

Sugarland Run and Horsepen Creek Watershed Management Plan

Watershed Advisory Group #1
December 10, 2008

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

Group Expectations

Juliana Birkhoff, CBI

Group Expectations

- Comments are offered as individuals and are exploratory.
- Meeting notes will not attribute comments to specific individuals.
- 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.

Watershed Program Background, Purpose & Policy Recommendation Process

Fred Rose

Why Develop Watershed Plans?

- Current Watershed Master Plan is over 25 years old
 - Conditions have changed – over 80% built-out
 - Need for identification of new capital projects
 - Need for identify opportunities for non-structural measures
- Community demands improved stream conditions – Quality of Life Issues
- Need for increased community collaboration and outreach
- Keep pace with changing Regulatory Requirements
 - Meeting the state's commitment of the Chesapeake Bay 2000 Agreement, 2/3 of watershed to have plans developed by 2010
 - NPDES/MS4 permit requirements
 - Development and implementation of TMDLs for impaired water bodies
- Identify needed Policy, ordinance and PFM requirement changes
 - Regional ponds versus onsite controls
 - Impacts of infill development



Early History

- Comprehensive watershed master plans were completed in late 1970's
- These plans primarily addressed conditions at the time:
 - Flooding
 - Stream erosion
 - Predicted the impact of the 2000 built condition as Future Basin Plans

Early History

- The Occoquan “down-zoned” case in 1982 resulted in preservation of low density development (1 dwelling per 5 acres) for significant areas in the Occoquan watershed within the county
- Best Management Practices (BMPs) were adopted in PFM for Occoquan area – 50% removal of phosphorus (P) required
- The Regional Pond Plan was developed and approved by the Board 1989 – approximately 150 facilities were sited mainly in western parts of county. Regional ponds are included as projects funded by pro-rata share.

The Last Decade

- Chesapeake Bay Preservation Act was adopted in 1993:
 - led to county's Chesapeake Bay Preservation Ordinance featuring Resource Protection Areas (RPA)
 - PFM requirement for BMPs for all areas outside the Occoquan watershed to achieve 40% P removal for new developments, 10% for redevelopment
- Application and receipt of first VPDES/MS4 Permit in 1997
- Failed attempt to adopt a Stormwater Utility in 1998
- Implementation of a Stream Protection Strategy (SPS) started in 1998

The Last Decade

- SPS Baseline Study completed in 2000, published January 2001 concluded that over 70% of streams were degraded, some key recommendations were:
 - Develop more detailed watershed plans for protection and restoration of streams
 - Continue annual monitoring to determine trends
 - Support ongoing federal, state and other county environmental initiatives
 - Establish working partnerships with residents to support environmental stewardship efforts

Watershed Planning Program Timeline

- Series of stakeholder meetings held between 2000-2001 to jump-start the development of watershed plans
- Options were decided on regarding the county-wide stream physical assessment (SPA) June 2001
- Renewal of MS4 Permit in January 2002 - led to significant increases in program requirements including need to develop watershed plans
- County-wide modeling standards and guidelines for Public Involvement (PI) were developed between 2002 and 2003



Watershed Planning Program Timeline

- 1st Watershed plan commenced for Little Hunting Creek in March 2003
- 2nd watershed plan for Popes Head Creek commenced in July 2003 – 3 others followed:
 - Cameron Run
 - Cub Run/Bull Run
 - Difficult Run
- 6th watershed plan for Middle Potomac Basins commenced in October 2004
- 1st watershed plan, Little Hunting Creek was adopted by Board Feb. 2005

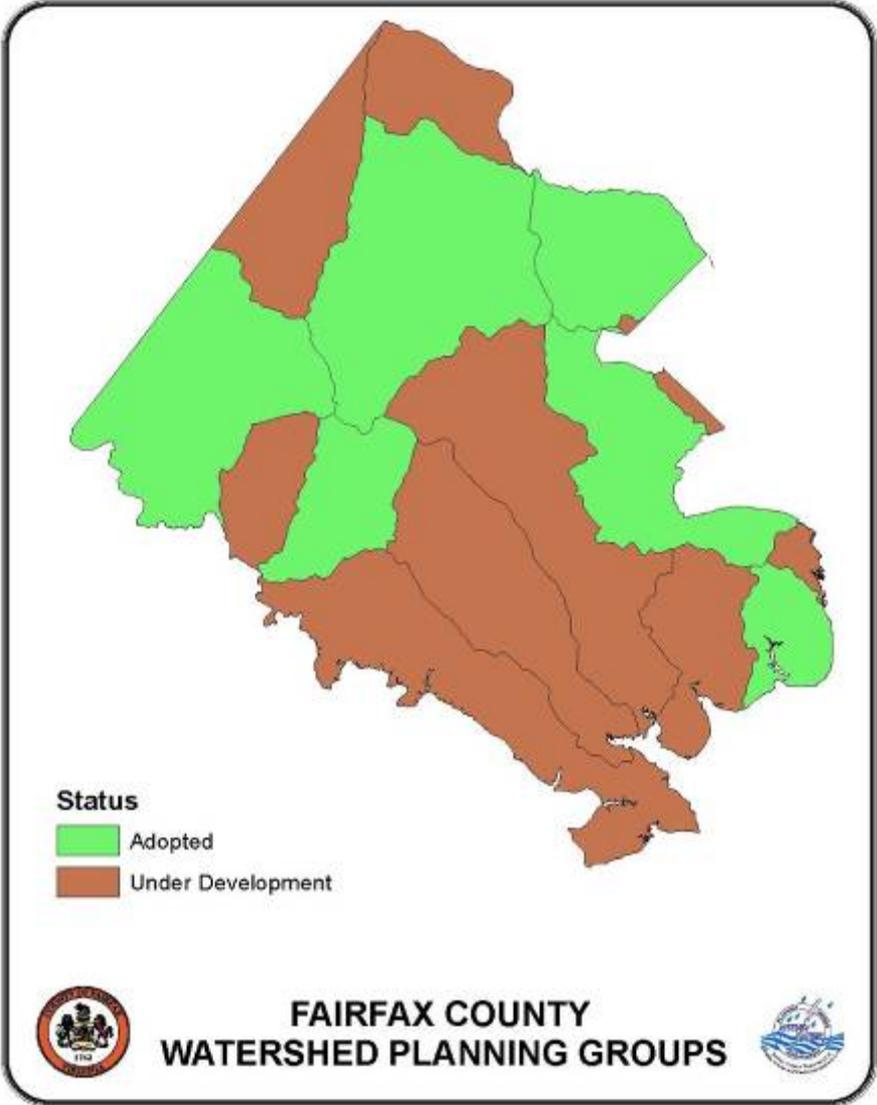
Watershed Planning Program Timeline

- Watershed planning program evaluation by CBI completed in July 2005 – resulted in streamlining of PI process for future plans
- Stormwater Needs Assessment study and advisory committee activities were conducted between May 2004 – March 2005
- Instead of SW Utility, Board adopted one-penny real estate tax revenue dedication for stormwater programs including implementation of watershed plan projects April 2005 – averages \$20M/year for last 4 years

Watershed Planning Program Timeline

- 2nd round (7 plans/19watersheds) commenced with Tetra Tech overall watershed modeling and other support work in Dec 2006
- 2nd round plans are being done concurrently rather than sequentially – big difference from 1st round
- Middle Potomac plan adopted by Board May 2008 – last of 1st round plans
- To date, plans are completed for approximately 50% of county land area – 6 plans/11 watersheds

Watershed Planning



Watershed Planning Program Timeline

- Watershed Consultants for 2nd round have completed existing condition watershed characterization leading to workbooks and the Issues Scoping Forums
- Development underway of a Watershed Data Management System to house data from all plans
- A county-wide prioritization system being developed to aid implementation through annual budget process

Policy Recommendations Process

~300 policy recommendations were taken from the six completed watershed management plans and broken into eight categories.

BMP/LIDs	Interagency Coordination	Enforcement and Inspection	Land-Use Policies
Outreach and Education	PFM Modifications	Watershed Improvements	Other

