

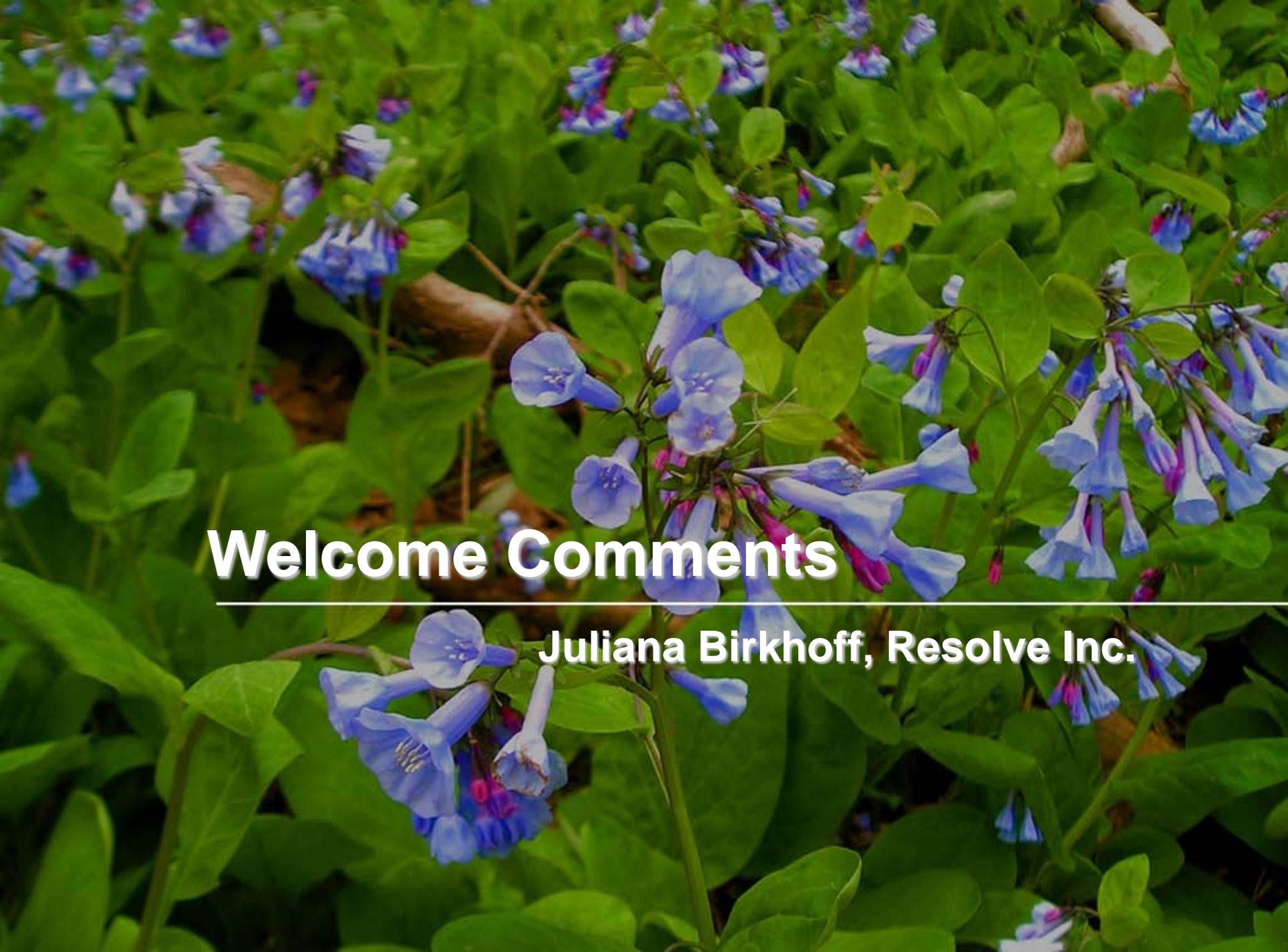
Sugarland Run & Horsepen Creek Watershed Management Plan

Draft Plan Forum
August 3, 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 a species of Salpiglossis, with vibrant green foliage. The flowers are trumpet-shaped and hang from the stems. The background is filled with more of the same plants, creating a lush, textured appearance.

Welcome Comments

Juliana Birkhoff, Resolve Inc.

Agenda

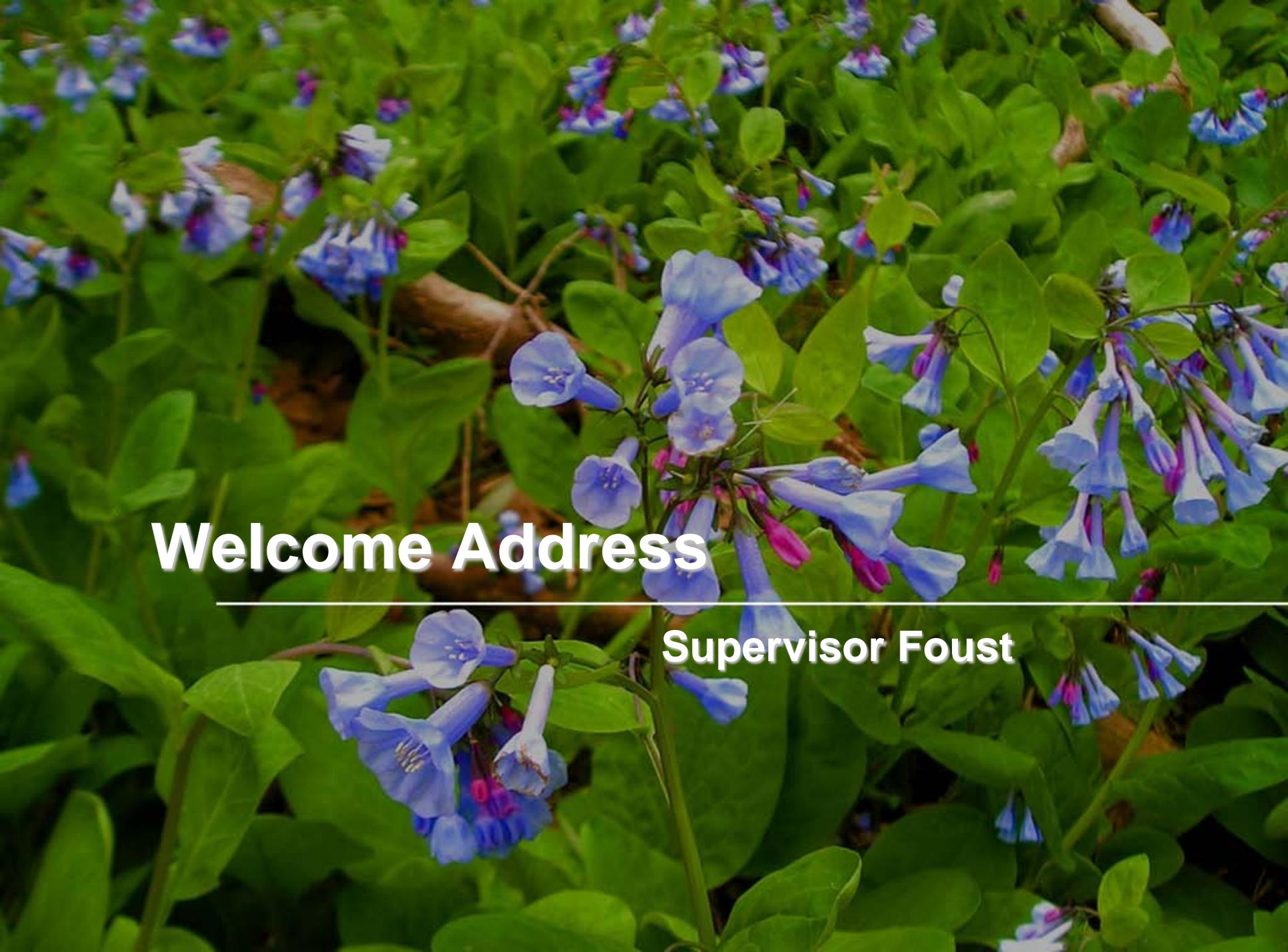
- Welcome
- Watershed Planning in Fairfax County
- Address by District Supervisor
- Watershed Primer
- Watershed Management Plan Overview
- Plan Comment Period and Timeline
- Breakout Sessions
- Adjourn



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

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 thin stems. The background is filled with more of the same plants, creating a lush, textured appearance.

