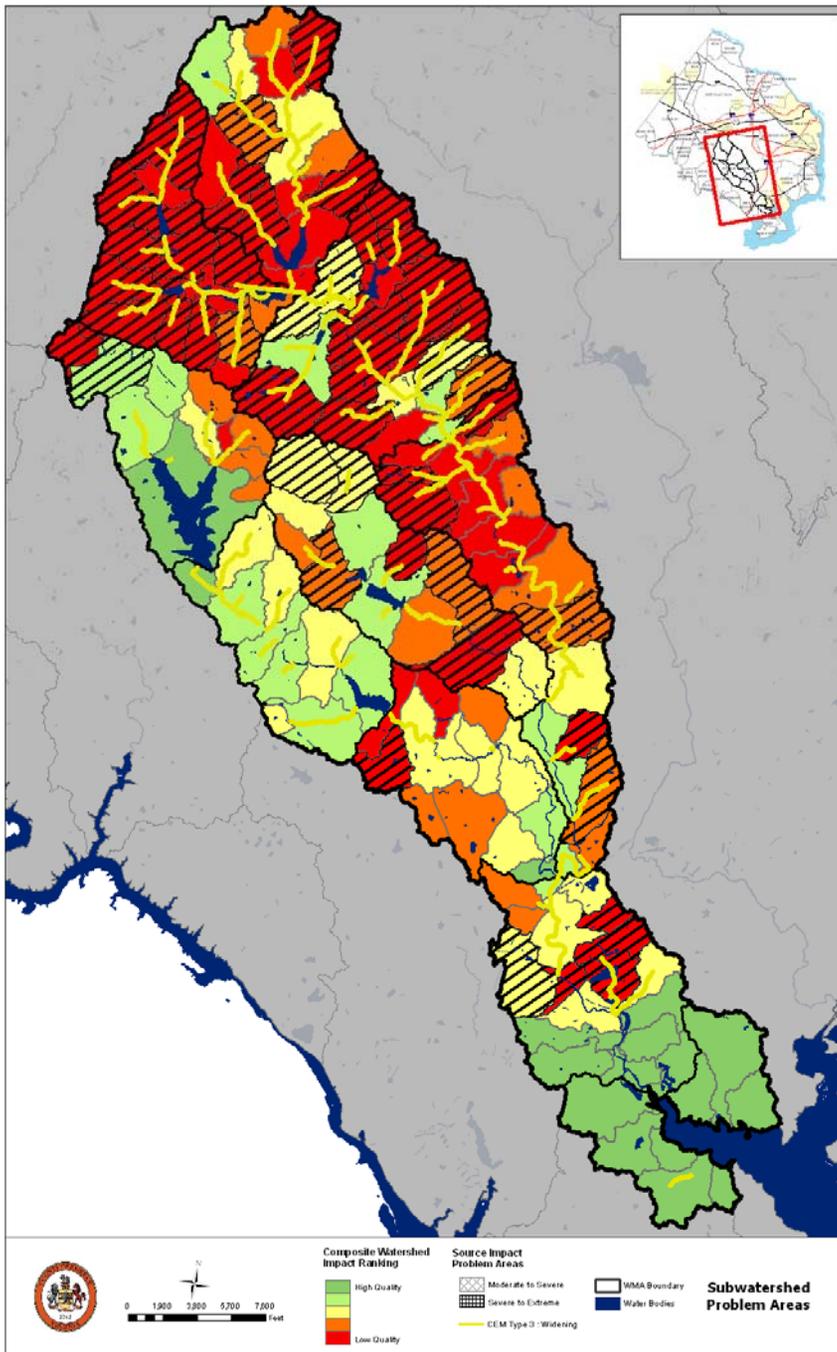
- Rabbit Branch
  - Sideburn Branch
  - Middle Run
  - Upper
  - Middle
  - Lower
- Tributaries-CEM 3
    - Rabbit Branch
    - Sideburn Branch
    - Pohick Creek