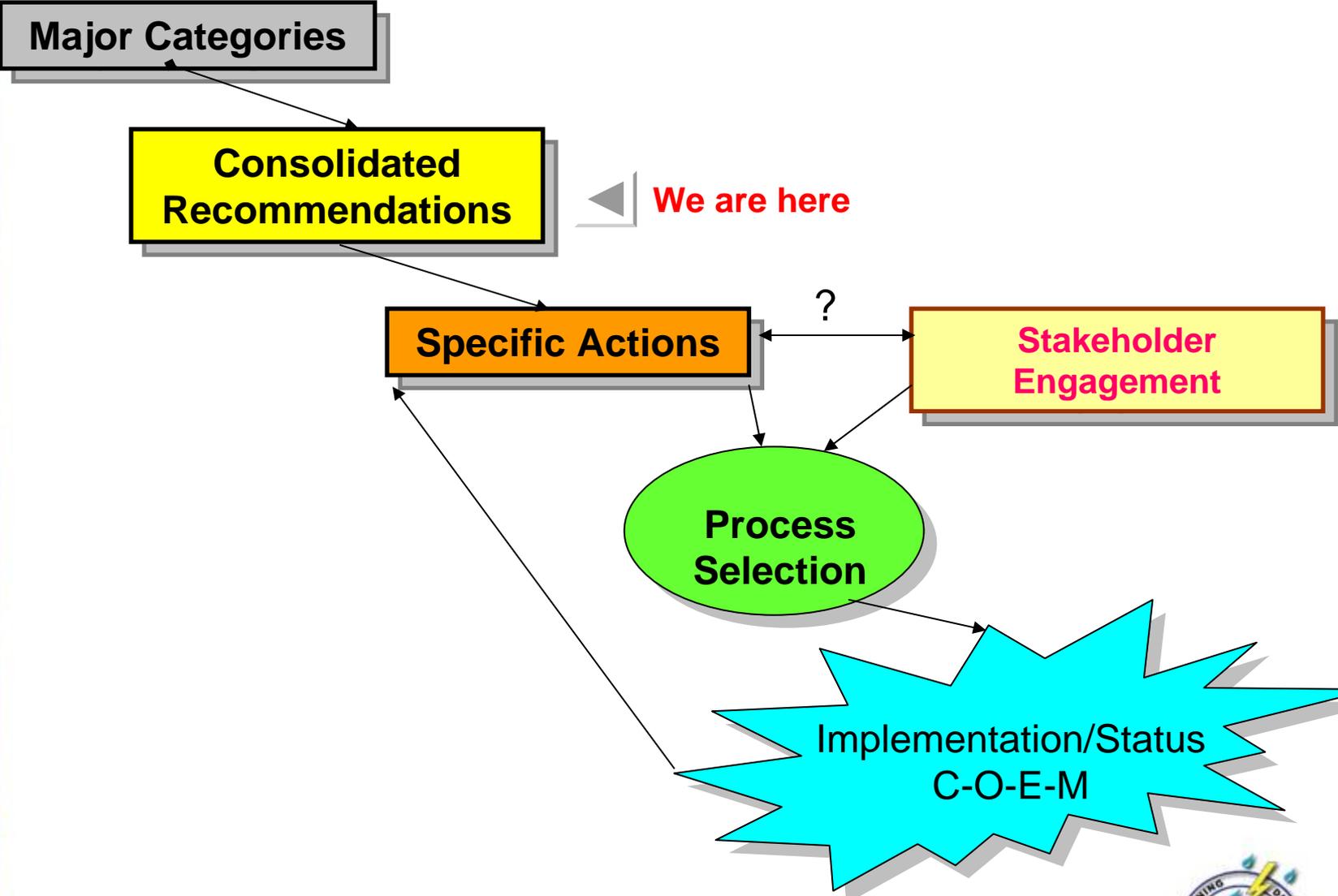
The recommendation list from each category were further consolidated into general themes

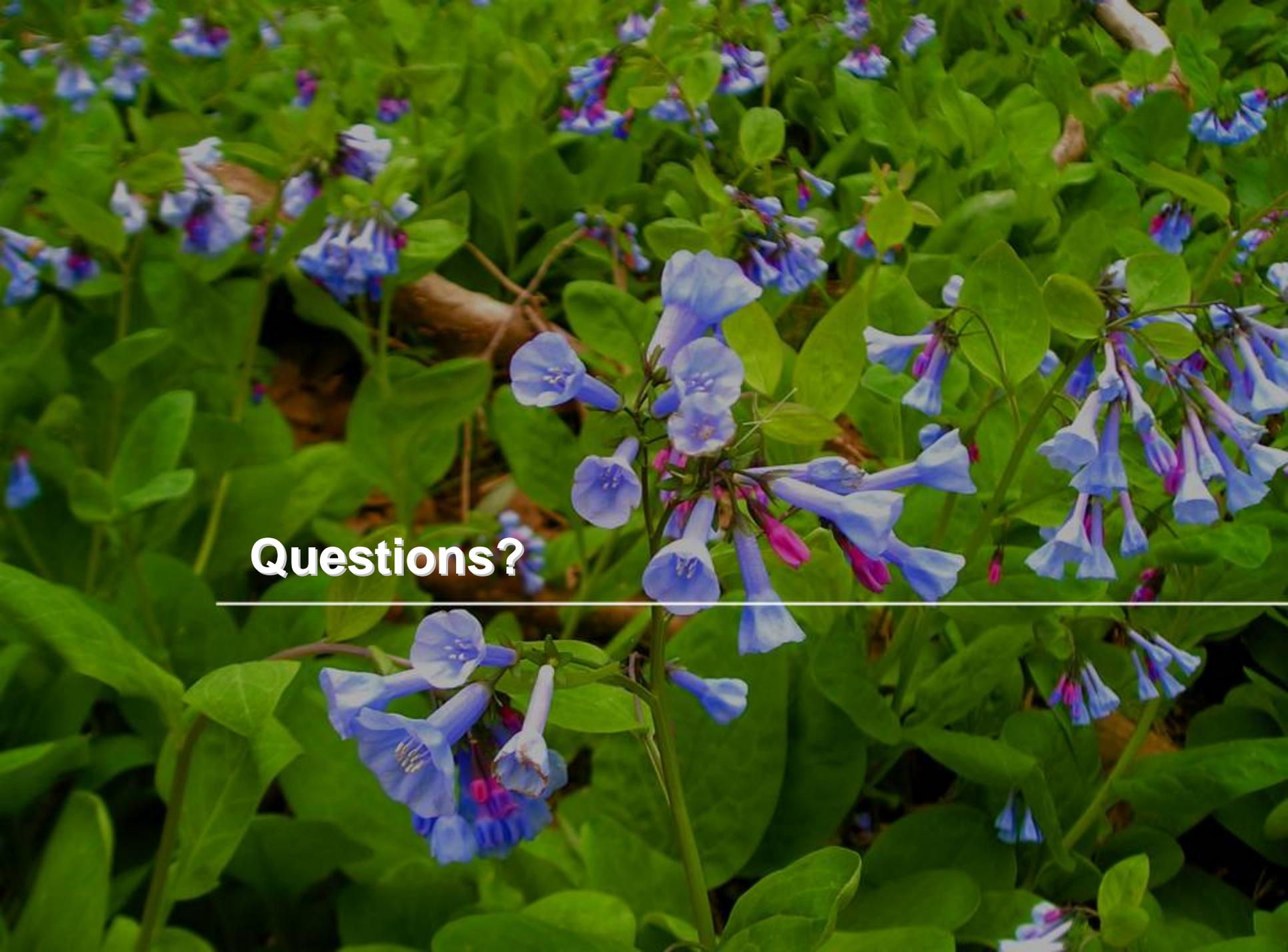
Consolidated Recommendations Example

Originally 28 BMP/LID recommendations – consolidated into 8

Recommendation	Action	Process	Status
Study BMP effectiveness	Implemented	NA	Monitor
Require developers to use LID to max extent possible	TBD	TBD	Ongoing
Require public facilities to use LID to max extent possible	TBD	TBD	Ongoing
Install BMPs to reduce the amount of N and P in facilities that do not have WQ controls	TBD	TBD	Ongoing
Allow LID on private lots	TBD	TBD	Ongoing
Update LID list in PFM	TBD	TBD	Ongoing
Standardize STW credits for innovative design	TBD	TBD	Ongoing
Retrofit existing STW facilities	Implemented	NA	Monitor

Policy Recommendations Process



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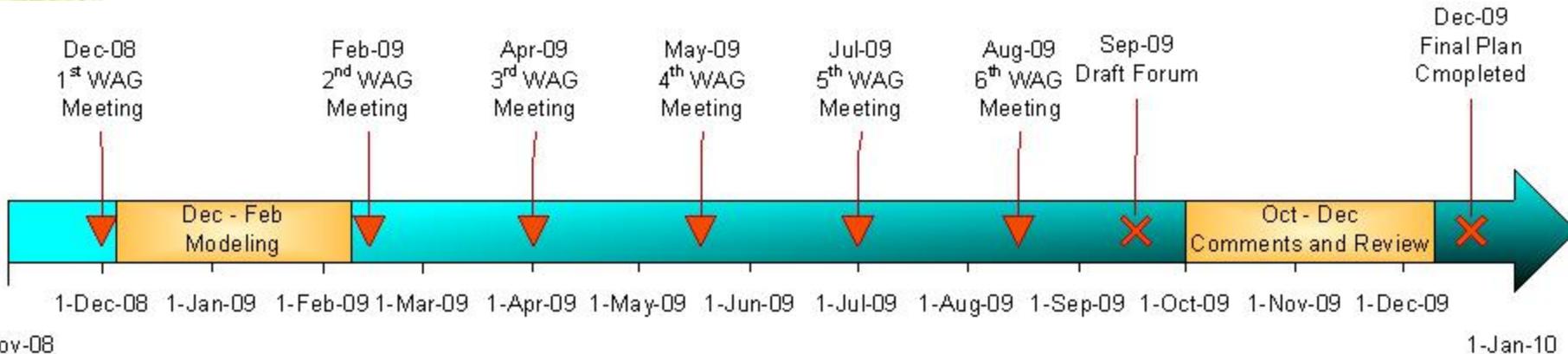
Questions?

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.