Welcome Address

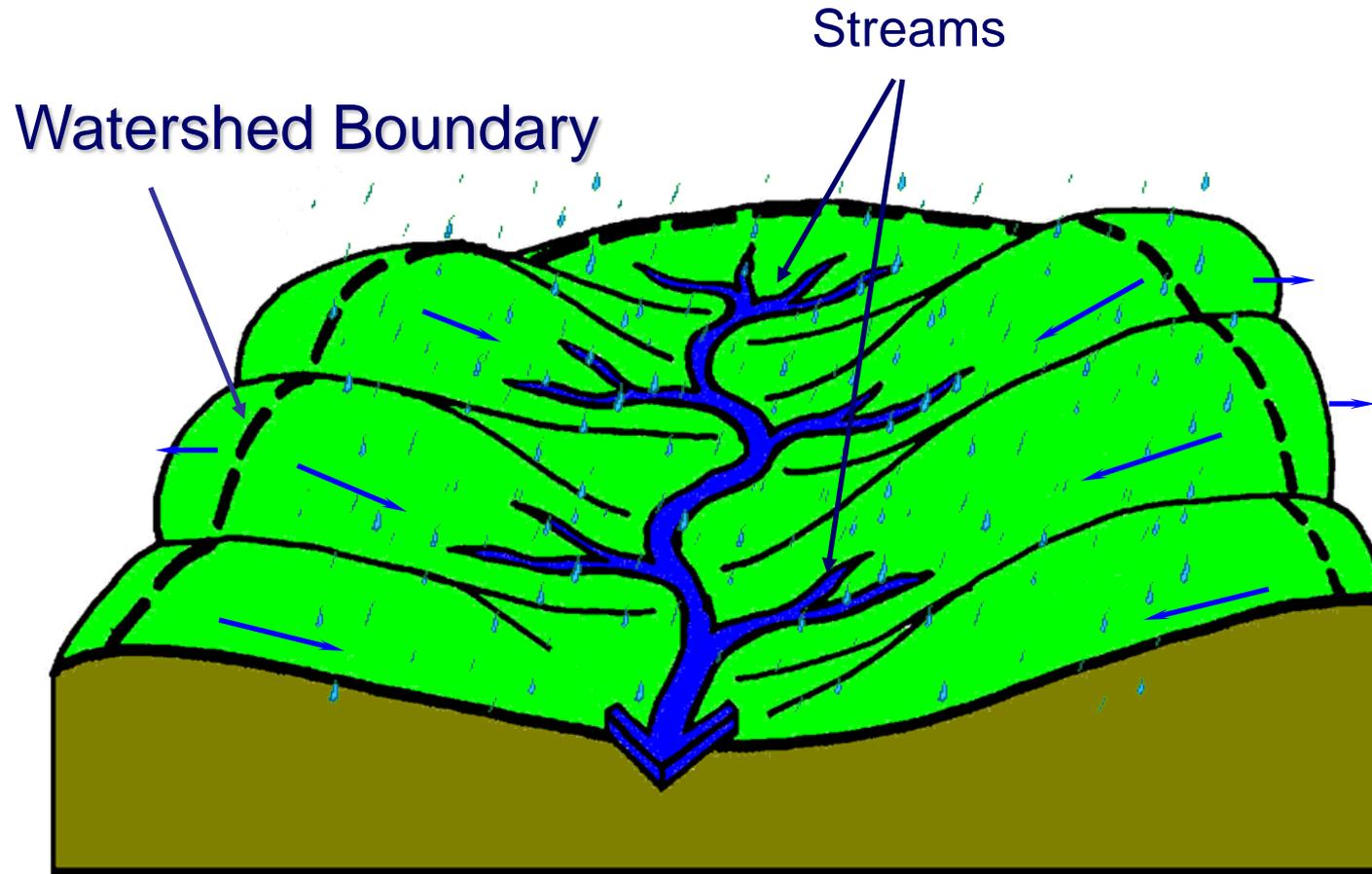
Supervisor Foust

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?

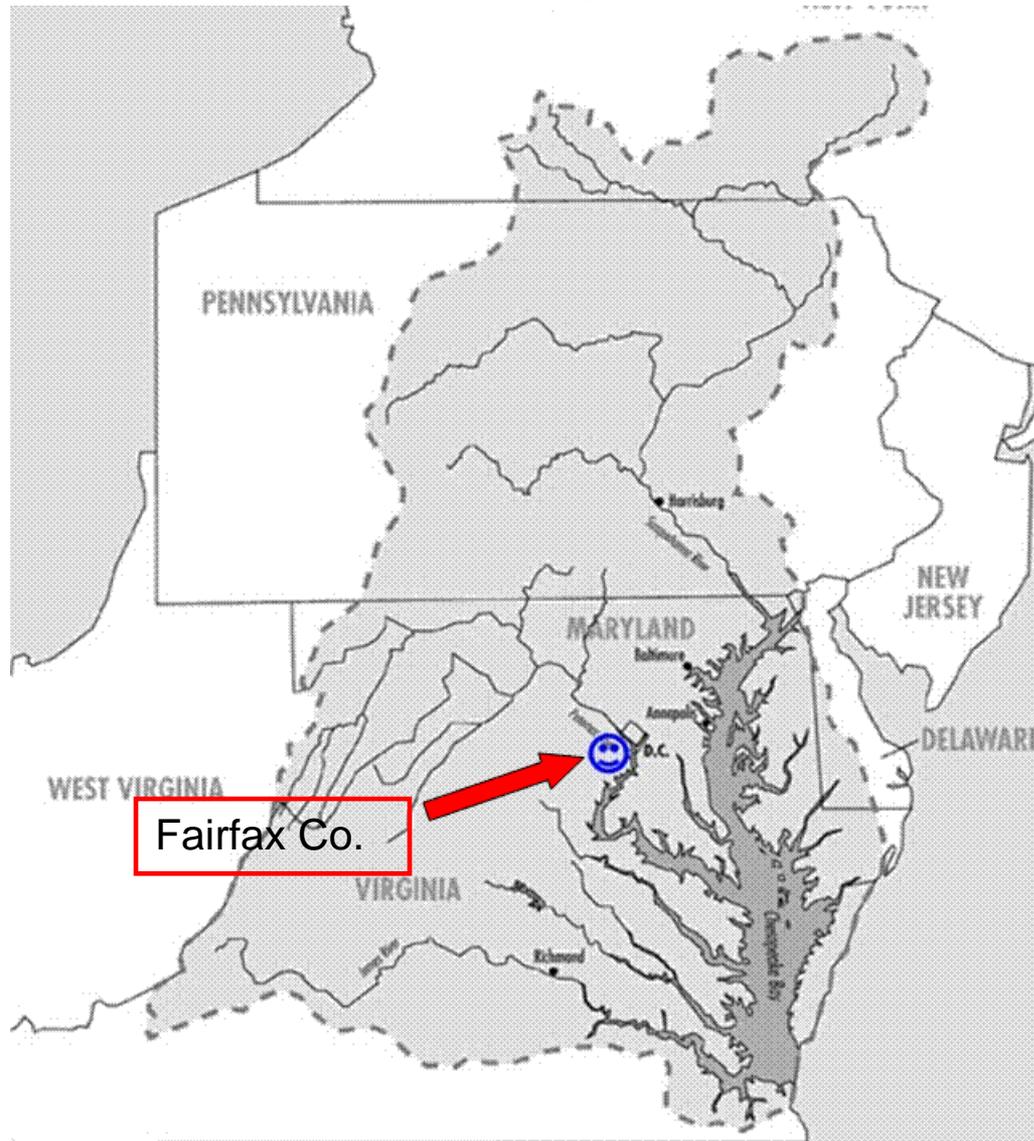


What is a Watershed?



