

# Upper Little Patuxent River Watershed Management Plan

---

**PUBLIC MEETING NO. 2**

**March 24, 2009**



# Meeting Outline

---

- Welcome and Introductions
- Presentation
  - Project Goals
  - Watershed Study Overview
  - Watersheds 101
  - Upper Little Patuxent (ULP) Watershed Overview
  - Results and Concept Plans
  - Restoration Toolbox and Citizen Involvement
- General Q&A
- Breakout Groups by Subwatershed



# Watershed Management Goals

---

*To restore, enhance and protect the Upper Little Patuxent River Watershed's natural resources.*

- Reduce negative impact of impervious surfaces
- Reduce levels of pollutants in waterways
- Reduce streambank erosion
- Increase forest area and connectivity of riparian habitats
- Increase public awareness and positive behaviors
- Protect private property



# Why the Upper Little Patuxent River Watershed?

---

- Numerous existing studies
- ULP rated as high priority watershed, high impervious
- Countywide bioassessment average ratings of Poor and Very Poor
- Segments on Maryland 303(d) list for biological, cadmium, nutrients, sediment
- Headwaters of the Little Patuxent
- Opportunity to coordinate with current Columbia Association watershed study

# Watershed Study Overview

---

- Phase I – completed November 2007
  - Compilation and synthesis of previous studies and GIS data
  - Delineate watershed and subwatersheds
  - Identify data gaps
  - Scope Phase II

# Watershed Study Overview

---

- Phase II –
  - Conditions Assessment
    - Stream Corridor Assessment (SCA)
    - Pollutant loading estimates
    - Problem area prioritization
  - Community Meeting #1 – June 2008
  - Develop watershed management strategy
  - Perform field investigations and develop concept plans and cost estimates for restoration and protection strategies
  - Implementation plan
  - **Community Meeting #2 – March 2009**
  - Final Report

# Watersheds

101



What is a Watershed?



