Patapsco River Watershed Assessment

COMMUNITY MEETING NO. 2

January 26, 2017

clean H2OWARD

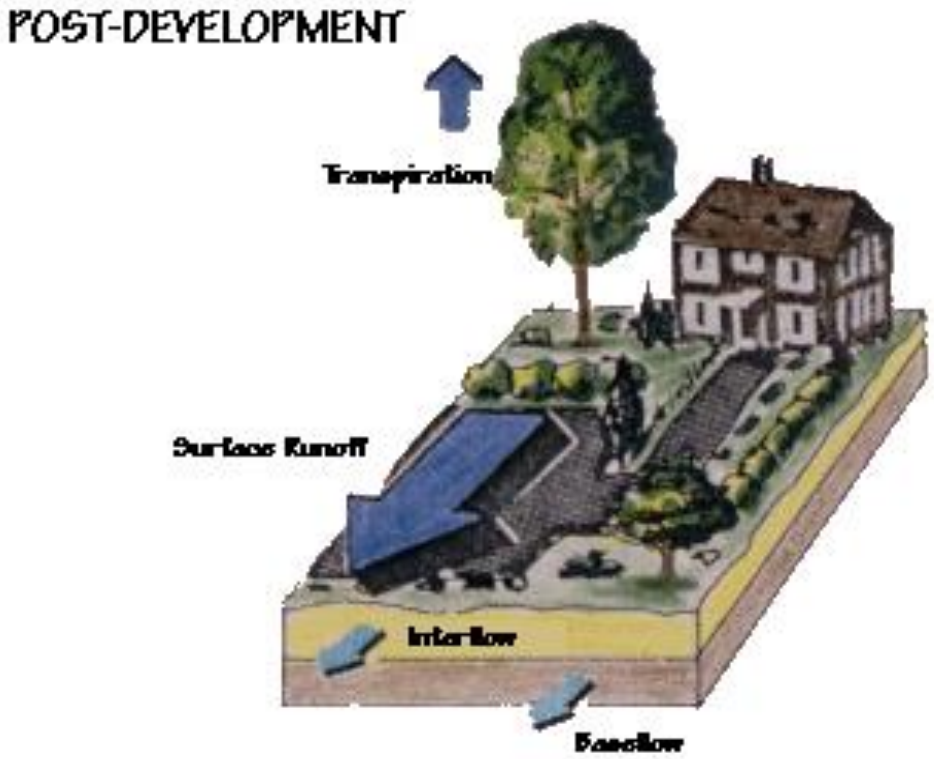
Howard County Stormwater Solutions

Meeting Outline

- Welcome and Introductions
- Watersheds 101
- Reasons for Study
- Countywide Implementation Strategy (CIS) – Part 1
- Watershed Study (Assessment Results, Concept Development, Pollutant Load Reductions)
- Restoration Toolbox
- Countywide Implementation Strategy (CIS) – Part 2
- Office of Community Sustainability
- Q&A

Watersheds
101

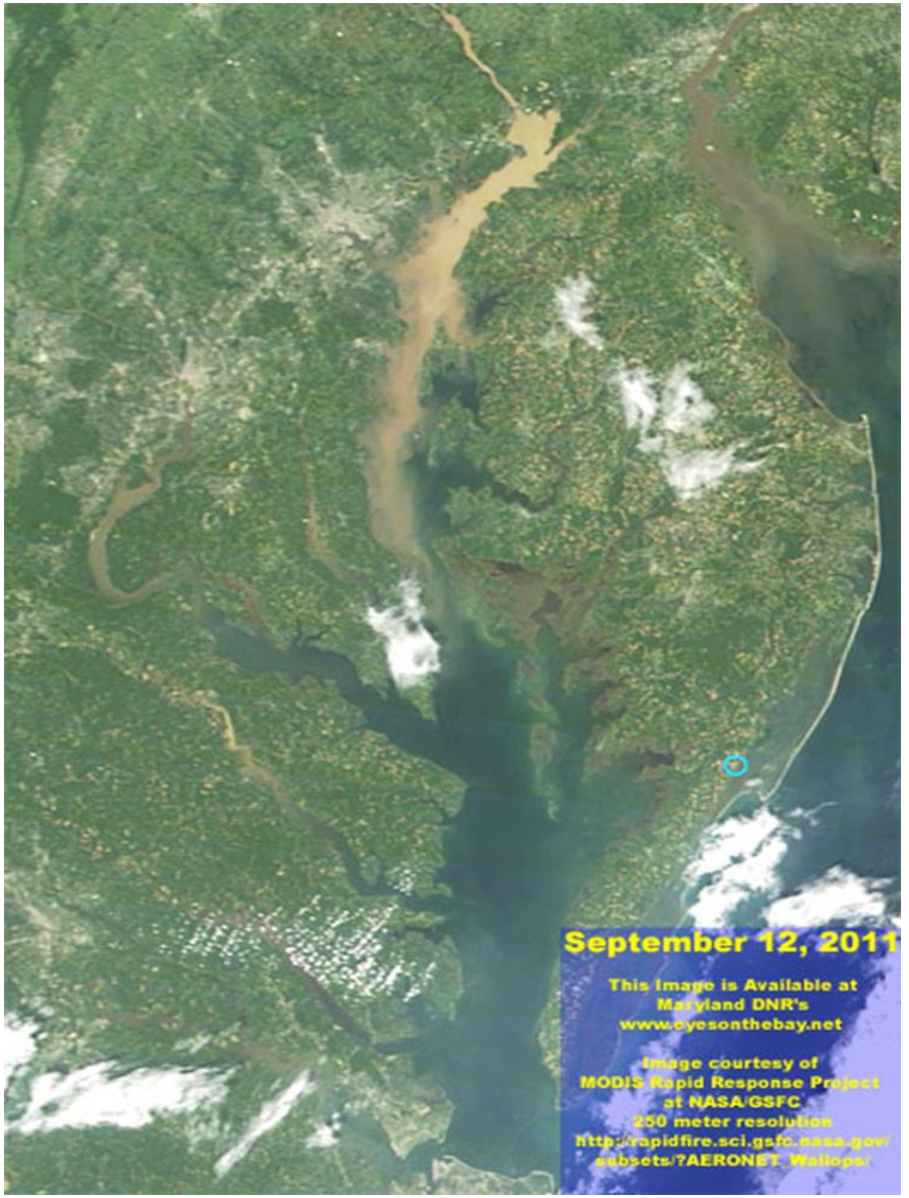
WATER BALANCE



Where does storm water go?