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

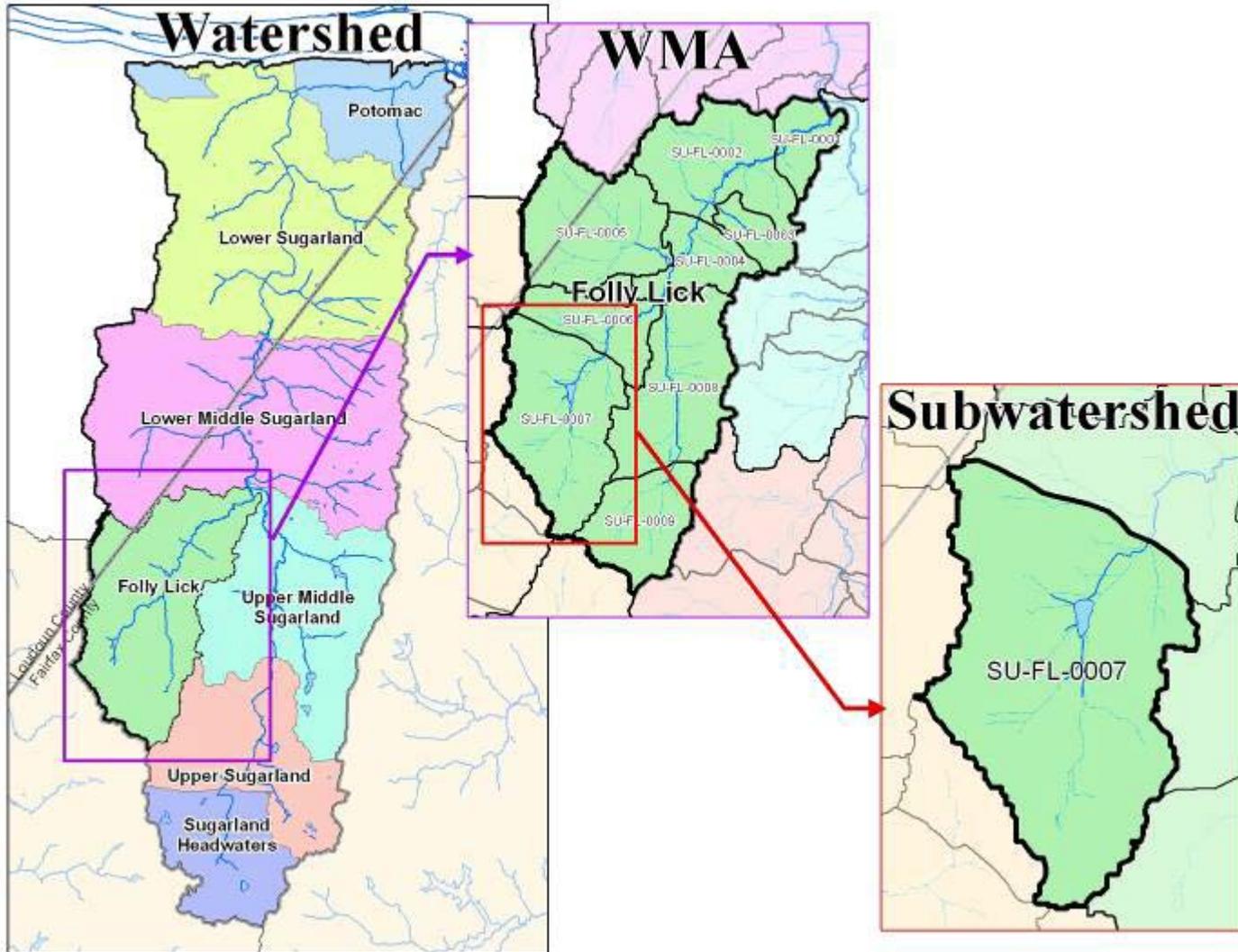
Chesapeake Bay Watershed



Fairfax County Watersheds



Watershed Planning Study Units



Stormwater Management

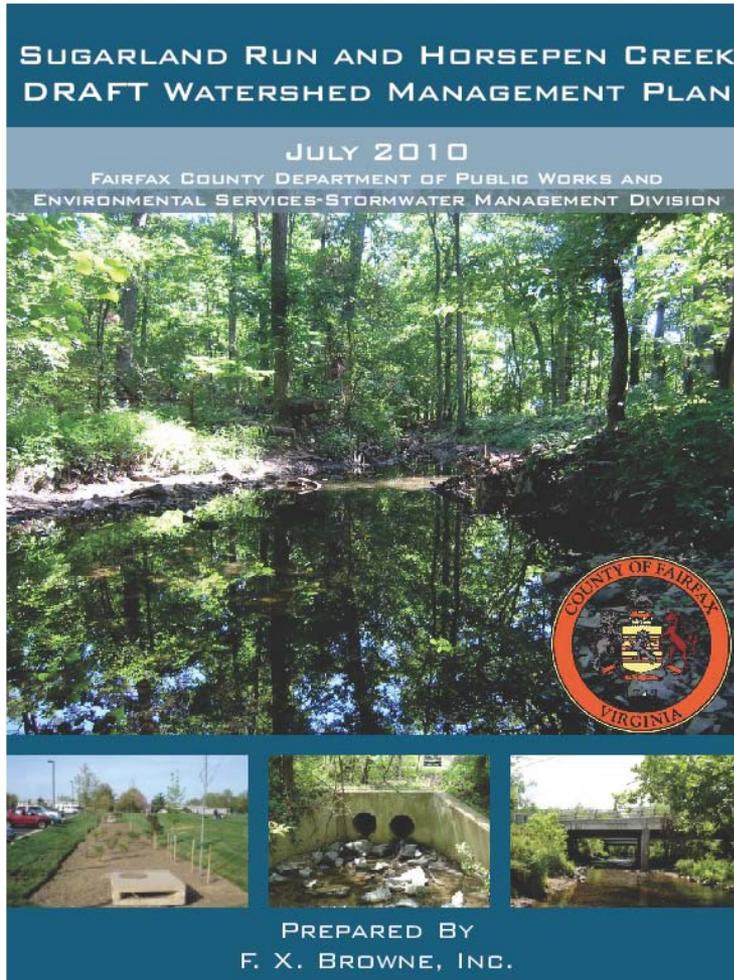
The process of controlling **stormwater runoff** that drains from rooftops, driveways, roads and other hard surfaces that do not allow water to permeate into the ground.



Stormwater Management



What Is a Watershed Management Plan?



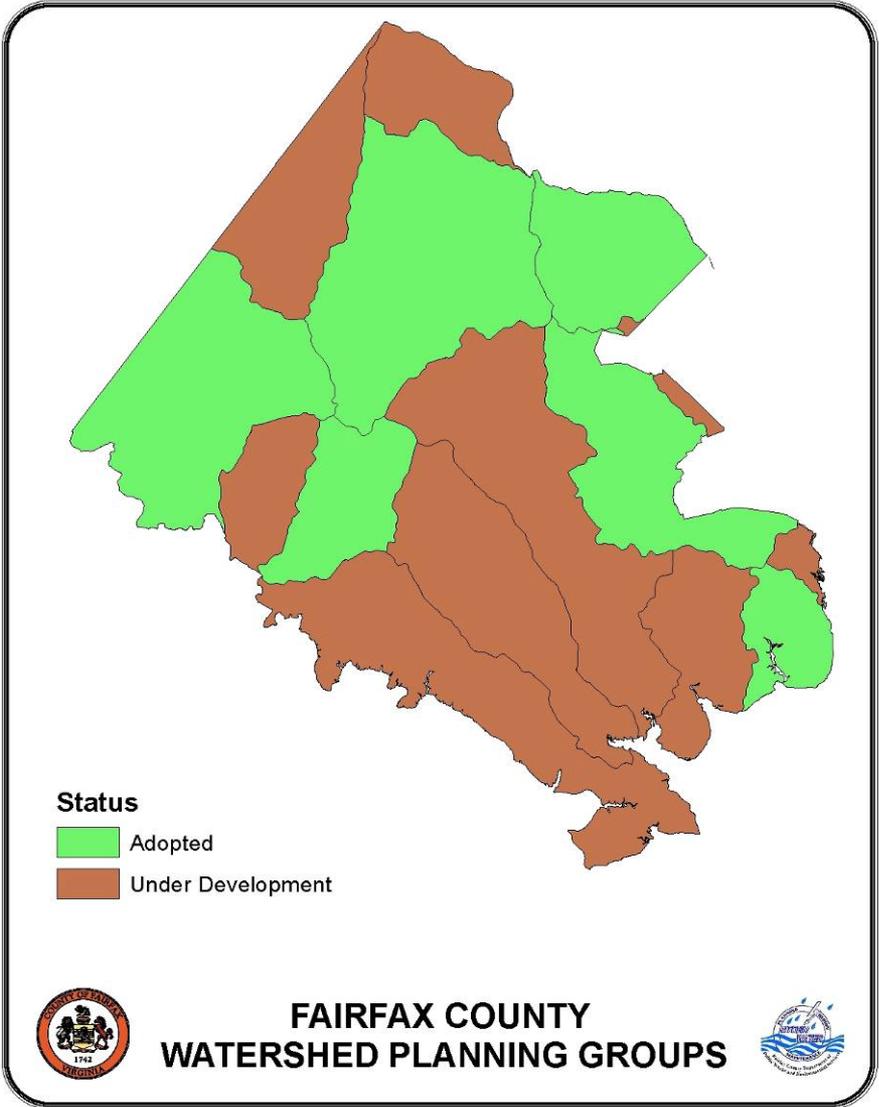
- A Watershed Management Plan is a tool to identify and address the issues affecting our environment.
- The plan contains a 25-year list of proposed projects to protect and restore our streams and other water resources.