# WATER BALANCE

PRE-DEVELOPMENT



POST-DEVELOPMENT



# Geomorphological Impacts



**Impervious Cover**



# Impervious Cover Influences Water Quality

---

**Pollutants build up on impervious surfaces and wash off into the stream system when it rains**



# Harmful Pollutants in Runoff



**Bacteria**

**Nutrients**

**Pesticides**

**Oil & Grease**

**Muddy Water**

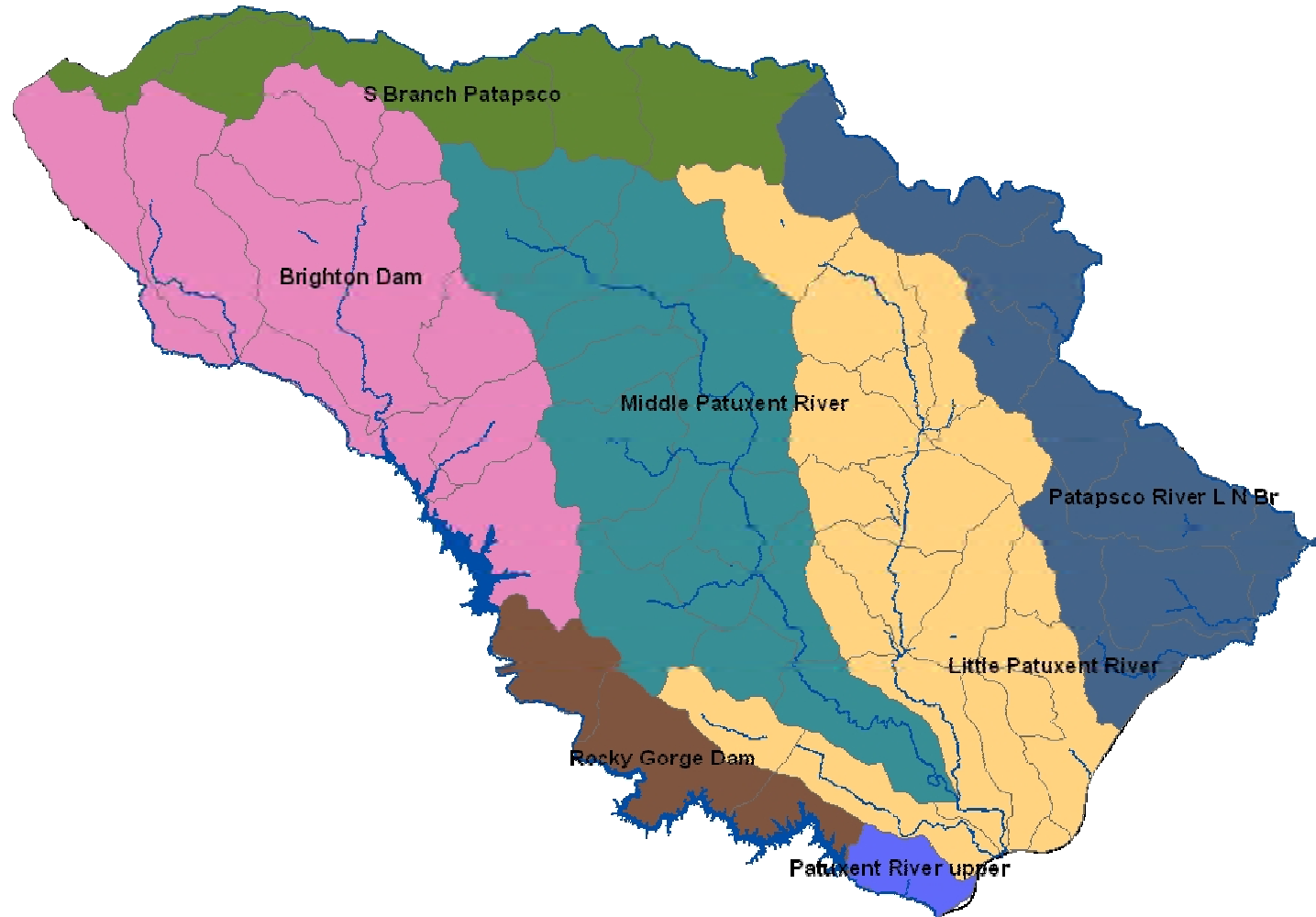
**Heavy Metals**

**(e.g. Zinc, Copper, Lead)**



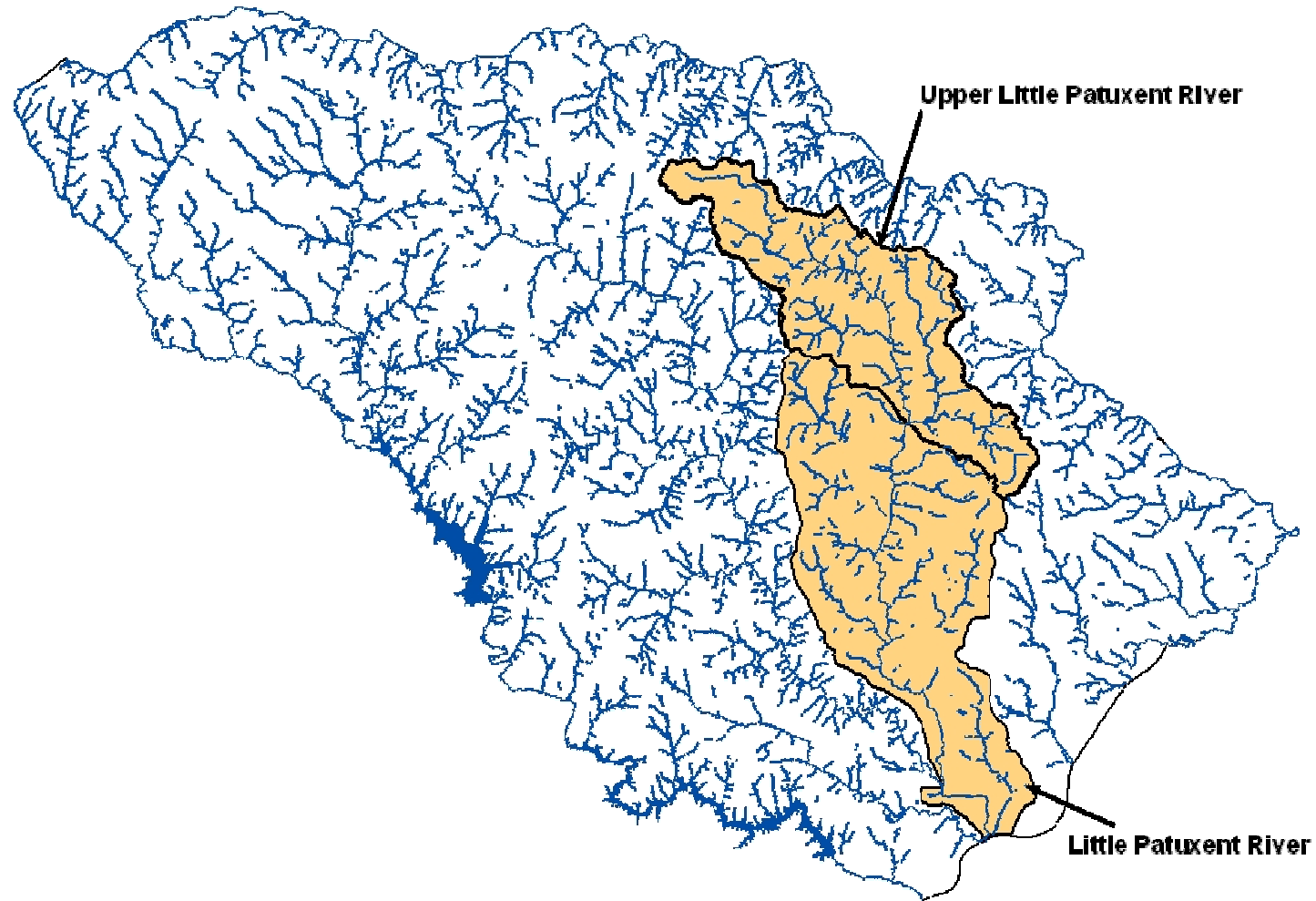
# Watershed Overview

---



# Watershed Overview

---



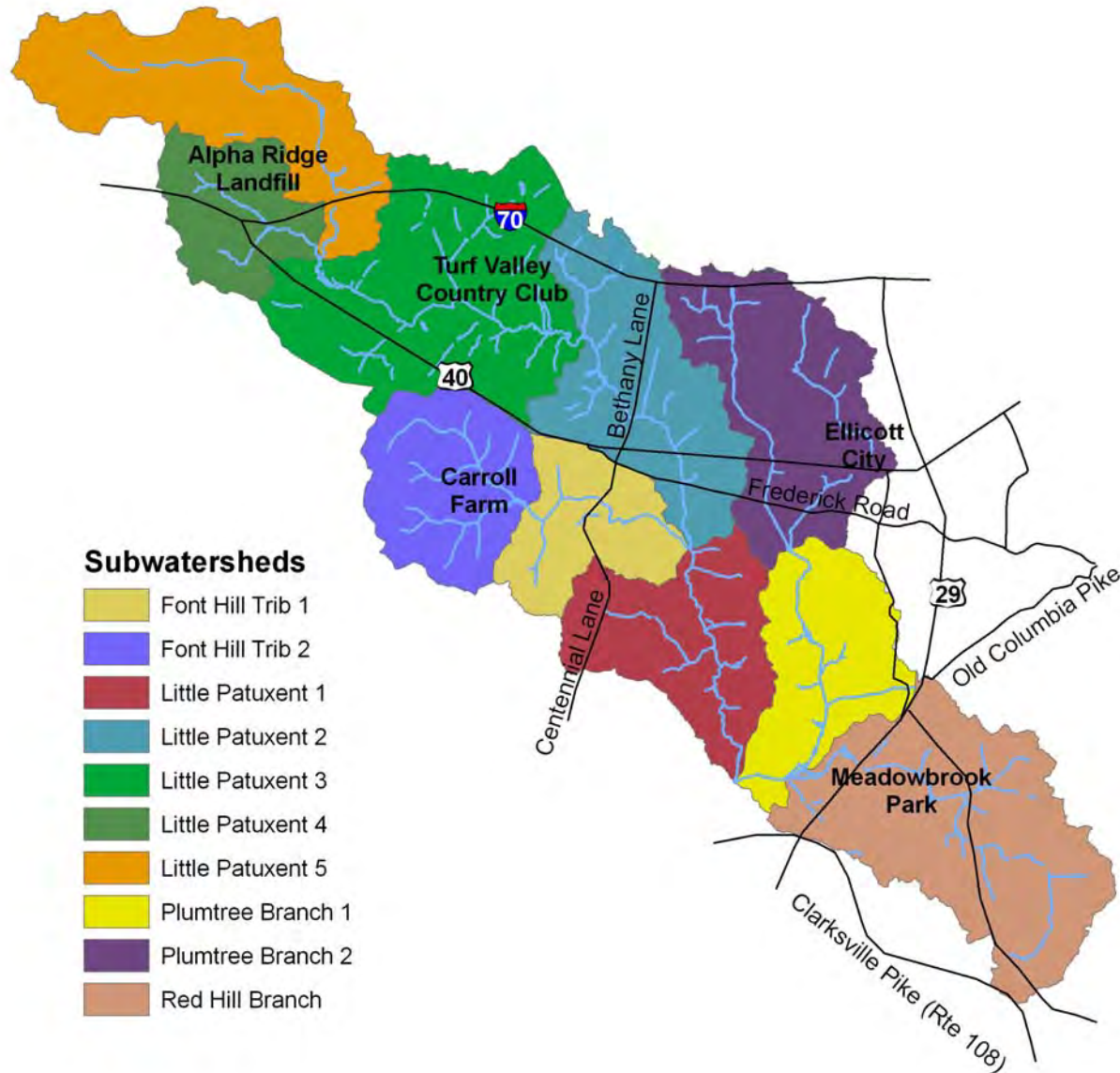
# Watershed Overview

---

- 17.3 square miles
- 44 miles of streams
- Major Roadways
  - Interstate 70
  - US Route 40
  - MD Route 144
  - US Route 29
  - MD Route 100
- Major Landmarks
  - Ellicott City
  - Carroll Farm
  - Turf Valley
  - Alpha Ridge
  - Meadowbrook Park