## Results of Subwatershed Characterization

- Based on Subwatershed Rankings ID Problem Areas
- Overlay the watershed Impact Indicators
  - Ranking each subwatershed from 1-139 based on indicator data
- Overlay the source impact indicators
  - Rank each subwatershed from 1-139 based on indicator data
- Focus on areas of concern to highlight



## Results of all Indicators

Hatched area highlights top third areas of concern reflecting ALL the indicators



# Restoration Approach

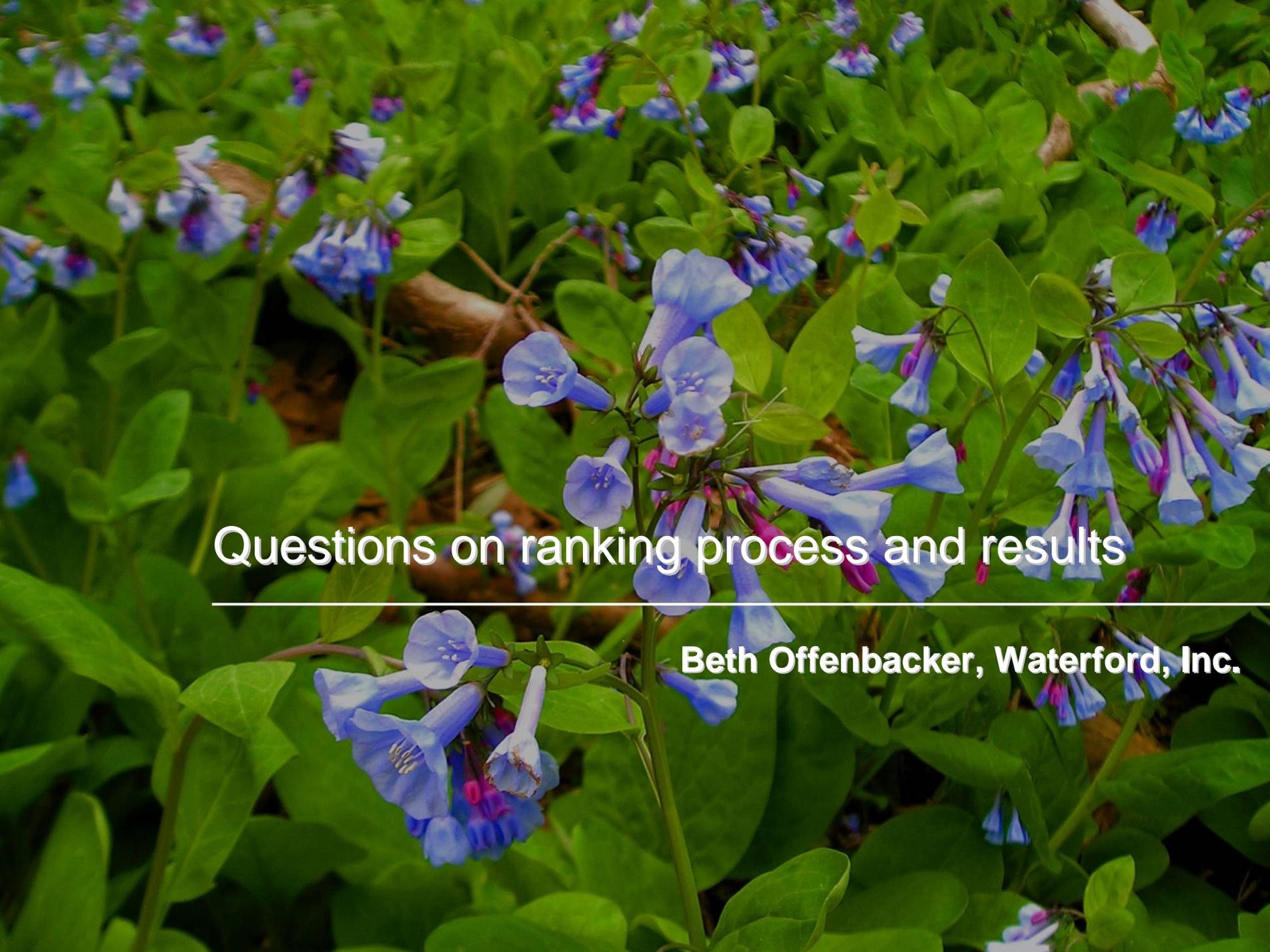
- Not feasible to implement restoration efforts on every location in an older urbanized watershed
- Develop a method for selecting candidate sites based on subwatershed ranking data
- Overall watershed conditions balanced with goals & resources
  - Improve “severe areas” conditions
    - Focus on areas of extreme degradation
  - Repair “moderate areas” condition
    - Change eroding banks, or inadequate forest buffer
  - Prevention “good areas” condition
    - Keep something “bad” from happening i.e. flood damage or pollution runoff