A. To a wastewater treatment plant so pollutants and trash can be removed before the water goes to a nearby stream. **False**
B. To a nearby stream without any treatment. **Possibly**
C. To a stormwater management facility for pollutant removal and then to a nearby stream. **Possibly**

The Problem


September 12, 2011
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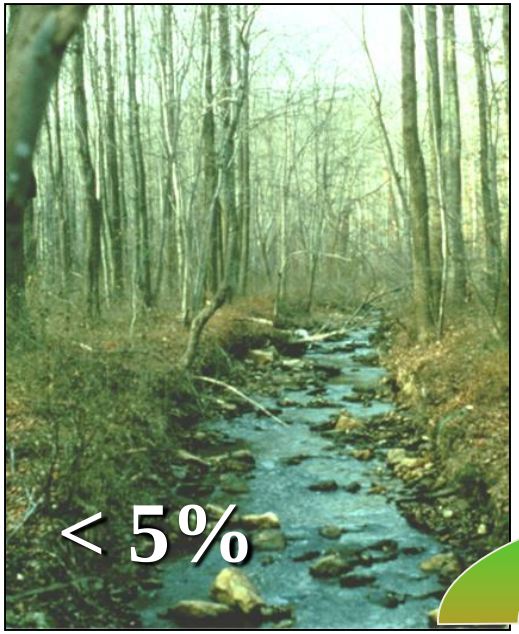
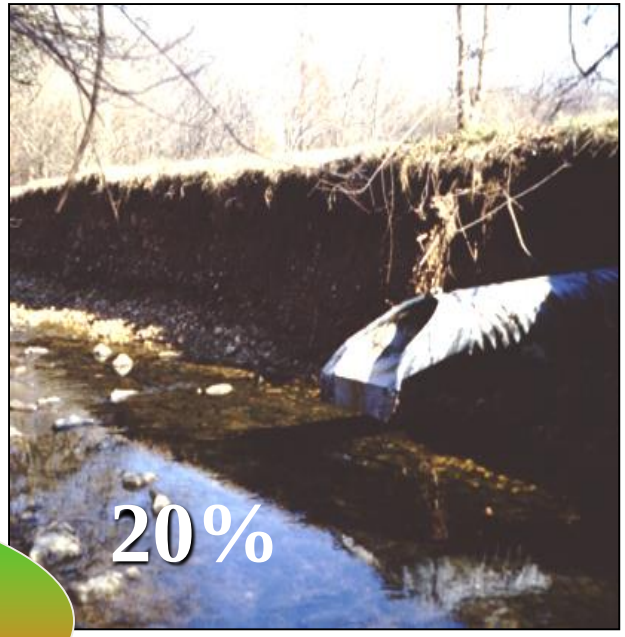
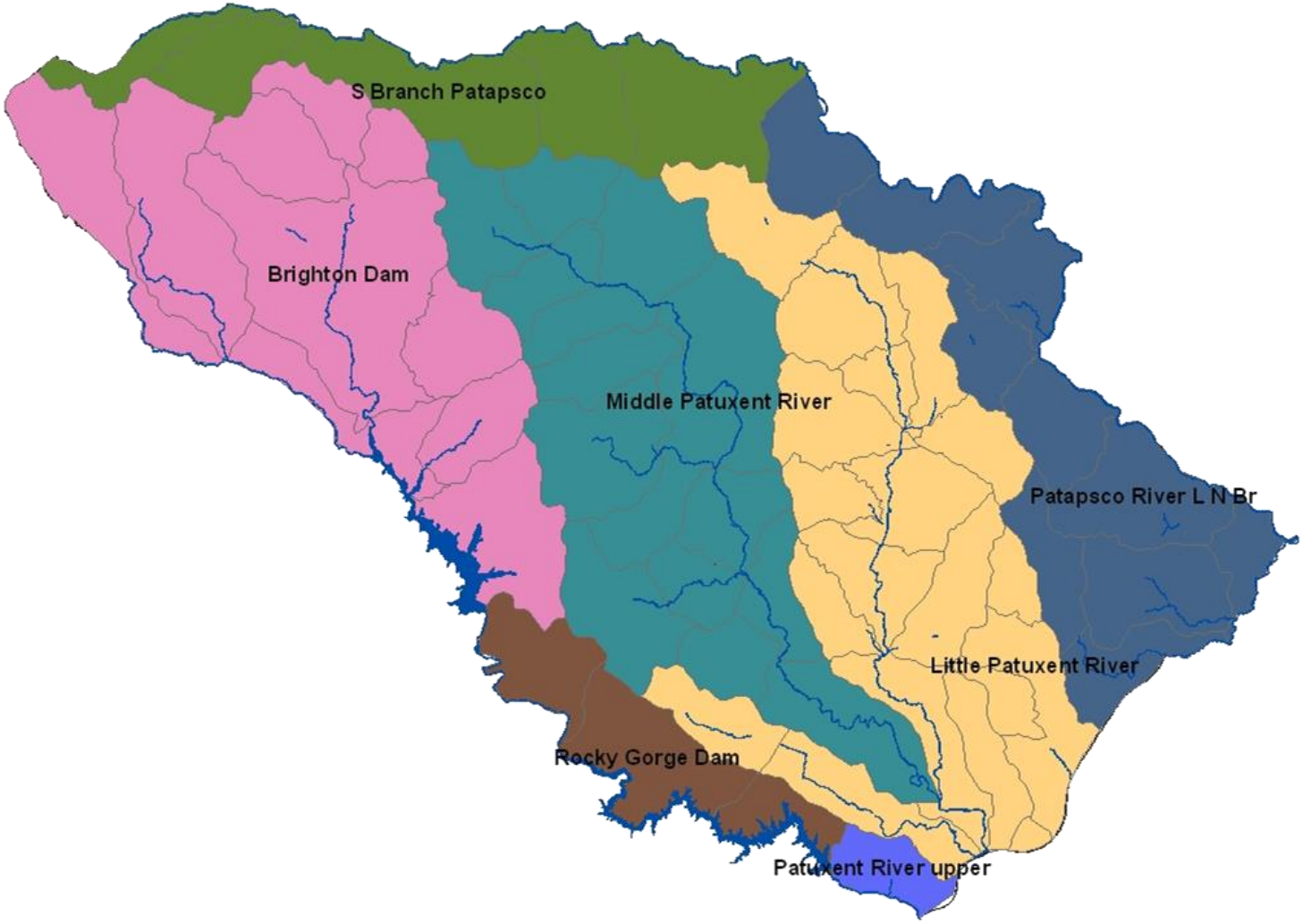