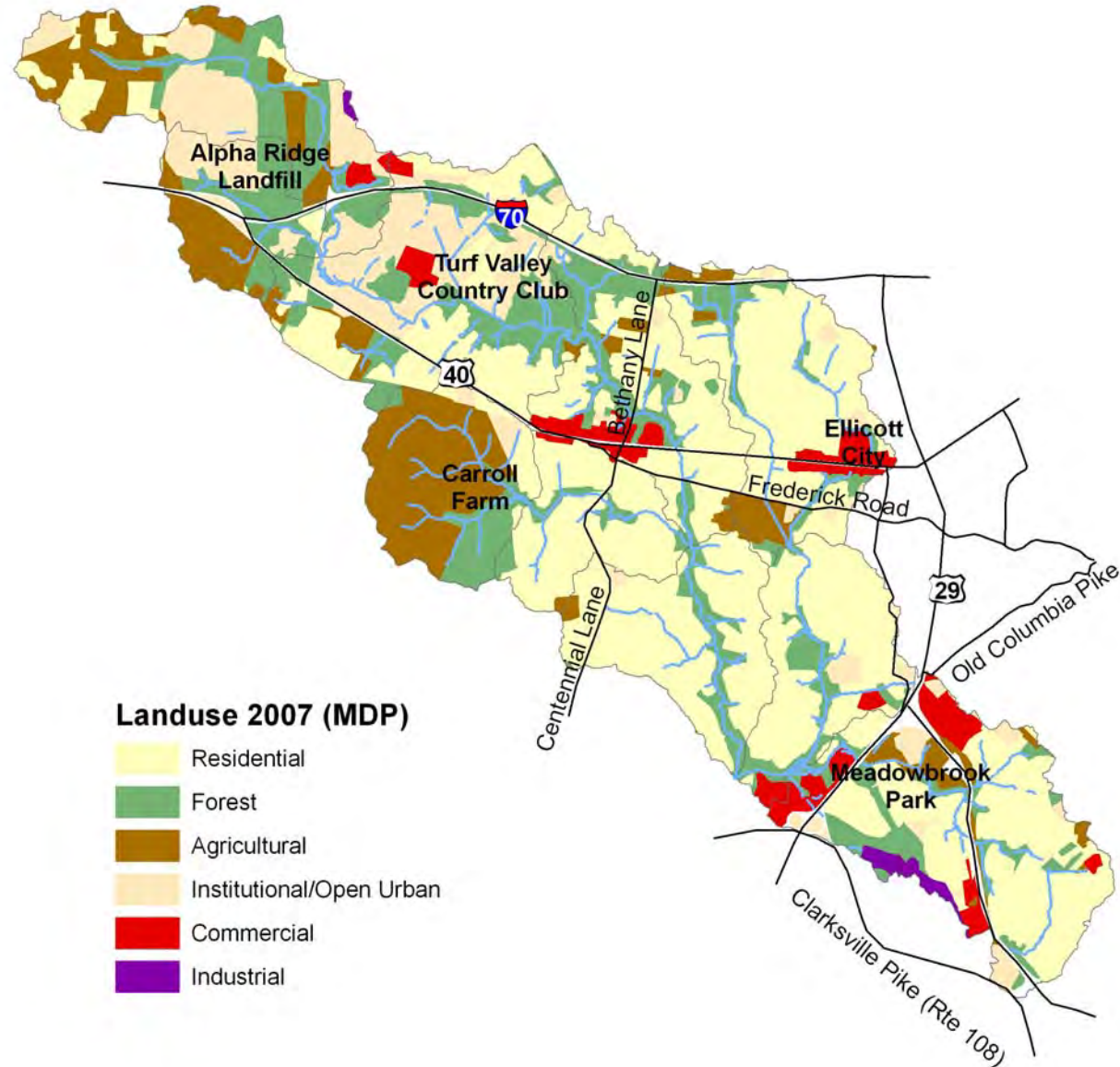
# Subwatershed Overview





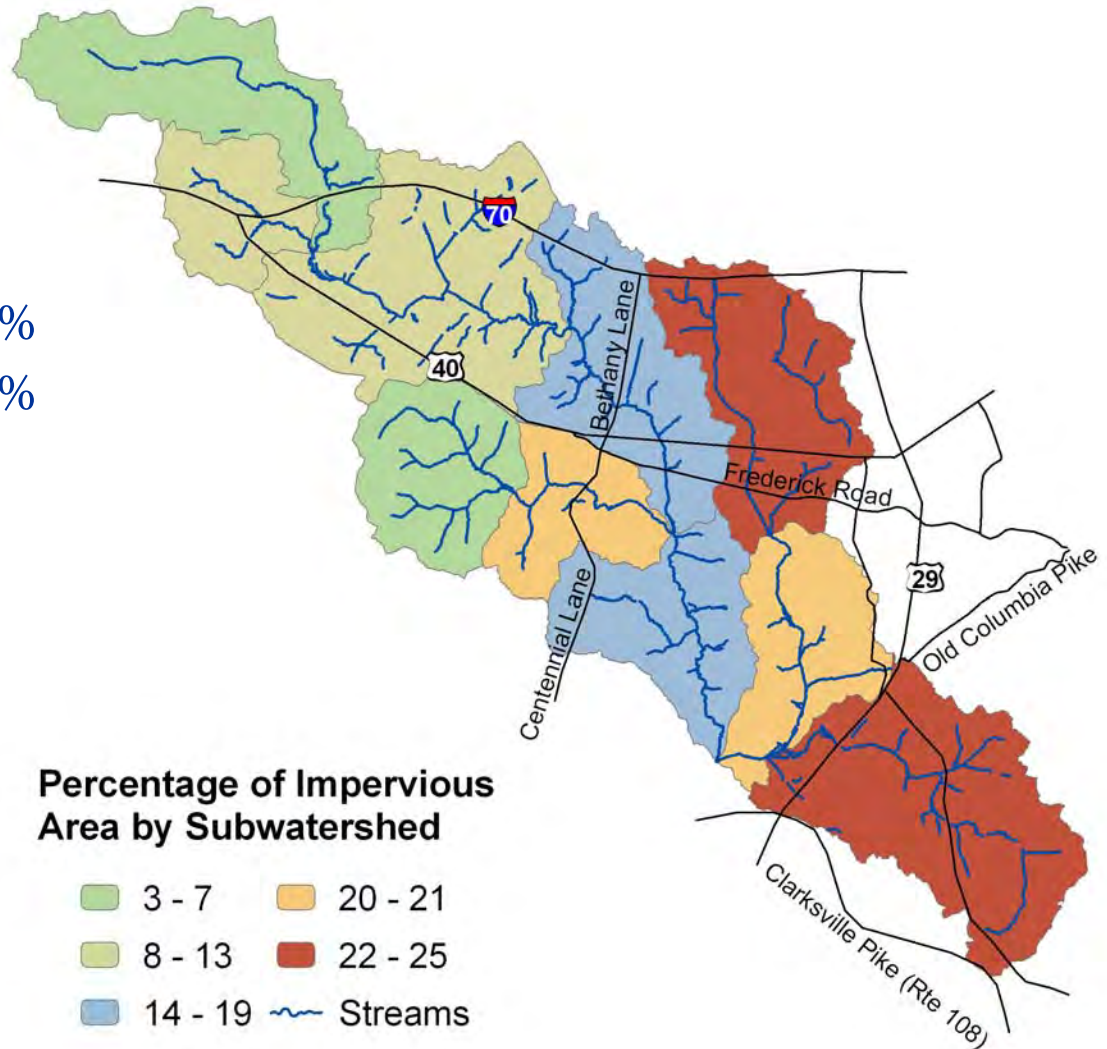
# Land Use

- Residential 50%
- Forest 20%
- Agricultural 15%
- Institutional 12%
- Commercial 4%
- Industrial 1%



# Imperviousness

- County Imperviousness 11%
- Upper Little Patuxent 16%
- Upper Little Patuxent covers 6.8% of the County but contributes 10% of its imperviousness



# Stream Corridor Assessment

---

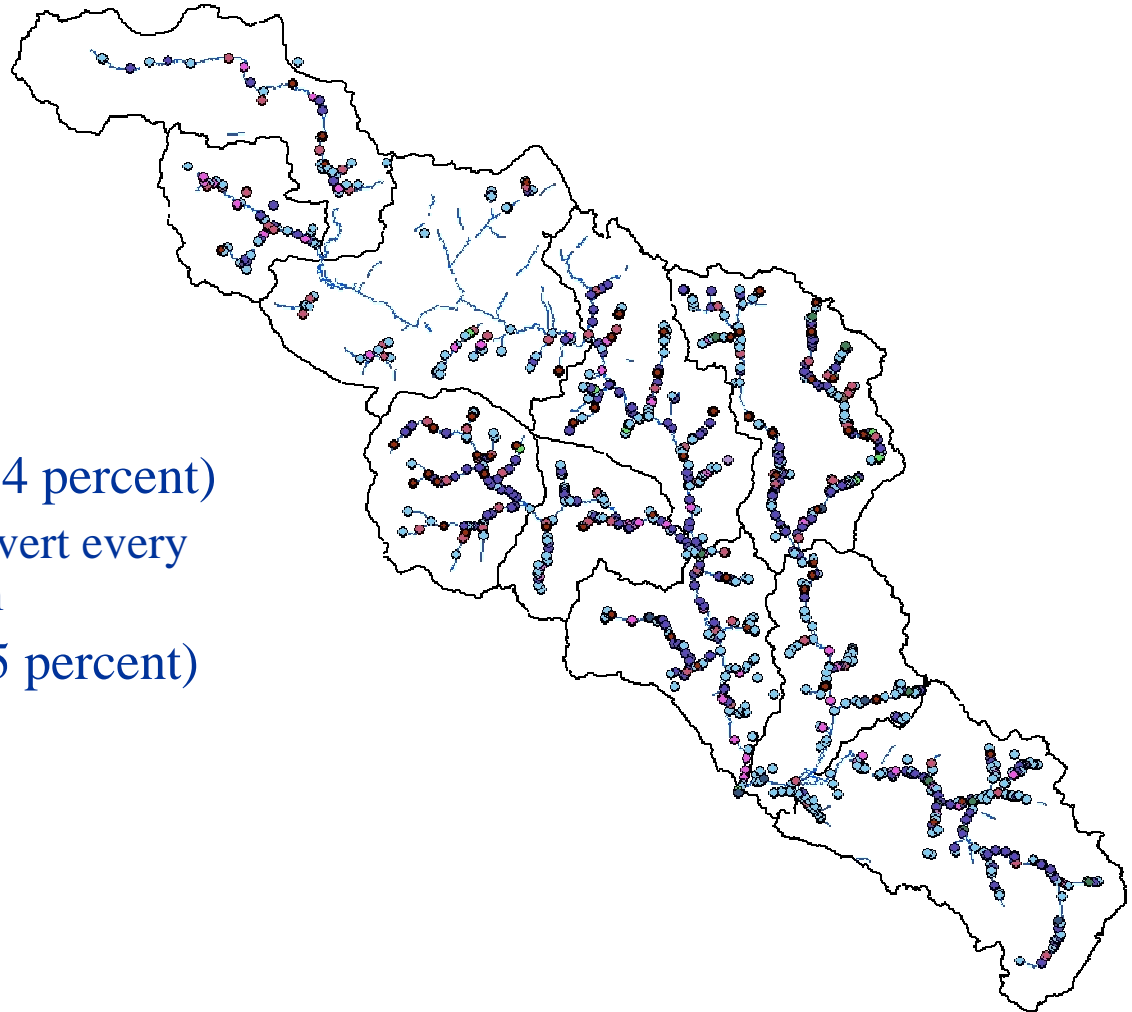
- Teams walked 44 miles
- Identified
  - Channel Alteration
  - Erosion Site
  - Inadequate Buffer
  - Pipe Outfall
  - Exposed Pipe
  - Fish Barrier
  - Trash Dumping
  - Construction
  - Unusual Condition
  - Representative Site
- Scored 1-5 for Severity, Correctibility and Access



# Stream Corridor Assessment

---

- 1049 points
- 24 points per mile
- Pipe Outfalls 571 (54 percent)
  - One outfall or culvert every 406 feet of stream
- Erosion Site 257 (25 percent)