Why Create Watershed Plans?

Healthy watersheds, healthier communities



Watershed Planning

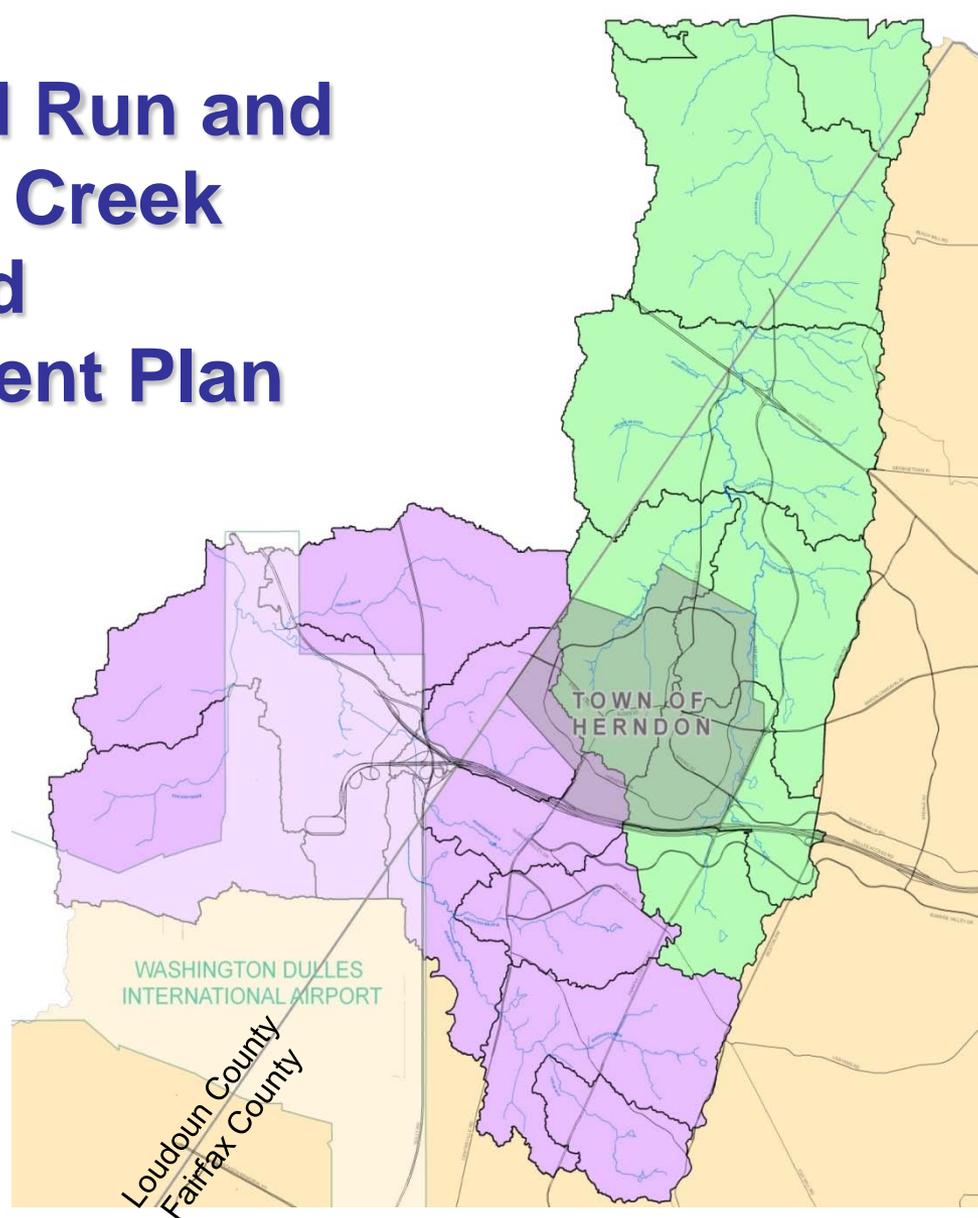


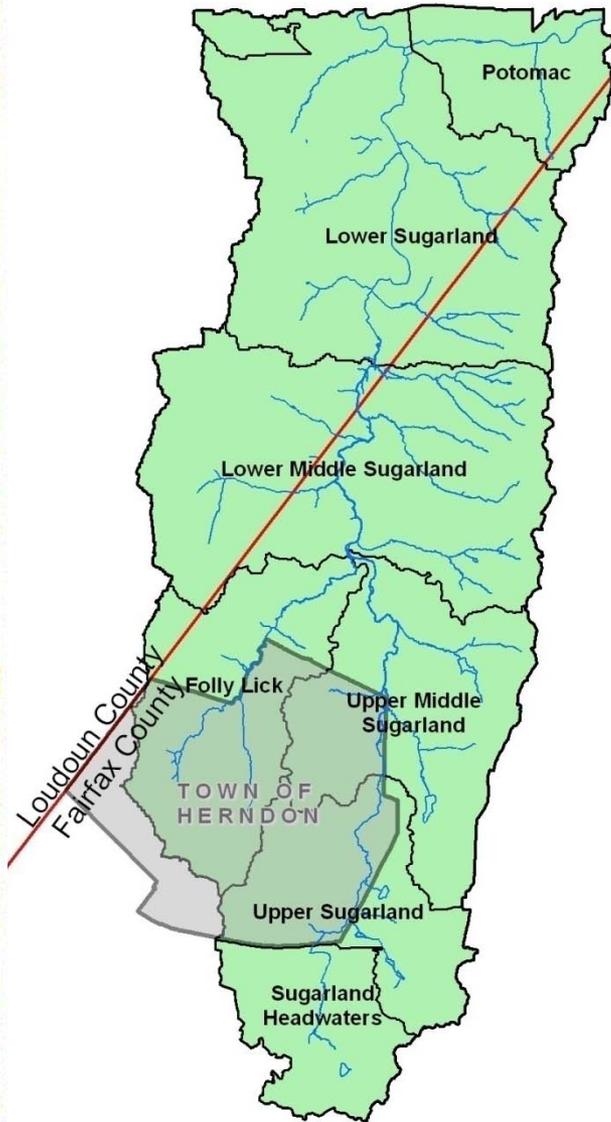
A close-up photograph of a dense field of blue and purple flowers, likely Virginia bluebells, with vibrant green foliage. The flowers are in various stages of bloom, some fully open and others as buds. The background is a soft-focus expanse of similar plants, creating a rich, textured green backdrop.

