
Sully District Council
Dec. 15, 2010
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Fairfax County Department of Public Works and Environmental Services
Presented by Watershed Planning & Assessment Branch, Stormwater Management
STORM WATER
COUNTY OF FAIRFAX
1742
VIRGINIA

Primer – introduction to watershed management

Plan Process – highlight the major steps of plan development

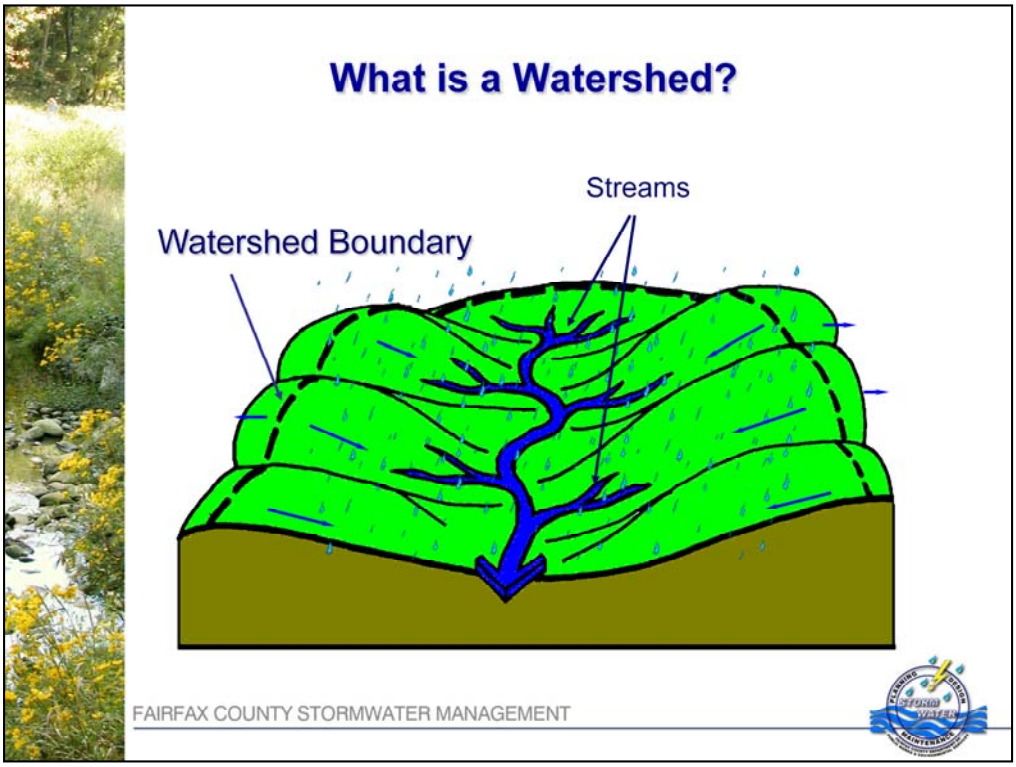
Project types – look at some examples of common projects

Plan Organization – how to read the plan

Next Steps

Tonight I will be presenting a watershed primer.

This will consist of some terminology and an introduction to stormwater management and the WMP.

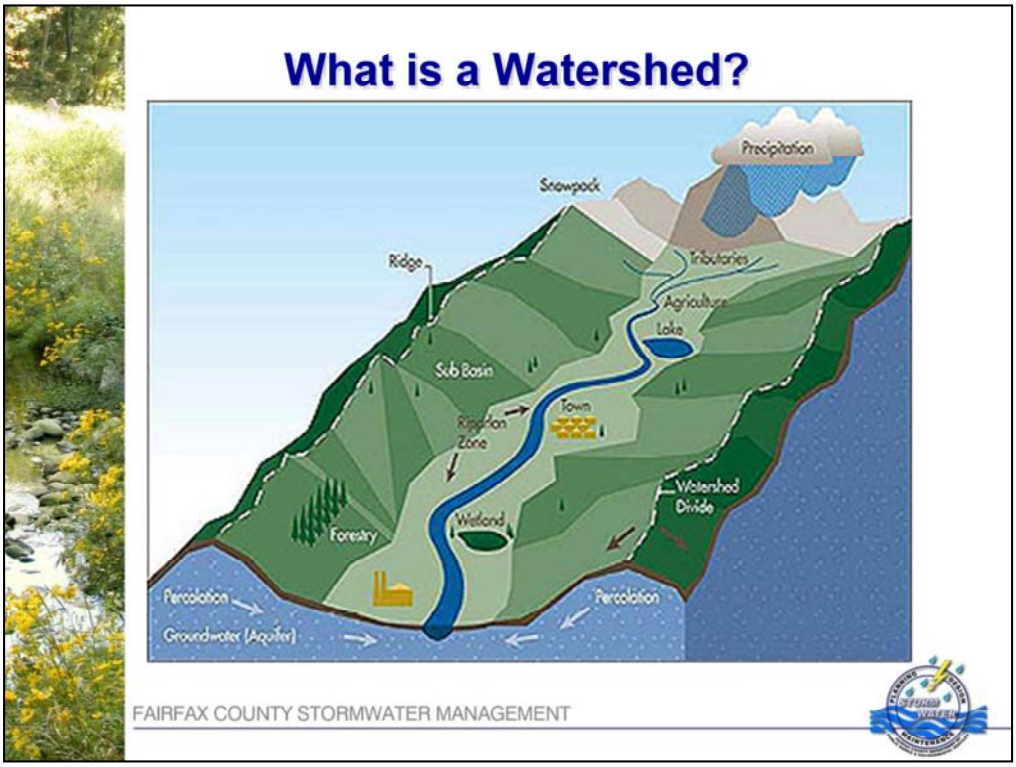


First and foremost, what is a watershed?

A watershed is the area of land where all of the water goes to the same place, generally to a single outlet point.

Watersheds are divided by watershed boundaries, represented by the black lines here. These divides are based on topography (elevation contours) and determine the course that the precipitation will follow. A drop of rainwater falling outside of this boundary will enter another watershed and will flow to a different point.

