

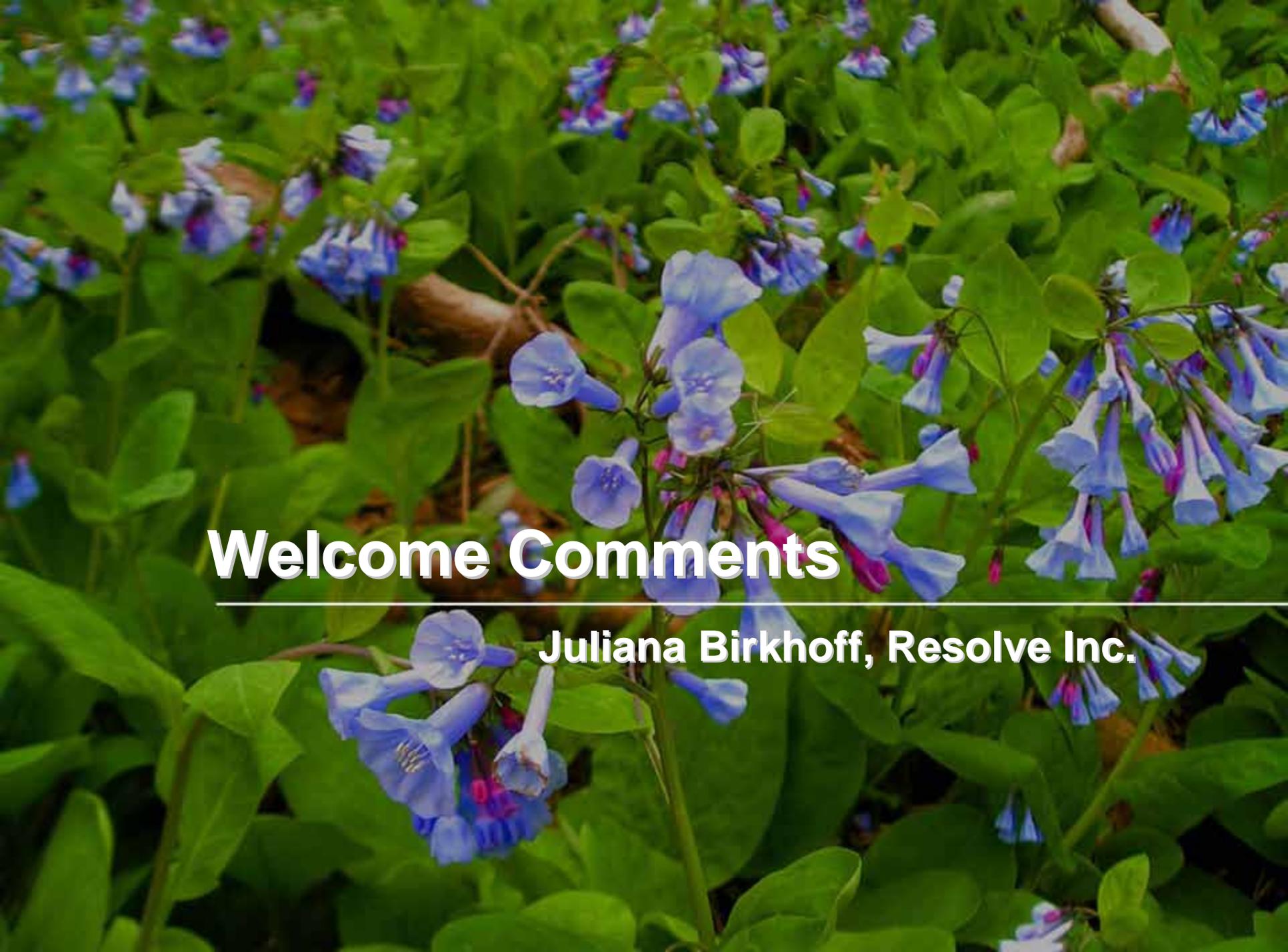
Nichol Run & Pond Branch Watershed Management Plan

Draft Plan Forum
September 23, 2010

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 trumpet-shaped and hang from thin stems. The background is filled with more of the same plants, creating a lush, textured appearance.

Welcome Comments

Juliana Birkhoff, Resolve Inc.

Agenda

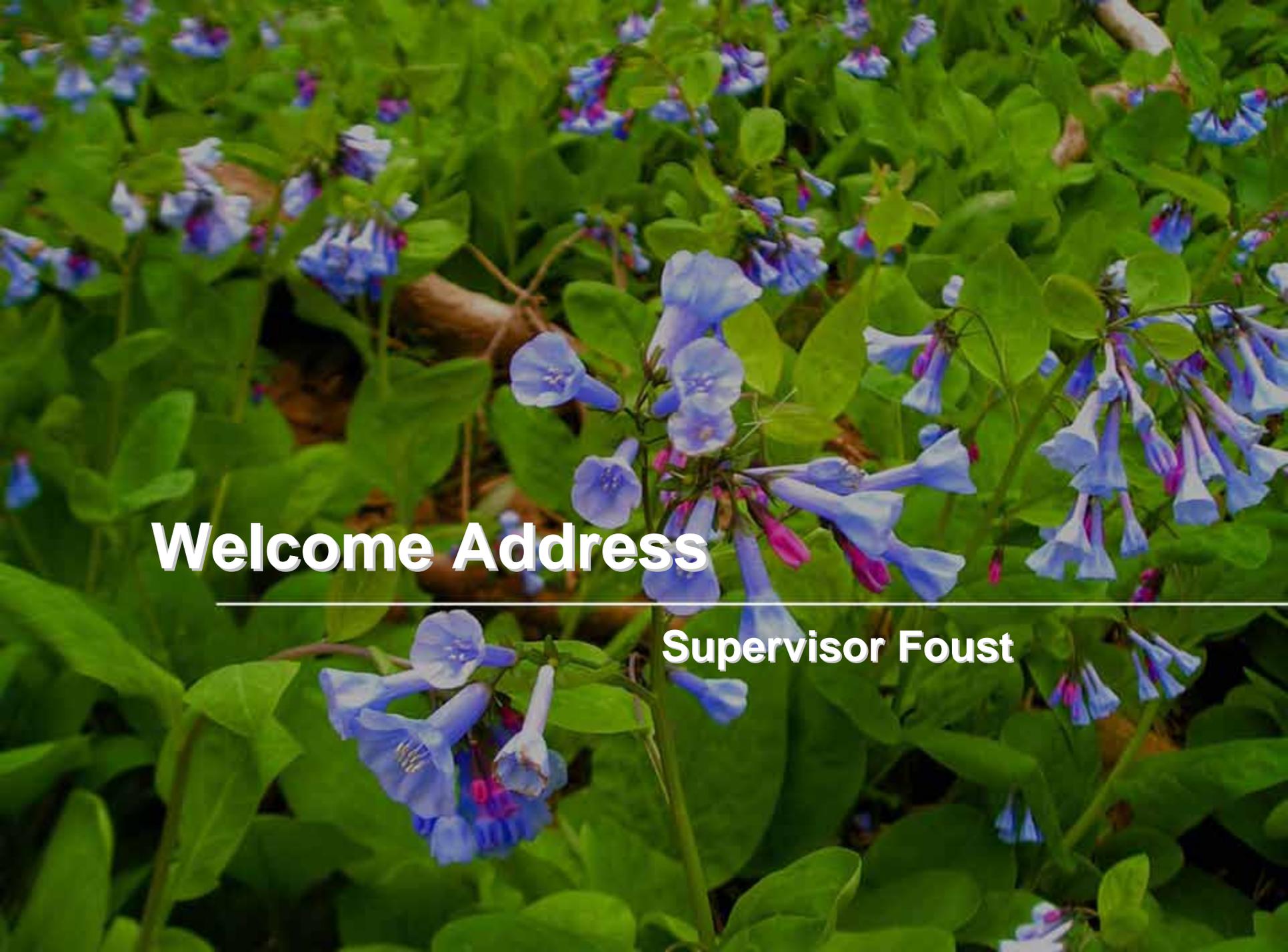
- Welcome
- Watershed Planning in Fairfax County
- Address by District Supervisor
- Watershed Primer
- Watershed Management Plan Overview
- Plan Comment Period and Timeline
- Breakout Sessions
- Adjourn



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, some fully open and others as buds. The background is a soft-focus expanse of similar flowers and leaves.