The Sugarland Run & Horsepen Creek Watershed Management Plan

Melissa Taibi, F.X. Browne

Sugarland Run and Horsepen Creek Watershed Management Plan



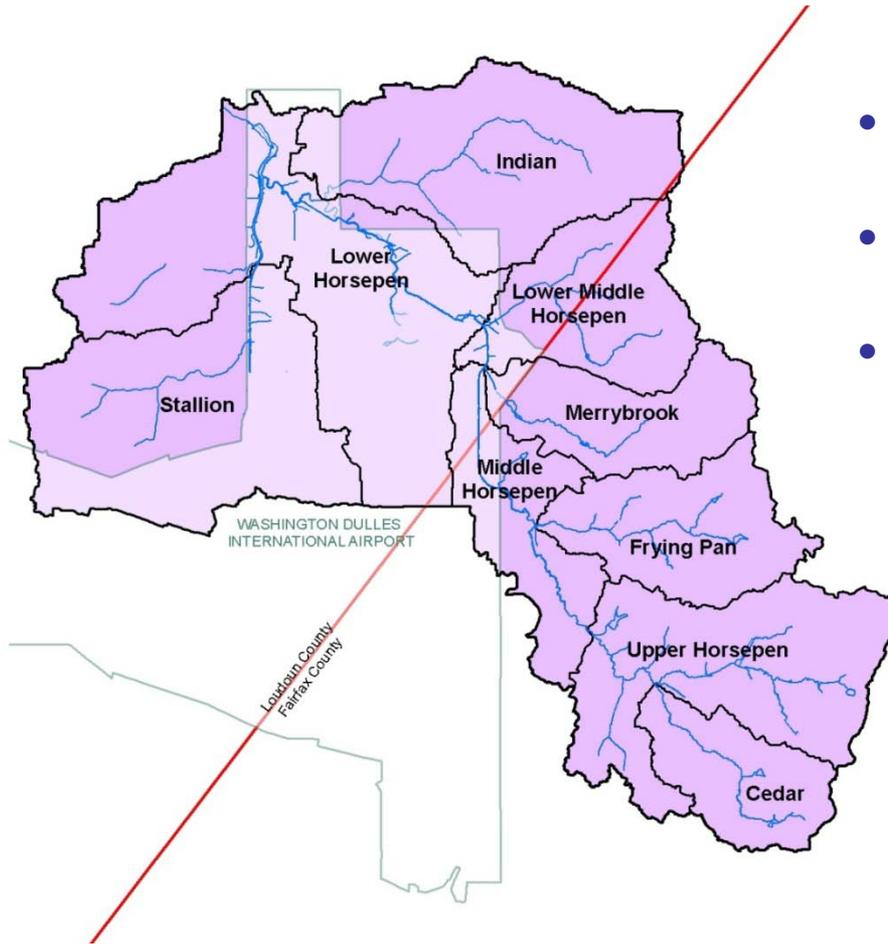


Sugarland Run Watershed

- 22.5 square miles, 13.7 square miles in Fairfax County
- 48.6 miles of perennial streams, 31.0 miles within Fairfax County
- Comprised of seven WMAs:
 - Folly Lick
 - Headwaters
 - Lower Sugarland
 - Lower Middle Sugarland
 - Potomac
 - Upper Sugarland
 - Upper Middle Sugarland



Horsepen Creek Watershed



- 22.8 square miles, 9.8 square miles in Fairfax County
- 36.3 miles of perennial streams, 19.4 miles within Fairfax County
- Comprised of nine WMAs:
 - Cedar Run
 - Frying Pan
 - Indian
 - Lower Horsepen
 - Lower Middle Horsepen
 - Merrybrook
 - Middle Horsepen
 - Stallion
 - Upper Horsepen

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



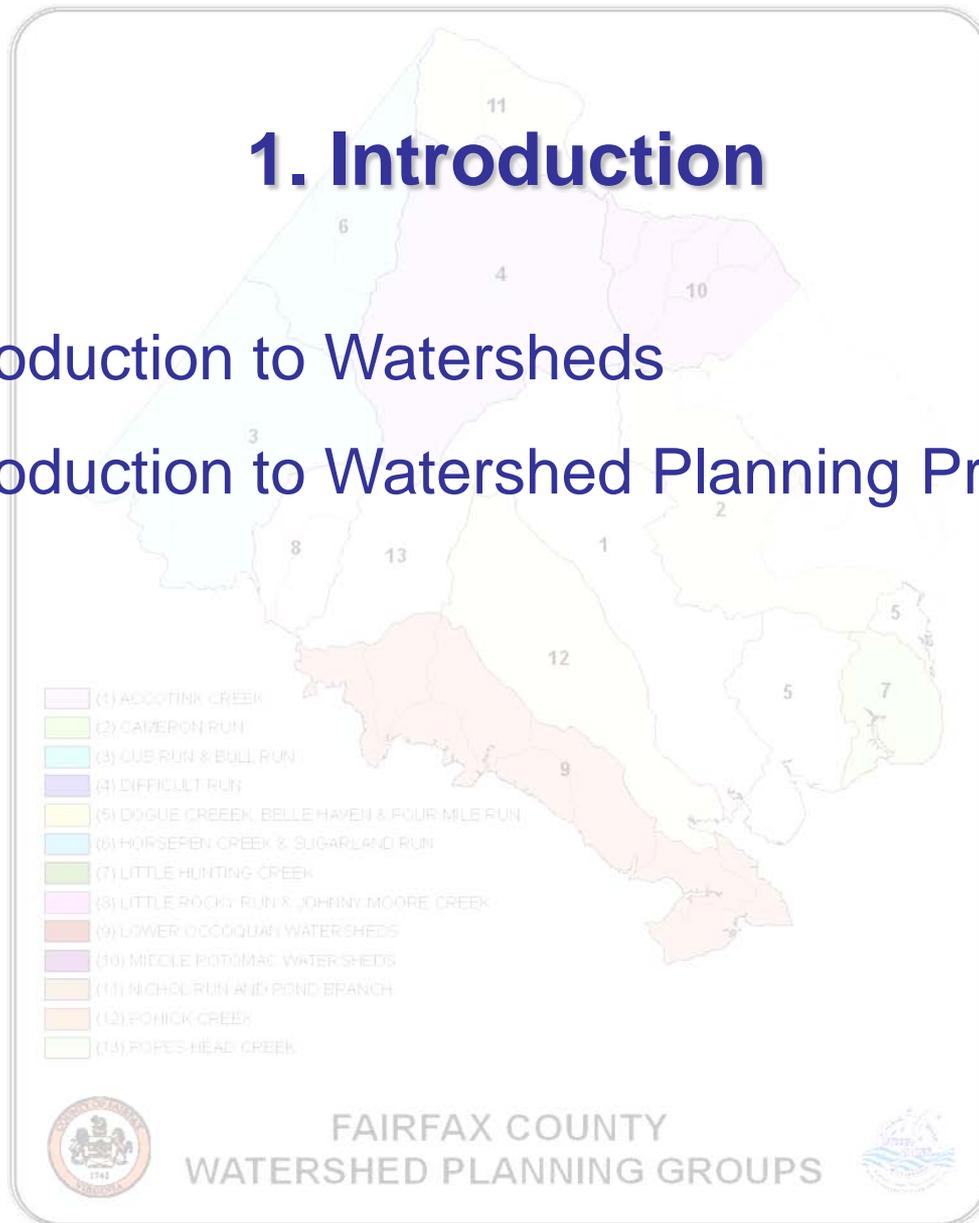
Executive Summary

- 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



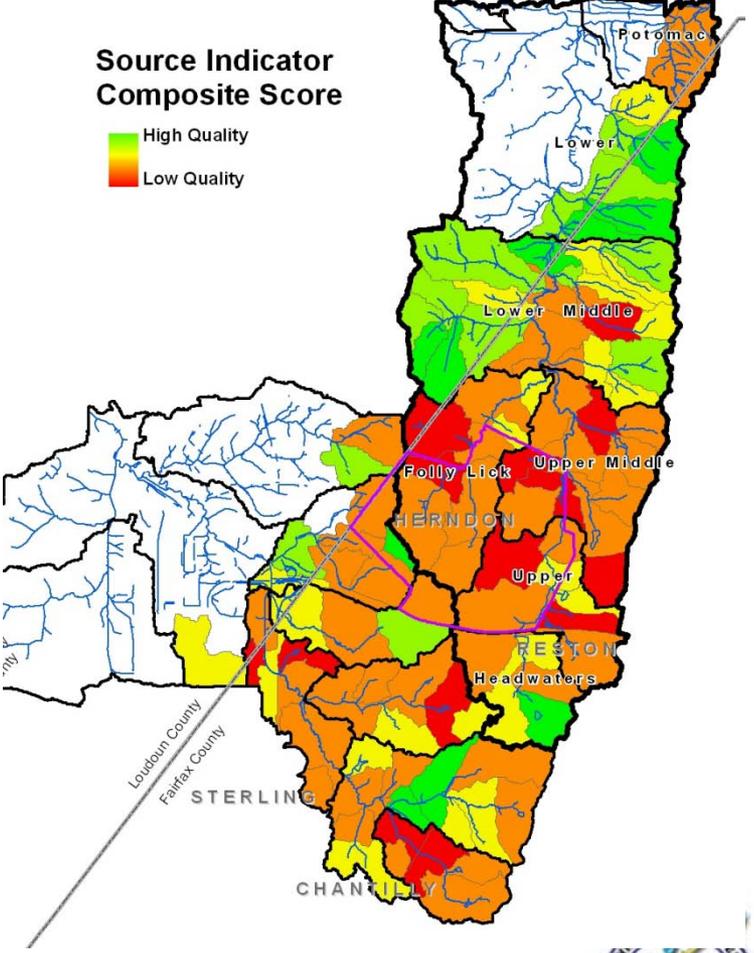
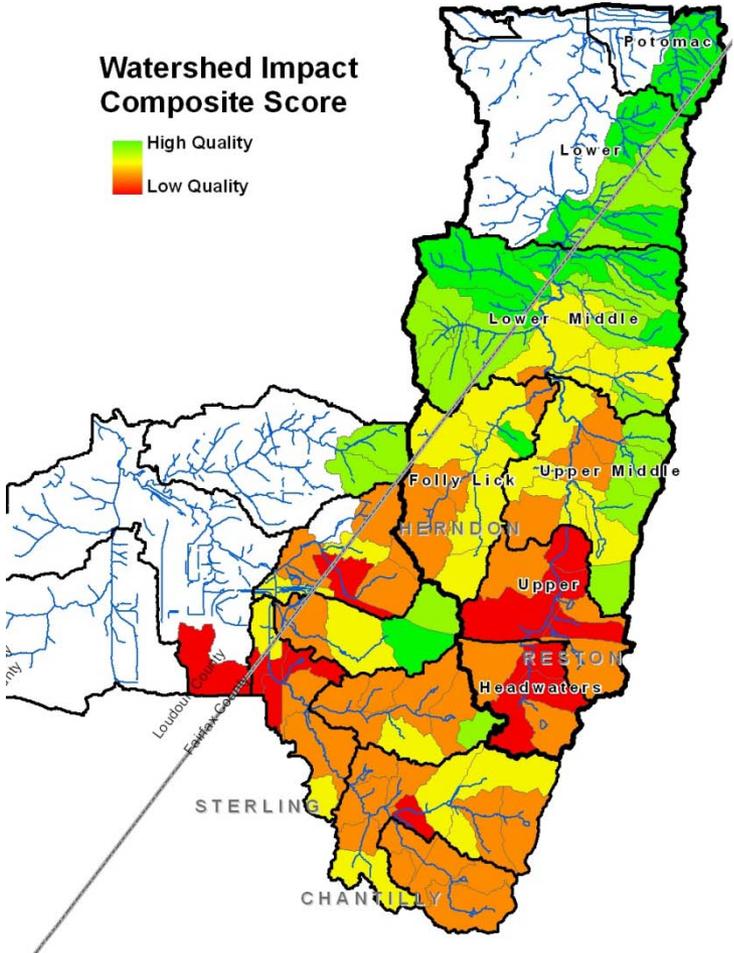
2. Watershed Planning Process