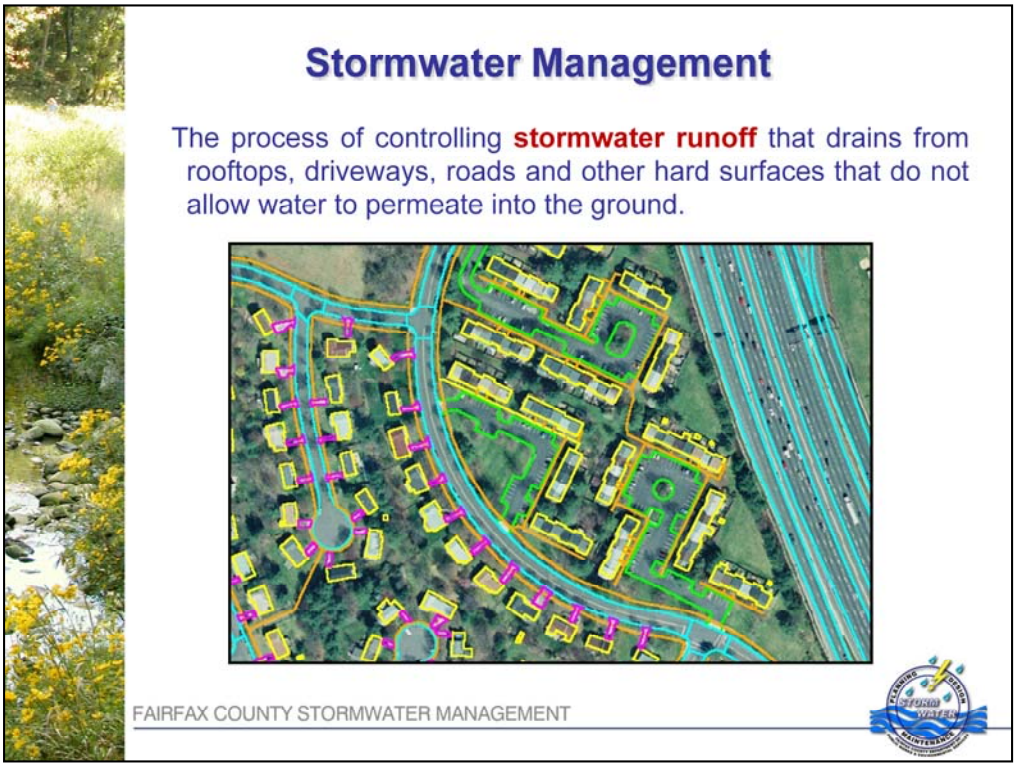
It is important to understand that a watershed includes the associated land area – not just the water bodies within.



Because a watershed includes all the land that drains to an outlet point, it is important to note how water may flow from one land use to another along its course.

In this illustration, water flows from agricultural lands to residential areas to industrial zones as it moves downstream.

Each of these land uses presents unique impacts and challenges to water quality as water dissolves and carries away different types of pollution from the varied landscape.

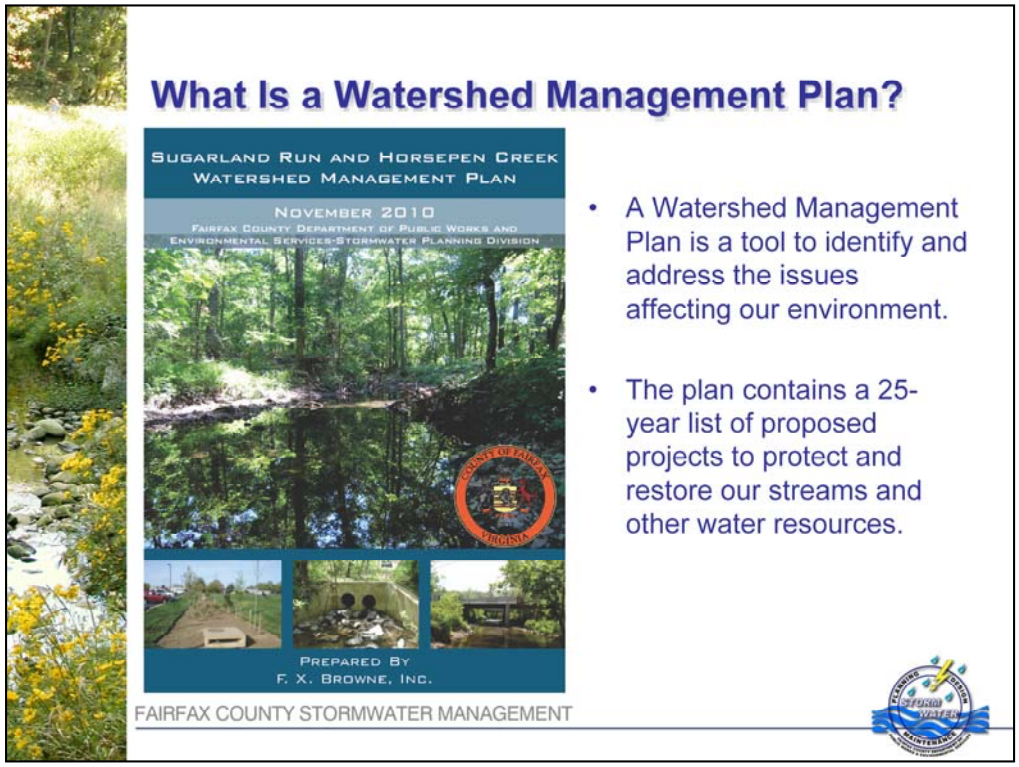


The primary driver for improved watershed planning is the issue of stormwater management.

Stormwater management is the process of controlling **stormwater runoff**, or water that is unable to infiltrate into the ground due to impervious surfaces. These colored polygons represent such surfaces like rooftops, driveways, roads.

Because impervious surfaces prevent stormwater from infiltrating into the soil, runoff increases in quantity and speed, causing environmentally harmful bank erosion in streams. Stormwater runoff also degrades water quality as it picks up pollutants like nutrients, oils, sediment, trash, heavy metals and chemicals that are left on our streets and walkways.