Timeline for the Sugarland Run and Horsepen Creek plan

Joe Sanchirico, Fairfax County

General Timeline

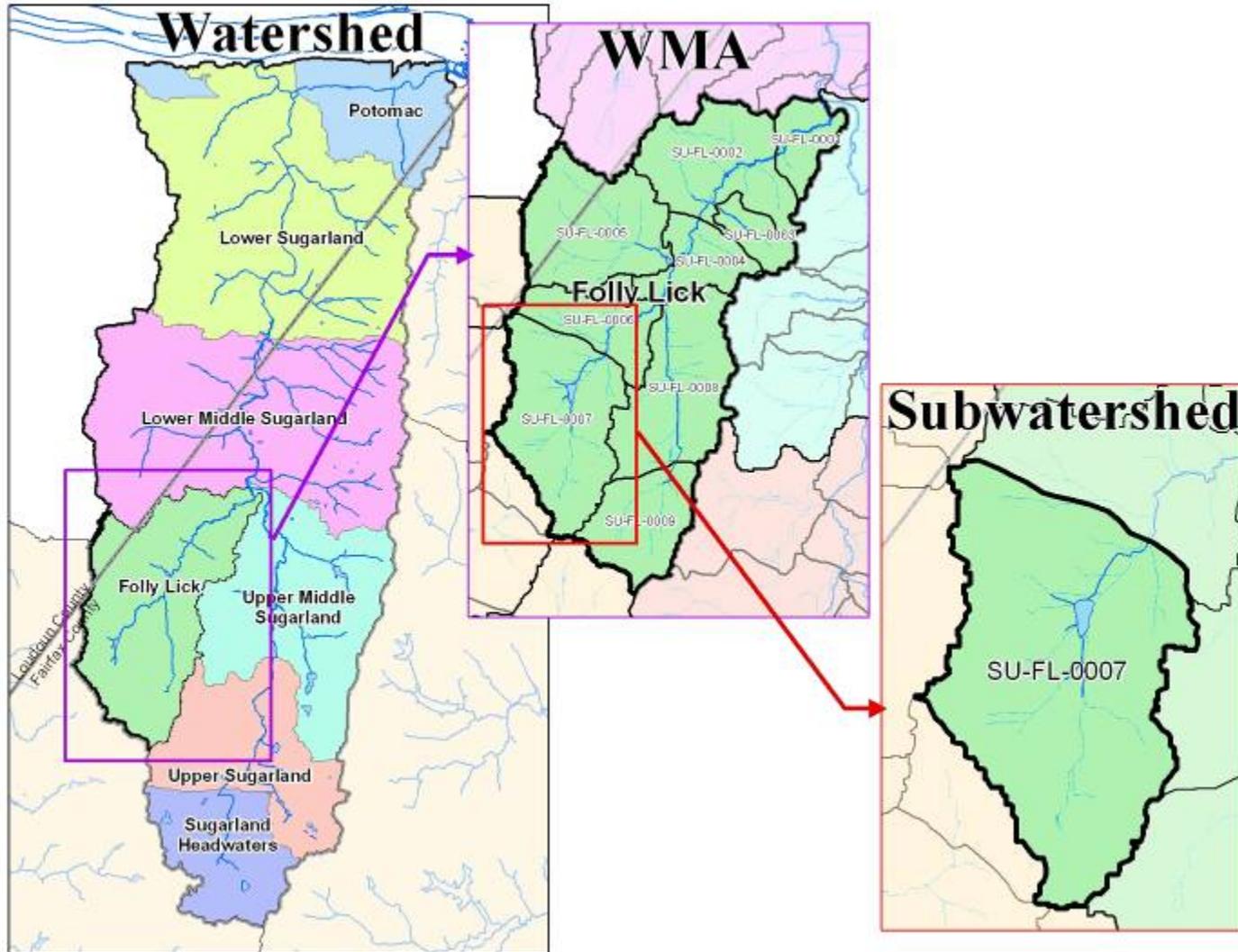


- **WAG #1:** Orientation to process
- **WAG #2:** Review Project Types and Restoration Strategies
- **WAG #3:** Prioritize & Evaluate Proposed Projects
- **WAG #4:** Prioritize & Evaluate Proposed Projects (cont'd)
- **WAG #5:** Prioritize & Evaluate Proposed Projects (cont'd)
- **WAG #6:** Review Draft Plan & Comment

Draft Plan Public Forum/ Public Comment period (30 days)

Finalize Plan and Submit to BOS for Adoption

Watershed Planning Study Units



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WAG Participation Guidelines

Juliana Birkhoff, CBI

Watershed Advisory Group Participation Guidelines

- **Substantive**
 - Goal is to develop recommendations for the County on watershed issues, problems, and preferred options to address restoration and preservation
- **Organizational**
 - WAG includes representatives from homeowners associations, environmental, recreation, civic, educational, other county and state organizations
 - Public welcome to observe
 - WAG responsible for representing constituency and outreach
 - Expect process to last ~10 months
 - County will consider all comments- but may not end up in plan

Watershed Advisory Group Participation Guidelines

- **Procedural**

- Consensus seeking decision making
- Facilitated discussions with flip chart or note taking by team to document
- One person per organization, others may act as alternates
- 4-6 meetings, please attend all
- Meeting summaries will be shared and posted on web site, updated watershed documents
- Draft Plan will be presented at the Draft Plan Forum for review