# Restoration Approach

Additional things to consider:

Candidate locations from big to small:

- Subwatershed: conditions over a drainage area
  - i.e. imperviousness or pollutant loading
- Tributary: condition of a length of stream
  - i.e. erosion, habitat, or buffer
- Site: conditions that can be located to a single spot
  - i.e. culvert, dumpsite, or streambank erosion point.

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## Questions on ranking process and results

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# Restoration Strategies & Project Type

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**Trish Hennessy-Webb, PBS&J**

# Restoration Strategies

- Stream Restoration and improving habitat quality
- Address flooding issues
- Improve Water Quality
- Regional Pond Alternatives

# Restoration Strategies-Streams

## 1. Stream Restoration:

- County Goal #1: Improve and maintain watershed functions in Fairfax County, including water quality, habitat and hydrology
- 1A.-Objective Hydrology: Minimize impacts of stormwater runoff on stream hydrology to promote stable stream morphology, protect habitat, and support biota

# Stream Restoration Approach

- Stream Restoration candidate sites identified from:
  - Stream Physical Assessment data
  - Field Reconnaissance
  - Multiple impairments
    - Poor Habitat Rating
    - Channel Morphology (CEM)
    - Stream Erosion
    - Minimal or No Riparian Buffer

# Streams Project Types

- Candidate Project Types:
  - Stream Restoration
    - New stream alignment
    - Re-alignment of existing channel
    - Stream stabilization
    - Bank stabilization
    - Buffer restoration



# Restoration Strategies- Flooding

- Flooding sites at road crossings:
  - County Goal #2 : Protect human health, safety and property by reducing stormwater impacts.
  - 1B Objective Hydrology: Minimize flooding to protect property and human health and safety.

# Flooding Approach

- Flooding Restoration candidate sites identified from:
  - Hydraulic Modeling
  - Field Reconnaissance
    - Neighborhood Source Assessment
    - Hot Spots
  - Impervious Surface coverage
  - Drainage Complaints

# Flooding Project Types

## Candidate Project Types: Road Crossings Culvert Retrofits

Projects designed to  
reduce the frequency of  
flooding of culverts and  
bridges

- Raising the roadbed
- Rebuilding culvert
- Replacing damaged culverts
- Rebuilding bridges to carry larger flows



# Restoration Strategies- Water Quality

- Water Quality Restoration Strategies focusing on:
  - Improving Water Quality:
    - County Goal #1: Improve and maintain watershed functions in Fairfax County, including water quality, habitat and hydrology
    - County Goal #2 : Protect human health, safety and property by reducing stormwater impacts.
    - 3A Objective Stream WQ: Minimize impacts to stream water quality from pollutants in stormwater runoff.

# Water Quality Approach

- Water Quality candidate sites identified from:
  - Pollutant load modeling
  - Field Reconnaissance
  - Biological Indicators
    - Fish Sampling data
    - Macroinvertebrate data
  - Water Quality data
  - Impaired waters listing
  - Impervious Surface coverage

# Water Quality Project Types

- **Structural**
  - Retrofits
    - Rehabilitation of existing SWM to enhance the water quantity/quality treatment, natural habitat and aesthetics
    - Use of shallow wetlands, increase groundwater infiltration
  - Source Controls
    - New Ponds
    - *Regional Pond Alternatives*
  - Low Impact Development (LID)
    - Bio-retention basin (rain garden)
    - Green Roof
    - Permeable pavers
    - Grassy swales