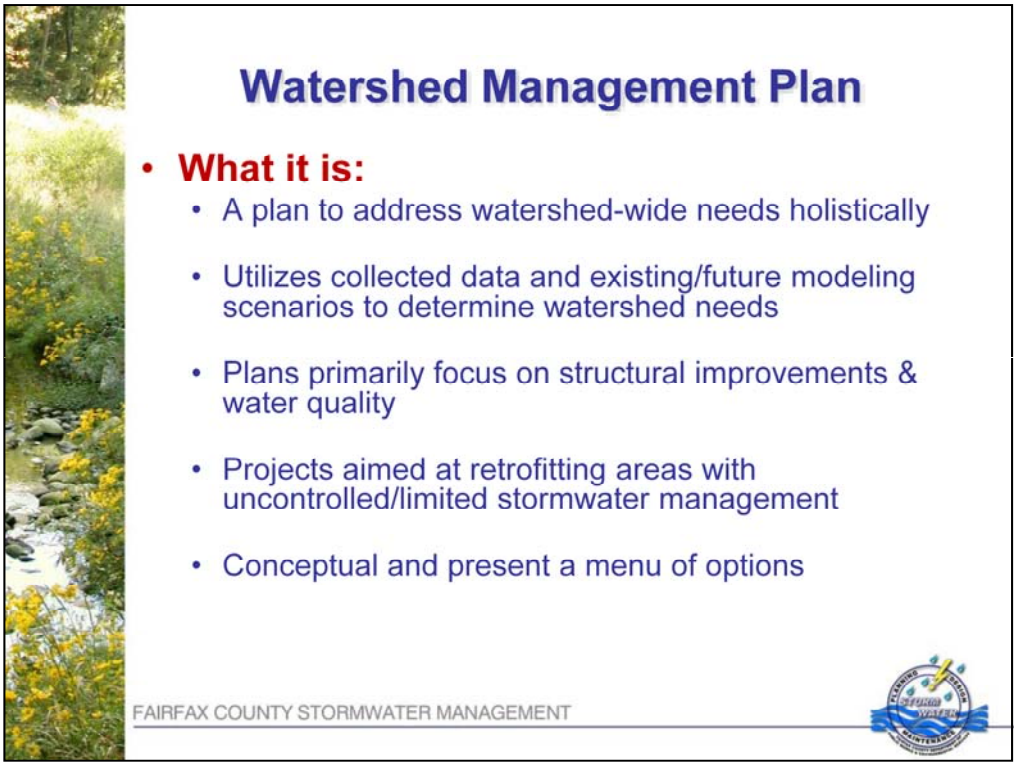
Stormwater management is concerned with controlling this runoff.



As a relatively urbanized area, the County needed a comprehensive way to assess our watersheds and create a plan to restore and preserve the natural resources that impact our lives.

Watersheds have an impact on the quality of our drinking water, our health and the health of the environment in which we live. Ineffective stormwater management can also result in property damage, affect recreational opportunities and have significant financial implications as water quality is impacted in the Chesapeake Bay.

These plans will help Fairfax County and it's residents make informed decisions to help ensure a better future in regards to our watersheds and communities.



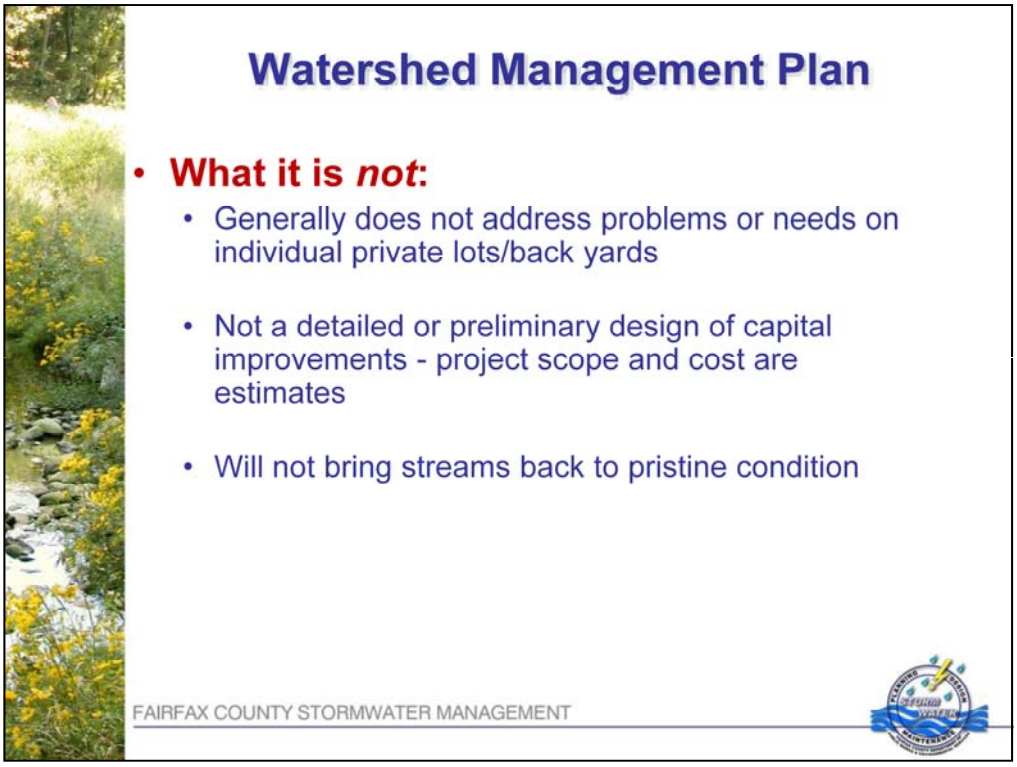
What it is:

A conceptual plan to address watershed-wide needs holistically – beyond the Band-Aid approach

Focus of the WMP is approximately 800 miles of stream network (below the 50 acre DA point)

Assessment/monitoring data, land-use data, drainage complaints, storm-net, field reconnaissance and residents' input are used in conjunction with modeling to define or characterize conditions

Conditions are ranked from Excellent – Very Poor which serves to indicate the relative watershed needs