Impervious Cover

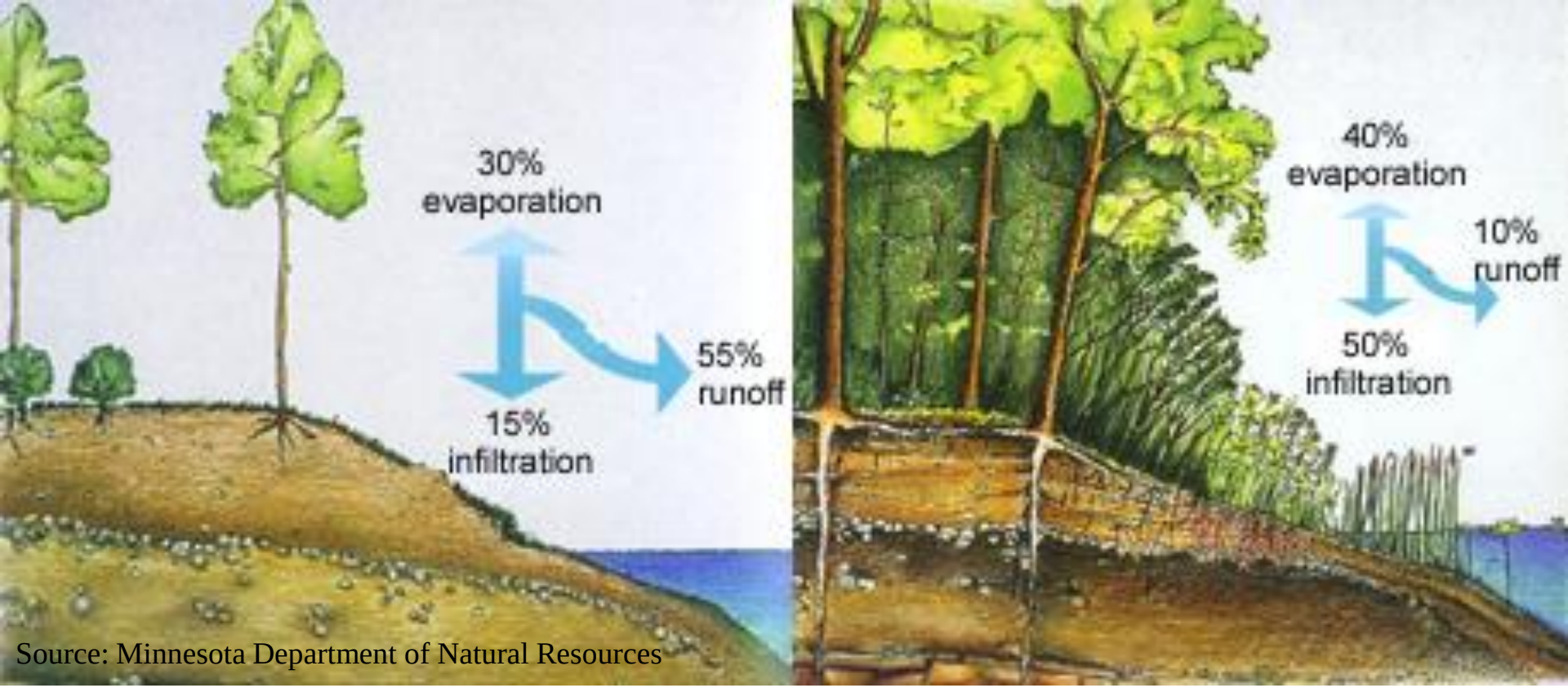
County = 12.7% Columbia ~ 15%-20%

County Watersheds



Impervious Area by Watershed

Watershed	Impervious	
	Acres	Percent
South Br. Patapsco	744	4.6
Triadelphia Reservoir (Brighton Dam)	1,830	5.0
Rocky Gorge Reservoir	585	7.3
Middle Patuxent	3,411	9.2
Patapsco - Lower North Br.	4,425	**18.3**
Little Patuxent	9,140	**24.0**
Patuxent – Upper	440	**25.5**



Source: Minnesota Department of Natural Resources

Water quickly runs off a shoreline cleared of natural vegetation, washing nutrients and pesticides into the water. A natural shoreline holds rainfall, which soaks into the soil; less water, soil and chemicals run into the lake or river. Shoreline and aquatic plants anchor shoreline areas, helping to protect them from erosion due to runoff and waves (Source:MN DNR)

Why is the County doing Watershed Planning?

- Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) permit
  - Permit requires treatment of **20%** of currently untreated impervious
  - Perform a comprehensive watershed assessment for the entire County within five year permit term
    - Little and Middle Patuxent Rivers in FY15 (Permit Year 1)
    - **Patapsco and Mainstem Patuxent Rivers in FY16 (Permit Year 2)**
  - Develop a Countywide restoration plan in Permit Year 1 (CIS)
- Total Maximum Daily Load (TMDL) "pollutant diet" for nutrients
- **Retrofitting water quality for older development**
- Looking for cost-effective opportunities for environmental restoration (List of projects)

Total Maximum Daily Load (TMDL)

- Chesapeake Bay TMDL Sectors:
  - Agriculture
  - Forest
  - Septic
  - **Urban Stormwater**
  - Wastewater
- NPDES Permit Year 1 - **Restoration Plan** for All Existing TMDL Waste Load Allocations (Bay and Local)
- All Sectors – Reduce Phosphorus (P) by ~30% and Nitrogen (N) by ~40% (approx. half of total reduction is urban stormwater)
- Bay TMDL - Meet 60% by 2017 and 100% by 2025
- Local TMDLs – County/MDE agree upon completion date

Countywide Implementation Strategy (CIS)

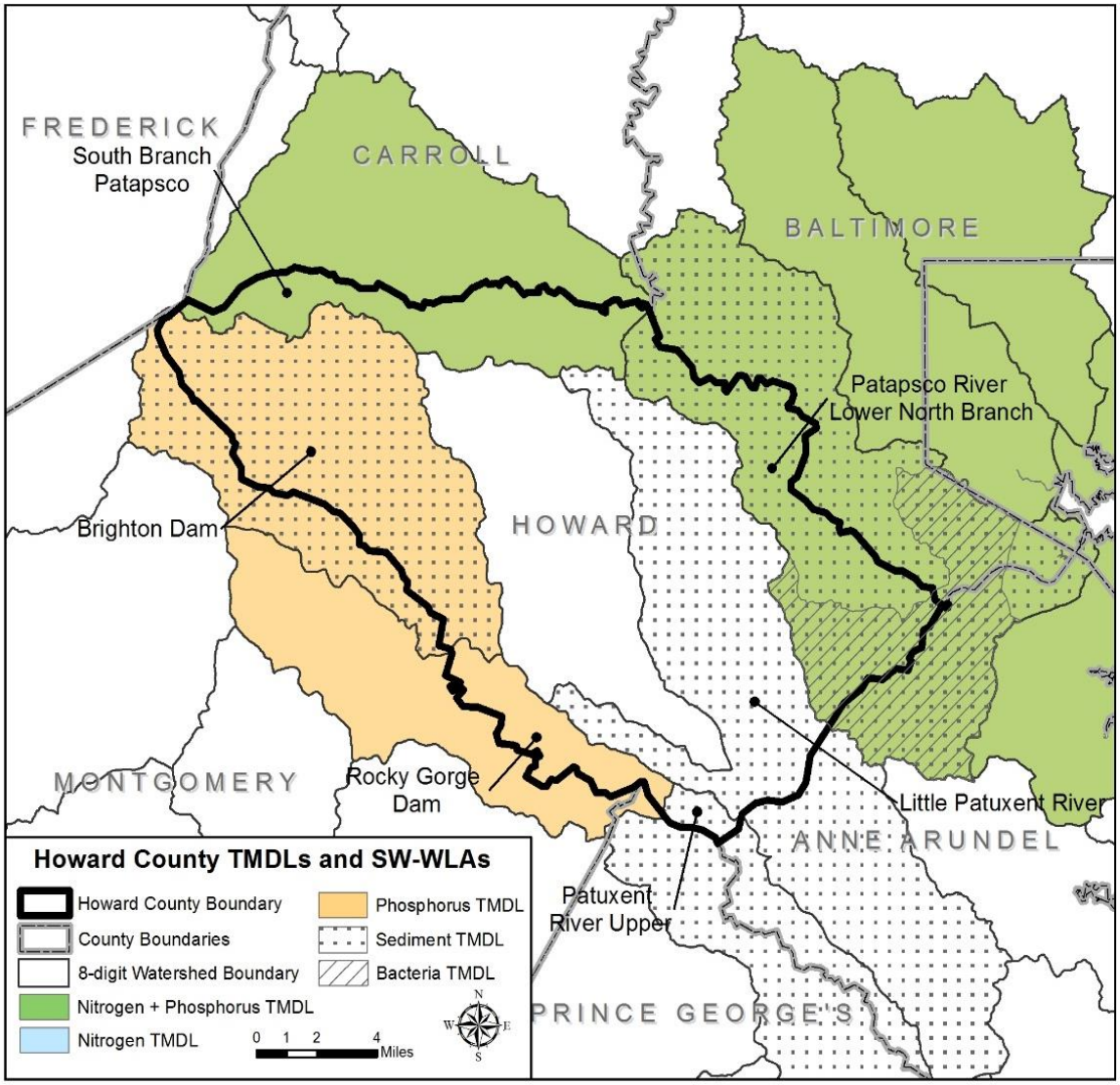
- County Restoration Plan
- Blue print for NPDES permit compliance, meeting TMDLs, and environmental improvements/protection
- Submitted to MDE December 17, 2015
- Review annually – currently finishing update for Patapsco/Patuxent study
- Consists of nine chapters