Watershed Planning in Fairfax County

Fred Rose, Fairfax County

A close-up photograph of a dense field of blue and purple flowers, likely Salpiglossis, with vibrant green foliage. The flowers are trumpet-shaped and hang from the stems. The background is a soft-focus expanse of similar flowers and leaves.

Welcome Address

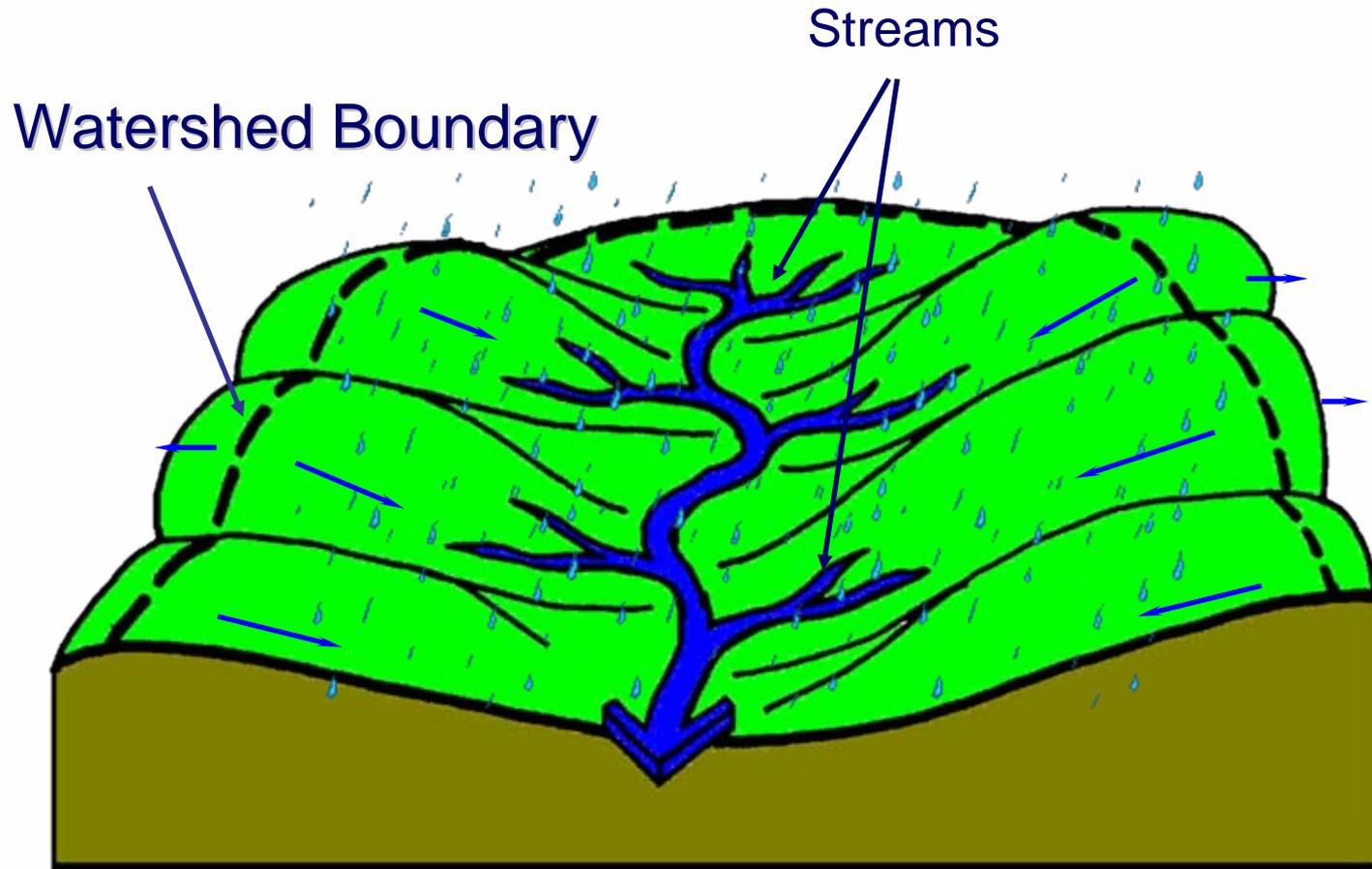
Supervisor Foust

A close-up photograph of a dense field of blue and purple flowers, likely a species of primula, 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.

Watershed Primer

Joe Sanchirico, Fairfax County

What is a Watershed?

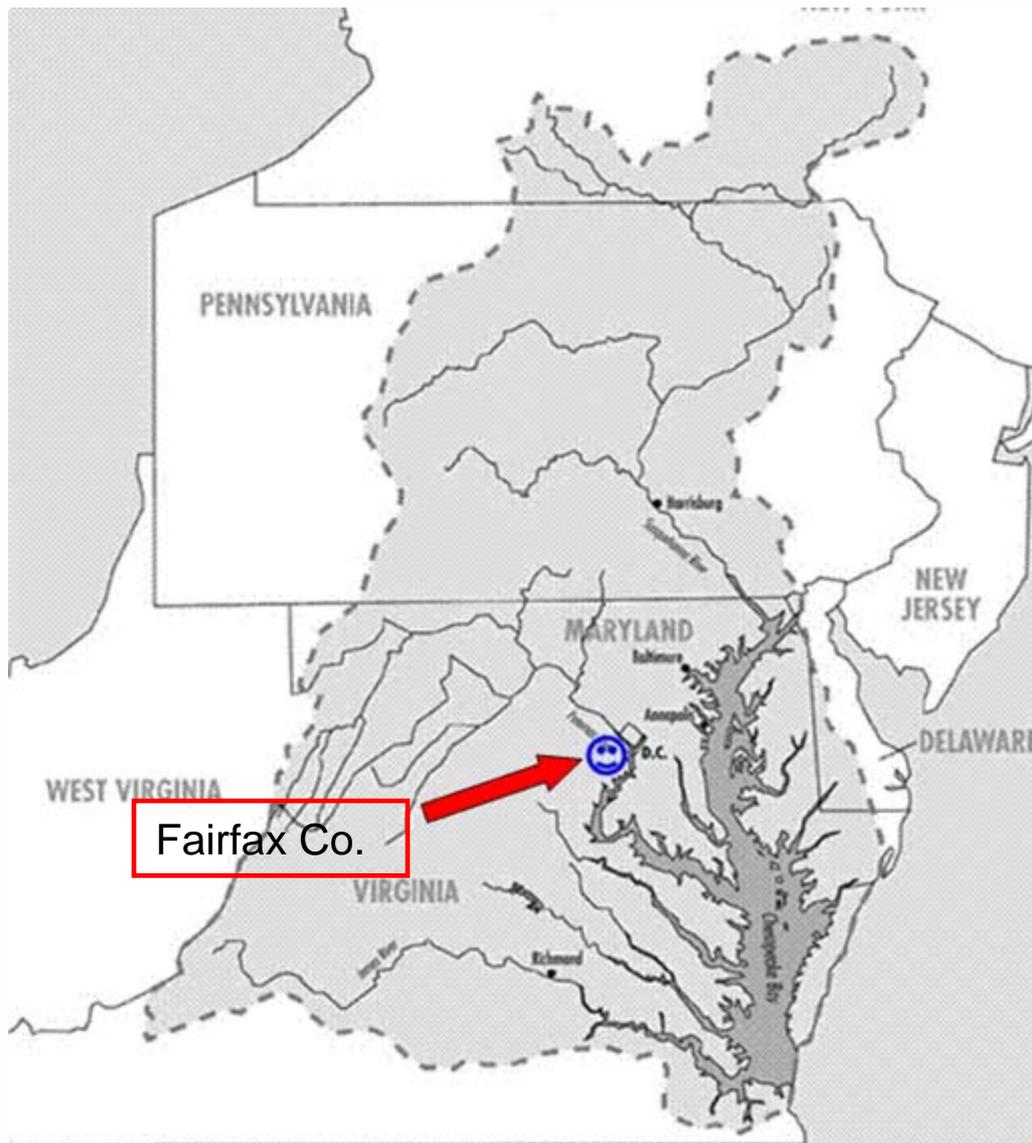


What is a Watershed?