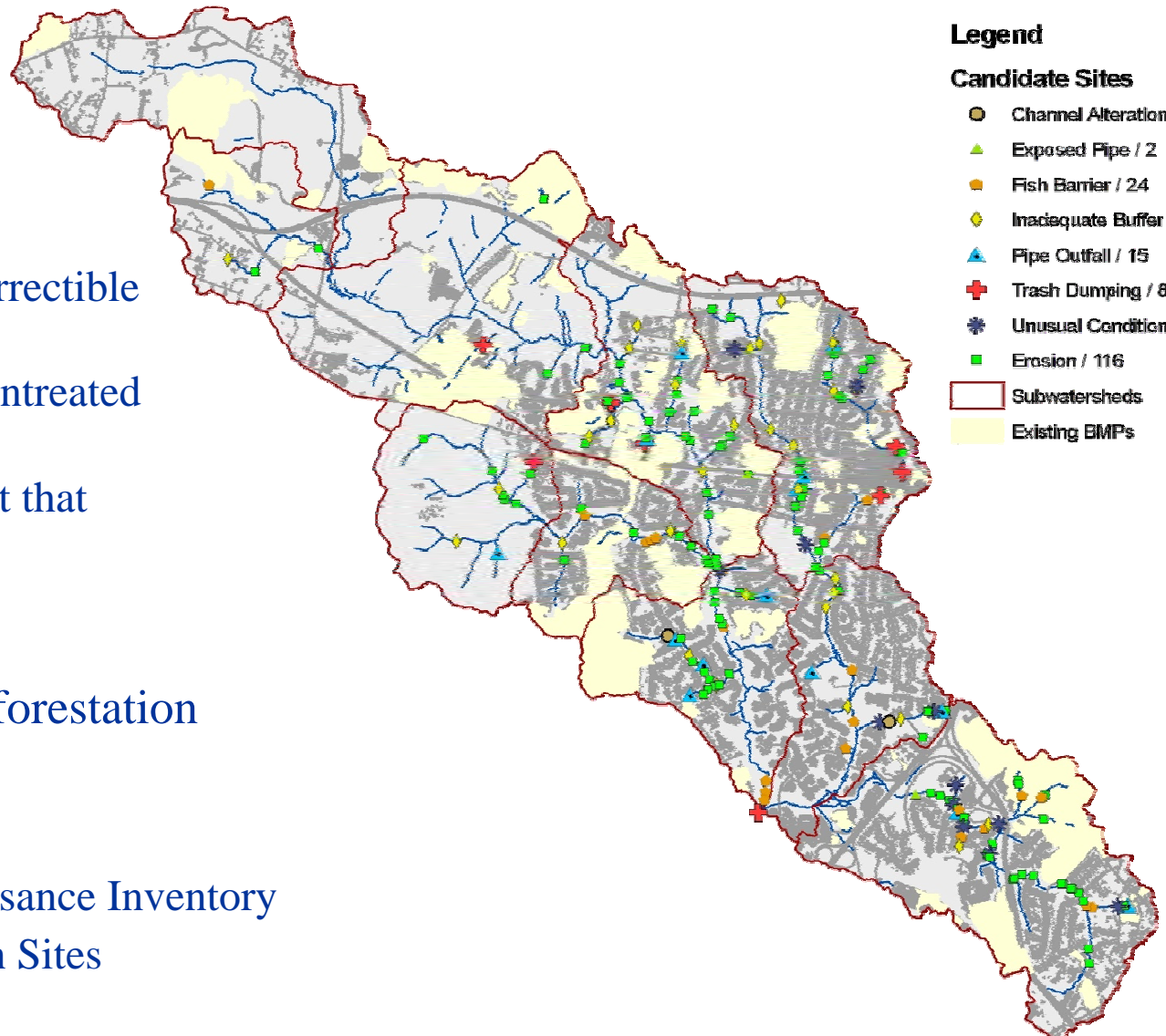


# Candidate Sites

## Legend

### Candidate Sites

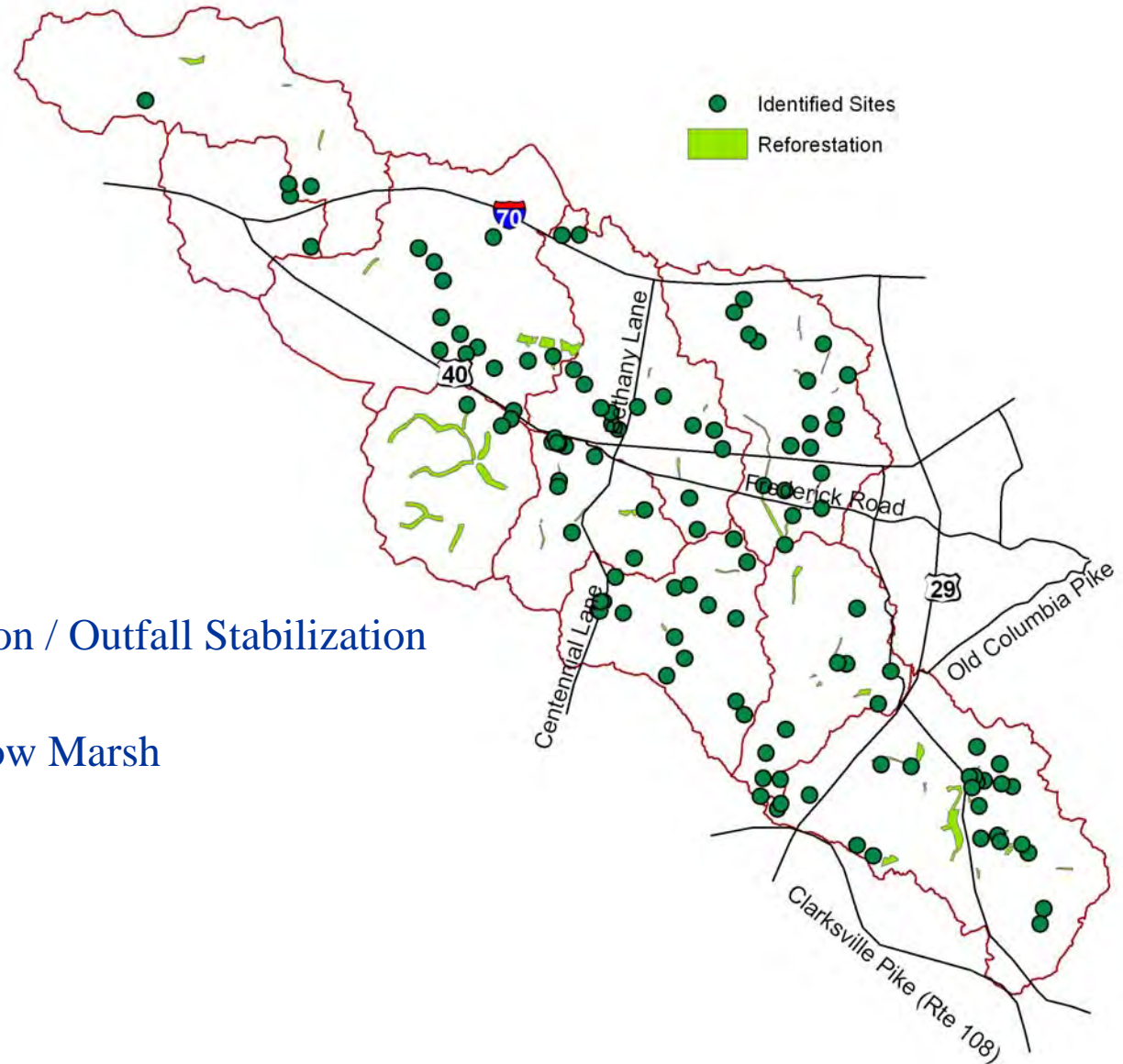
- Channel Alteration / 2
- ▲ Exposed Pipe / 2
- Fish Barrier / 24
- ◆ Inadequate Buffer / 32
- ▲ Pipe Outfall / 15
- ✚ Trash Dumping / 8
- ✱ Unusual Condition / 12
- Erosion / 116
- ▭ Subwatersheds
- Existing BMPs



- Candidate Sites
  - Most severe and correctible SCA data points
  - Concentrations of untreated impervious
  - Buffer enhancement that connect habitats
  - Citizen issues
- Mapping Effort - Reforestation
- Field Effort
  - Retrofit Reconnaissance Inventory
  - Stream Restoration Sites

# Candidate Sites

- Results - 184 Total Sites
  - 64 - Reforestation
  - 31 - Bioretention
  - 25 - Stream Restoration / Outfall Stabilization
  - 57 - Pond Retrofit
  - 7 - New Pond / Shallow Marsh