- 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



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**

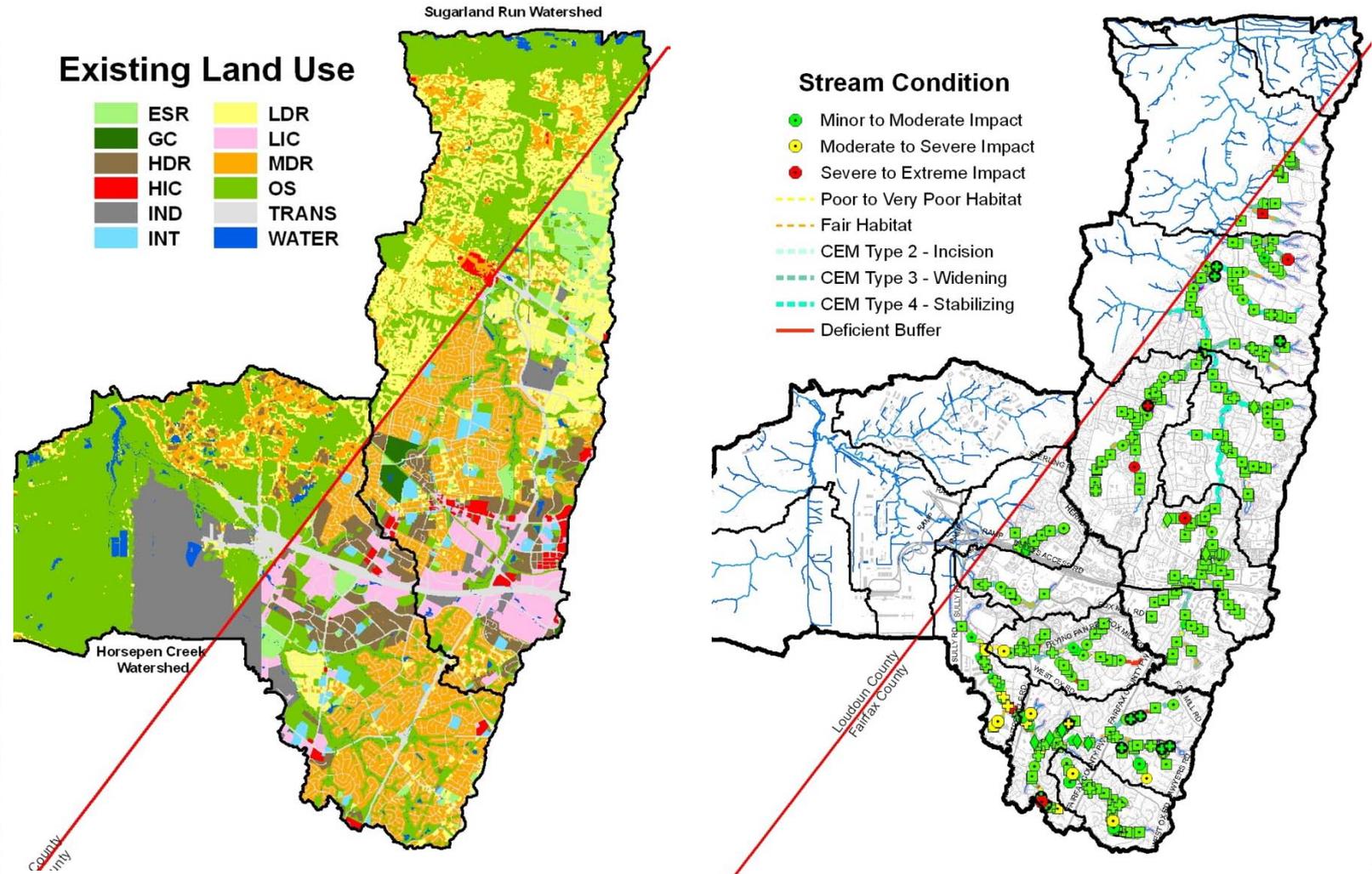
3. Summary of Watershed Conditions

- Summary of Existing Watershed Conditions
 - General WMA information
 - Land use
 - Stream Condition
 - Results of Flooding Model
 - Overall Condition based on Subwatershed Ranking
- Sugarland Run listed before Horsepen Creek
- 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