Countywide Implementation Strategy (CIS)

Chapter 1 – Background and Purpose

- NPDES MS4 Permit requirement
- **Chesapeake Bay TMDL and Local TMDLs**
- Middle Patuxent – no local TMDLs
- **Impervious baseline determination**
- Impervious area treatment – 20% of untreated
- Summary of previous studies

Howard County TMDL Watersheds



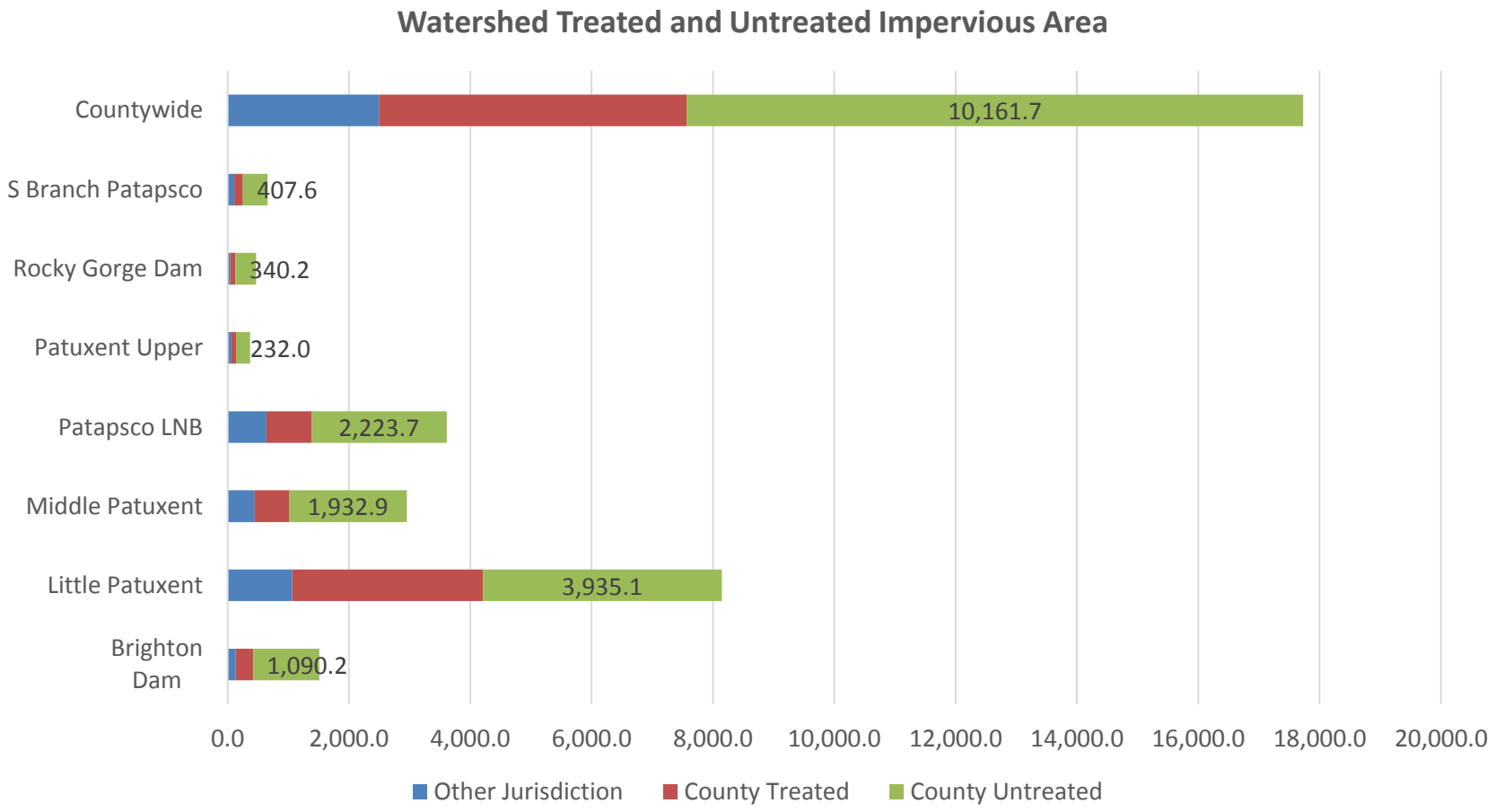
Countywide Implementation Strategy (CIS)

Howard County **Local** TMDLs:

Watershed	Impairment
Patapsco River - Lower North Branch	Sediment, Bacteria
Baltimore Harbor (S. Branch Patapsco+Patapsco LNB)	Nitrogen, Phosphorus
Patuxent River Upper	Sediment
Triadelphia Reservoir (Brighton Dam)	Sediment
Rocky Gorge Reservoir	Phosphorus
Little Patuxent River	Sediment

Impervious Area Baseline

- Countywide 10,161.7 untreated County impervious acres
- 20% Restoration Goal = 2,032.3 acres



Countywide Implementation Strategy (CIS)

Chapter 2 – Causes and Sources of Impairment

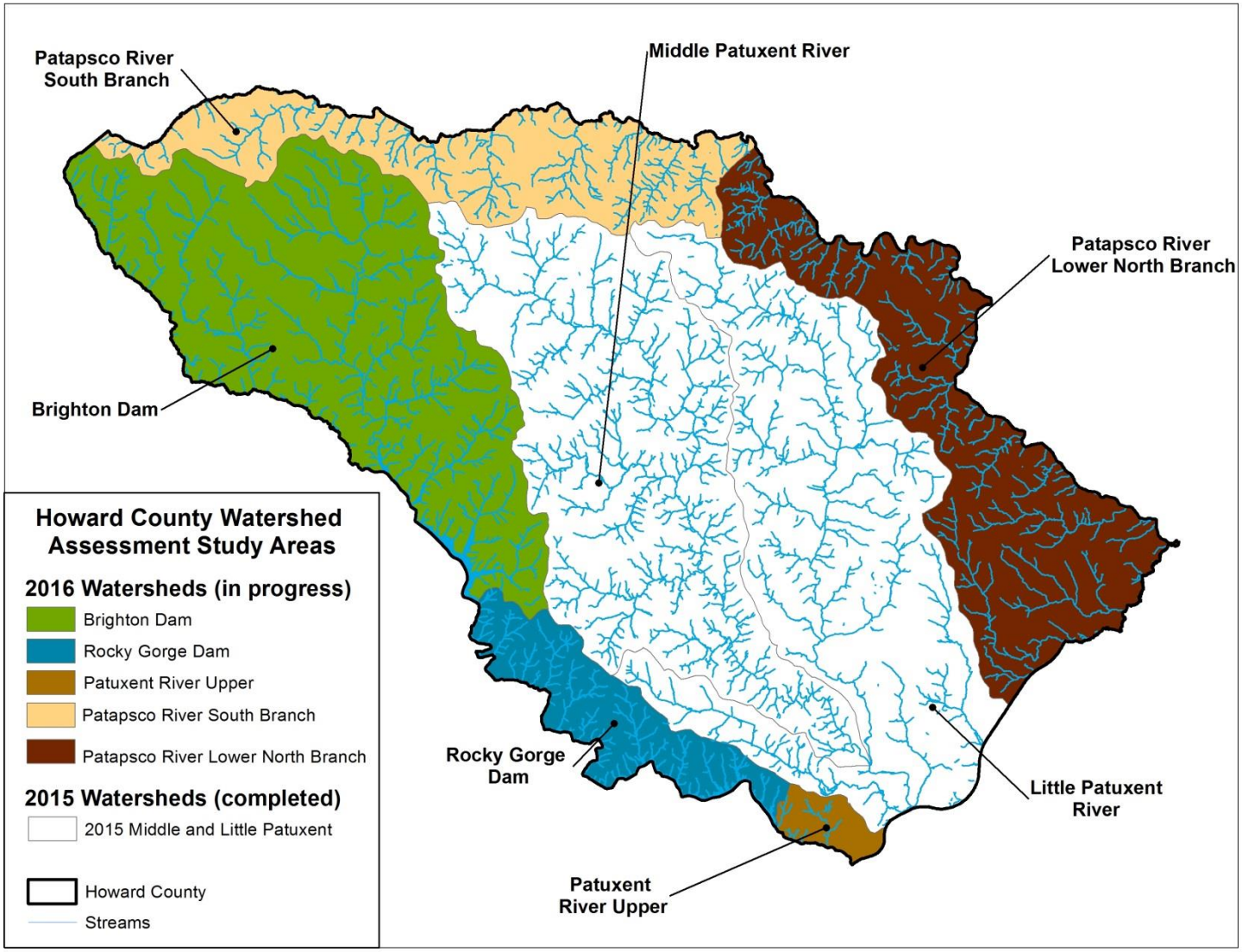
- Biological impairments
- Nutrients, sediment, bacteria
- Land use/Land cover
- Impervious areas
- Anticipated growth