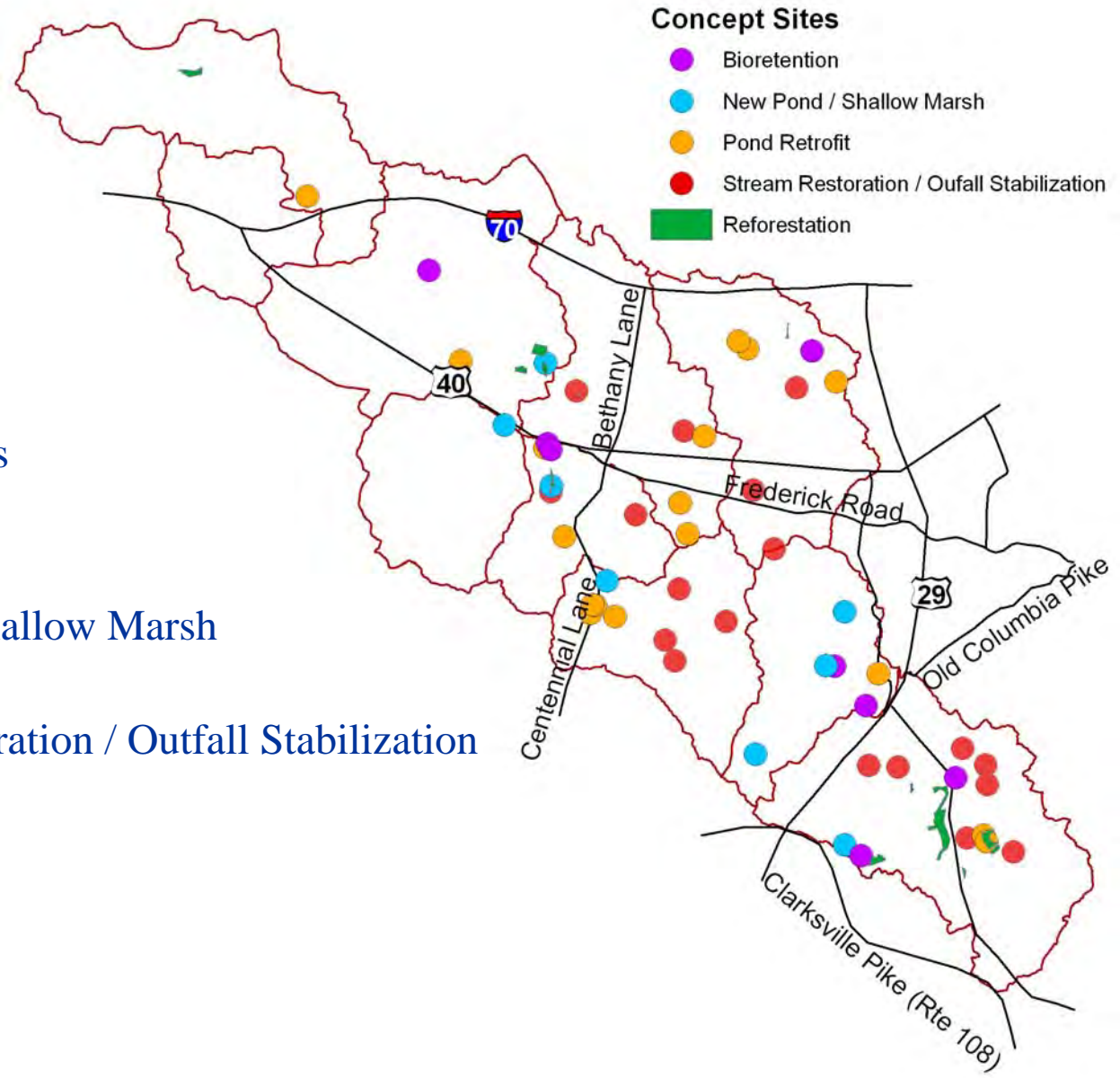
# Candidate Sites Ranking

---

- Rank the top sites for full Concept Design
- Benefits
  - Quantity Control / Flooding
  - Water Quality
  - Water Temperature
  - Channel Erosion
  - Instream Habitat
  - Riparian Habitat
  - Fish Passage
  - Public Safety
  - Addressing Citizen Issue
  - Education / Outreach
  - Combined Effect
  - Impervious Area Treated
- Constraints
  - Environmental Permitting
  - Adjacent Landuse
  - Property Ownership
  - Facility Access
  - Design / Construction
  - Public Safety
  - Existing Utility Conflicts

# Concept Sites

- Result - 65 Total Sites
  - 17 - Reforestation
  - 8 - Bioretention
  - 8 - New Pond / Shallow Marsh
  - 17 - Pond Retrofit
  - 15 - Stream Restoration / Outfall Stabilization





# Concept Plans

## Proposed Project

Upper Little Patuxent

**Project Number:** LPX1\_04A  
**Subwatershed:** Little Patuxent 1

**Project Type:** Pond Retrofit  
**Project Size:** 21.6 acre drainage area/ 3.6 acres impervious

**Project Location:** In open space between Burleigh Cottage Lane and Centennial Lane.



**Project Description:** This project would entail retrofitting an existing pond situated between Burleigh Cottage Lane and Centennial Lane which captures runoff from neighborhoods along White Rose Way and Camelford Court. The pond would be excavated to increase detention volume to provide pollutant removal closer to current design standards. The design would incorporate water quality features such as a micropool, aquatic bench, forebay, and a meandering flow path. Because the project is a wet pond and is located near private residences, property owners would be kept informed and involved in the planning and design process.

### Project Benefits:

**Water Quality** Conversion to a wet pond / wetland designed to current standards would provide water quality treatment and pollutant removal.

### Project Constraints:

**Environmental** No environmental constraints are anticipated with this project.  
**Property Ownership** This project lies within County owned property (Burleigh Manor open space).  
**Facility Access** Access to this site is obtained from Centennial Lane.  
**Design / Construction** Traffic maintenance will be required due to volume of traffic on Centennial Lane.

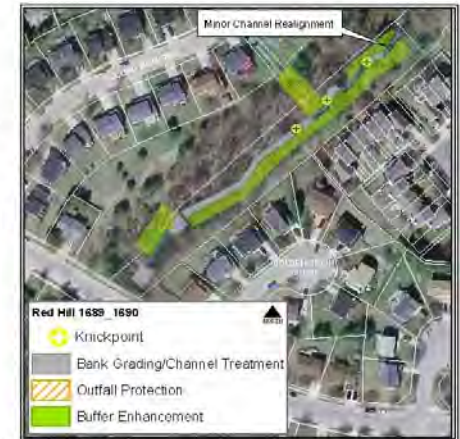
## Proposed Project

Upper Little Patuxent

**Project Number:** 1688\_1690  
**Subwatershed:** Red Hill

**Project Type:** Stream Restoration  
**Project Size:** Approx. 600 linear feet

**Project Location:** Between Rolling Meadows and Golden Grain Court, upstream of the culvert at Wheatfield Way.



**Project Description:** This project would require regrading and stabilization of banks in localized areas throughout the study reach to stabilize the existing actively eroding banks. In some areas the banks may require stone protection to further stabilize the bank. Many trees in the riparian buffer appear to be providing stabilization to the banks through the root masses and therefore should be preserved. A series of 3 knick points exist approximately 300 linear feet upstream of the culvert at Wheatfield Way. These knick points are currently holding the existing grade and should be stabilized using grade control structures in order to prevent further headcutting. A grade control structure should also be applied just upstream of the culvert at Wheatfield Way to further stabilize the channel. An outfall enters the channel approximately 300 linear feet upstream of the culvert and should be stabilized in conjunction with the stream stabilization work. A riparian buffer enhancement will be applied to areas being regraded and along the left bank (facing downstream) to restore ecological function.

### Project Benefits:

**Stabilization** The stream banks will be stabilized to reduce scour. The channel bed will be stabilized using grade control structures to protect the existing knick points and prevent further headcutting.  
**Water Quality** Implementation of this project will provide a reduction in sediment supply and the associated water quality benefits.  
**Education** The project could provide educational benefits due to the proximity of the project to adjacent residential areas.

# Concept Plans

## Proposed Project

Upper Little Patuxent

Project Number: LPX1\_04A  
Subwatershed: Little Patuxent 1

Project Type: Pond Retrofit  
Project Size: 21.6 acre drainage area/ 3.6 acres impervious

### Cost Detail:

ITEM	QTY	UNITS	UNIT COST	TOTAL
<b>Site Work</b>				
Clear and Grub	0.3	AC	\$5,000.00	\$1,260
Pavement / Sidewalk Removal		SY	\$7.50	\$0
Curb-Gutter Removal		LF	\$10.00	\$0
Remove Pilot Channels		LF	\$6.00	\$0
Remove Barrel Pipe		LF	\$77.00	\$0
<b>Pond Construction</b>				
Grading and Excavation (Class I)	588	CY	\$30.00	\$17,640
Hauling and Disposal	588	CY	\$20.00	\$11,760
Embankment		CY	\$60.00	\$0
Forebay	79	CY	\$45.00	\$3,555
Safety bench	235	CY	\$30.00	\$7,050
Riser		LS	\$10,000.00	\$0
Outflow Pipe		LF	\$80.00	\$0
Outlet Protection	1	LS	\$8,000.00	\$8,000
Fencing		LF	\$20.00	\$0
Rip Rap Stabilization		LF	\$60.00	\$0
SWM Landscaping	1,254	SY	\$10.00	\$12,540
<b>Direct Construction Subtotal</b>				<b>\$61,795</b>
<b>Indirect Costs</b>				
E/SC, MOT, MOS (20% of Directs or \$10,000)	1	LS	\$12,369.00	\$12,369
Construction Stakeout (1,000 Day)	3	Day	\$3,000.00	\$3,000
<b>Base Construction Cost</b>				<b>\$77,164</b>
<b>Mobilization (10% of Directs or \$1,000)</b>				<b>\$6,180</b>
<b>Subtotal</b>				<b>\$83,334</b>
<b>Contingency (30%)</b>				<b>\$25,000</b>
<b>Construction Subtotal</b>				<b>\$108,334</b>
<b>Envtl Studies / Permitting (5% of Construction or \$5,000)</b>				<b>\$5,417</b>
<b>Engineering and Surveys (25% of Construction or \$40,000, maximum \$50,000)</b>				<b>\$40,000</b>
<b>Total Capital Cost</b>				<b>\$153,750</b>
<b>Operations and Maintenance Costs</b>				
Annual Maintenance	6	Percent	\$3,708	
Discount Rate	5	Percent		
Expected Life	20	Years		
<b>Net Present Value of O&amp;M Costs</b>				<b>\$48,208</b>
<b>Life Cycle Cost</b>				<b>\$200,000</b>