# Structural Retrofits Projects

- Conversion of existing STW management facilities to improve water quantity and quality controls
- New structures including ponds, wetlands, culvert retrofits, and outfall treatments



# Structural: LID Projects



Green  
Rooftops



Filterra Box



Parking lot biofilter



Rain  
Barrel



Downspout filtration



Porous pavers

# Water Quality Projects Types

- **Non-Structural:**
  - Planting/restoring stream buffers (riparian vegetation)
  - Public Education
    - Individuals: lawn care fertilizing, car washing
    - Residents: rainwater harvesting and low impact activities
    - Business: turf management practices for golf courses
  - Street Sweeping
    - Trash Removal
  - Recommend activities for non-profit & community groups
    - “Friends of” groups
    - Litter pick ups, buffer plantings, storm drain stenciling, etc..
  - Reduce and disconnect impervious surfaces

# Non-structural Projects



# Non-structural Projects



# Restoration Strategies – Regional Pond Alternative

- Restoration Strategies focusing on:
  - Regional Pond Alternatives:
    - County Goal #1: Improve and maintain watershed functions in Fairfax County, including water quality, habitat and hydrology
    - 3A. Objective Hydrology: Minimize impacts to stream water quality from pollutants in stormwater runoff.

# Regional Pond Alternative

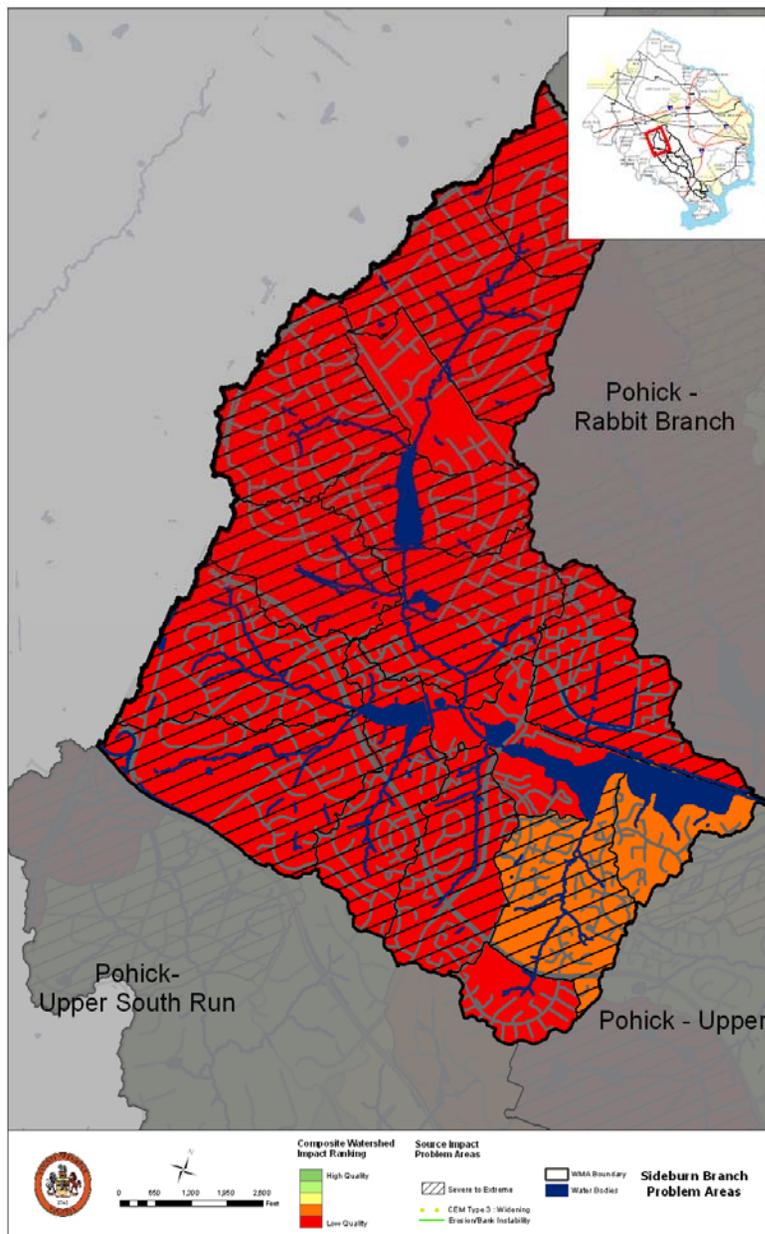
- Purpose of Regional Ponds: Designed to reduce the number of smaller onsite stormwater facilities
- Service large drainage areas (100-300ac)
- Encompass more than one site development
- Regional Ponds that have not been constructed
  - Pohick Creek 15 Regional Ponds
    - 7 built regional ponds
    - 8 not constructed
      - 6 in Upper South Run
      - 1 in Upper
      - 1 Rabbit Branch