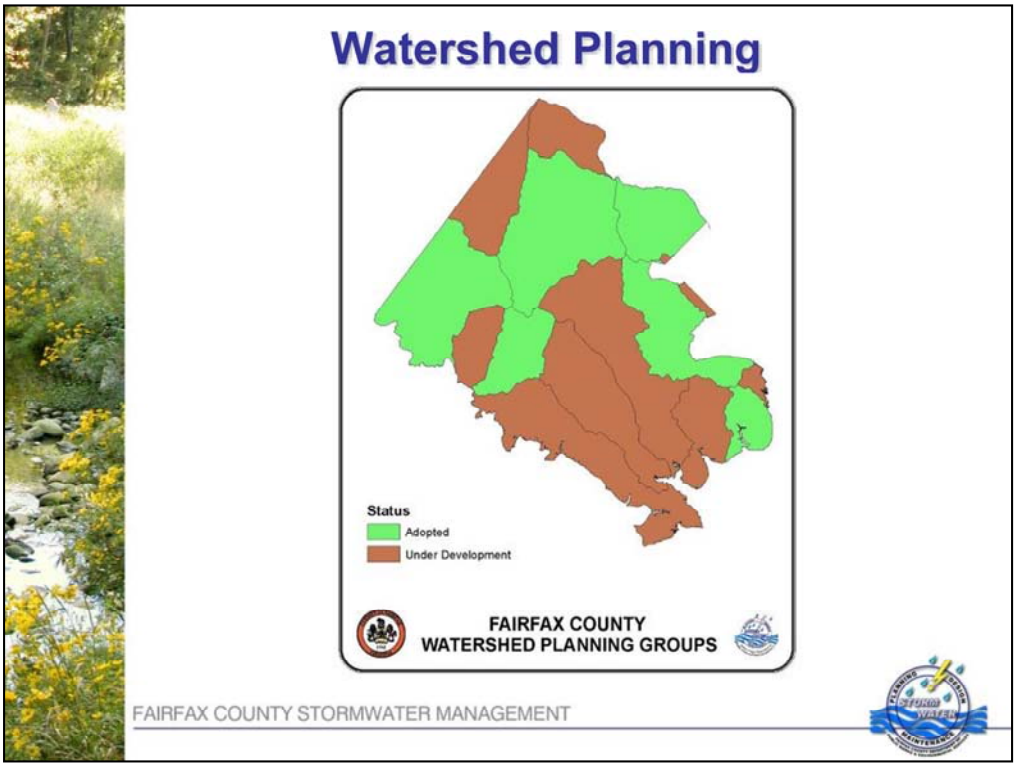


What it's not:

Does not necessarily address problems or needs on individual lots/back yards below the 50 acre DA point

Not a detailed or preliminary design of capital improvements – project scope and cost not exact

Will not bring streams back to pristine condition – that plan would be impractical and cost prohibitive

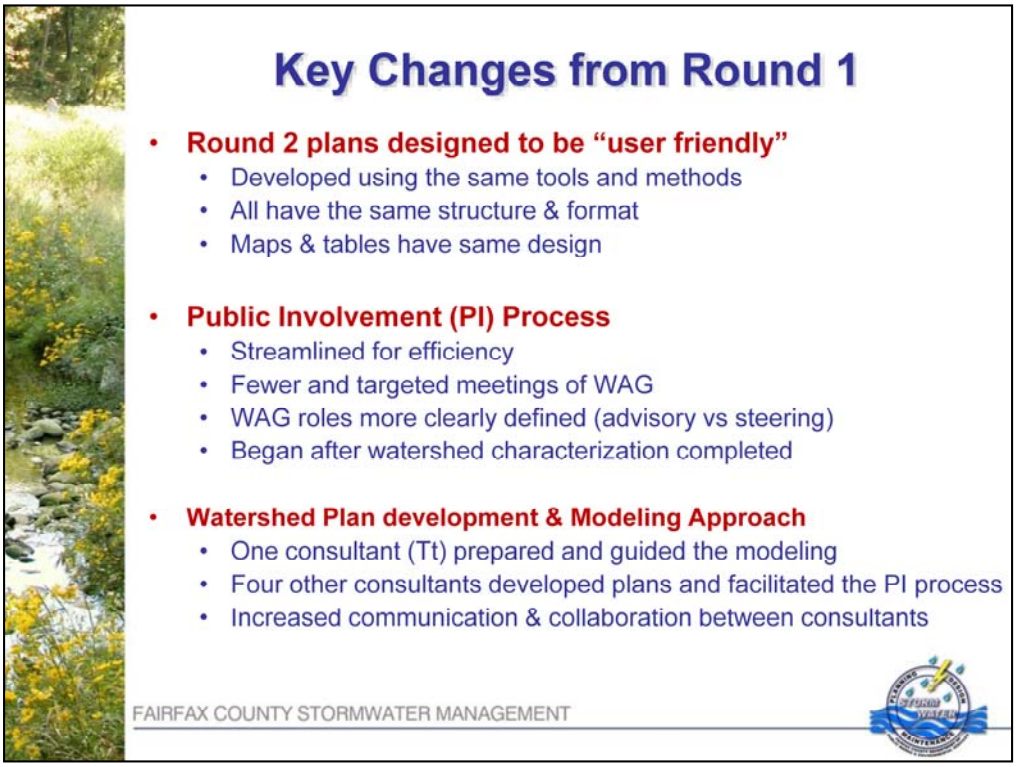


The WMPs are developed based on planning groups. Although there are 30 FFX watersheds, some have been combined for planning purposes.

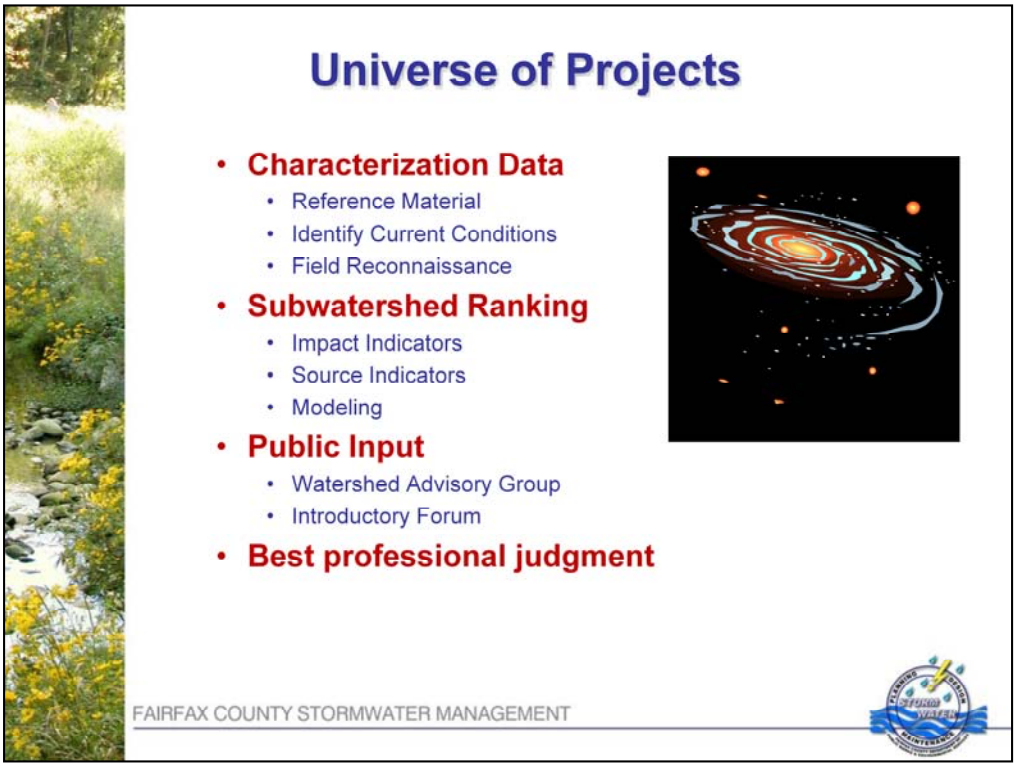
Next slide – This maps shows that the 30 ‘sheds have been consilidated into 13 planning groups.