Countywide Implementation Strategy (CIS)

Chapter 3 – Management Measures

- **Watershed assessments**
- Summarizes Little/Middle Patuxent; updated now for Patapsco/Patuxent
- Modeling approach (MAST – **M**aryland **A**ssessment **S**cenario **T**ool & BayFAST)
- BMPs – types and efficiencies for pollutant removal

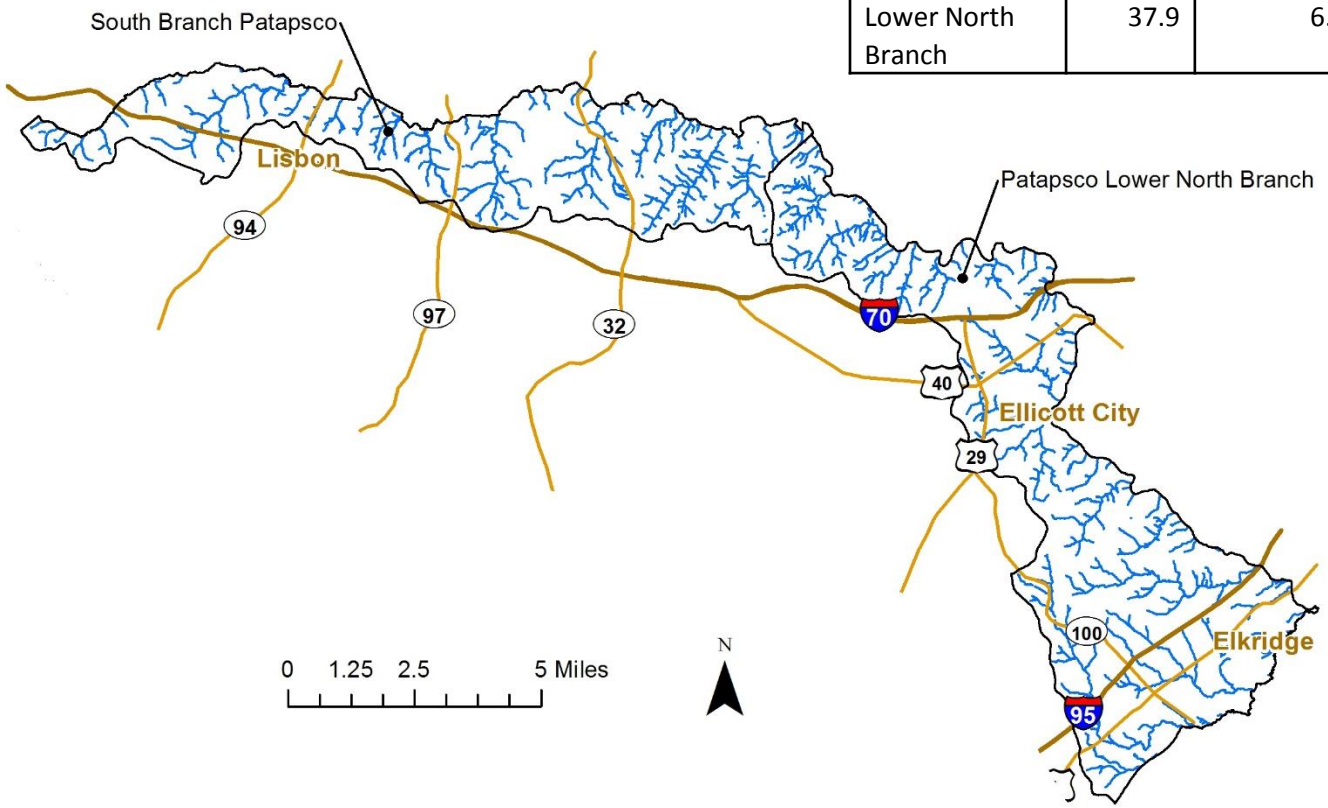
Patuxent/Patapsco Watershed Assessment



Watershed Characteristics

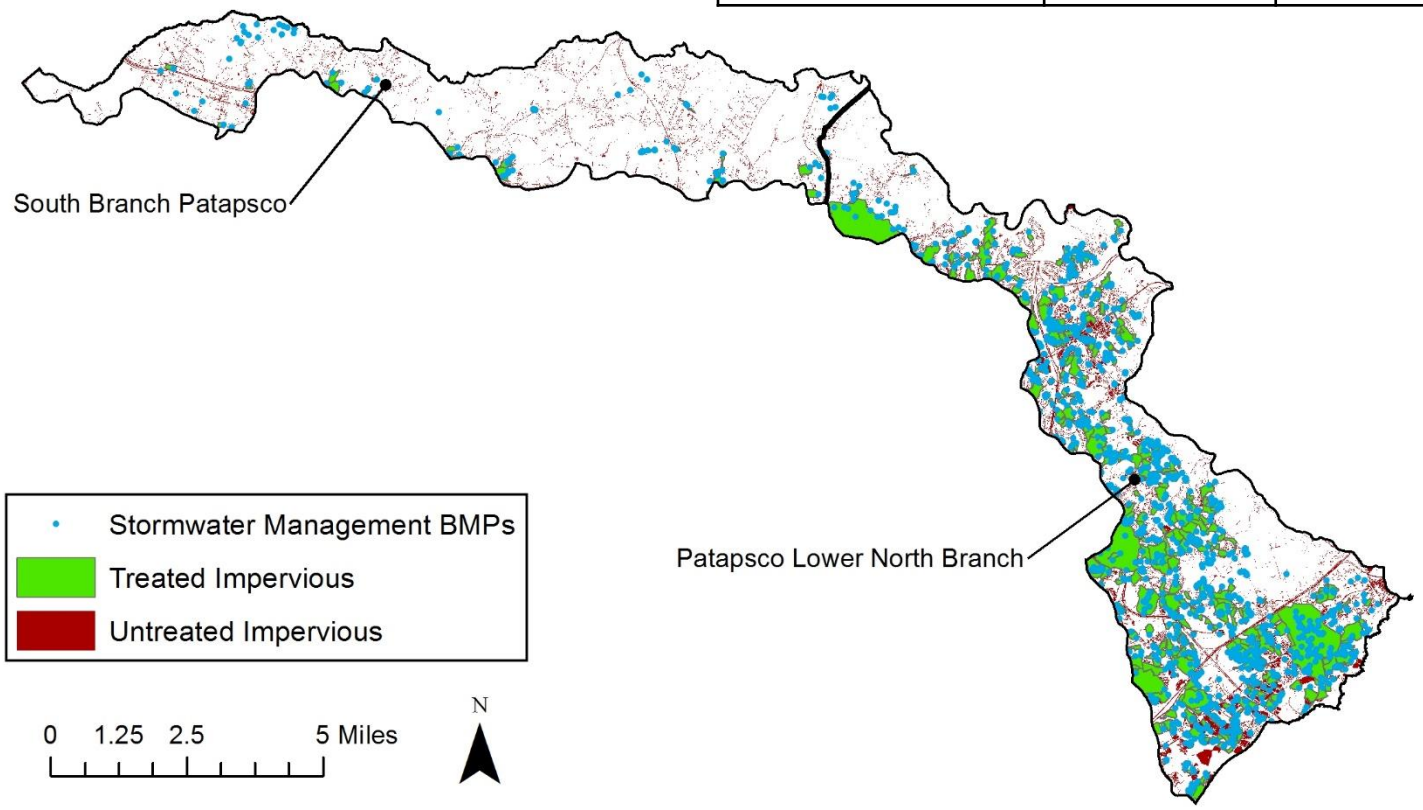
Patapsco River Watersheds

Watershed	Total Area (sq. mi.)	Impervious Area (sq. mi.)	Impervious Percent	Wooded Area (sq. mi.)	Wooded Percent
South Branch Patapsco	25.1	1.2	4.8	7.0	27.9
Patapsco River Lower North Branch	37.9	6.9	18.2	13.0	34.3



Stormwater BMPs