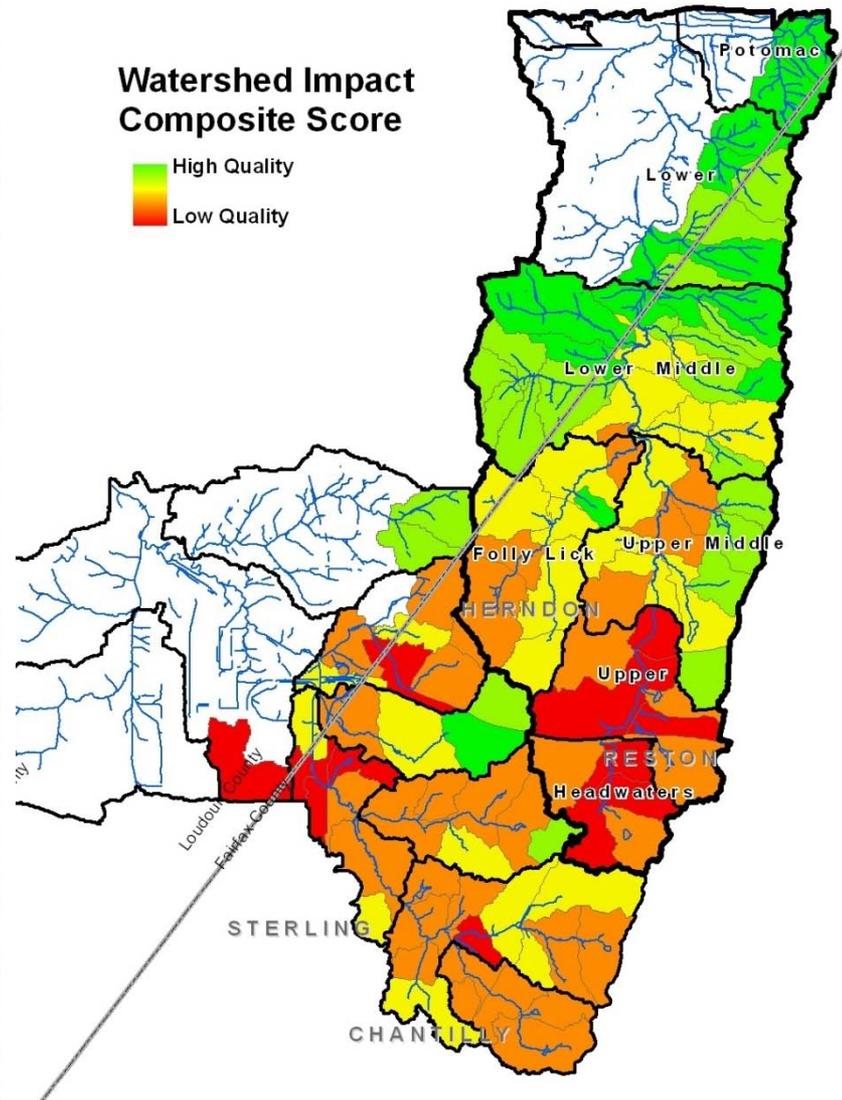
Buffer Restoration



Project Prioritization Process

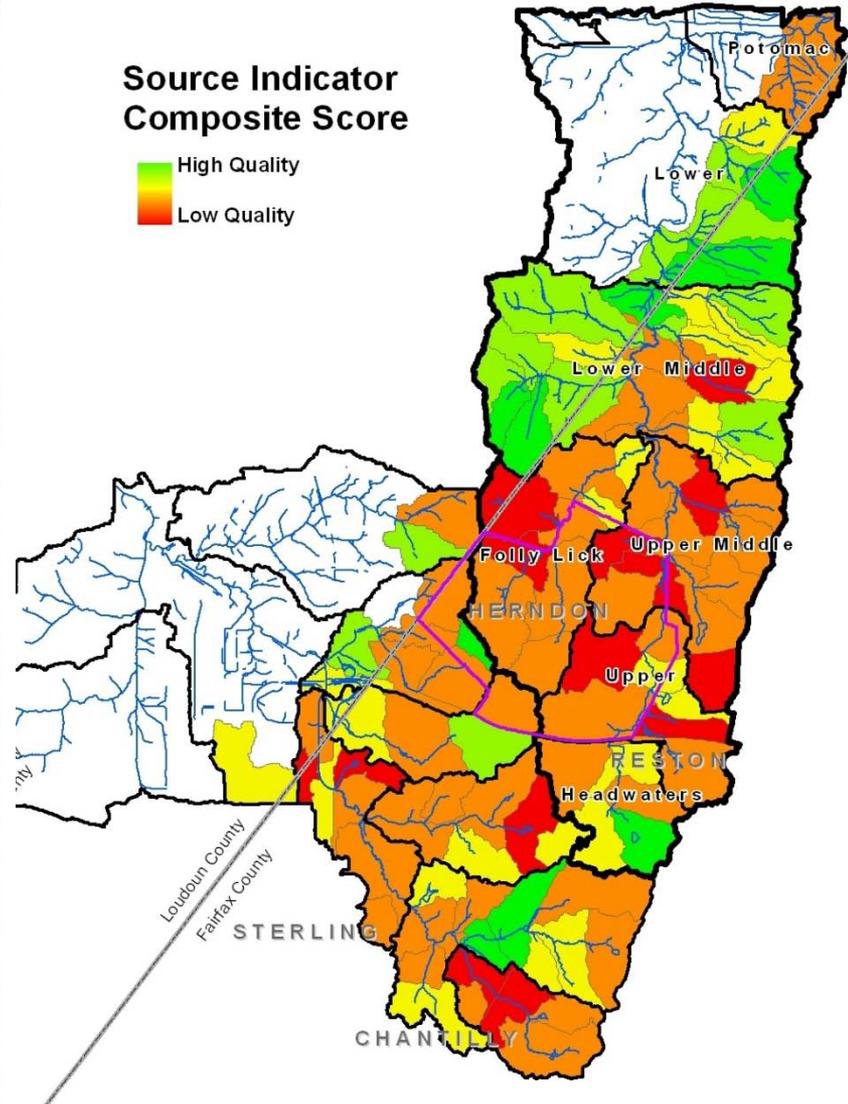
- Effect on Watershed Impact Indicators
- Effect on Source Indicators
- Location within Priority Subwatersheds
- Sequencing
- Implementability

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

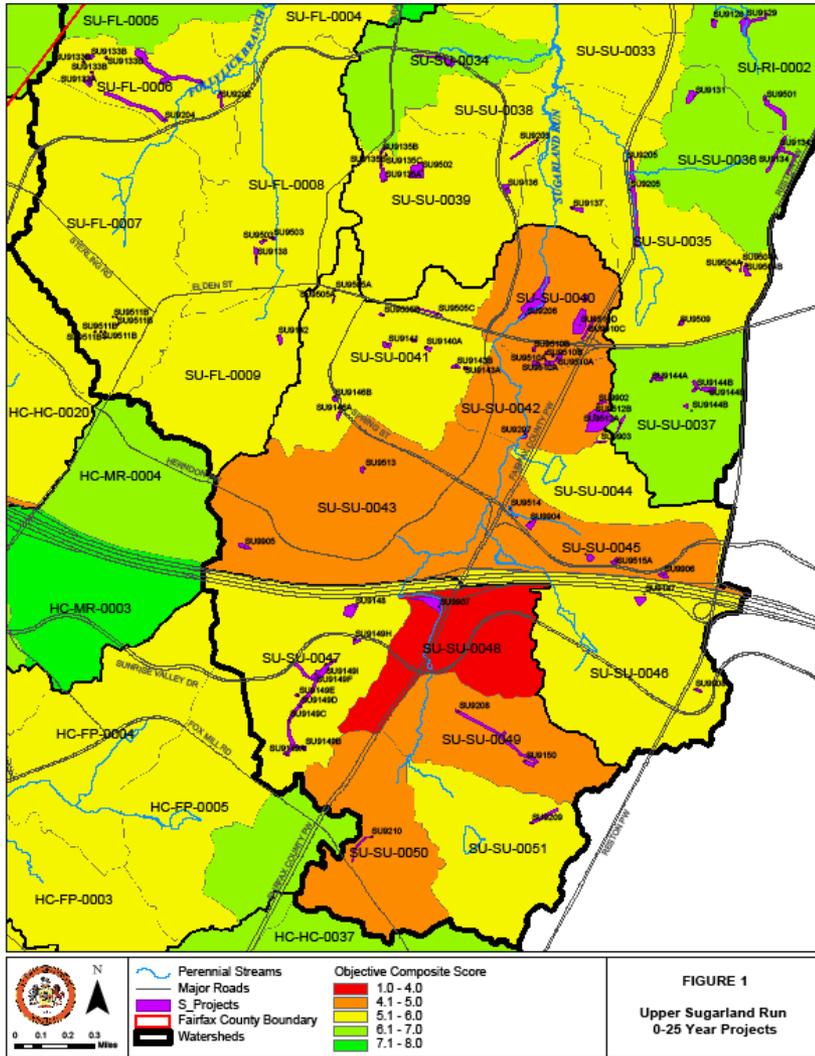
Source Indicators: *Sources of watershed stressors*



- 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.



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
 - 70 best ranked projects in Sugarland and Horsepen
- 25-Year Implementation Plan
 - Next 50 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

- Sugarland Run listed before Horsepen Creek
- 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
- Regional pond alternatives are a larger suite of projects
 - Additional sub-project description, map and costs for each subproject greater than \$80,000
- Fact sheets are grouped by WMA and organized alphabetically with Sugarland WMAs first



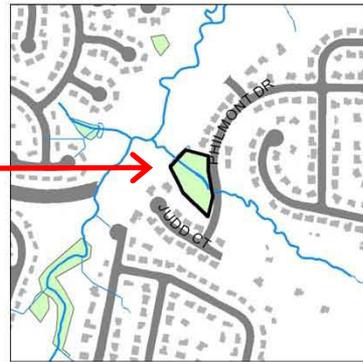
Project # & Type →

SU9123 Stormwater Pond Retrofit

Sugarland Run Watershed
Sugarland - Folly Lick Watershed Management Area

← **Watershed & WMA**

Location Map →



Address:	12538 Philmont Drive
Location:	Near Philmont Drive & Judd Court
Land Owner:	County
PIN:	0102-16-C4
Control Type	Quality/Quantity
Drainage Area	60 acres
Receiving Waters	Folly Lick Branch

Project Info:

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

Project Description →

Description: Improve existing regional dry pond S-04 (1440DP) to enhanced extended detention dry basin with marsh areas. Remove concrete trickle ditch and retrofit outlet structure.