# Regional Pond Alternatives – Approach/Projects

Projects to retrofit areas lacking adequate SWM – in lieu of large regional pond

- Conversion of existing quantity controls to water quality BMPs
- New structures including ponds, wetlands, LIDs, and outfall treatments





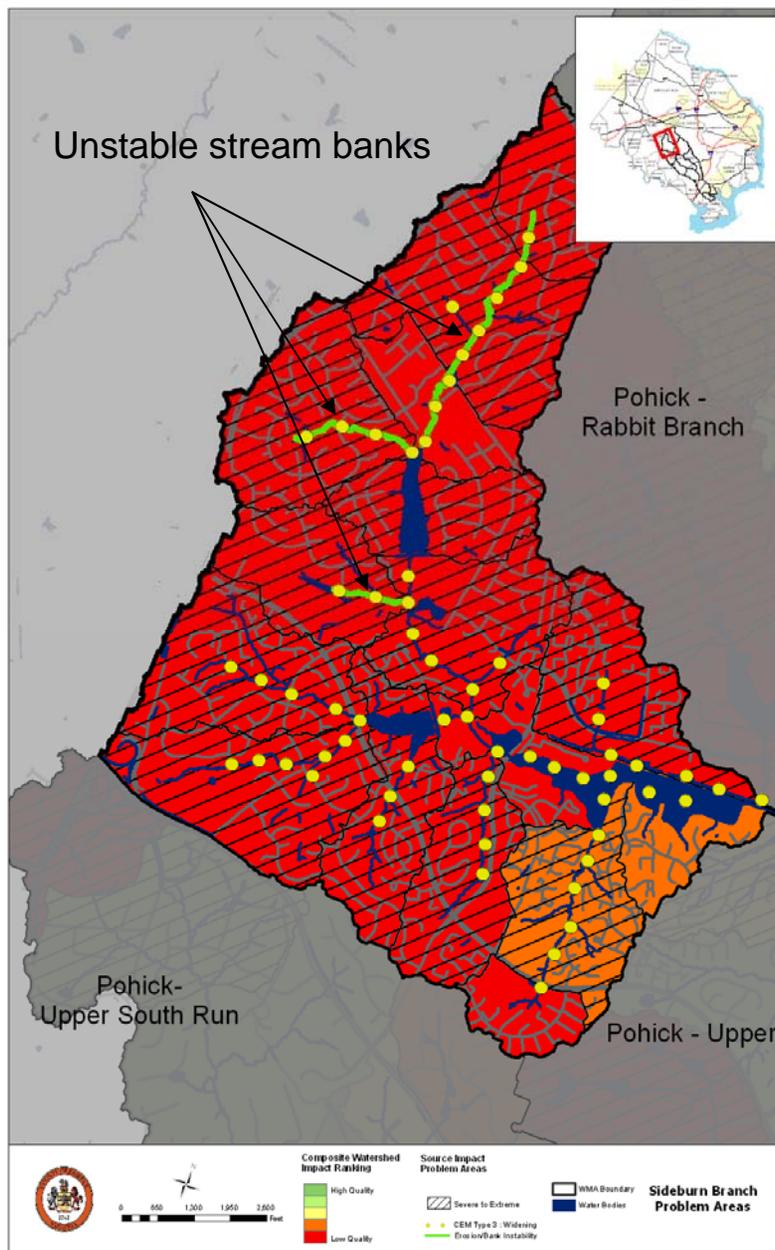
# Sideburn Branch WMA

16 subwatersheds  
Watershed Indicators

- 13 ranked: 102-139
- High % SW runoff

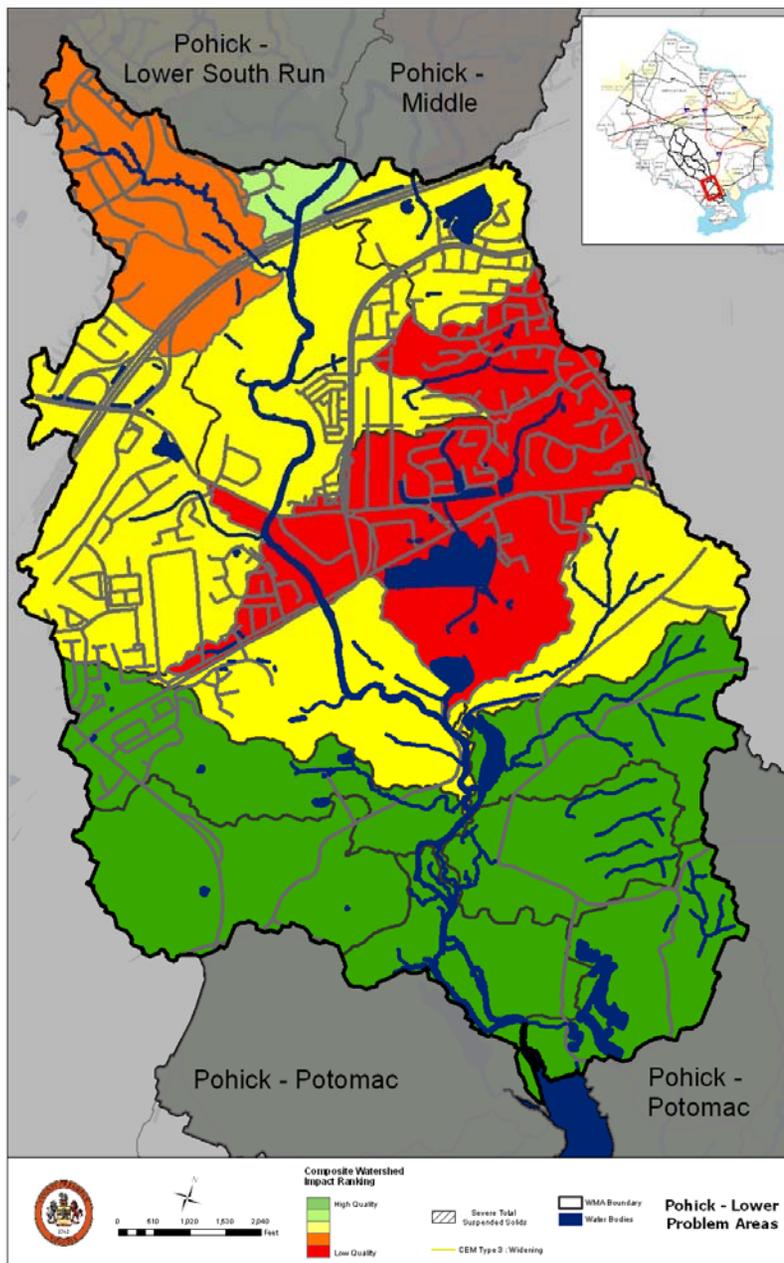
Source Indicators

- High % impervious areas
- High % area disturbed w/in 50ft natural stream buffer