- **Behavioral**

- Basic good meeting participation

- **County will publicize meetings and progress**

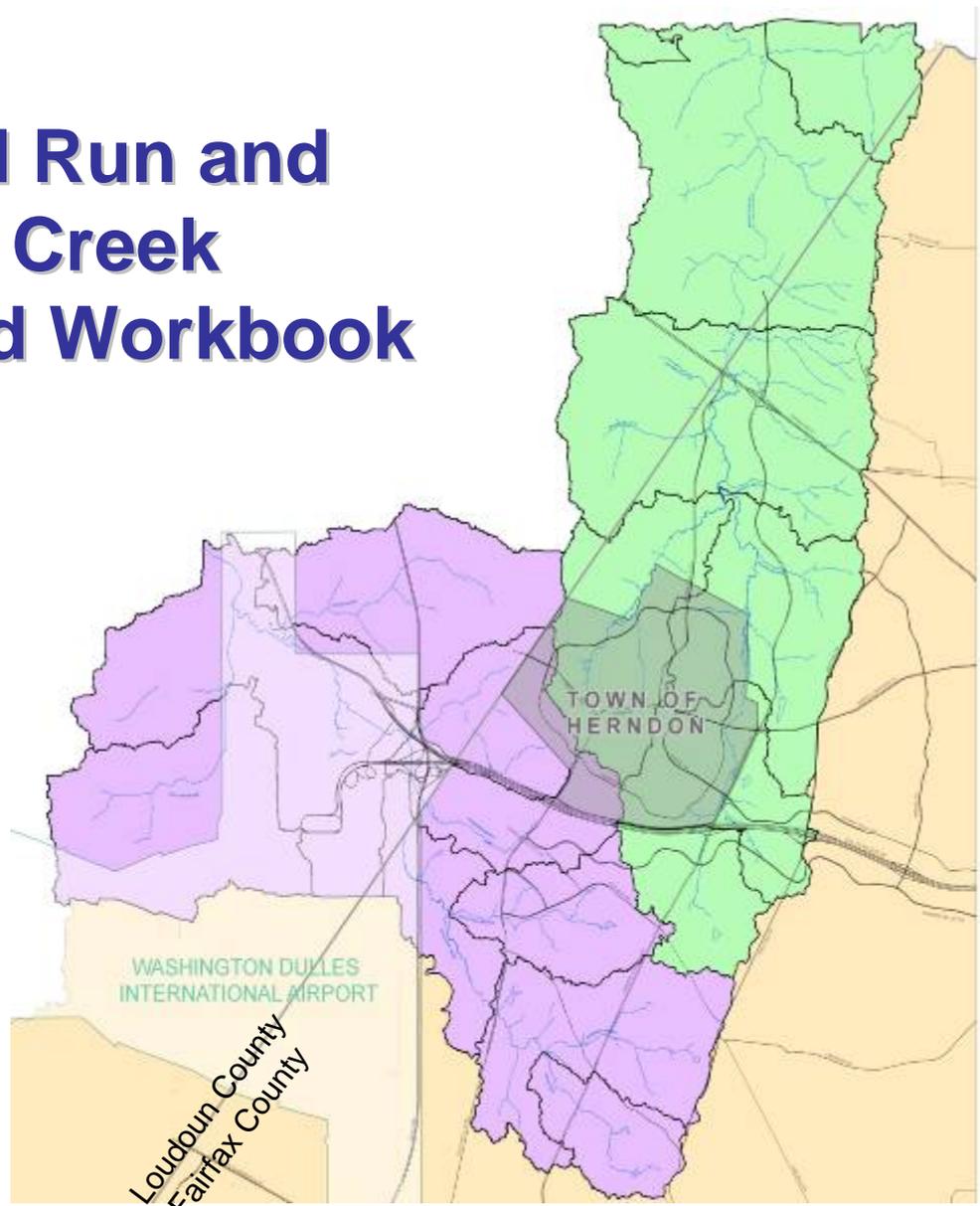


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Watershed Workbook



Sugarland Run and Horsepen Creek Watershed Workbook



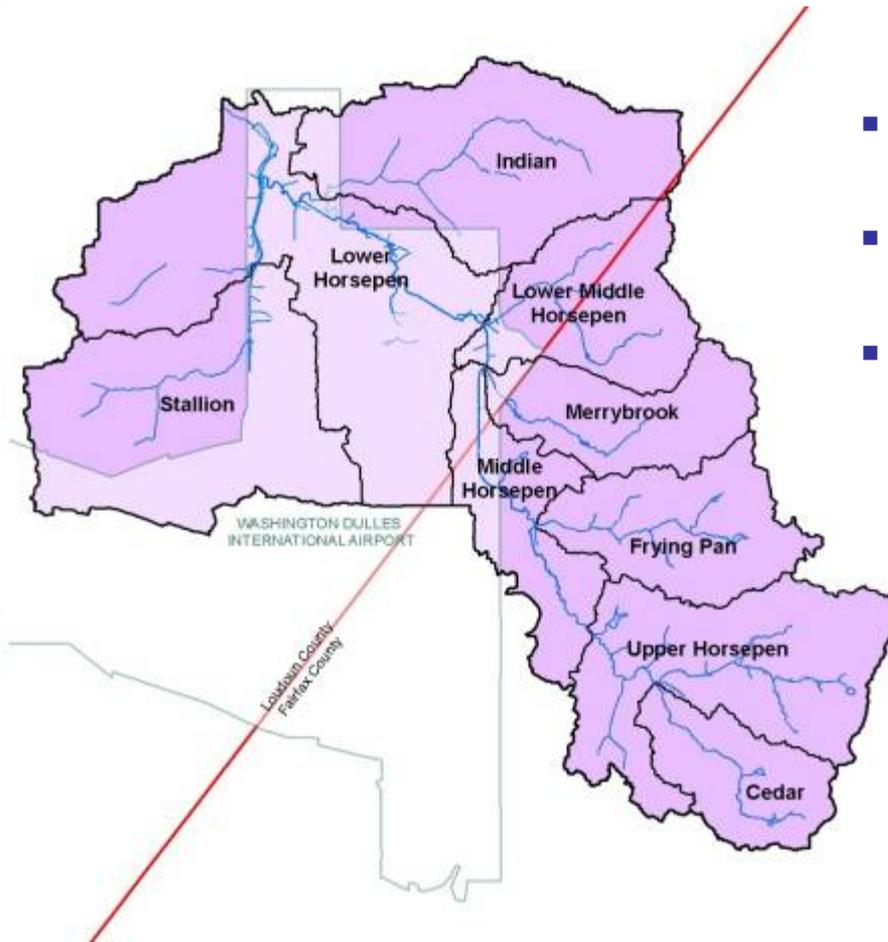


Sugarland Run Watershed

- 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



Watershed Workbook Structure

- Chapter 1 – Introduction
- Chapter 2 – Watershed Study Methodology
- Chapter 3 – Sugarland Run Watershed
- Chapter 4 – Horsepen Creek Watershed
- Chapter 5 – Glossary of Terms
- *Future Addition – Restoration Strategies*

Chapter 1 – Introduction

- Background, Goals & Objectives
- Watershed Workbook Organization
- Watershed History and Condition
 - General Watershed Characteristics
 - Watershed History and Population Growth
 - Existing and Future Land Use
 - Aquatic Environment
 - Terrestrial Environment
 - Resource Protection Areas
 - Stormwater Management



Chapter 2 – Watershed Study Methodology

- Watershed Management Areas and Subwatersheds
- Existing and Future Land Use
- Field Reconnaissance and Stream Physical Assessment
- Watershed Characterization
- Modeling
- Subwatershed Ranking

Field Reconnaissance



- Stormwater Management
- Stormwater Infrastructure
- Drainage Complaints
- Proposed County Projects
- Neighborhood Assessments
- Hot Spot Assessments



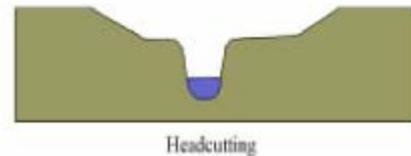
Stream Physical Assessment

Channel Evolution Model

Stage 1 –
Stable



Stage 2 –
Incision



Stage 3 –
Widening



Stage 4 –
Stabilizing



Stage 5 -
Stable

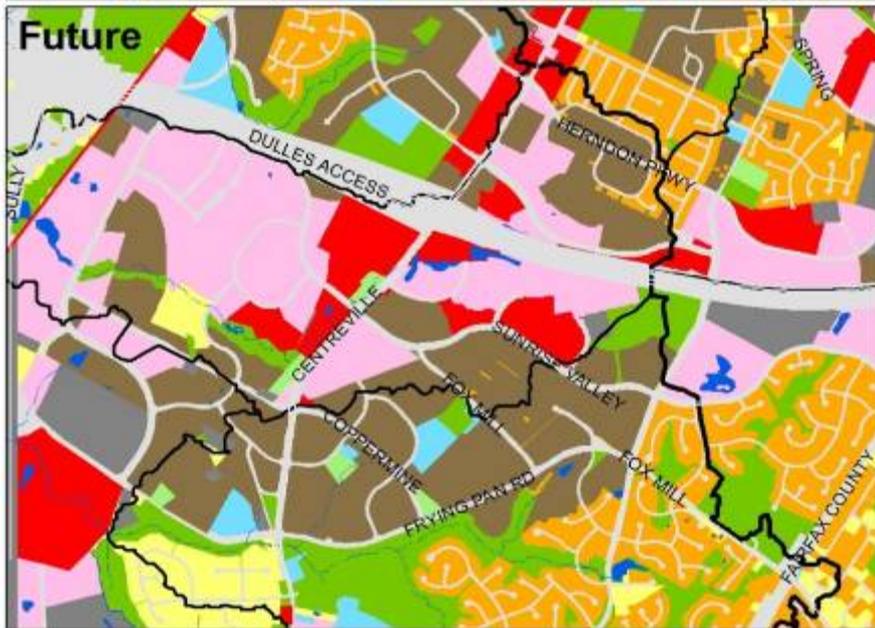
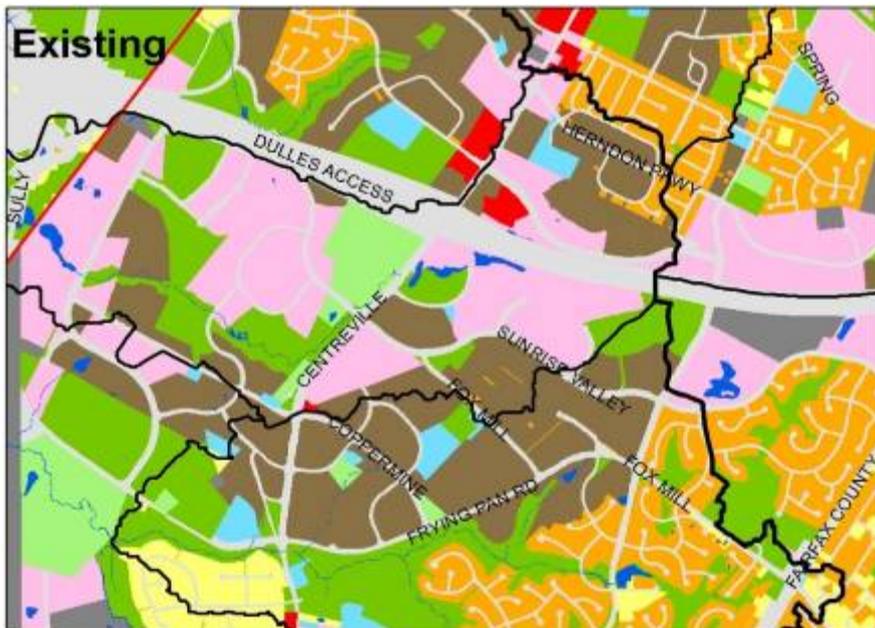


- Supplement 2005 Study
- Habitat conditions
- Impacts to stream from infrastructure & problem areas
- General stream characteristics
- Geomorphic classification
 - Sugarland Run – Stage 3 & 4
 - Horsepen Creek – Stage 2 & 3

Chapters 3 & 4

Sugarland Run and Horsepen Creek

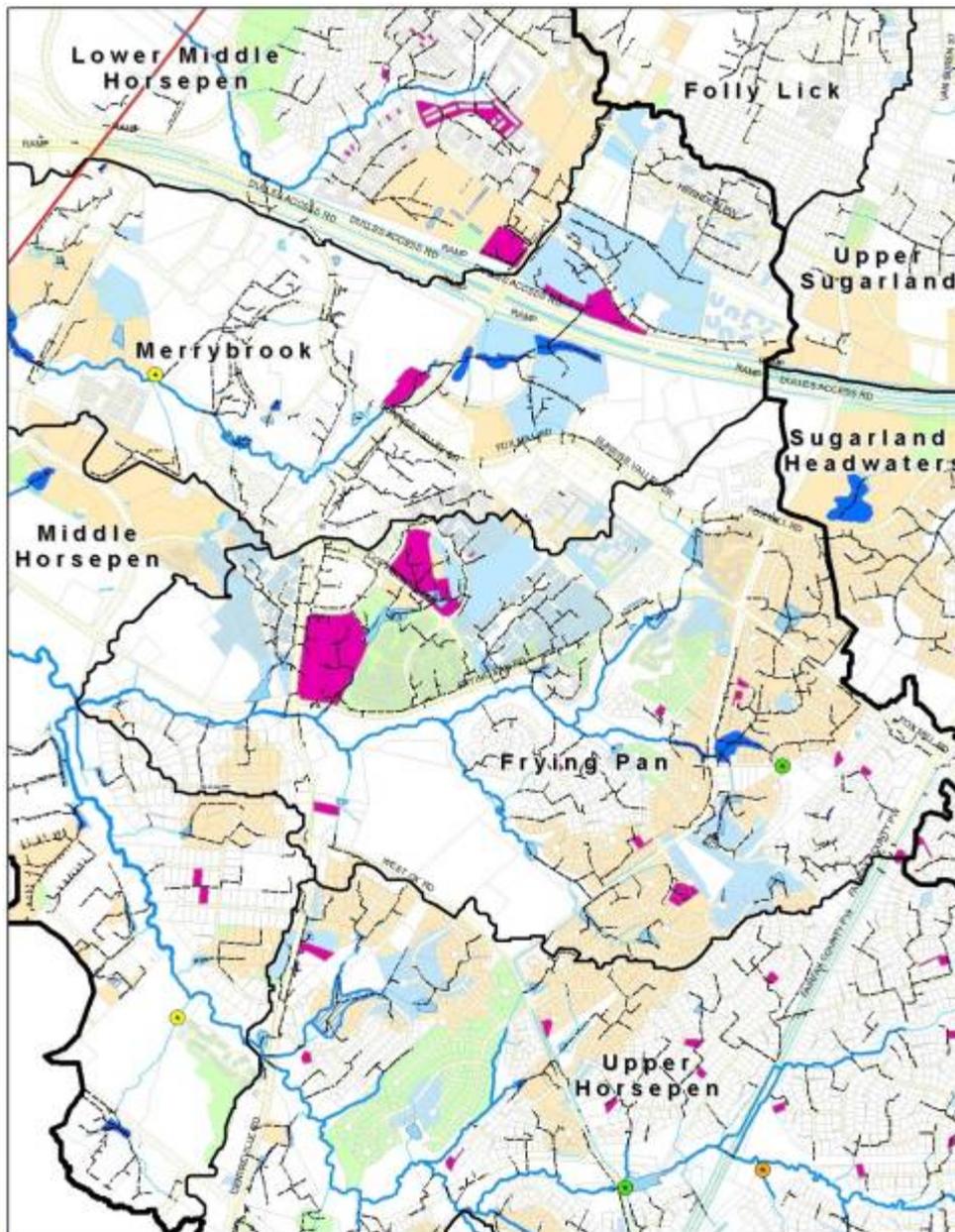
- Initial assessment of existing conditions
 - Land Use
 - Stormwater Infrastructure
 - Stormwater Management
 - Stream Conditions
 - Field Reconnaissance
 - Stormwater Modeling
 - Subwatershed Ranking
- Results depicted at WMA scale