← **Detailed Project Area Map**

Map Legend →

 Retrofit to Enhanced ED Basin

Project Area Map



Project Benefits Qualitative & Quantitative (Modeling)

Project Benefits: An estimated one ton/yr of total suspended solids, 75 lbs/yr of nitrogen, and 10 lbs/yr of phosphorus will be removed. This project will also generally improve water quality, reduce peak stormwater flows for storms up to a 10-year event, and provide for evapotranspiration and wildlife habitat.

Project Design Considerations: Minimal environmental permitting requirements are anticipated. Projects in RPAs may require exemptions or waivers. This is an existing county facility. A storm drainage easement may be necessary. Accessibility is excellent from Philmont Drive. No tree impacts or significant construction issues are anticipated.

Project Design Considerations

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

Costs:

Item	Units	Quantity	Unit Cost	Total
Organic Compost Soil Amendment	CY	158	\$40.00	\$6,320.00
Plantings	AC	0.79	\$25,000.00	\$19,750.00
Grading and Excavation	CY	2535	\$35.00	\$88,725.00
Embankment	CY	200	\$50.00	\$10,000.00
Outflow Pipe	LF	20	\$125.00	\$2,500.00
RipRap Stabilization	SY	11	\$100.00	\$1,100.00
Structural BMP Retrofit and Incidentals (Low)	LS	1	\$10,000.00	\$10,000.00
Initial Project Costs				\$138,395.00
<i>Plantings: 5% of project costs (unless incl. as line item)</i>				\$0.00
<i>Ancillary items: 5% of project cost</i>				\$6,919.75
<i>Erosion and Sediment Control: 10% of project costs</i>				\$13,839.50
Base Construction Costs				\$159,154.25
<i>Mobilization (5%)</i>				\$7,957.71
Subtotal 1				\$167,111.96
<i>Contingency (25%)</i>				\$41,777.99
Subtotal 2				\$208,889.95
<i>Engineering Design, Surveys, Land Acquisition, Utility Relocation and Permits (45%)</i>				\$94,000.48
Total Costs				\$302,890.43
<i>Estimated Project Costs</i>				\$310,000.00

Detailed
Project Costs

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-year Implementation Plan Modeled

Water Quality Benefits of 25-year Implementation Plan Will Be Added for Final Plan

Watershed	Area (ac)	Scenario	Runoff Volume (in/yr)		Peak Flow (cfs/ac)		TSS (lb/ac/yr)	TN (lb/ac/yr)	TP (lb/ac/yr)
			2 Year	10 Year	2 Year	10 Year			
Sugarland Run	14,407.07	Existing Condition	613.11	1,447.72	0.070	0.170	198.83	4.850	0.702
		Future Without Projects	649.40	1,550.05	0.075	0.178	202.51	4.952	0.714
		Future With Projects	624.97	1,516.01	0.072	0.174	193.48	4.826	0.693
		Reduction (10-year Plan)	-24.43 -4%	-34.04 -2%	-0.003 -4%	-0.004 -2%	-9.03 -4%	-0.13 -3%	-0.021 -3%
Horsepen Creek	14,597.04	Existing Condition	1,176.07	2,625.44	0.140	0.300	213.24	4.80	0.660
		Future Without Projects	1,342.96	2,972.98	0.155	0.342	220.20	4.99	0.682
		Future With Projects	1,327.69	2,924.03	0.153	0.336	205.48	4.88	0.661
		Reduction (10-year Plan)	-15.27 -1%	-48.95 -2%	-0.002 -1%	-0.006 -2%	-14.72 -7%	-0.12 -2%	-0.021 -3%





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 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.

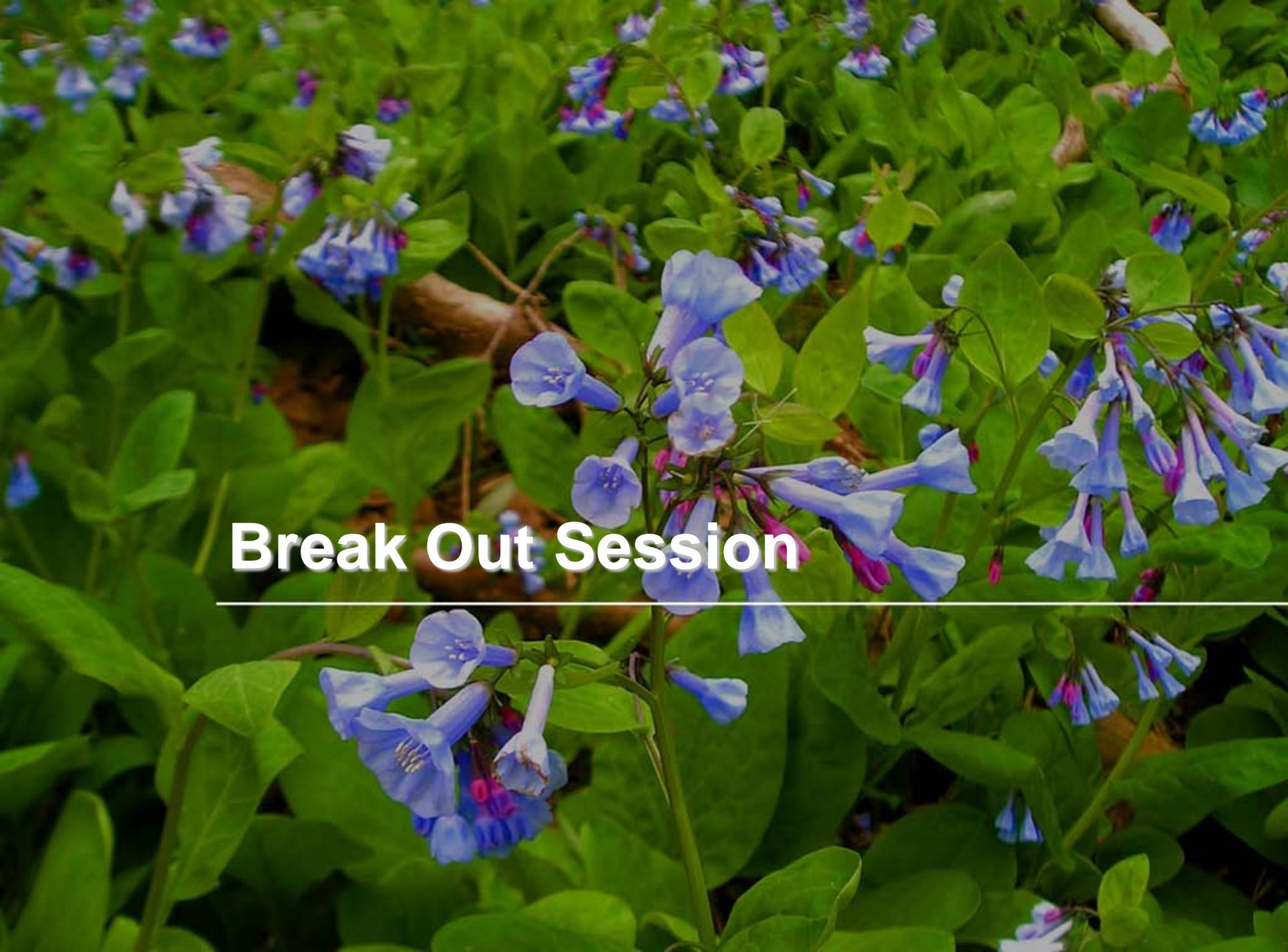
Comment Period and Timeline

How to Provide Comments

- Tonight – in breakout groups
- Online Comment Form
http://www.fairfaxcounty.gov/dpwes/watersheds/sugarlandrun_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 9/3/10)
 - 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 (late 2010)

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

Policy and Action Recommendations

- The first six plans had >300 policy and action recommendations
- The full list can be found at: www.fairfaxcounty.gov/dpwes/watersheds/wspolicyrec.htm
- Round 2 plans do not have any p/a recommendations
- P/A recommendations are being dealt with concurrently to completing final WMPs

Recommendations may be divided into eight categories:

1. BMP/LID
2. Coordination
3. Enforcement and Inspections
4. Land-Use Policies
5. Outreach and Education
6. PFM
7. Watershed Improvements
8. Other