<http://www.epa.gov/owow/watershed/whatis.html>

Chesapeake Bay Watershed



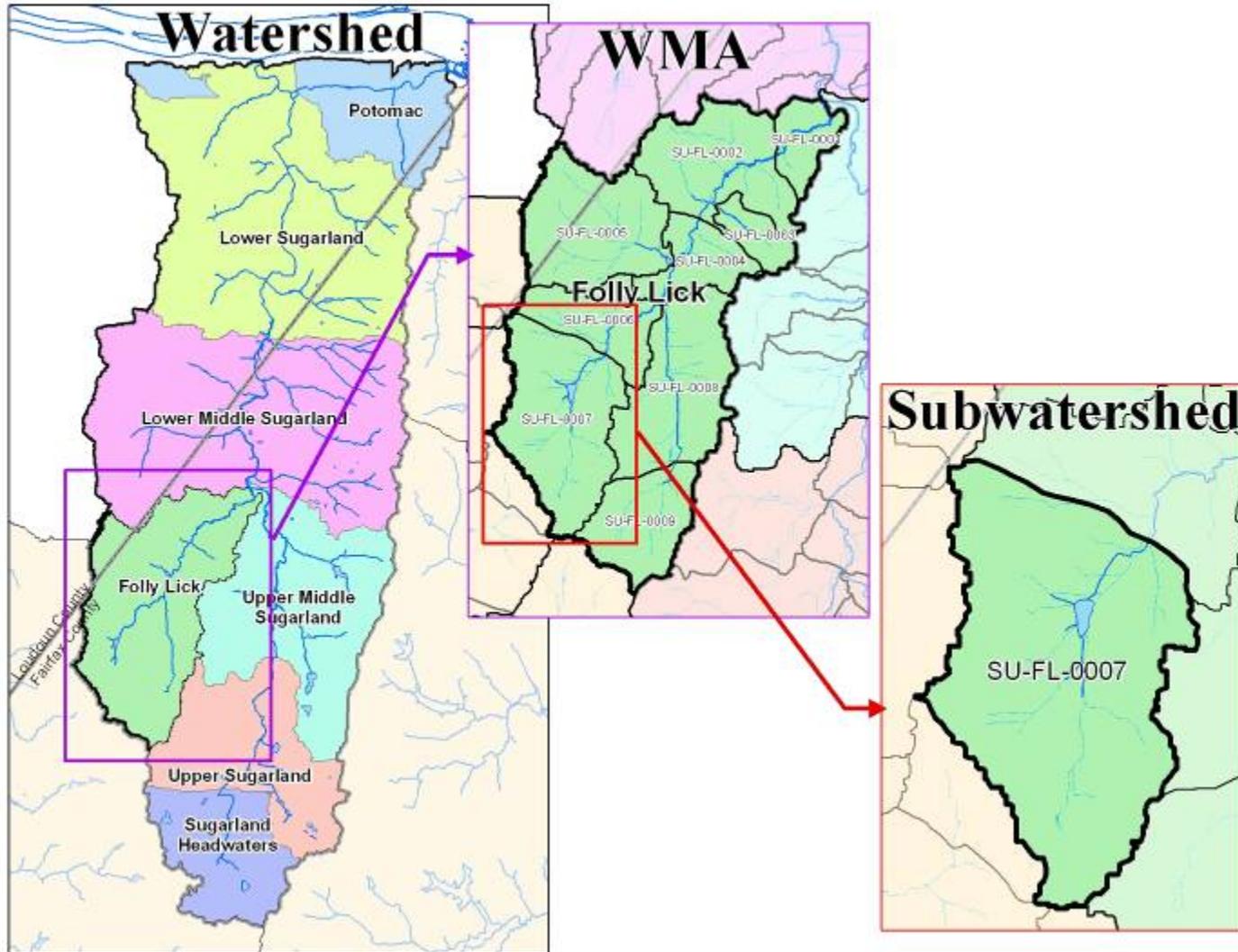
Fairfax Co.



Fairfax County Watersheds



Watershed Planning Study Units

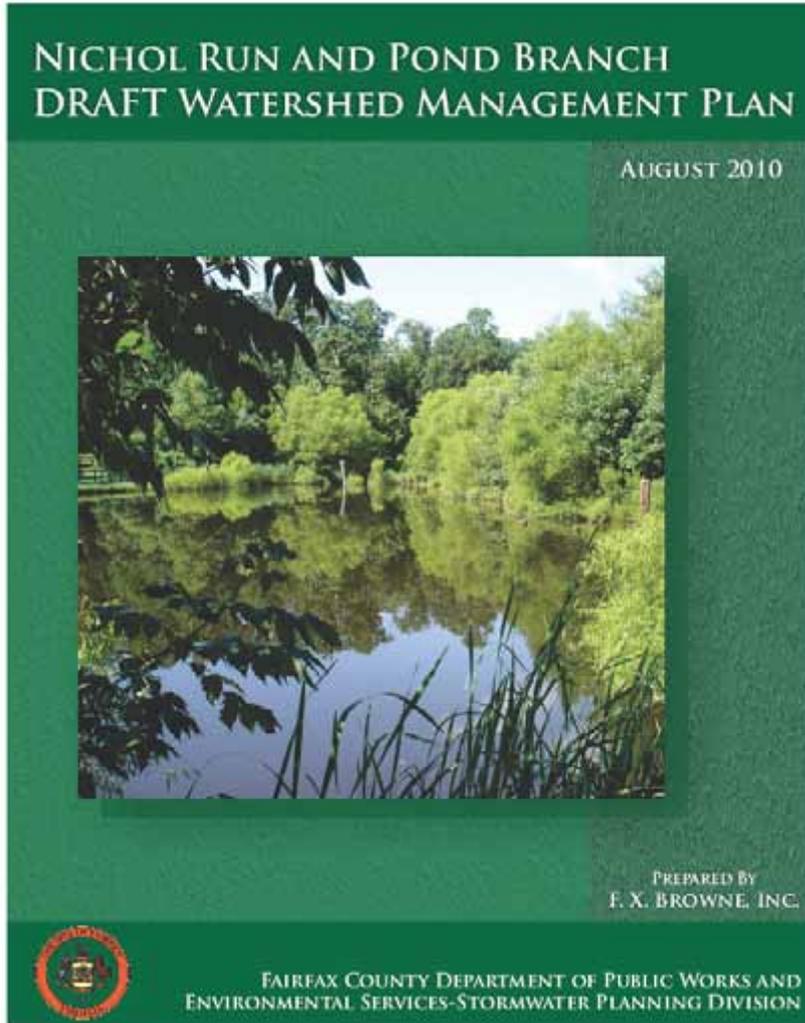


Stormwater Management

The process of controlling **stormwater runoff** that drains from rooftops, driveways, roads and other hard surfaces that do not allow water to permeate into the ground.