Next slide - This map depicts the status of the Watershed Planning effort to date. The Watershed Management plans for the green watershed groups have been completed and also adopted by the Board of Supervisors. The brown watershed groups represent those that are currently under development. About 50% have been adopted.


Watershed Management Plan Process



The lessons learned from the first round



Characterization Data

Fairfax County Reports

- Fairfax County Stream Protection Strategy Baseline Study
- Fairfax County Comprehensive Plan
- Role of Regional Ponds in Fairfax County's watersheds

Geographic Information Systems (GIS) data

- Drainage Complaints & Impervious Area

Regulatory Requirements

- EPA/Virginia DEQ
- Chesapeake Bay Program
- Municipal Separate Storm Sewer Systems Permit

Identify Current Conditions

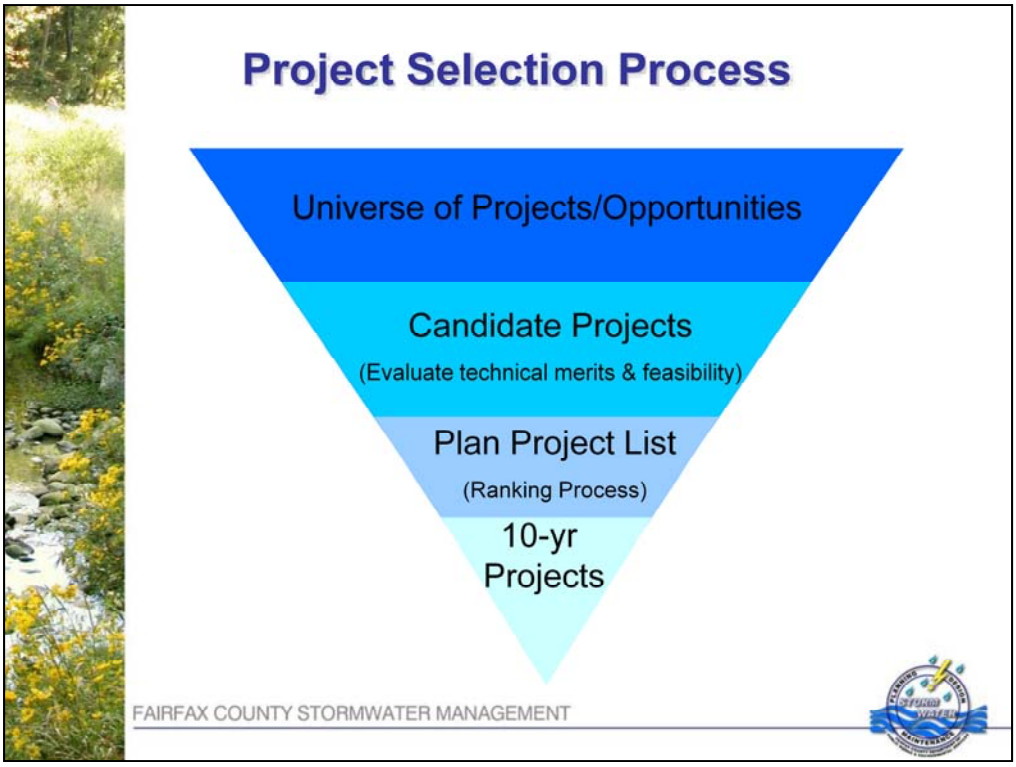
- Land Use (residential, industrial, etc)
- Stormwater Infrastructure
- Stream Conditions
- Modeling

Field reconnaissance

- "Windshield Survey" of neighborhoods identified through desktop analysis
- Supplements GIS info
- Pollution Source Assessments, Hot Spot Evaluations & Site Photos

Subwatershed Ranking

Impact Indicators provide information on the overall watershed condition - how are areas are impacted (biological/chemical data)?



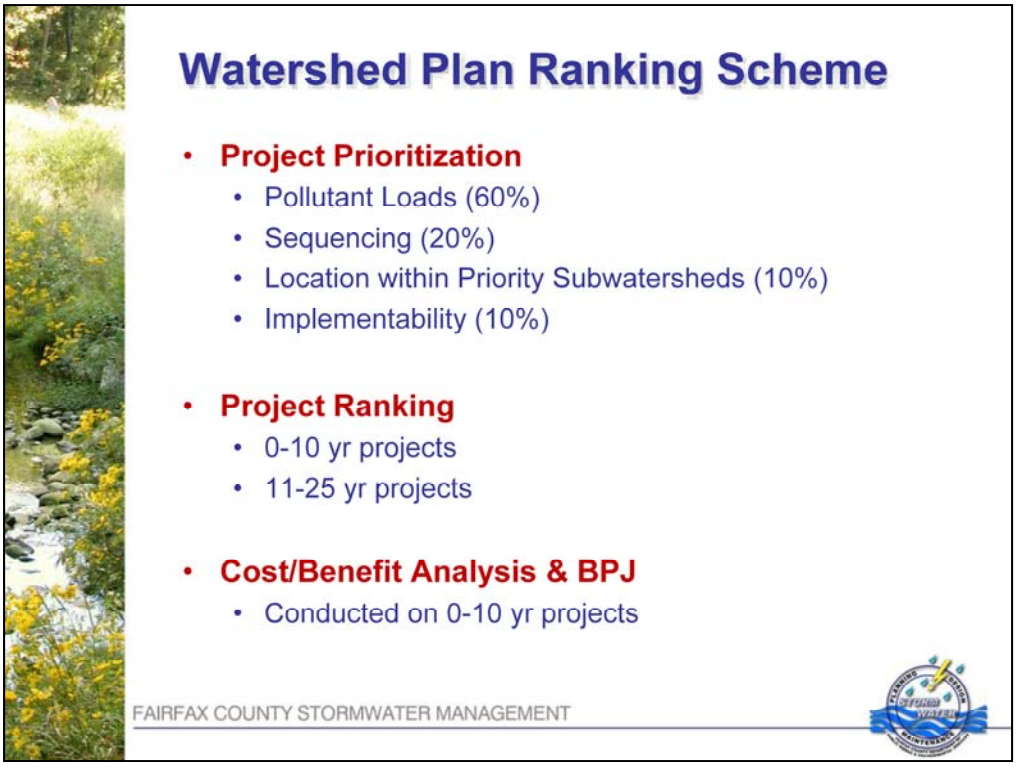
This diagram shows a general flow of the projects as we go from the Universe to the 10 year project list.