Land Use

- One of the leading causes of stream degradation, including water quality impairments and habitat decline.
- Future based on County's 25-year Comprehensive Plan

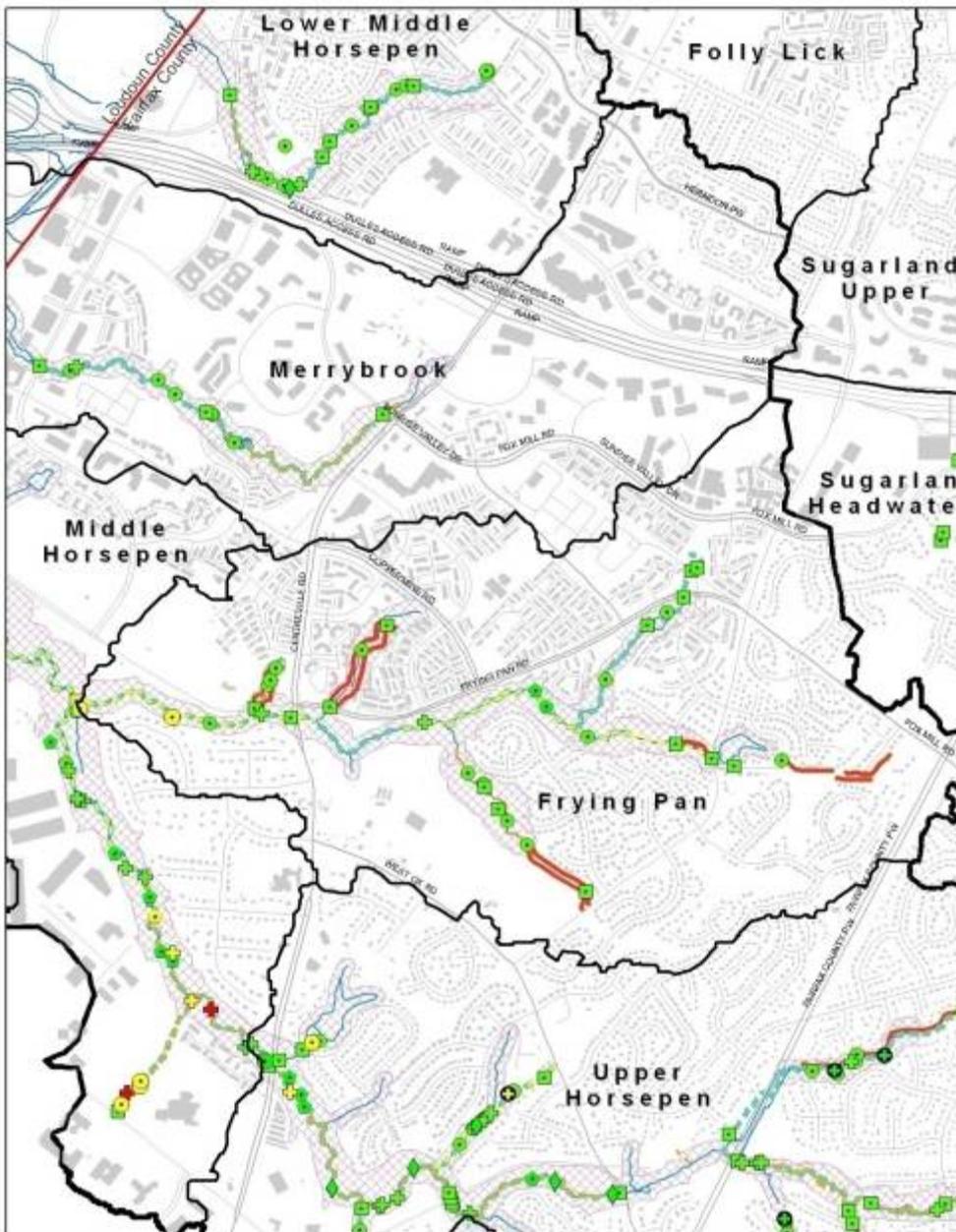
	Open Space		Institutional
	Golf Course		Low Intensity Commercial
	Estate Residential		High Intensity Commercial
	Low Density Residential		Industrial
	Medium Density Residential		Transportation
	High Density Residential		Water



Stormwater Infrastructure

- Regional Ponds
- Stormwater facilities
- Stormwater drainage pipes/channels
- Stormwater Management
 - Detention Only
 - Quality/Quantity
 - Quality Only





Stream Conditions

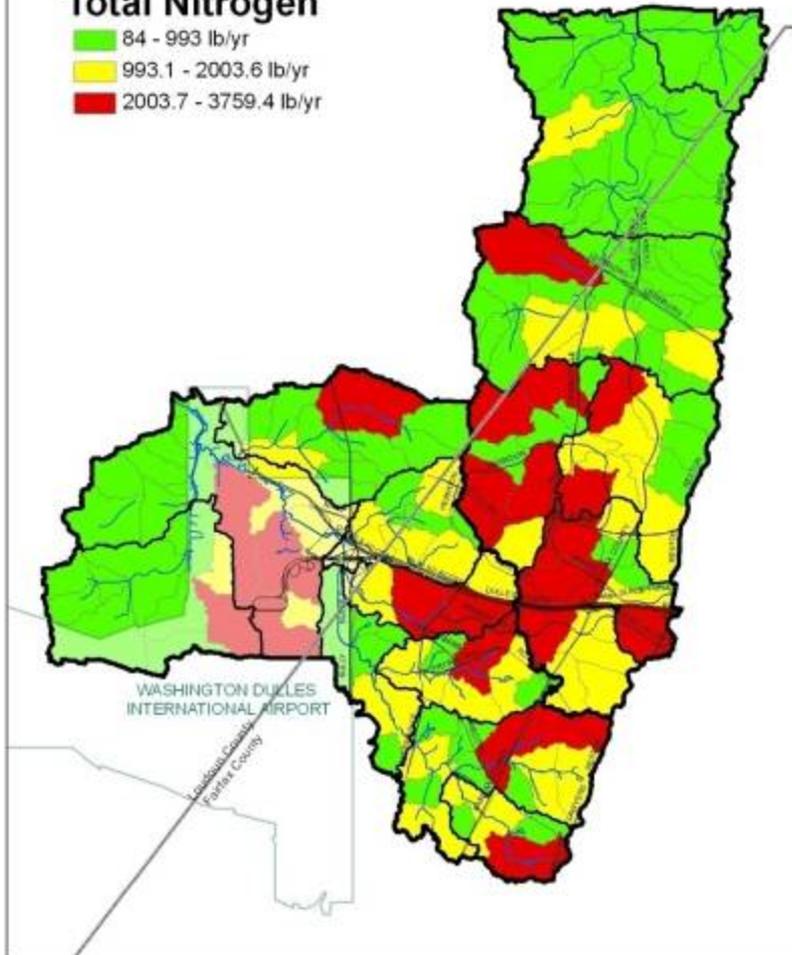
- Head Cuts
- Erosion
- Obstructions
- Stream Crossings
- Pipes
- Dump Sites
- Ditches
- Habitat Scores
- Channel Evolution Models
- Deficient Buffers
- Resource Protection Areas