Watershed	Stormwater BMPs	Treated Area (acres)	Treated Area (sq. mi.)
South Branch Patapsco	181	164.1	0.3
Patapsco River Lower North Branch	2,696	880.8	1.4



Watershed Study – Phase 1

- Completed Fall 2016
  - Desktop Analysis
  - Handheld Tablet Setup and Programming
  - Consultant Field Calibration and Training
  - Field Assessment (Approx. 3 months)
  - Review and Compile Field Data
  - Late June 2016 - Community Meeting - #1
  - Prepare Site Ranking and Prioritization

Field Assessments and Results

Project Types Investigated

- Retrofit of Existing BMPs
- New BMPs
- Outfall Stabilization
- Stream Restoration
- Reforestation/Riparian Buffers

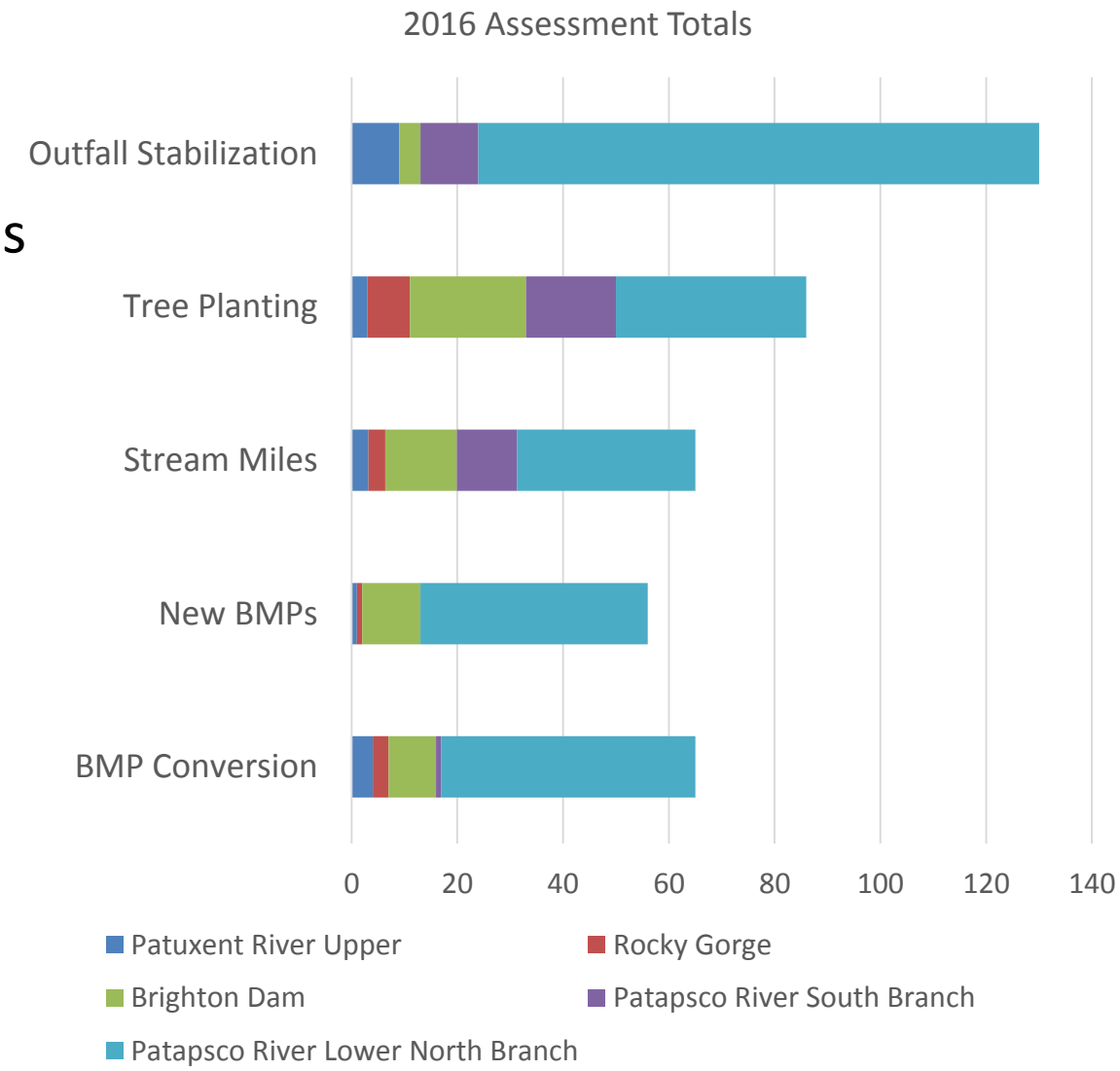
- Source Reduction?