Unit Costs

Direct Construction

Indirect Construction

Contingency

Environmental Clearance

Design and Surveys

Total Capital Cost

Life Cycle Cost

# Watershed Management Plan

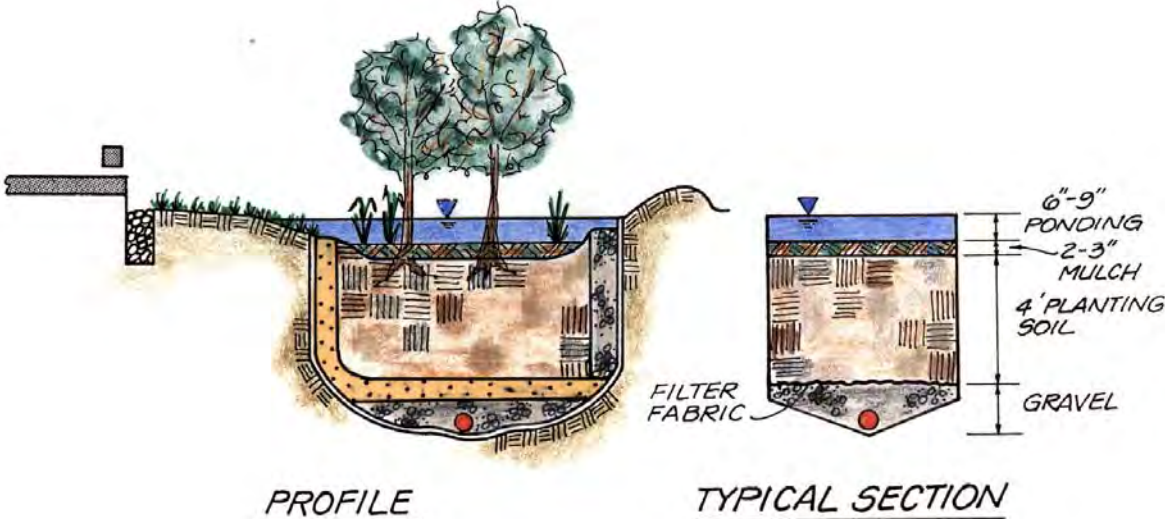
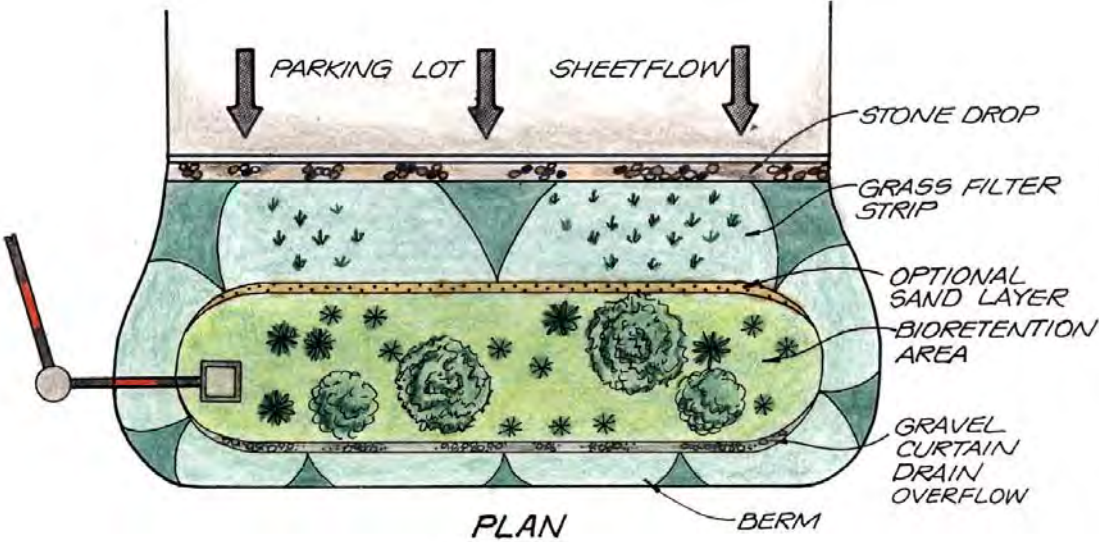
---

- Plan Purpose and Goals
- Watershed Conditions
  - Land Use and Impervious Surfaces
  - Stream Condition – Stream Corridor Assessment
- Development of Detailed Strategies and Concept Plans
  - Field Investigation
  - Prioritization
  - Cost, benefits, constraints
- Implementation Plan
  - Rank the strategies and concepts – incorporate cost
  - Funding Requirements and Sources
  - Monitoring Program and Success Tracking
  - Items for Additional Study

# Restoration Toolbox

---

# Bioretention Facility



# Bioretention Facility

---

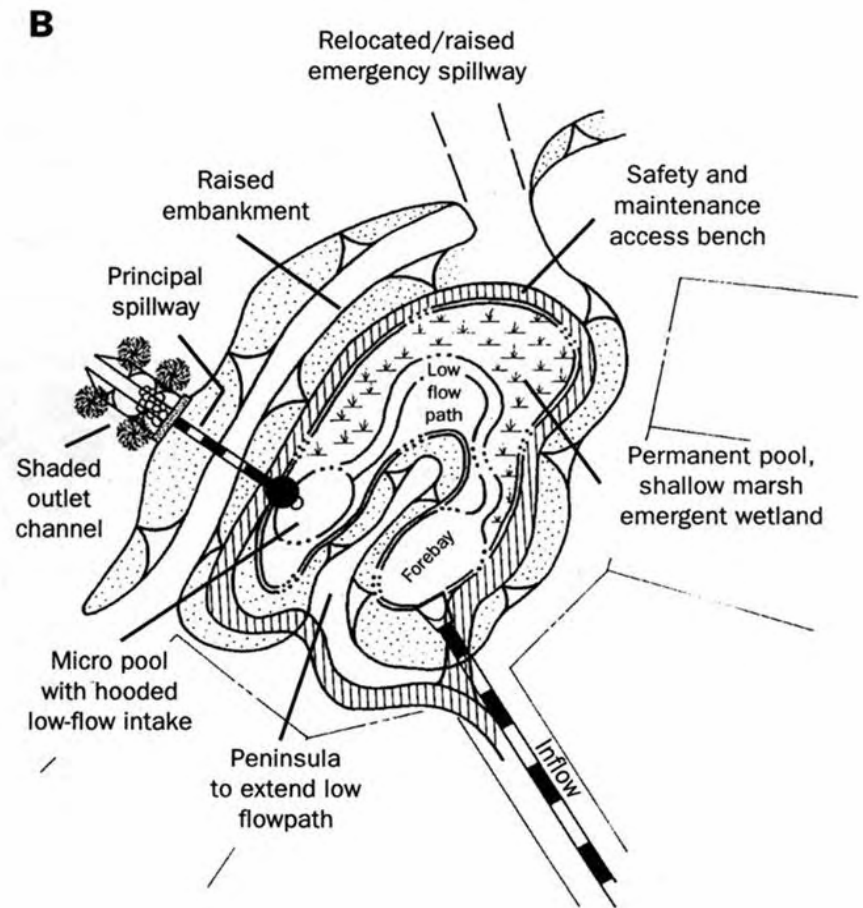
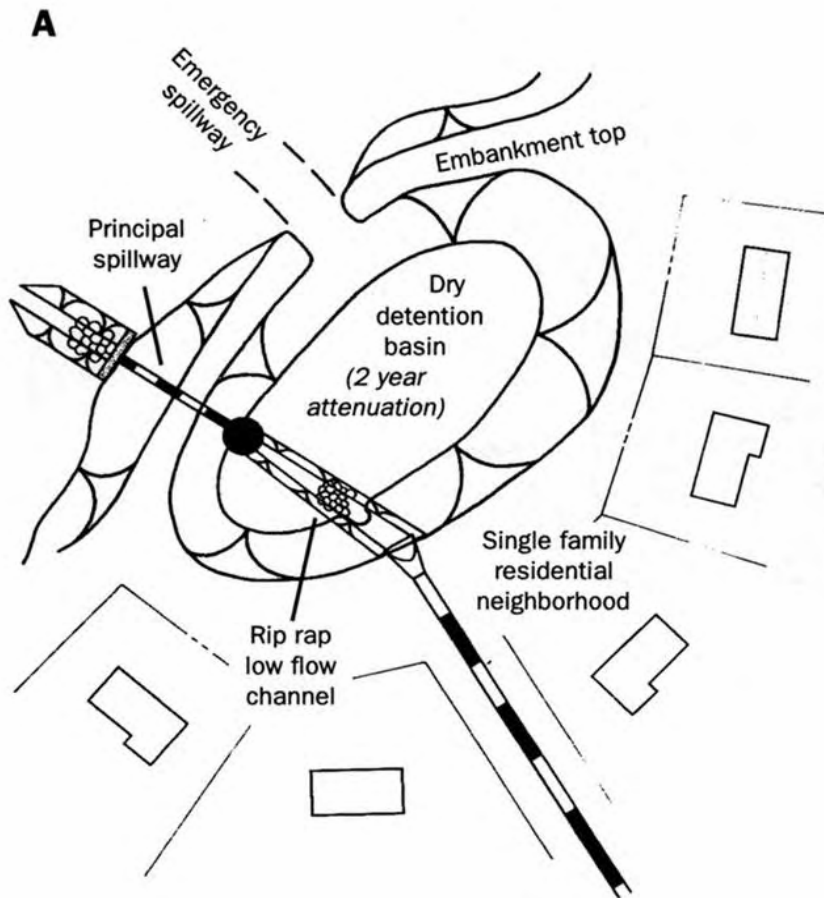