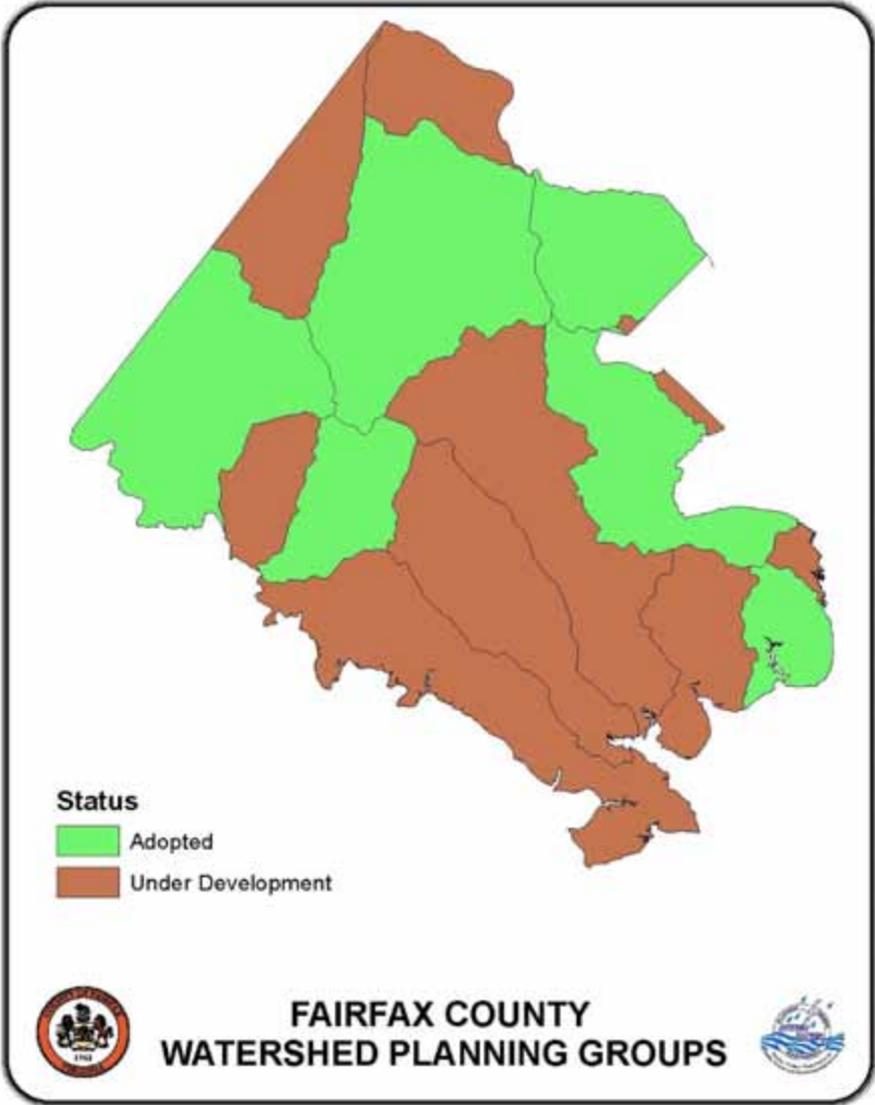


What Is a Watershed Management Plan?



- A Watershed Management Plan is a tool to identify and address the issues affecting our environment.
- The plan contains a 25-year list of proposed projects to protect and restore our streams and other water resources.

Watershed Planning



The background of the slide is a close-up photograph of a large number of small, bell-shaped flowers. The flowers are primarily light blue and purple, with some showing darker purple or magenta hues. They are surrounded by lush, bright green leaves. The overall scene is a vibrant, natural setting.

The Nichol Run & Pond Branch Watershed Management Plan

Melissa Taibi, F.X. Browne



Nichol Run and Pond Branch Watershed Management Plan



FAIRFAX COUNTY STORMWATER MANAGEMENT





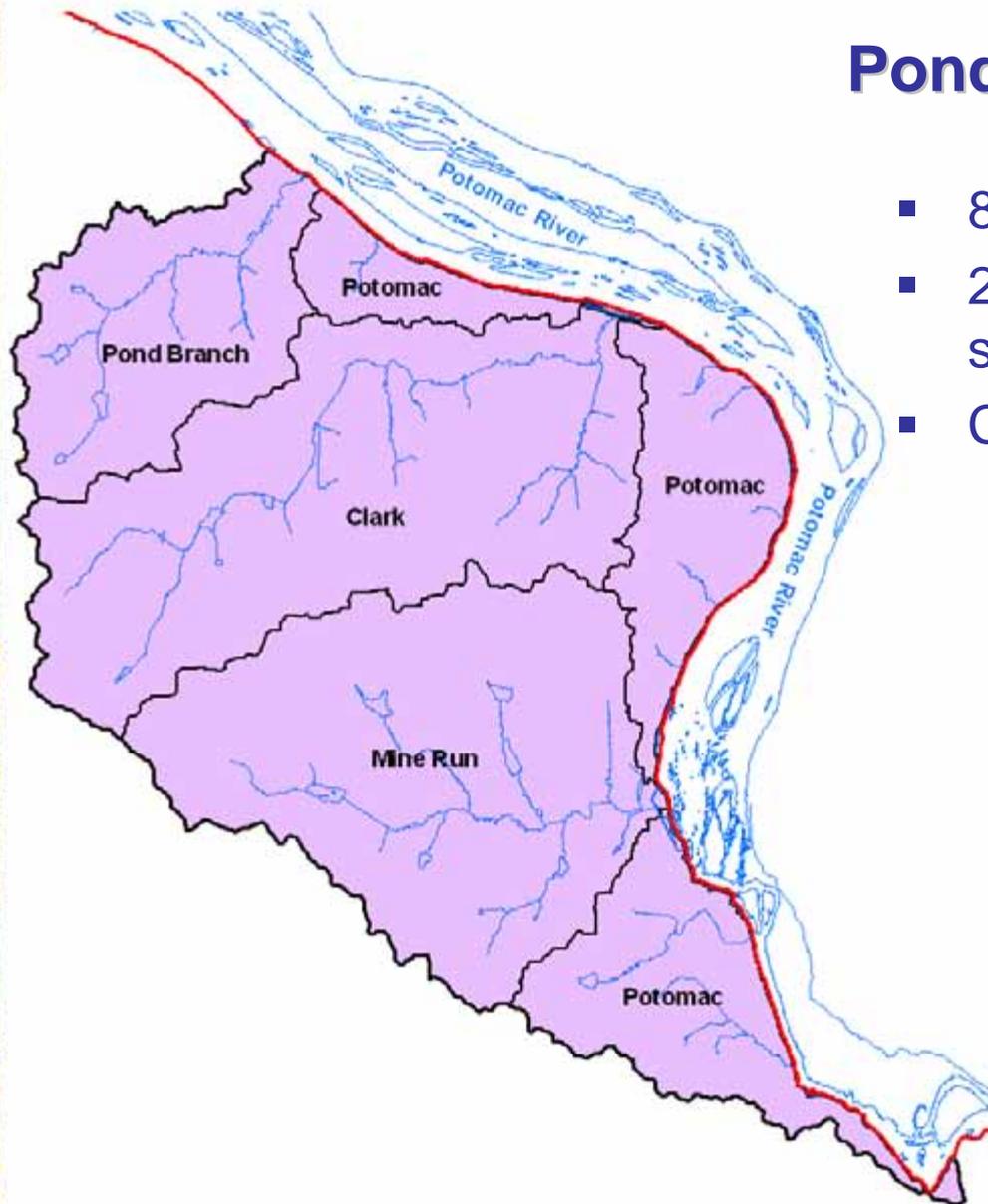
Nichol Run Watershed



- 8.2 square miles, 0.04 square miles in Loudoun County
- 31.8 miles of perennial streams
- Comprised of four WMAs:
 - Jefferson
 - Lower Nichol
 - Potomac
 - Upper Nichol



Pond Branch Watershed



- 8.5 square miles
- 23.8 miles of perennial streams
- Comprised of four WMAs:
 - Clark Branch
 - Mine Run
 - Pond Branch
 - Potomac

Organization of Watershed Management Plan

Executive Summary

1. Introduction
2. Watershed Planning Process
3. Summary of Watershed Conditions
4. Summary of Watershed Restoration Strategies
 - Describes Strategies and Project Types
5. WMA Area Restoration Strategies
 - Identifies Projects in each WMA
6. Benefits of Plan Implementation
 - Modeling Results and Project Cost/Benefit Analysis
7. Glossary and Acronyms
8. References