Field Assessment

Assessment Results – Total

Sites Assessed:

- 130 Outfall stabilizations
- 86 Tree planting sites
- 65.0 Stream miles
- 56 New BMP sites
- 65 BMP conversions

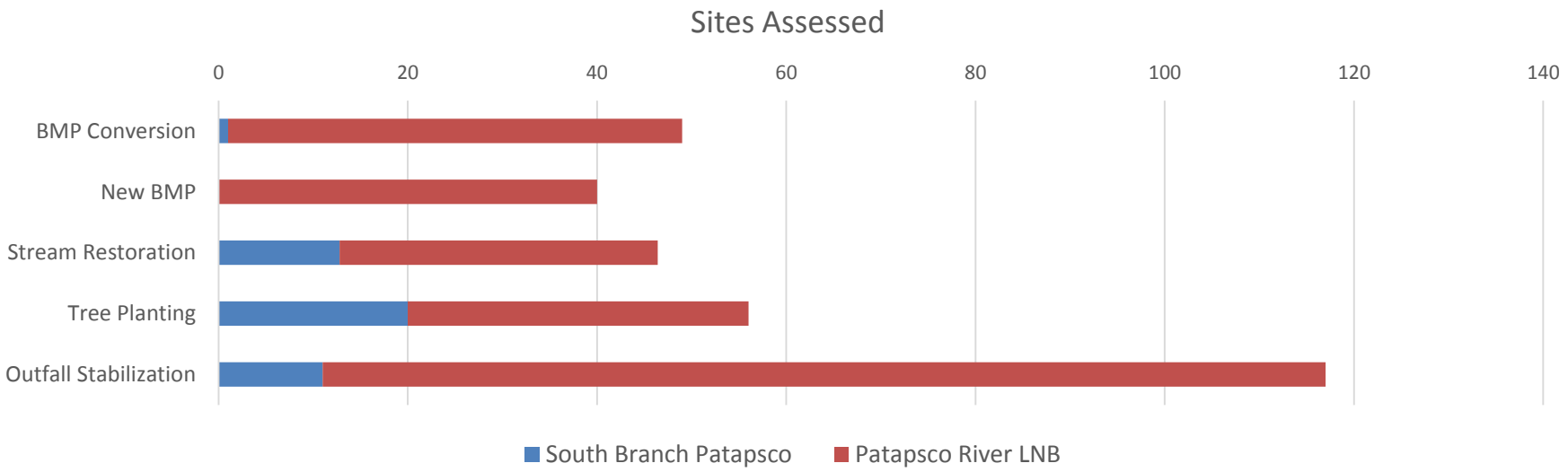


Assessment Sites – Patapsco Watersheds

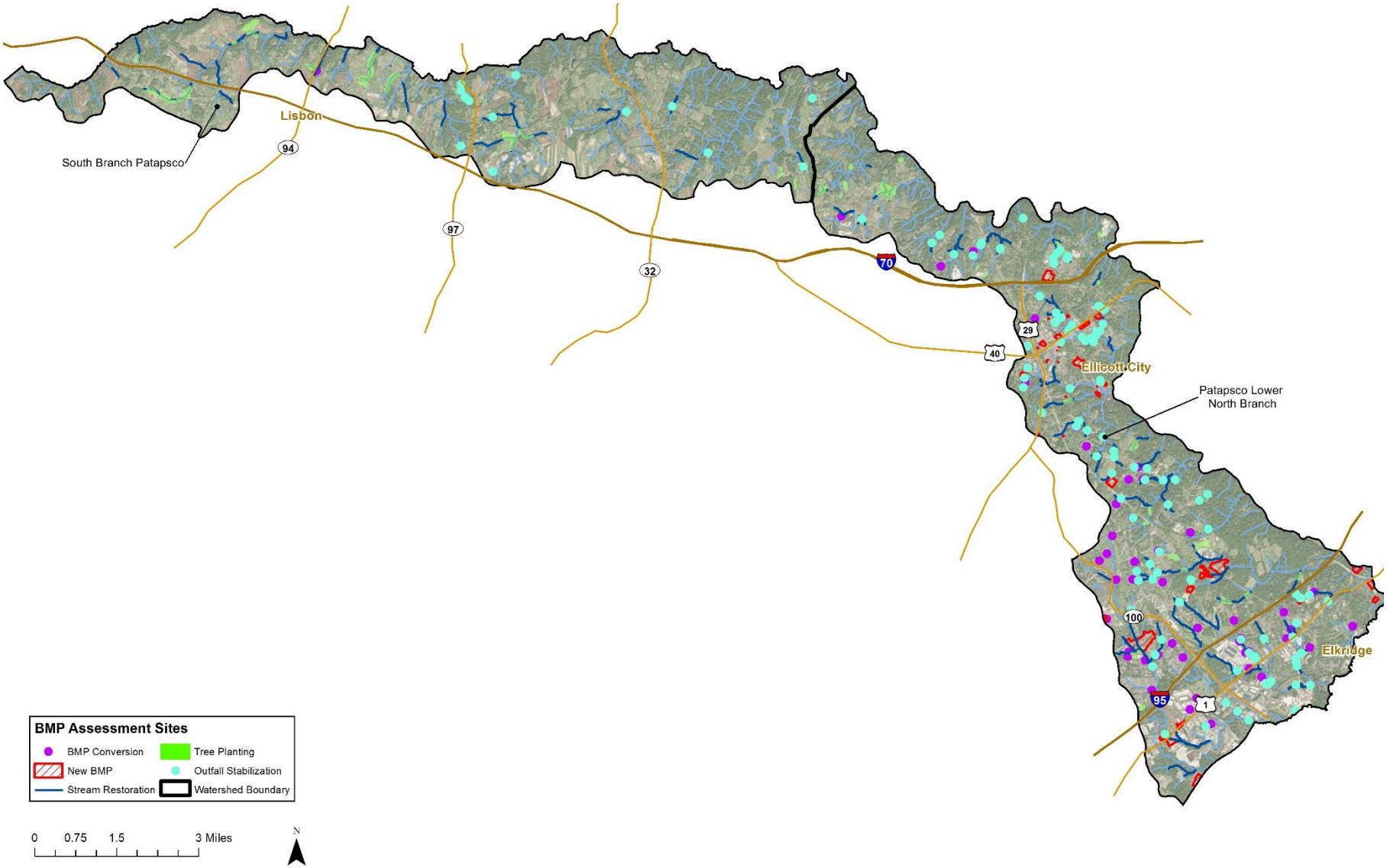
Numbers of Sites Assessed

Type	Unit	South Branch Patapsco	Patapsco River Lower North Branch
BMP Conversion	Number of sites	1	48
New BMP	Number of sites	0	40
Stream Restoration	Stream miles	12.8	33.6
Tree Planting	Number of sites	20	36
Outfall Stabilization	Number of sites	11	106
	Total Assessments	**32 sites 12.8 stream miles**	**230 sites 33.6 stream miles**