Nutrients from Stormwater Runoff

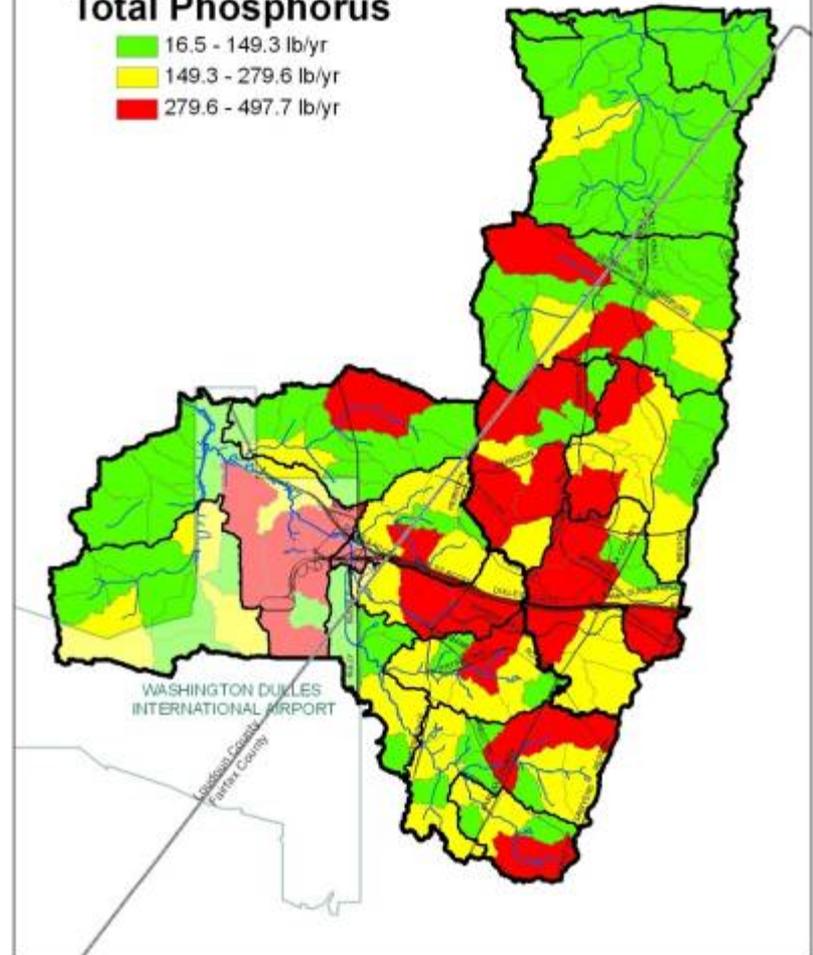
Total Nitrogen

- 84 - 993 lb/yr
- 993.1 - 2003.6 lb/yr
- 2003.7 - 3759.4 lb/yr

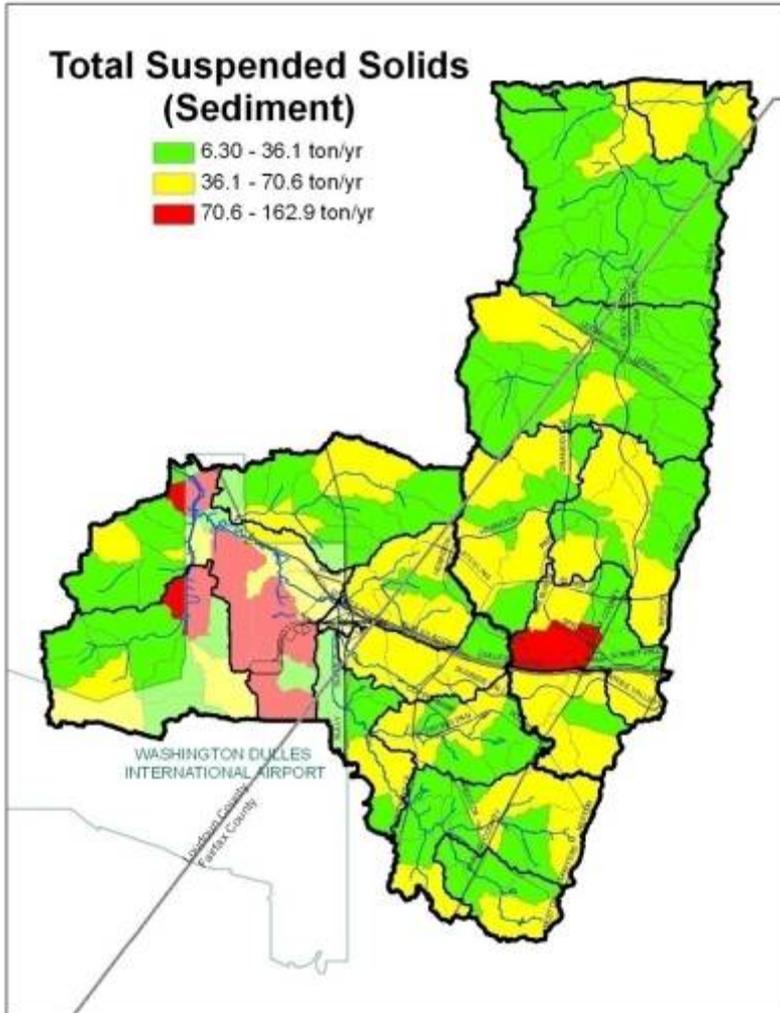


Total Phosphorus

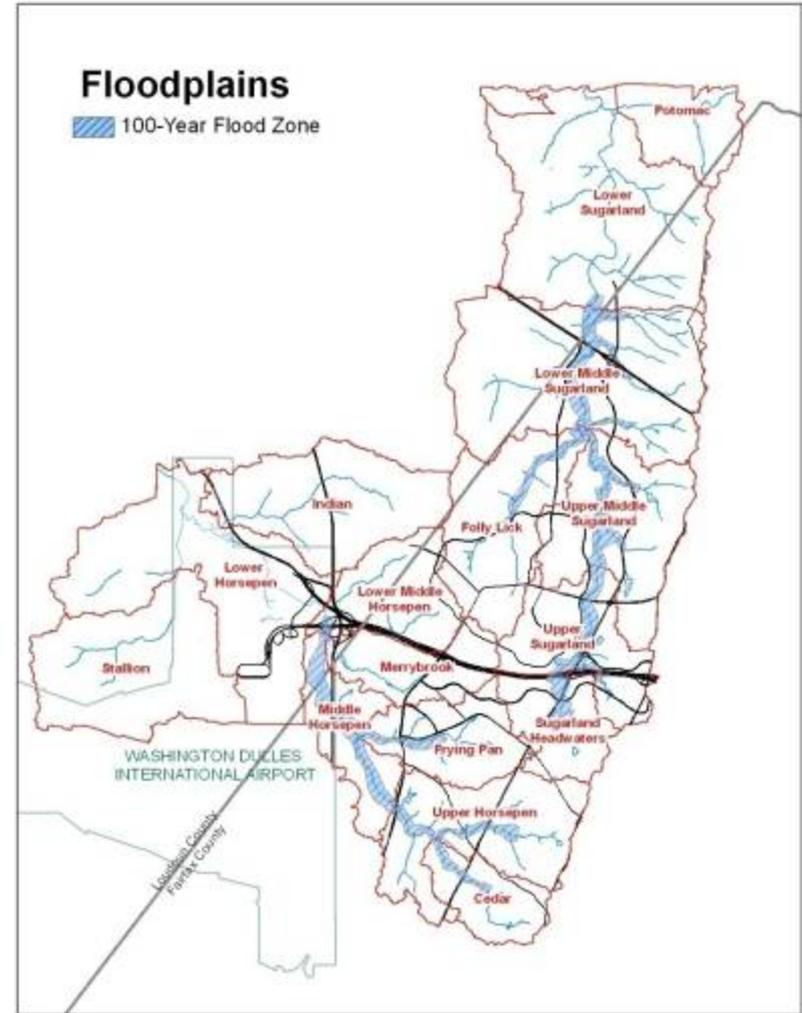
- 16.5 - 149.3 lb/yr
- 149.3 - 279.6 lb/yr
- 279.6 - 497.7 lb/yr



Sediment from Stormwater Runoff



Floodplain Modeling





Subwatershed Ranking

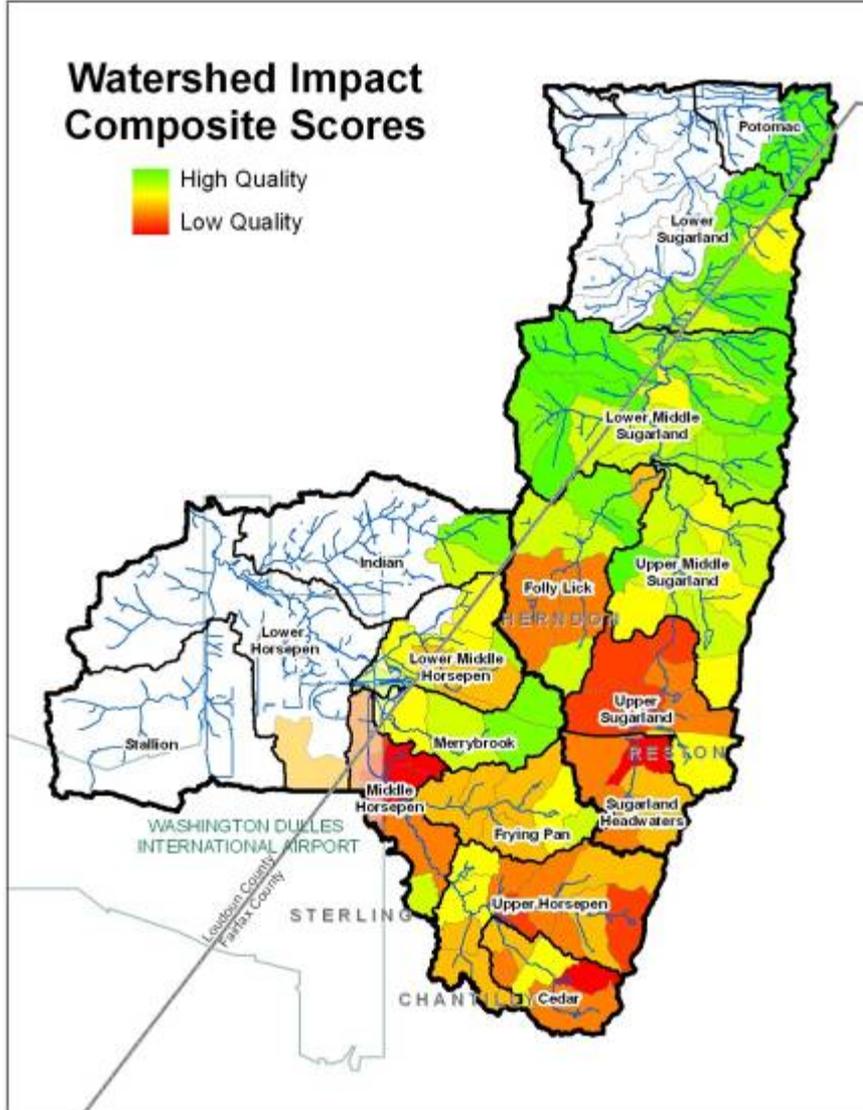
- Provides a systematic means of compiling available water quality and natural resources information.
- Tool for planners and managers to prioritize subwatersheds
- Methods are consistent throughout the latest set of Watershed Management Plans, so ranking is comparable between watersheds.