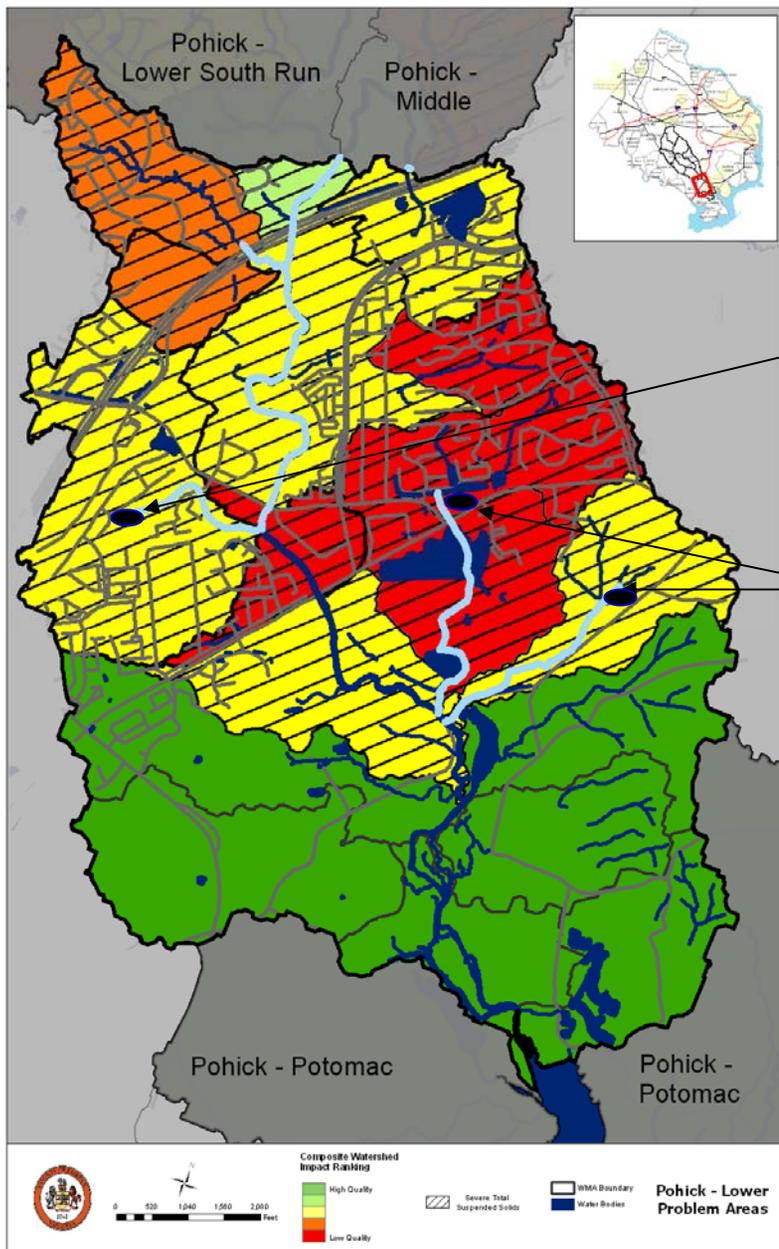
## Sideburn Branch Candidate project

- Stream Stabilization
- Bank Stabilization
- Retrofit stormwater management facilities to improve efficiencies
- *Yellow = Streams CEM 3*
- *Green = bank erosion*



# Pohick -Lower WMA

- 18 subwatersheds
- Watershed Indicators
  - 12 ranked: 4-50
  - Fairly low % SW runoff
- Source Indicators
  - low % impervious areas
  - low % area disturbed w/in 50ft natural stream buffer
- Minimal Treated areas