Appendices



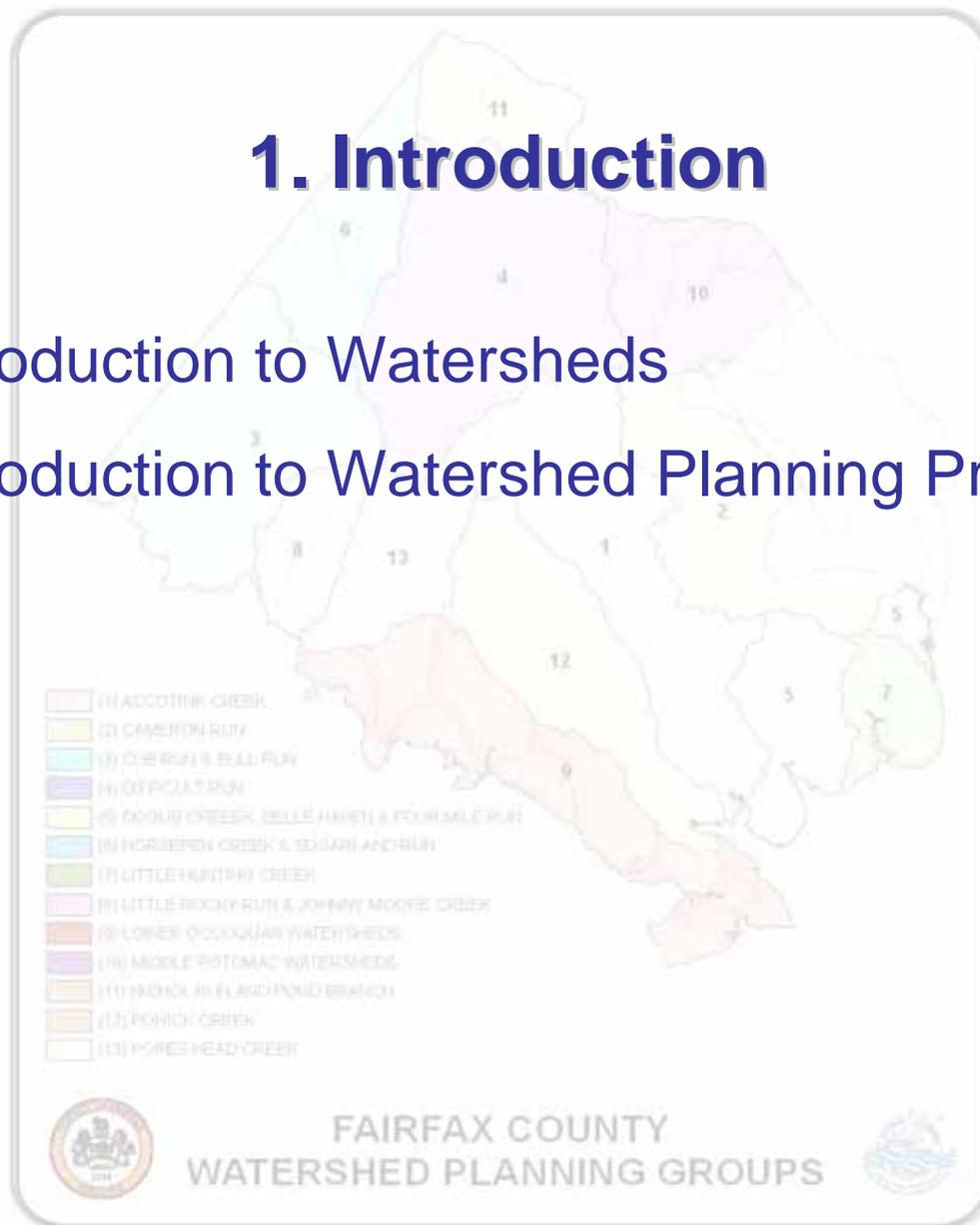
Executive Summary

- Overview of Plan
- Master Project List
 - 10-year Implementation Plan
 - 25-year Implementation Plan
 - Non-Structural Projects



1. Introduction

- Introduction to Watersheds
- Introduction to Watershed Planning Process



2. Watershed Planning Process

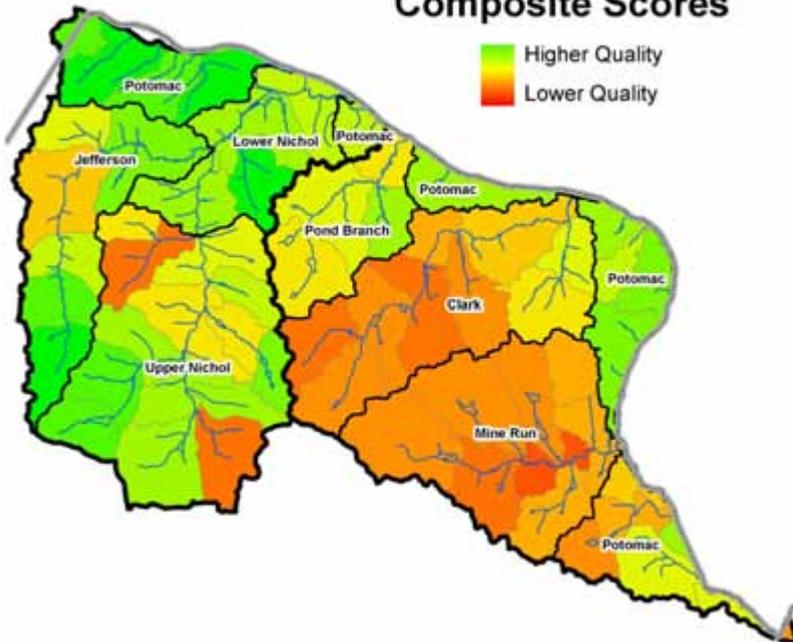
- Watershed Goals and Objectives
- Subwatershed Ranking
- Stormwater Modeling
 - Pollution Model (STEPL)
 - Hydrologic Model (SWMM)
 - Hydraulic Model (HEC-RAS)
- Public Involvement Plan

Subwatershed Ranking

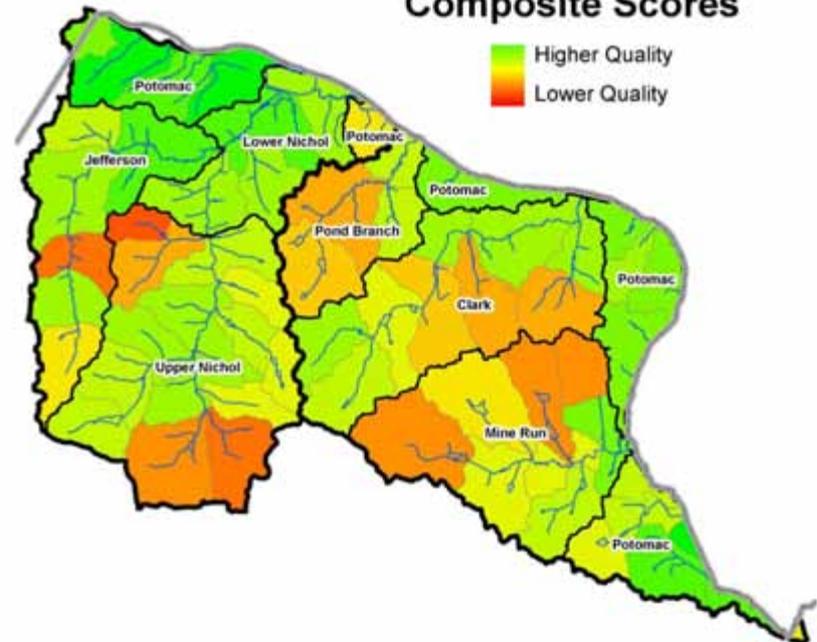
- Systematic means of compiling available water quality and natural resources information
- Consistent methodology throughout latest set of Watershed Management Plans
- Allows for analysis of future conditions using “predictive” indicators

Subwatershed Ranking

Watershed Impact Composite Scores



Source Indicator Composite Scores



Stormwater Modeling

- **Pollution Model**
 - Spreadsheet Tool for Estimating Pollutant Loads (STEPL)
 - Models Total Nitrogen, Phosphorus, and Sediment
- **Hydrologic Model**
 - Storm Water Management Model (SWMM)
 - Models Stormwater Flows
- **Hydraulic Model**
 - Hydrologic Engineering Centers River Analysis System (HEC-RAS)
 - Models Floodplain