Subwatershed Ranking Indicators

- Watershed Impact Indicators
- Source Indicator
- Programmatic Indicators

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

Subwatershed Ranking

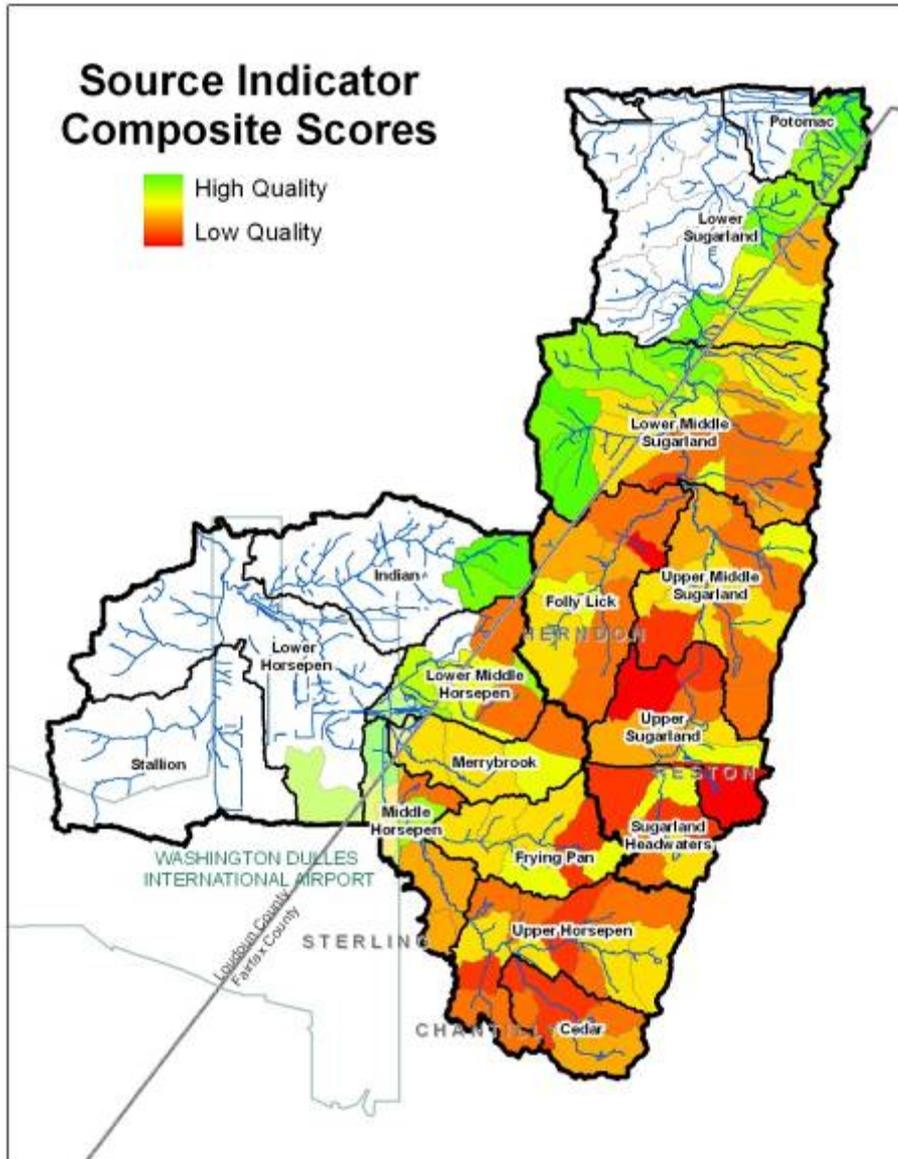
Fairfax County Goals

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.

Fairfax County Objectives

1. Hydrology
2. Habitat
3. Stream Water Quality
4. Drinking Water Quality
5. Stewardship

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

Programmatic Indicators

- Existing stormwater management facilities
- A tool to evaluate watershed management needs
- Will be used during *Candidate Project Identification*



Status

- Where we are in the process
 - Initial Evaluation of Existing Conditions
 - Preliminary Modeling & Subwatershed Ranking
 - Introductory & Issues Scoping Forum, Oct. 30th, 2008

- Next Steps
 - Public Involvement/WAG
 - Comprehensive Evaluation of Existing Conditions, Public Input, and Future Build-out Scenarios
 - Develop and Prioritize Restoration and Preservation Strategies
 - Evaluating Projects

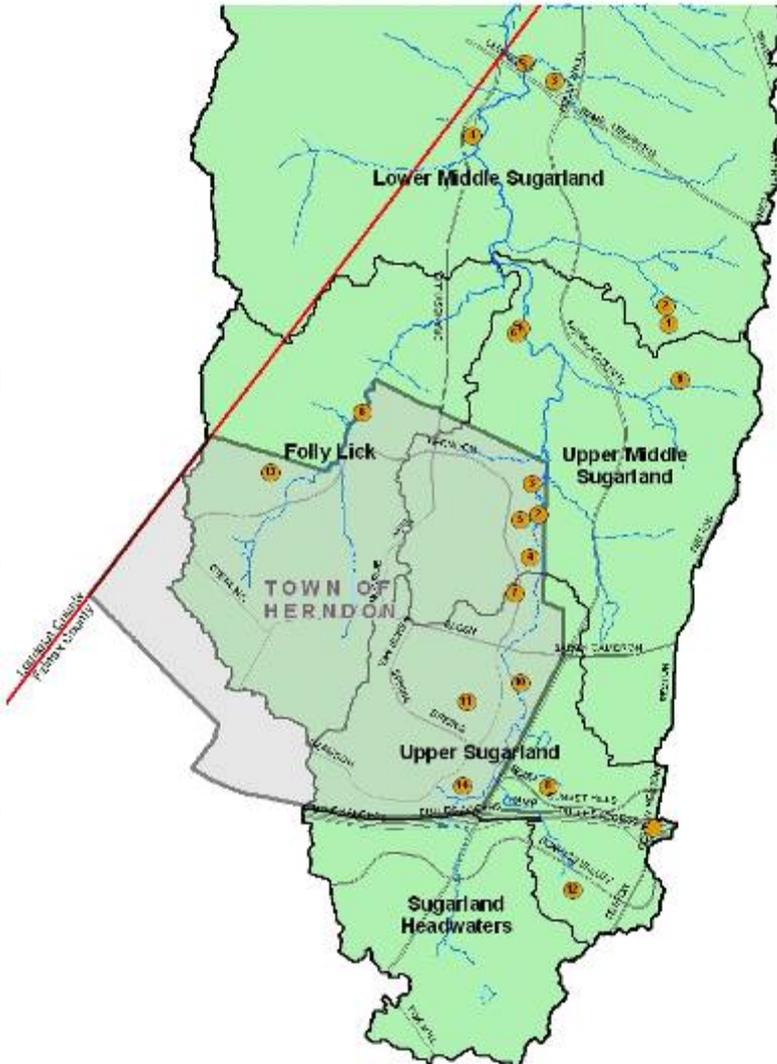
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Identified Problems

Identified Problems

- From the Stream Protection Strategy Study Baseline Study, 2001
 - Macro-invertebrate (Benthic) Scores were low:
 - Fair in Sugarland Run, Poor to Fair in Horsepen Creek
 - Overall site conditions were also low:
 - Poor to Fair in Sugarland Run, Very Poor to Poor in Horsepen Creek
- From the Stream Physical Assessment, 2005
 - Habitat Assessment: Sugarland Run
 - 16% poor, 30% fair, and 54% good
 - Habitat Assessment: Horsepen Creek
 - 7% very poor, 21% poor, 35% fair, 36% good, and 1% excellent
 - The assessment shows that stream bank stability and deficient buffers are a concern on many of the stream reaches

Sugarland – Identified Problems

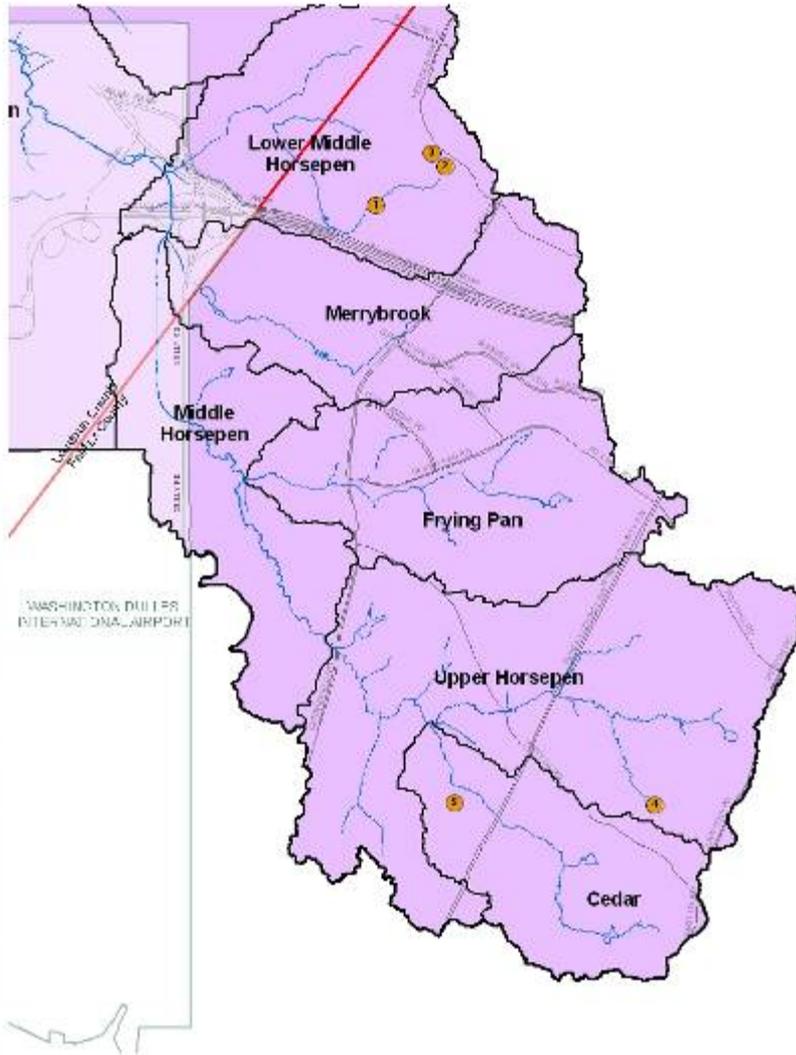


Issues Identified within Fairfax County during the Scoping Forum – October 30, 2008