Once we have the Universe of Projects we then take the steps to start the selection process. Here is the general flow of how projects are selected from the universe of possibilities.

Initially, We conducted a public meeting (WAG) to present the projects that were identified.

An important step in the selection process is to trim down all the potential projects into the candidate projects. The candidate projects will be further analyzed and move forward through the selection process. The projects that don't make the cut are set aside.

Once the Candidate projects are submitted to the county and the list is approved, each project site is investigated. This is the second field visit of the process in order to verify the site conditions, feasibility (access), scope and potential benefits.



Project Prioritization helped us determine the projects that made it into the 10 year project group.

Each project was scored on based on these factors:

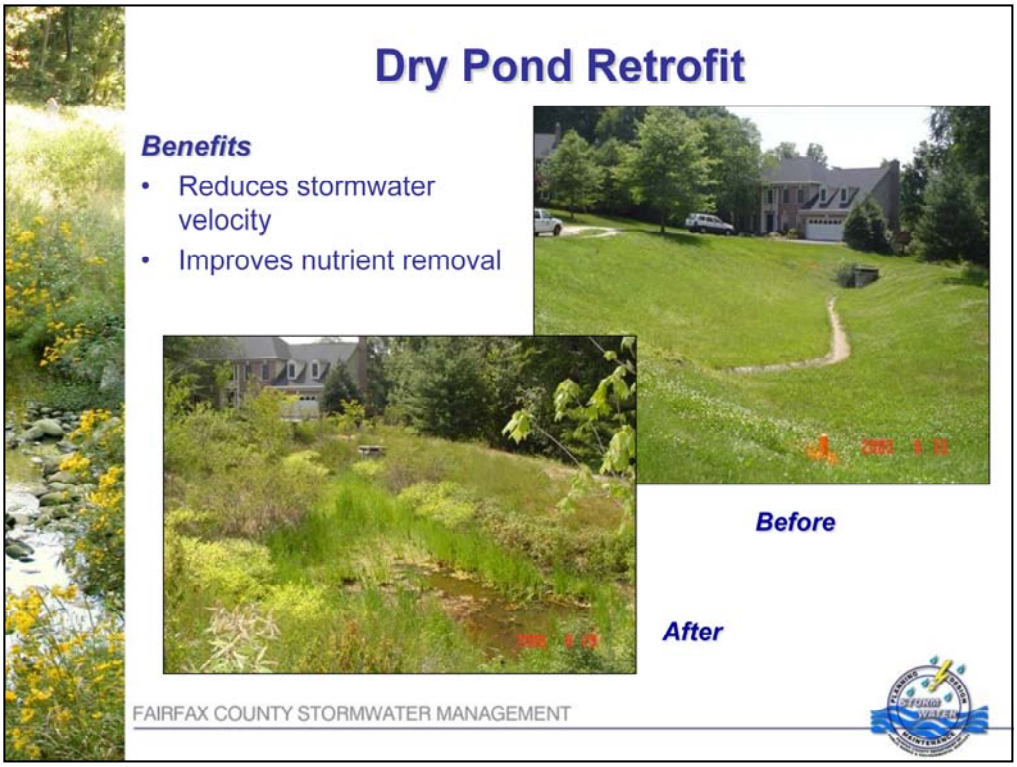
1. Projects that provide the most reduction in nitrogen, phosphorus and sediment score highest
2. Sequencing- projects upstream (headwaters) should be a higher priority than projects downstream
3. The location within priority subwatersheds- Based on our watershed characterization and modeling – the areas where projects are most needed
4. Implementability- projects with lower complexity and w/o land acquisition requirements should be given higher scores. Public v Private

5. All of the information in the above slides illustrates the comprehensive process the County undertook to ensure the best projects were selected for the plan.


Project Types

Typical Project Types

- New/Retrofit Stormwater Management Pond
- Stream Restoration Projects
- Culvert Retrofits
- New/Retrofit BMP/LID
- Flood Protection
- Non-Structural
  - Buffer restoration
  - Education and Outreach
  - Rain Barrels
  - Street sweeping
  - Dump site cleanups



Essex Manor Pond Restoration - Watershed: Little Hunting Creek

Concrete trickle ditches were designed to move low flow as efficiently as possible and to leave most of the pond bottom dry to facilitate mowing. Subsequent research shows that a non-paved meandering flow path gives more opportunity for pollutant removal and improves water quality.

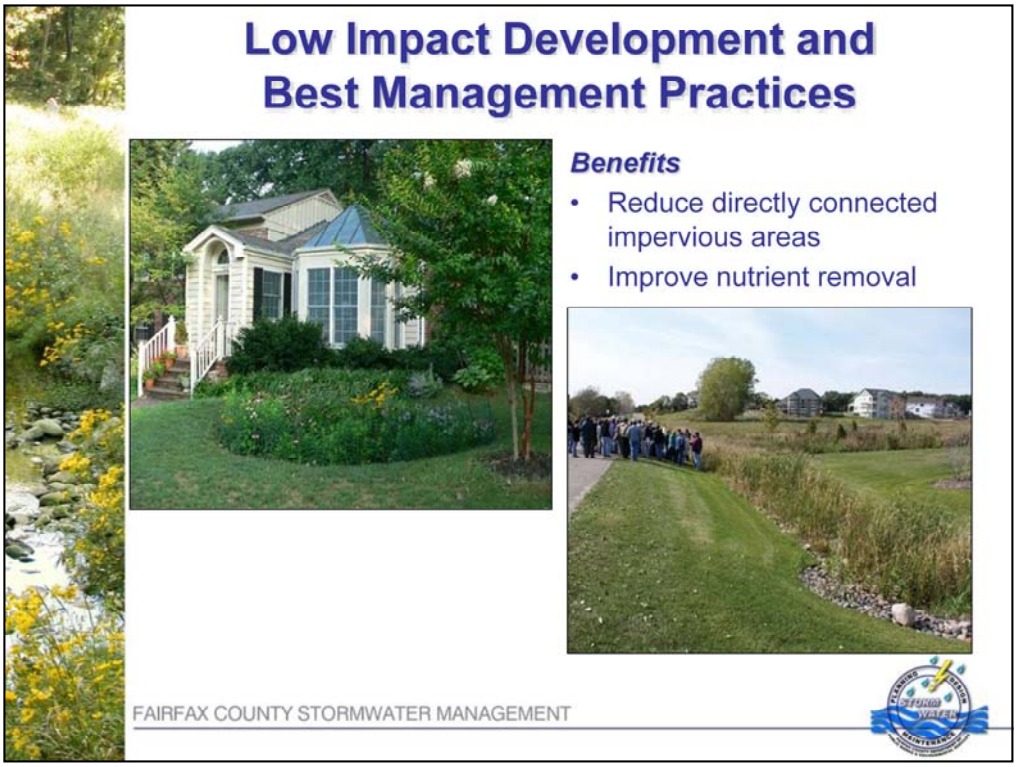
By removing the concrete trickle ditch, integrating a wetland system and changing the control structure the pond will provide water quality benefits not seen in typical dry ponds.