Public Involvement Plan

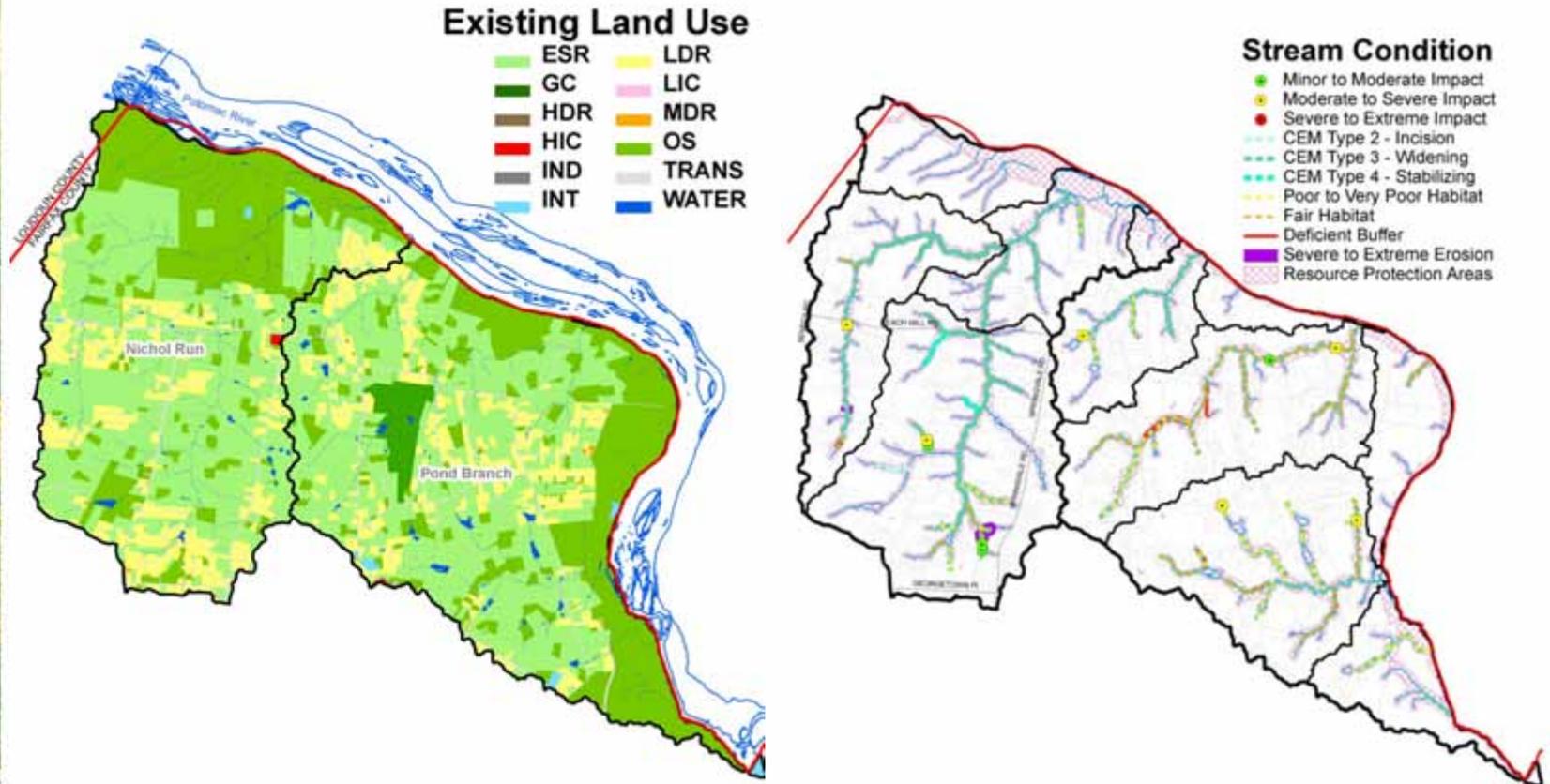
- **Introductory and Issues Scoping Forum**
 - Increase community awareness and understanding of stormwater management
 - Incorporate community ideas into the scope of the watershed plans
- **Watershed Advisory Group**
 - Provide meaningful participation options for a diversity of stakeholders
 - Several meetings throughout the plan development in order to provide guidance and comments at critical junctures of the process
- **Draft Plan Forum**

3. Summary of Watershed Conditions

- Summary of Existing Watershed Conditions
 - General WMA information
 - Land use
 - Stream Condition
 - Results of Flooding Model
 - Overall Condition based on Subwatershed Ranking
- Nichol Run listed before Pond Branch
- WMAs Organized in Alphabetical Order



Watershed Characterization



4. Summary of Watershed Restoration Strategies

- Priority Subwatershed Identification
- Description of Prioritization Process
- Summary of Subwatershed Strategies
- Project Type Descriptions
 - Each Major Project Type
 - Description, Diagrams, and Photos

Project Development Process

- Identify Priority Subwatersheds
 - Moderate to Poor Condition
 - Better Condition and At-Risk Areas
- Identify Impairments & Preservation Qualities
- Develop Improvement Goals
 - Restoration Strategies
 - Preservation Strategies
- Identify Projects

Restoration Strategies

•Reduce Flooding

- Reduce runoff volume & peak runoff using infiltration
- Reduce peak runoff using detention basins
- Improve road crossings

•Improve Water Quality

- Best Management Practices (BMPs) that provide quality and quantity control
- BMPs that provide only quality control
- Non-Structural Measures

•Improve Habitat/Reduce Streambank Erosion

- Stream Restoration – Natural Channel Design
- Streambank Stabilization
- Stream Buffer/Riparian Zone Restoration

Outfall Improvement

Before



After



Benefits

- Reduce erosion
- Decrease velocity
- Nutrient removal

Stormwater Pond Retrofit

Benefits

- Existing facility
- Increase detention time
- Improve water quality

After



Before



Dry Pond Retrofit

Benefits

- Reduces stormwater velocity
- Improves nutrient removal



Before



After

Stream Restoration

- Benefits
 - Reduced erosion
 - Improved nutrient removal
 - Restore riparian habitat

Before



After

Green Roof

Before



After



Benefits

- Reduced runoff
- Improved nutrient removal

LID Bioretention/Bioswale

Benefits

- Reduce directly connected impervious areas
- Improve nutrient removal



Non-Structural Project Evaluation

- Evaluated after structural projects to better determine areas in need of additional non-structural alternatives
- Some projects/project groups are WMA – wide
- Evaluation based on:
 - Existing need for additional stormwater management with no/few opportunities for structural projects
 - Areas with deficient riparian buffer
 - Riparian zones vulnerable to future development

Non-Structural Projects



Rain Barrel

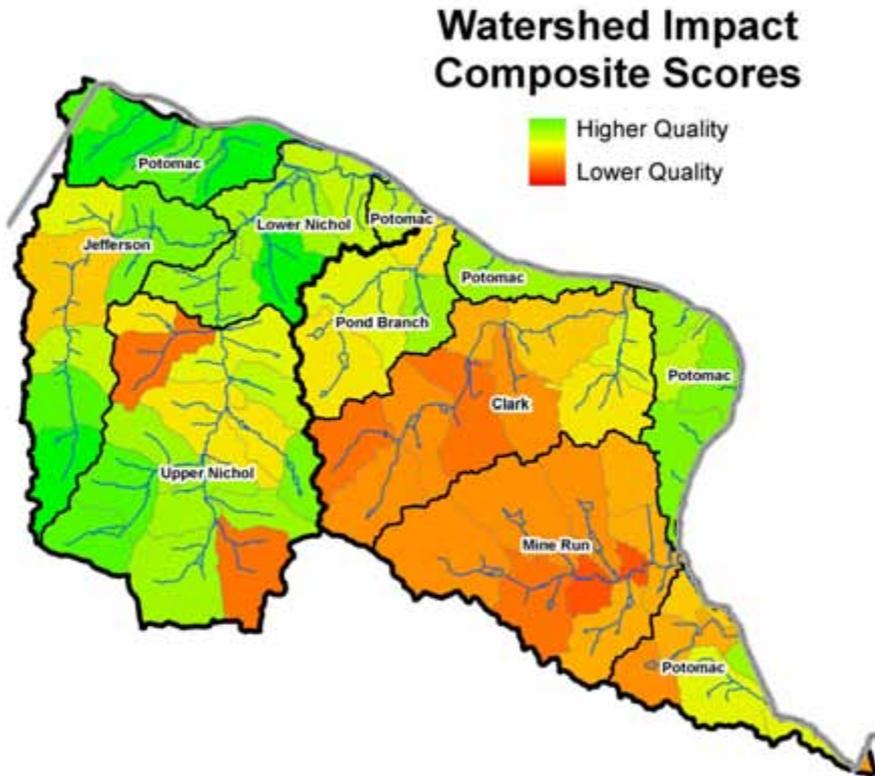


Buffer Restoration

Project Prioritization Process

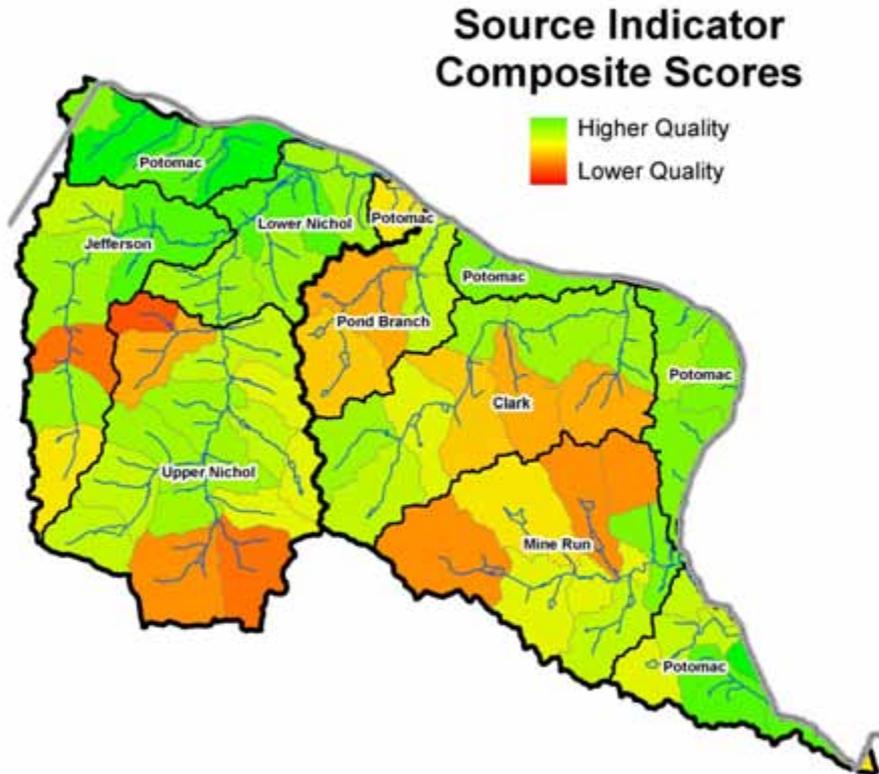
- Effect on Watershed Impact Indicators
- Effect on Source Indicators
- Location within Priority Subwatersheds
- Sequencing
- Implementability