Some Issues Include:

- Problems around bridges
- Stream channel erosion
- Insufficient stormwater controls
- Flooding
- Invasive species
- Damaged stormwater facilities

Horsepen – Identified Problems



Issues Identified within Fairfax County during the Scoping Forum – October 30, 2008

Some Issues Include:

- Stream channel erosion
- Insufficient stormwater controls
- Flooding
- Damaged stormwater facilities

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Project Examples



Types of Candidate Projects

Structural

- Regional Pond Alternatives
- Catchment Improvements
- Stream Restoration
- Road Crossing Improvements
- Low Impact Development

Non-structural Measures

- Stream Restoration
- Preservation
- Education and Outreach

Regional Pond Alternatives

Projects to retrofit areas lacking stormwater management

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



Catchment Improvement

Projects to retrofit areas to reduce stormwater impacts

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



Stream Restoration - Structural

In-stream projects, including channel stabilization
and channel restoration



Road Crossing Improvements

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



Low Impact Development



An innovative approach to land development and stormwater management

- Protect and improve water quality, watershed hydrology, and fish and wildlife
- Reduce infrastructure costs
- Make communities more attractive
- Meet new regulations

Examples of Low Impact Development



Green
Rooftops



Filterra Box



Parking lot biofilter



Rain
Barrel



Downspout filtration



Porous pavers

Non-structural Measures

Pollution prevention and programs to reduce pollutants from non-stormwater discharges



- Cluster developments
- Minimize total disturbed areas
- Minimize soil compaction
- Re-vegetate/forest disturbed areas
- Reduce impervious cover
- Rooftop disconnection
- Disconnection from storm sewers

Stream Restoration – Non-Structural

Riparian buffer restorations



Preservation

- Areas of high quality habitat or land cover that should be preserved
- Protect sensitive and special value features
- Protect, conserve, and enhance riparian areas
- Protect/utilize natural flow pathways in stormwater planning and design



Education and Outreach

- Increase public awareness of watershed conditions
- Encourage public involvement
- Educate public on how they can help to improve watershed conditions



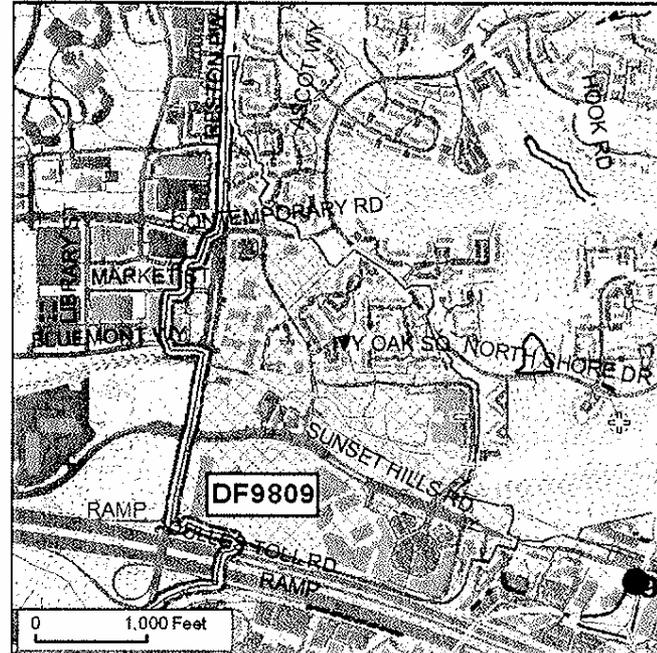
Example of Project Concept Plan

Project Number: DF91135
Catchment Code: DFDG9901
Candidate Site: C135

Project Type: Pond Retrofit
Project Size: +/- 3.5 acres

Project Location: This project is located upstream of Reston Parkway.

Project Description: This project would consist of retrofitting the existing pond located between Water Pointe Lane and the Reston Parkway. It will not only increase the storage, but it will also increase the amount of treatment on the stream.



Potential Project Benefits:

Peak Flow	This project could result in a significant reduction to the peak discharge.
Water Quality	Reduction of pollutants can be expected through the vegetative plantings and the settling of pollutants.

Potential Project Constraints:

Environmental	No environmental constraints are anticipated.
Property Ownership	This project appears to be on public property.
Facility Access	Access to this area is very good by way of public roads.
Design / Construction	No design or construction problems are anticipated for this project.

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Next Steps

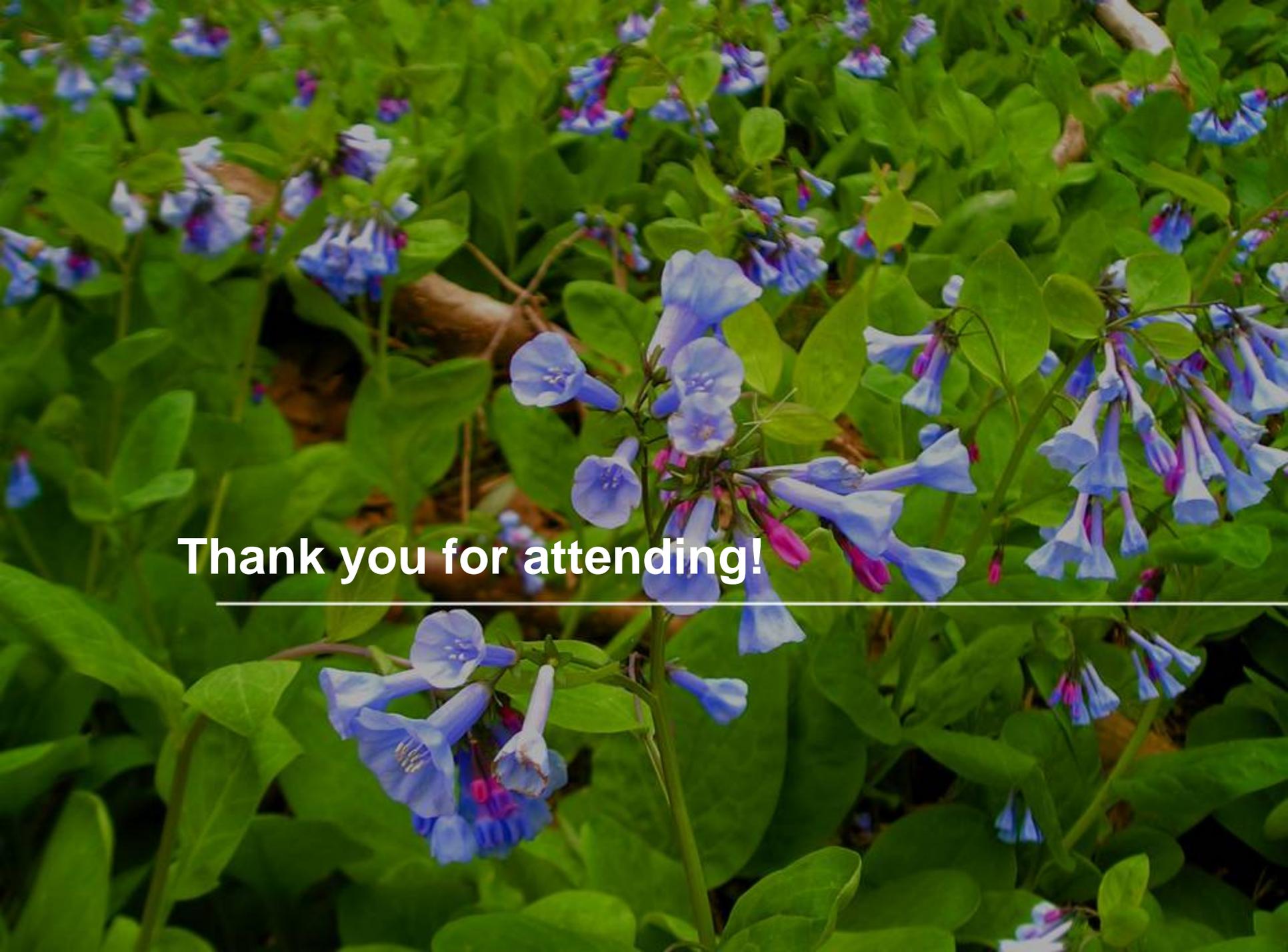


Next Steps

- FX Browne will review any new watershed issues raised
- FX Browne will develop engineering solutions to the identified problems and create a management plan
- Next meeting in early spring 2009 to review the proposed solutions

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Questions?

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Thank you for attending!