Natural Stream Channel Design

Problematic Conditions: Large quantities of uncontrolled stormwater caused bank erosion, tree loss and negative impacts to aquatic life.

The eroded stream was filled with suitable material to reconnect the channel to the natural floodplain

The project was designed using “natural stream restoration techniques” which aim at creating habitat for native wildlife.



Problematic Conditions: Stormwater from impervious surfaces lacked quality treatment (ie.: nutrients, oil & other pollutants). Installation of a rain garden (bioretention basin) provides for water quality treatment and groundwater recharge through infiltration.

Bioretention basins are hybrid retention/detention facilities that provide both water quality control and peak discharge rate control for runoff from impervious areas.

Various project types including:

- Targeted rain barrel programs
- Buffer restoration
- Improving vegetation in existing stormwater facilities
- Riparian zone preservation through conservation easements, deed restrictions, or zoning changes

Lack of a native riparian buffer decreases the amount of rain that infiltrates into the groundwater and increases the amount of pollutants that enter our waterways.

Establishing a native riparian buffer will reduce the amount of stormwater entering streams and filter nonpoint source pollutants

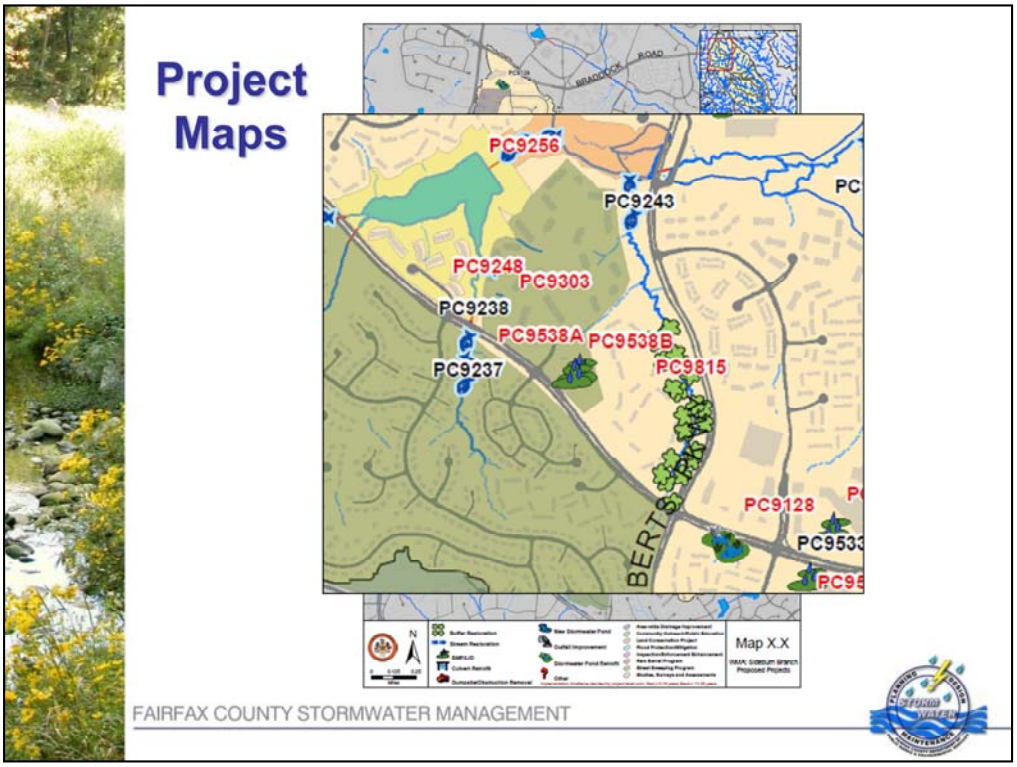

Plan Organization

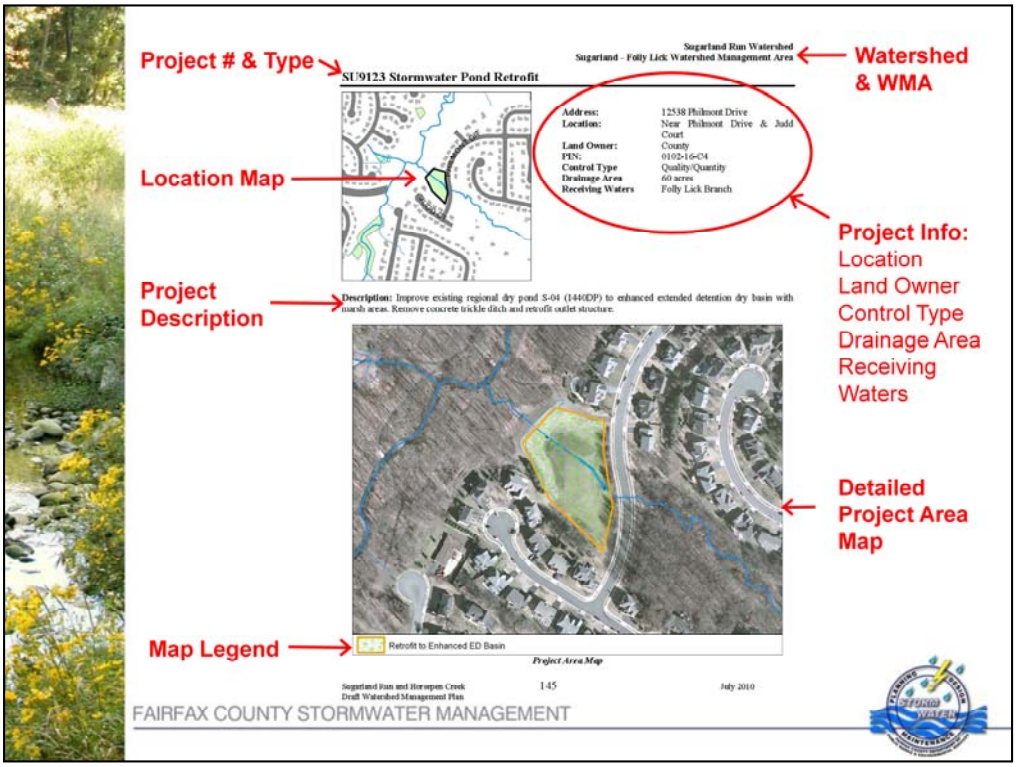
Organization of Watershed Management Plan