Watershed Impact Indicators: *Watershed condition*



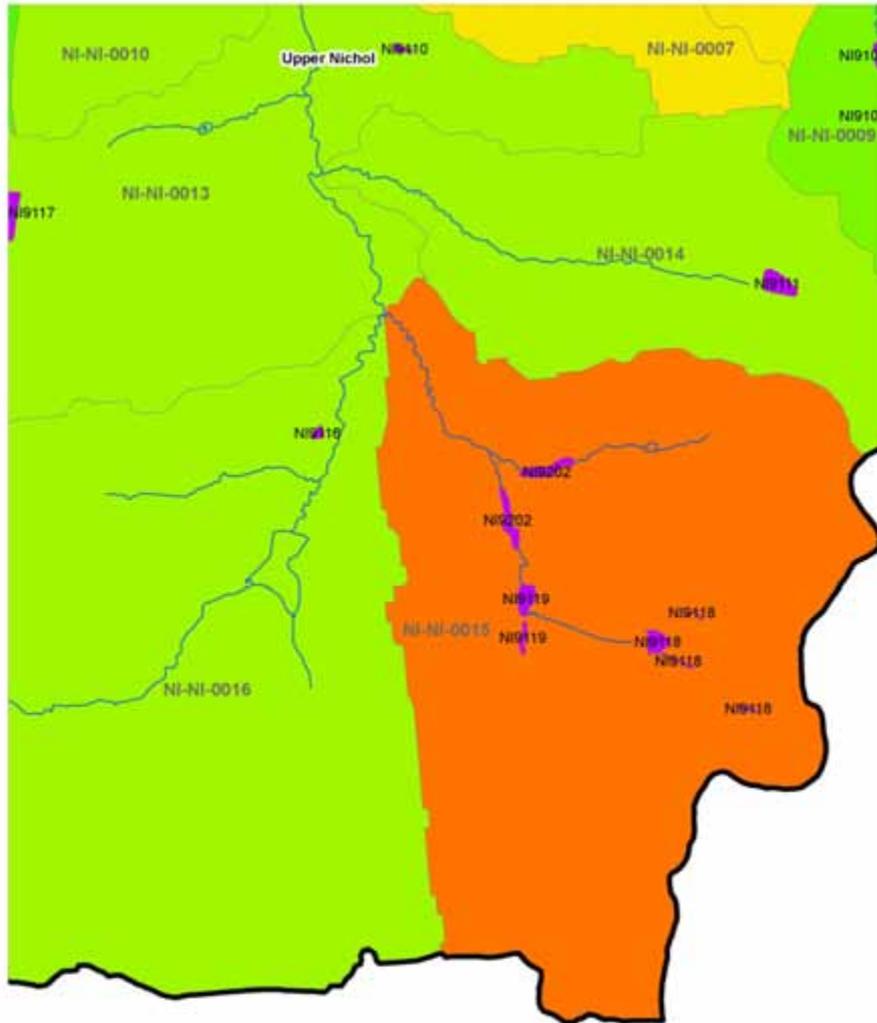
- Benthic Communities
- Fish Communities
- Aquatic Habitat
- Channel Morphology
- Instream Sediment
- Building Hazards (floodplain)
- Flood Complaints
- Riparian Habitat
- Wetland Habitat
- Forested Habitat
- *E. coli* Concentration
- Sediment & Nutrient Runoff

Source Indicators: *Sources of watershed stressors*



- Channelized Streams
- Impervious Area
- Stormwater Outfalls
- Onsite Sewage Disposal
- Streambank Buffer Deficiency
- Sediment & Nutrient Runoff
- Percent Urban Landcover
- Industrial Discharges

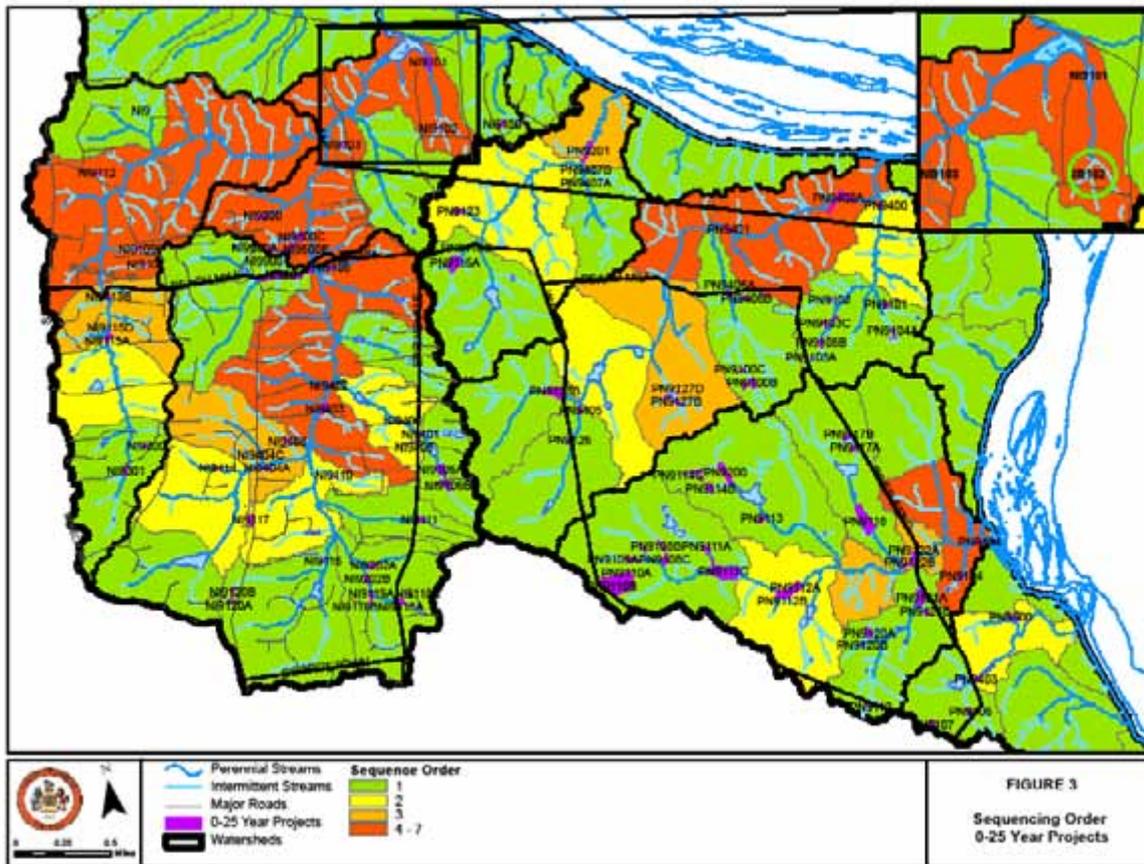
Location within Priority Subwatersheds



Projects in poor quality subwatersheds may have the potential to provide a greater impact than projects located within a high quality subwatershed.

Sequencing

Projects in headwater areas should be completed first and considered higher priority.



Implementability

- Less complex projects and projects without land acquisition requirements will be easier to implement and were given higher scores.
- Implementability determined in three steps:
 - Analysis of property owner(s)
 - Quintiles established to produce a project score (1-5) based on parcel ownership
 - Final BPJ adjustments made based on overall complexity and implementability of the project.