# Pohick - Lower Candidate project

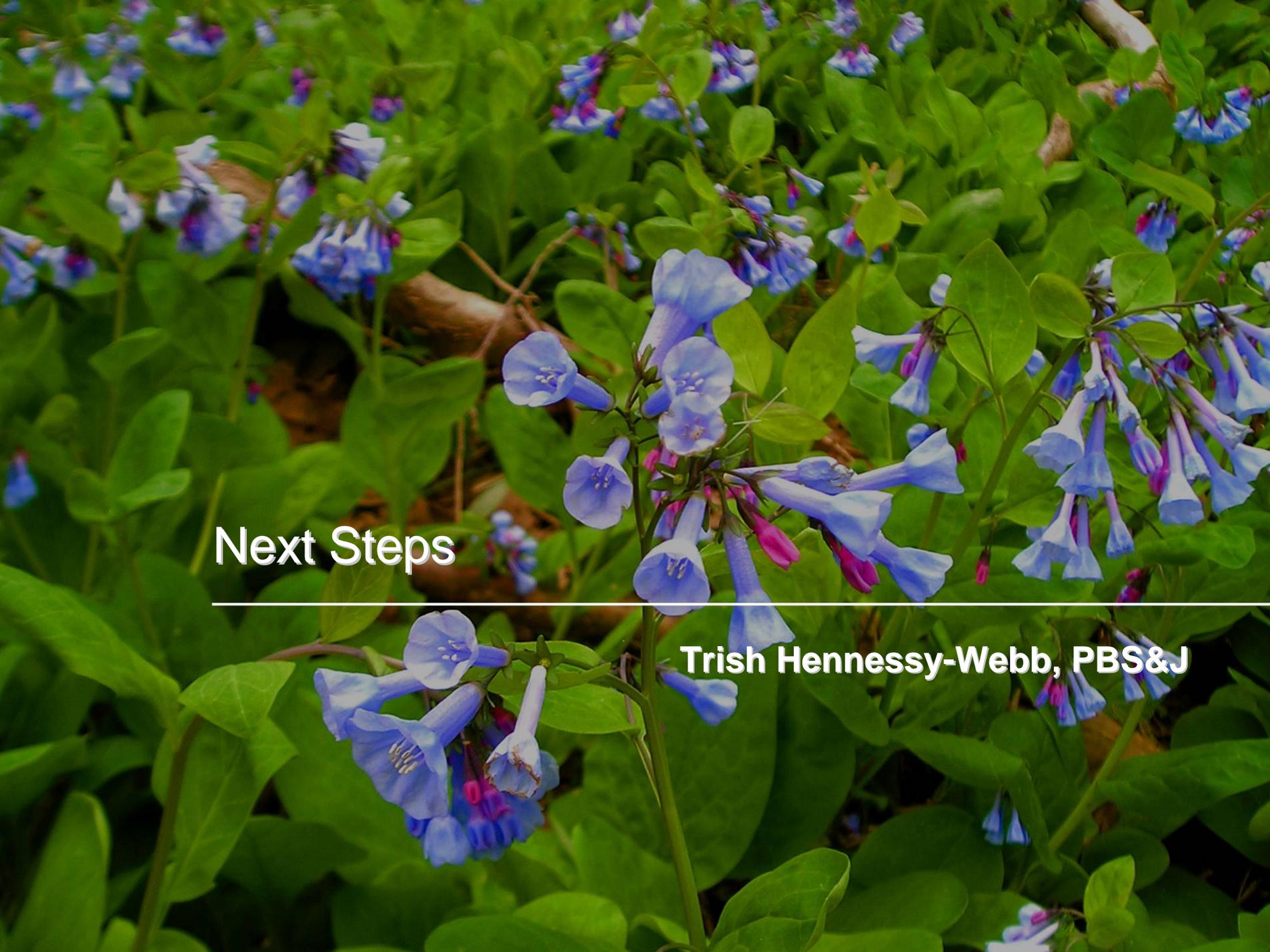
- Low Impact Development
  - Laurel Hill Area
- Retrofit stormwater management facilities to improve efficiencies
  - ● = candidate site
  - *Hatch* = High TSS loads
  - *Light Blue* = CEM 3 streams
  - *High percent impervious cover*

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## Questions on restoration strategies

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**Beth Offenbacher, Waterford, Inc.**

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**Next Steps**

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**Trish Hennessy-Webb, PBS&J**

# Approach to Project Development and Selection

- Field Survey
  - Assess Site Constraints
  - Recommendations for change
- Work upstream to downstream
- Focus on candidate projects in head waters to provide Quantity and Quality controls
  - Retrofit SWM facilities to reduce flow and increase drawdown and channel protection
  - LID practices increase infiltration
- ID candidate projects providing quality control
  - Retrofit for quality control
  - LID in older areas with limited treatment
- ID candidate Stream Restoration projects
  - Stream restoration
  - Buffer restoration