# Sand Filter

---



# Dry Pond Conversion Schematic



**Dry Pond**



**Shallow Marsh**





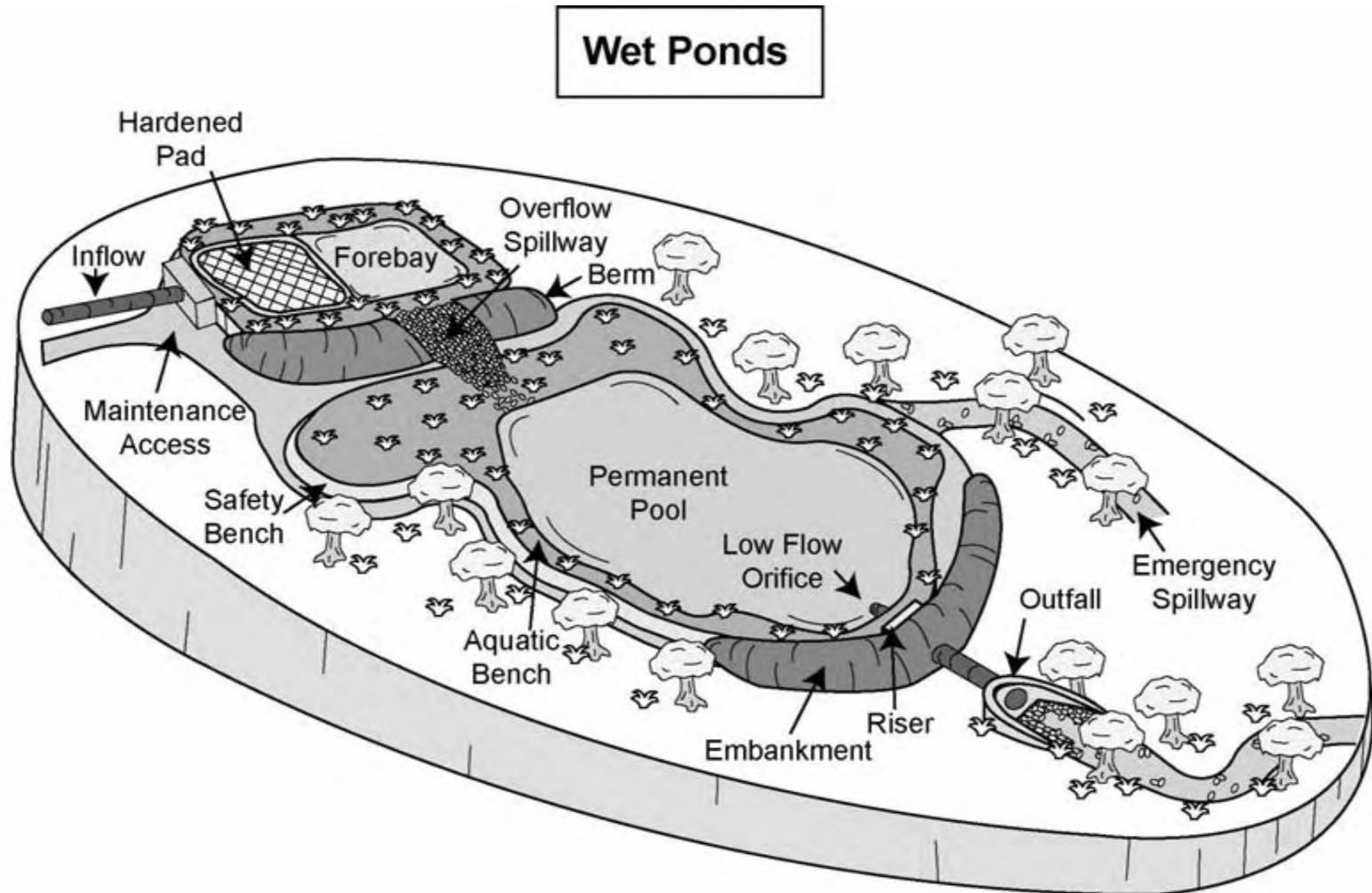
**BEFORE**



**Retrofit Existing Pond**

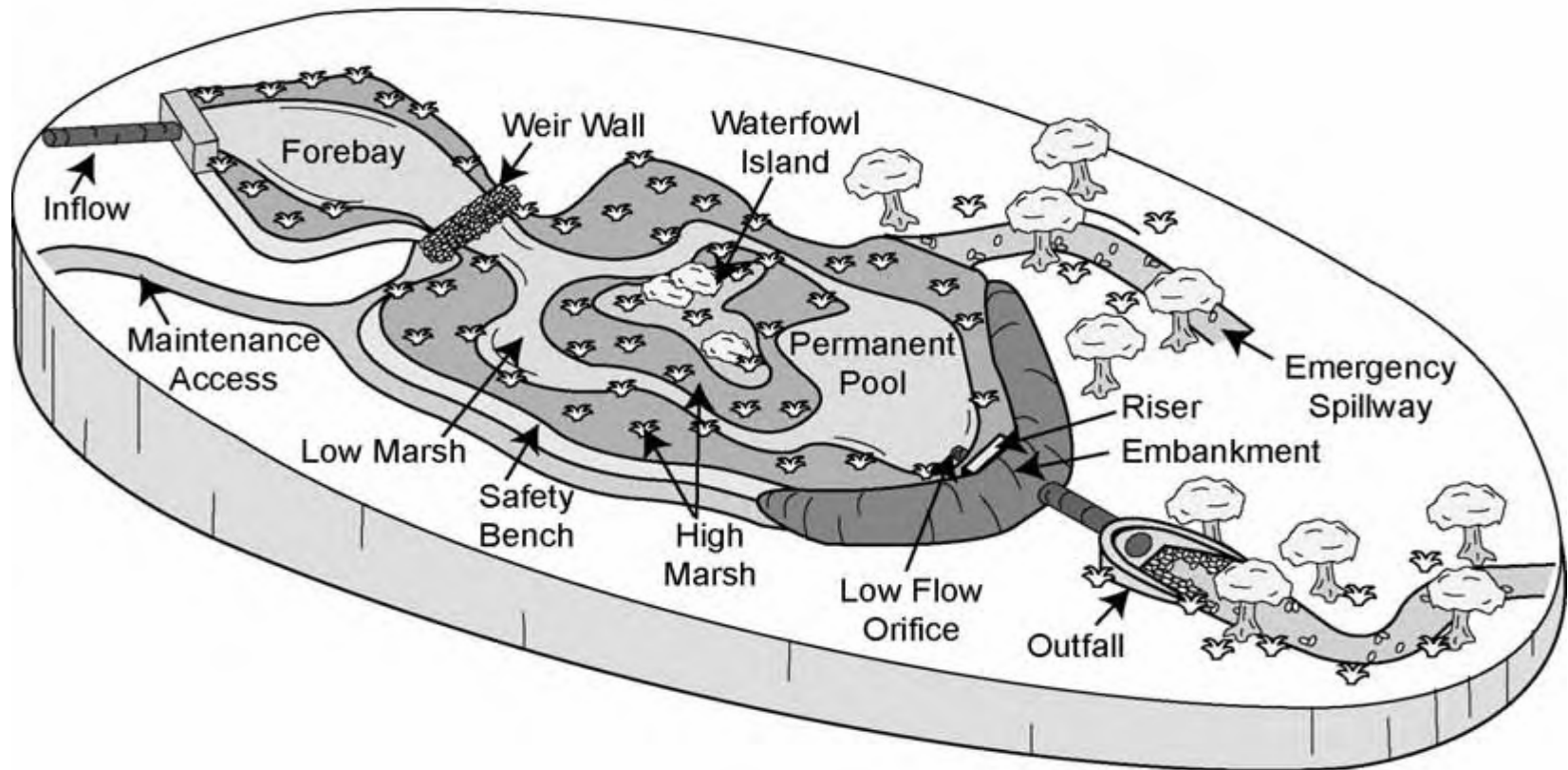
**AFTER**

# Wet Pond Schematic



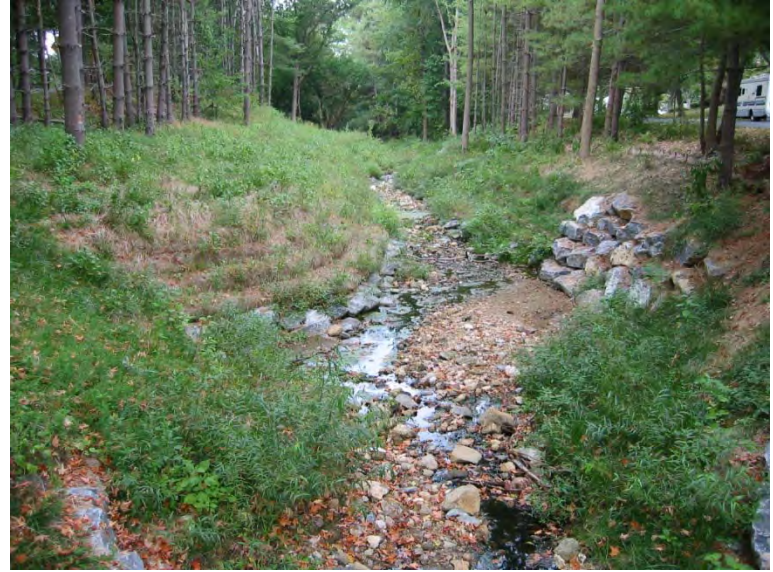
# Constructed Wetlands Schematic

## Wetlands



# Stream Restoration

---



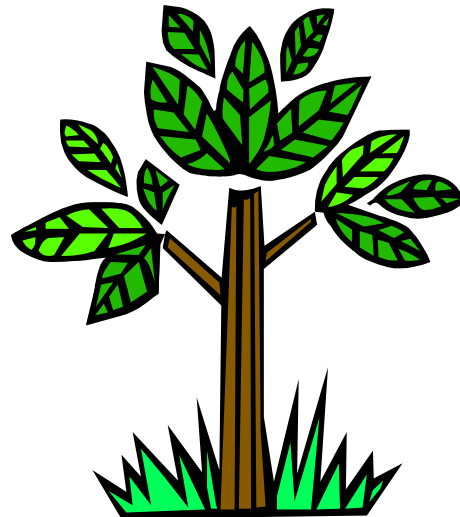
# Riparian Buffer Enhancement

---





**What can homeowners do to  
improve the water quality in  
the Upper Little Patuxent  
River watershed?**



# Everyday Things

---

Pick up after your pet

Reduce the amount of fertilizer you use

Reduce runoff from your yard

- Disconnect your downspouts

- Reduce turf area

Remember that anything that runs off your driveway or lawn ends up in the creek

- Oil leaks

- Pesticides

Plant a tree (or more) – Stream ReLeaf Program

Reduce, Reuse and Recycle!!



# Volume Reduction

---

There are both simple and complex ways to reduce runoff from your yard

- downspout disconnection
- rainbarrels