10 and 25-Year Implementation Plans

- 10-Year Implementation Plan
 - 35 best ranked projects in Nichol and Pond
- 25-Year Implementation Plan
 - Next 30 projects in ranking order
- Projects ranked lowest were dropped from plan
- WAG input was important in refining final 10 and 25-year implementation plans.

5. WMA Area Restoration Strategies

- Nichol Run listed before Pond Branch
- WMAs Organized in Alphabetical Order
- Each WMA Section Contains
 - Key WMA Conditions
 - Description of 10-year Structural Projects and Non-Structural Projects
 - Table Containing all Projects within WMA
 - Map Showing Types and Locations of all Projects
- Fact Sheets for all 10-year Projects
 - Organized in the same order as the WMA sections

Project Fact Sheets

- All projects in 10-year Implementation Plan
- Contains overview of project, benefits and considerations
- Fact sheets are grouped by WMA and organized alphabetically with Nichol WMAs first

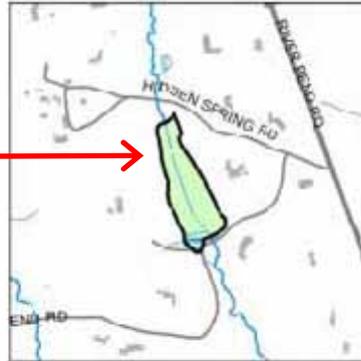
Project # & Type →

PN9118 Stormwater Pond Retrofit, Culvert Retrofit

Pond Branch Watershed
Pond Branch - Mine Run Watershed Management Area

← Watershed & WMA

Location Map →



Address:	456 River Bend Road
Location:	Near River Bend Road & Hidden Springs Road
Land Owner:	Private
PIN:	0084 01 0020, 0084 01 0021, 0084 01 0025, 0084 01 0028, 0084 01 0034Z, 0084 01 0036, 0084 09 0012
Control Type	Quality/Quantity
Drainage Area	181.34 acres
Receiving Waters	Mine Run Branch

← Project Info:

- Location
- Land Owner
- Control Type
- Drainage Area
- Receiving Waters

Project Description →

Description: Retrofit existing farm pond (FM0002) to wet retention pond; install outlet structure and lower water level for additional storage. Repair and stabilize erosion impacts to spillway and downstream channel and culvert at River Bend Road.



← Detailed Project Area Map

Map Legend →

Retrofit to Wet Retention Pond
 Culvert Retrofit

Project Area Map





Project Benefits
Qualitative &
Quantitative
(Modeling)

Project Benefits: This project will reduce sediment and nutrient loadings, improve water quality in downstream waterbodies, increase storage volume, reduce peak stormwater flows up to the 10-year event, and provide for evapotranspiration and wildlife habitat. This project will also repair damage to the spillway. The new outlet structure will allow for a more controlled stormwater discharge to enhance the performance of the pond. This project will also repair damage to River Bend Road and stabilize the channel. An estimated 1,612 lbs/yr of total suspended solids, 10 lbs/yr of nitrogen, and 5 lbs/yr of phosphorus will be removed.

Project Design Considerations: Minimal environmental permitting requirements are anticipated. Additional permitting may be required for a project within a stream or wetland. Projects in RPAs may require exemptions or waivers. The farm pond is privately owned by multiple owners. A storm drainage easement may be necessary. Accessibility is excellent via an ingress-egress easement from nearby roads. There are no tree impacts or significant construction issues anticipated.

Project Design Considerations

- Project Coordination & Sequencing
- Permitting & Easements
- Construction Issues & Tree Impacts

Costs:

<i>Item</i>	<i>Units</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Total</i>
Organic Compost Soil Amendment	CY	40	\$40.00	\$1,600.00
Plantings	AC	0.1	\$25,000.00	\$2,500.00
Clear and Grub	AC	0.1	\$8,500.00	\$850.00
Grading and Excavation	CY	250	\$35.00	\$8,750.00
Embankment	CY	150	\$50.00	\$7,500.00
Outflow Pipe	LF	50	\$125.00	\$6,250.00
RipRap Stabilization	SY	75	\$100.00	\$7,500.00
Structural BMP Retrofit and Incidentals (High)	LS	1	\$20,000.00	\$20,000.00
<i>Initial Project Costs</i>				\$54,950.00
<i>Plantings: 5% of project costs (unless incl. as line item)</i>				\$0.00
<i>Auxiliary Items: 5% of project cost</i>				\$2,747.50
<i>Erosion and Sediment Control: 10% of project costs</i>				\$5,495.00
<i>Base Construction Costs</i>				\$63,192.50
<i>Mobilization (5%)</i>				\$3,159.63
<i>Subtotal 1</i>				\$66,352.13
<i>Contingency (25%)</i>				\$16,588.03
<i>Subtotal 2</i>				\$82,940.16
<i>Engineering Design, Surveys, Land Acquisition, Utility</i>				
<i>Relocation and Permits (45%)</i>				\$37,323.07
<i>Total Costs</i>				\$120,263.23

Detailed Project Costs

Estimated Project Costs \$130,000.00

Total Project Cost Rounded up to nearest \$10,000



6. Benefits of Plan Implementation

- Overview of Stormwater Models
 - Pollution Model (STEPL)
 - Hydrologic Model (SWMM)
 - Hydraulic Model (HEC-RAS)
- Analysis of Stormwater Modeling Results
- Cost Benefit Analysis
- Overall Costs and Benefits of Plan Implementation

Plan Benefits

Benefits of 10 and 25-year Implementation Plans Modeled

WMA	Area (ac)	Scenario ³	Runoff Volume (in/yr) ¹		Peak Flow (cfs/ac) ¹		TN ² (lb/ac/yr)	TP ² (lb/ac/yr)	TSS ² (lb/ac/yr)
			2 Year	10 Year	2 Year	10 Year			
Nichol Run Watershed	5,249.63	Existing Condition	1,122	2,637	0.129	0.303	1.90	0.290	111.87
		Future Without Projects	1,138	2,665	0.131	0.307	2.07	0.310	111.84
		Future With Projects (10yr)	1,021	2,478	0.117	0.285	2.01	0.300	79.80
		Reduction (10-year Plan)	-10.3%	-7.0%	-10.3%	-7.0%	-2.9%	-3.2%	-28.6%
		Future With Projects (25yr)	N/A	N/A	N/A	N/A	1.96	0.290	76.72
		Reduction (25-year Plan)	N/A	N/A	N/A	N/A	-5.3%	-6.5%	-31.4%
Pond Branch Watershed	5,404.10	Existing Condition	2,398	5,623	0.276	0.647	2.09	0.330	115.55
		Future Without Projects	2,449	5,700	0.282	0.656	2.21	0.350	115.72
		Future With Projects (10yr)	972	3,057	0.112	0.352	2.07	0.310	85.00
		Reduction (10-year Plan)	-60.3%	-46.4%	-60.3%	-46.4%	-6.3%	-11.4%	-26.5%
		Future With Projects (25yr)	N/A	N/A	N/A	N/A	2.00	0.290	78.70
		Reduction (25-year Plan)	N/A	N/A	N/A	N/A	-9.5%	-17.1%	-32.0%



7. Glossary and Acronyms

8. References



Appendices

- Appendix A: Watershed Workbook
 - Watershed Study Methodology
 - Detailed Characterization of Existing Watershed Conditions
 - Draft Document
- Appendix B: Technical Documents
 - Subwatershed Strategies
 - Prioritization
 - Modeling
- Appendix C: Public Involvement
 - Summaries of Initial Forum and WAG Meetings

A close-up photograph of a dense field of blue 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.

Comment Period and Timeline

How to Provide Comments

- Tonight – in breakout groups
- Online Comment Form
http://www.fairfaxcounty.gov/dpwes/watersheds/nicholrun_docs.htm
- E-mail – watersheds@fairfaxcounty.gov
- Phone - 703-324-5500, TTY 711
- Fax - 703-802-5955
- Mail - Stormwater Planning Division
12000 Government Center Parkway,
Suite 449
Fairfax, VA 22035



Timeline

- 30 Day Review and Comment period (ends 10/23/10)
 - General public, county agencies, external organizations
- Evaluate and Incorporate Comments into Plan
- Finalize Plan
- Present to the County's Board of Supervisors
- Submit for Adoption



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

Break Out Session