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


Project Maps
PC9256
PC9243
PC9248
PC9303
PC9238
PC9538A
PC9538B
PC9237
PC9815
PC9128
Map X.X
FAIRFAX COUNTY STORMWATER MANAGEMENT


Project # & Type
Sugarland Run Watershed
Sugarland - Folly Lick Watershed Management Area
Watershed & WMA
SU9123 Stormwater Pond Retrofit
Location Map
Address: 12538 Philmont Drive
Location: Near Philmont Drive & Judd Court
Land Owner: County
PIN: 0102-16-04
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
Sugarland Run and Horsepen Creek Draft Watershed Management Plan
145
July 2010
FAIRFAX COUNTY STORMWATER MANAGEMENT

Project Benefits
Qualitative & Quantitative (Modeling)

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

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.

Costs:

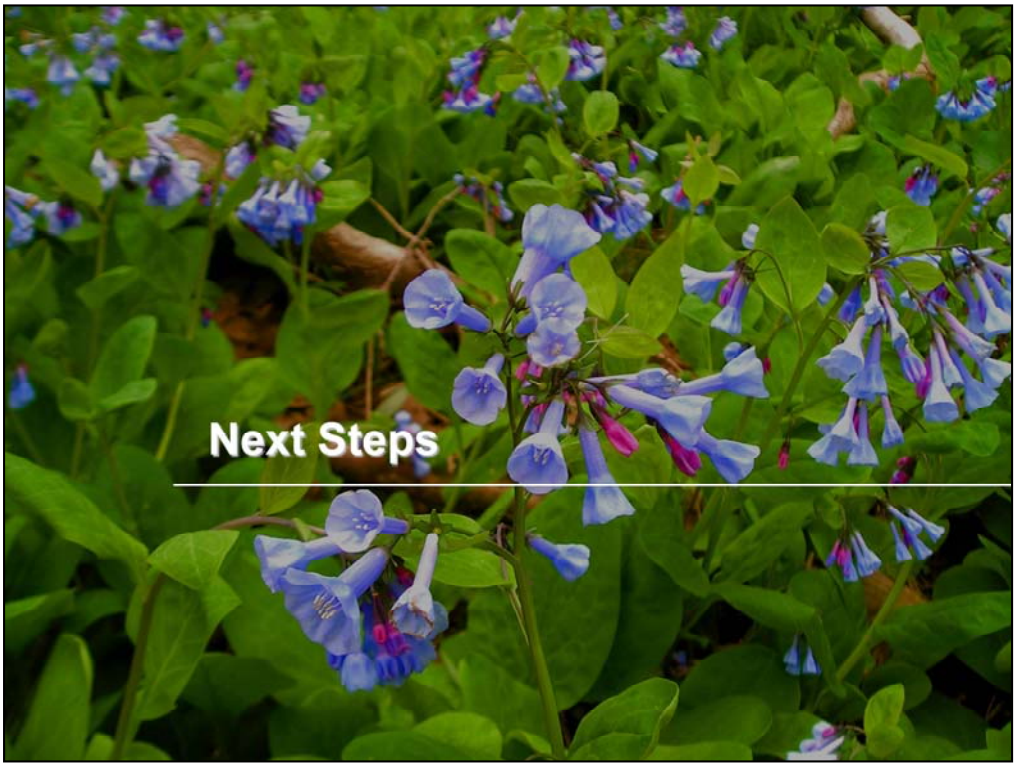
Item	Units	Quantity	Unit Cost	Total
Organic Compost Soil Amendment	CY	138	$40.00	$6,320.00
Plantings	AC	0.79	$25,000.00	$19,750.00
Grading and Excavation	CY	2535	$35.00	$88,725.00
Embankment	CY	200	$50.00	$10,000.00
Outflow Pipe	LF	20	$125.00	$2,500.00
RipRap Stabilization	SY	11	$100.00	$1,100.00
Structural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

Detailed Project Costs

Total Project Cost
Rounded up to nearest $10,000

WMP Projects in Sully District

Watershed Plan	All Projects in Sully District				All Projects in Plan			
	Total	10-year	25-year	Non-Struct.	Total	10-year	25-year	Non-Struct.
Sugarland Run & Horsepen Creek	19	7	8	4	139	70	50	19
Little Rocky Run & Johnny Moore Creek	26	10	12	4	76	40	29	7
Totals	45	17	20	8				


Next Steps

Countywide Prioritization

- **Project Prioritization tool**
  - Database of all recommended WMP projects & attributes
  - Screen by multiple selection criteria and scenarios
  - Map selected project location in GIS
  - Will be completely populated after Round 2 is complete
  - Potential to link to other systems to track implementation
- Final selected projects to support annual work-plan and implementation budget

Watershed Plans & Broader Issues

- **Plans are a head-start in addressing Bay restoration goals**
  - Complete implementation likely not enough to meet Bay goals
  - Future evaluation of Bay targets vs. plan benefits is needed
- **Competing & conflicting priorities – dictated by state/EPA**
  - Practices and projects in plan may not completely address local stream TMDLs (i.e. Accotink Creek Flow TMDL)
  - Increased requirements will impact project implementation and monitoring priorities
- **Resources and timing for implementation a big challenge**

http://www.fairfaxcounty.gov/dpwes/watersheds

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