- rain gardens
- lawn conversion

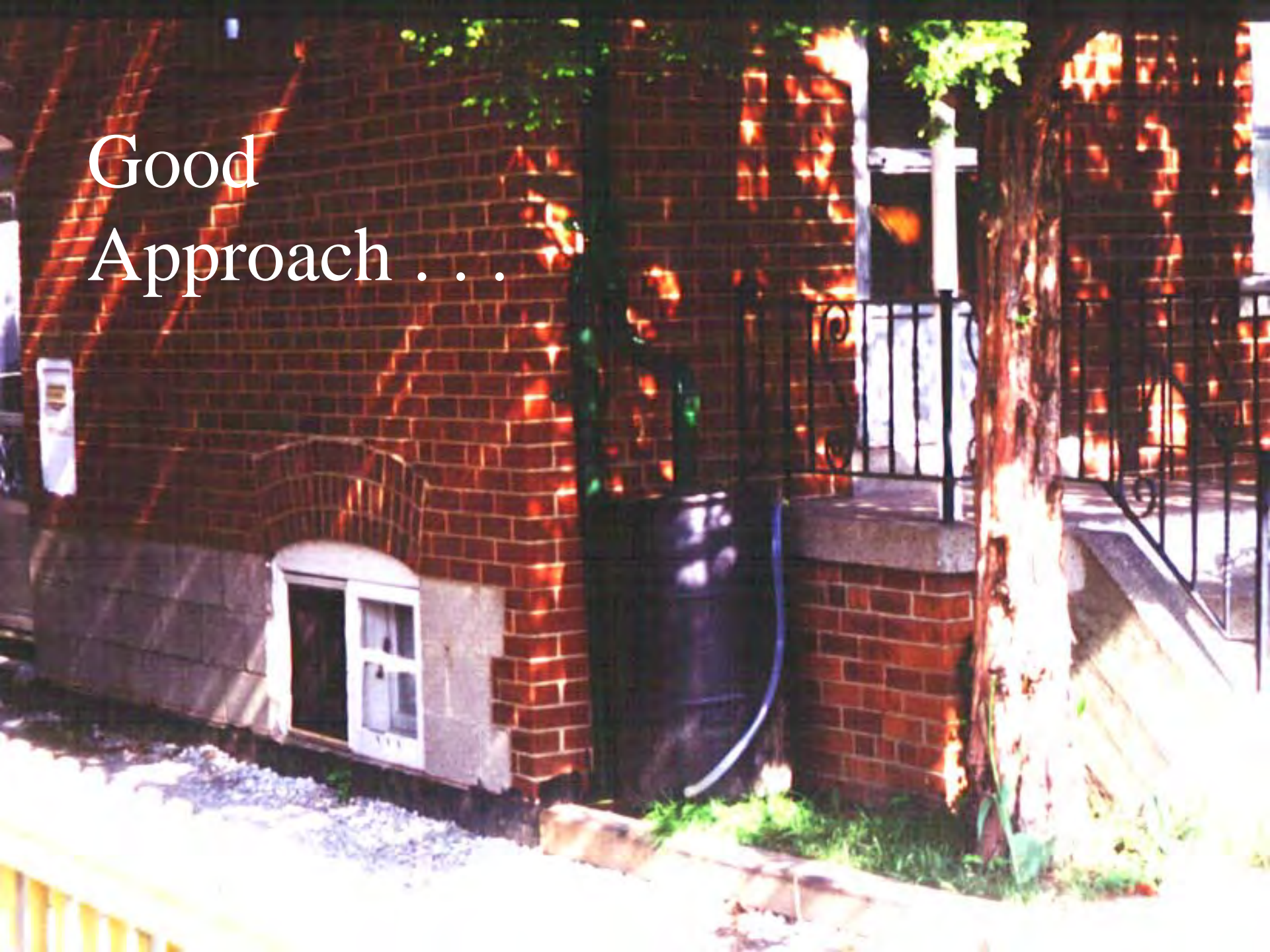


Bad  
Approach . . .



2. 5. 2002

Good  
Approach . . .



Overfertilization?  
Too much turf?



Disconnected impervious





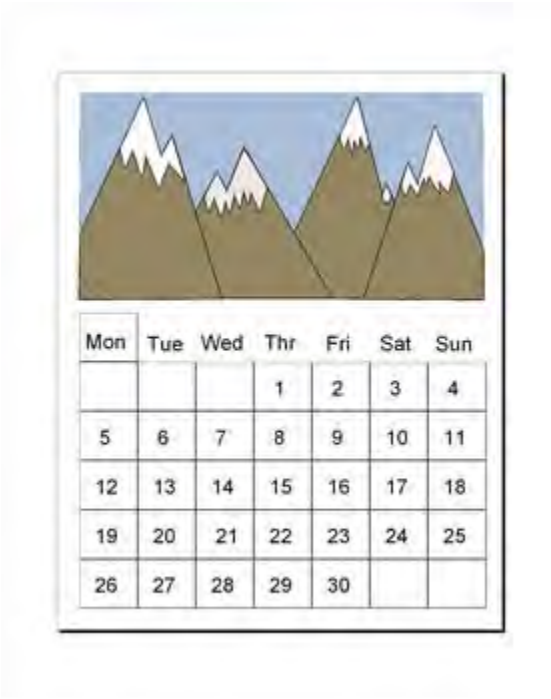


Lack of  
riparian buffer.



# Now What?

---



Time

&

Money



# Time and Money

---

- Total Cost of Priority Projects (w/Concepts)
  - \$17 million
- Typical Capital Budget for SWM Division
  - \$1.25 million/year
- Phase projects into Capital Budget requests
- Chesapeake Bay Trust Fund 2010 Grant
- Stormwater Utility?
- **Advocate** for funding

# Next Steps

---

- Post report and concept plans to County website
- Add ULP priority sites into Countywide project backlog list.
- Public property vs Private property sites
- County will continue to look for opportunities to implement the recommendations of the Final Report.
- Continued public education and involvement is needed.

# Questions?

---

**Stormwater Management Division**

**Watershed Studies webpage:**

**<http://www.co.ho.md.us/DPW/wras.htm>**