Note: includes Field and Desktop Assessments



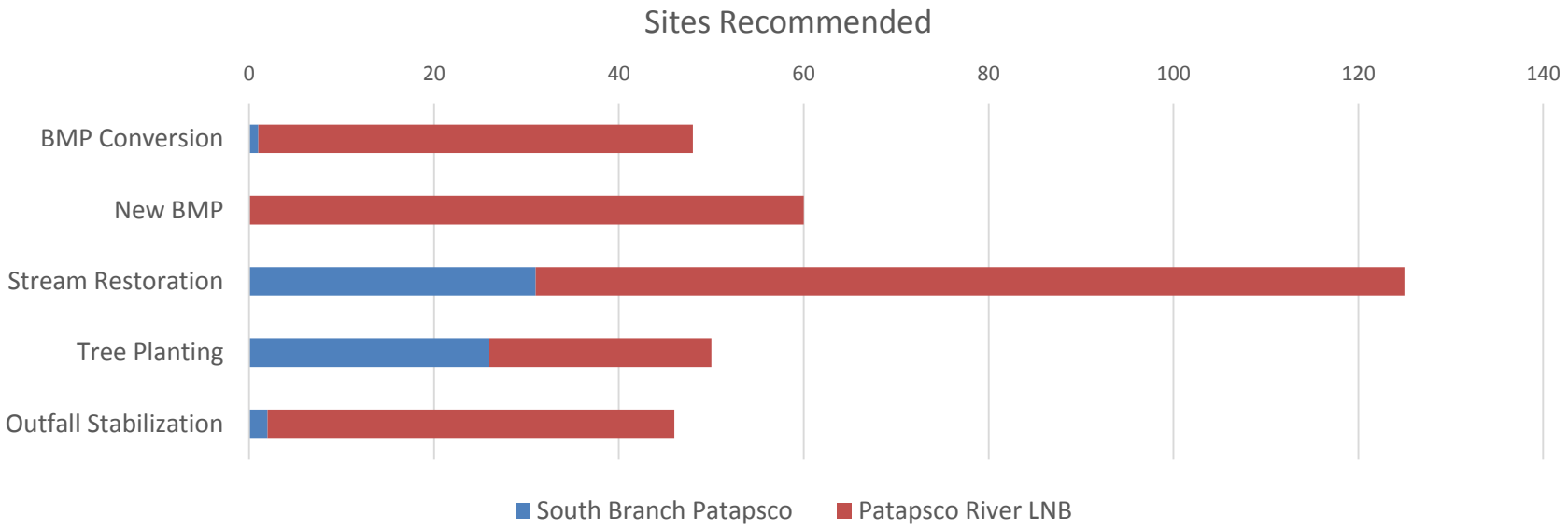
Assessment Sites



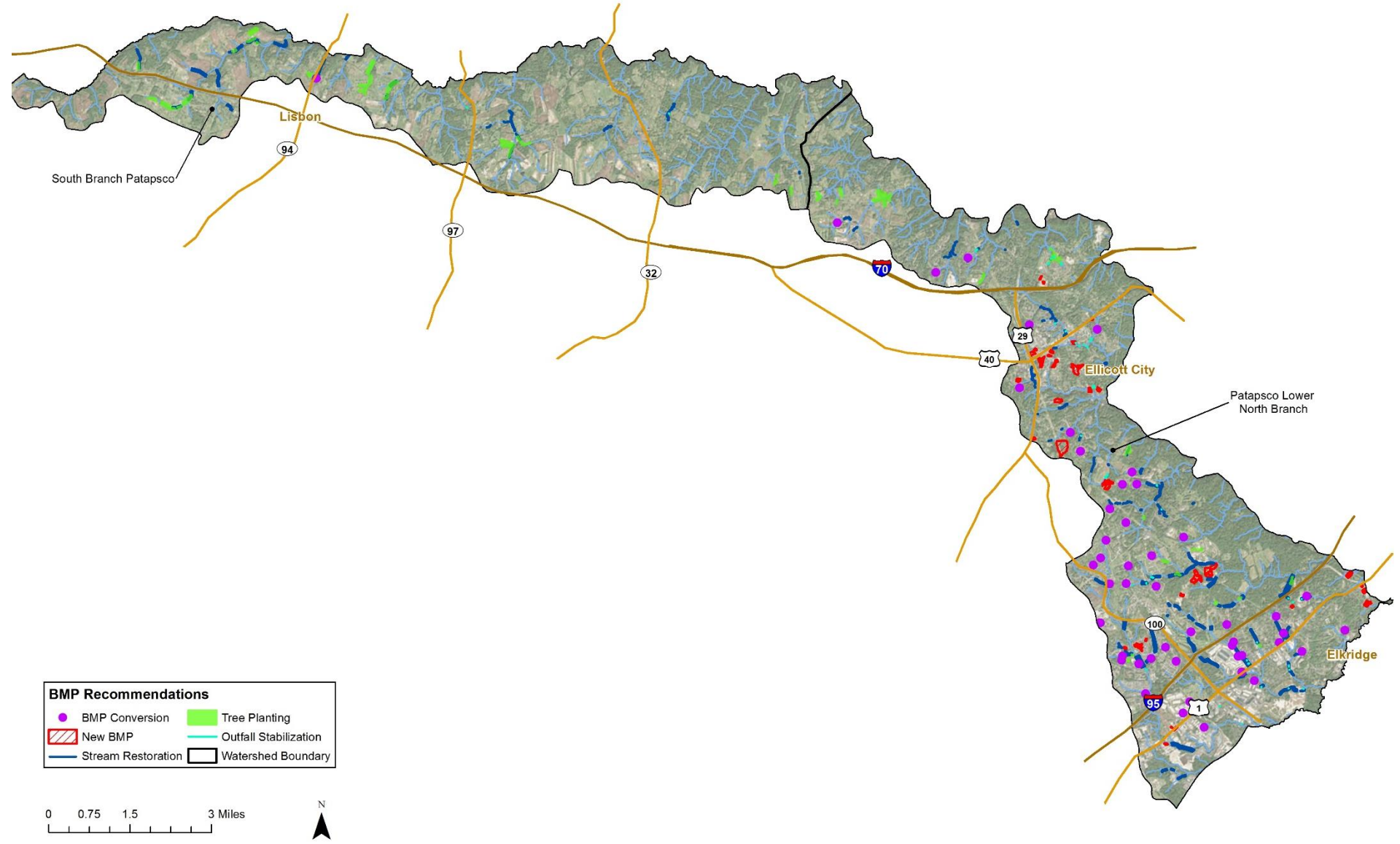
Assessment Recommendations

Number of Sites Recommended by Field Crews

Type	South Branch Patapsco	Patapsco River Lower North Branch
BMP Conversion	1	47
New BMP	0	60
Stream Restoration	31	94
Tree Planting	26	24
Outfall Stabilization	2	44
Total Recommendations	60	**269**



Recommended Sites



Watershed Study – Phase II

- Scheduled completion early 2017
  - Perform Concept Level Designs (Including Cost Estimates)
  - Rank sites ($/acre of impervious treated)
  - Input to restoration plan (CIS) update
  - Generate Draft Watershed Report
  - **Community Meeting - #2**
  - Review and Comment Period
  - Report to MDE - Early 2017

Site Ranking Factors

- Feasibility
  - Ease of access
  - Conflicts with infrastructure or other site constraints
  - Adverse impacts to nearby trees
  - Ownership – public vs. private
  - Pond/infrastructure already in need of repair
  - Field assessment – high potential for restoration/retrofit
  - Site preparation required before planting

- Biological uplift – additional benefits, such as augmenting existing green infrastructure or protecting wetlands
  - Within 500 feet of Green Infrastructure Network or High Quality (Tier II) waters
  - Planting is within 100 feet of wetlands

Site Ranking Factors

- Permit contribution – how project will help meet MS4 impervious treatment requirements and TMDL pollutant reduction goals
  - Acres of impervious treatment
  - Pollutant load reduction factor (Sum of % load reductions for TN, TP, and sediment)
  - Cost per acre of impervious treatment

- Programmatic benefit – value beyond primary functional purpose
  - Site has educational value and/or is visible for public demonstration
  - Site is near 2 or more other potential projects allowing for easier monitoring and demonstration of benefit

Site Ranking Factors

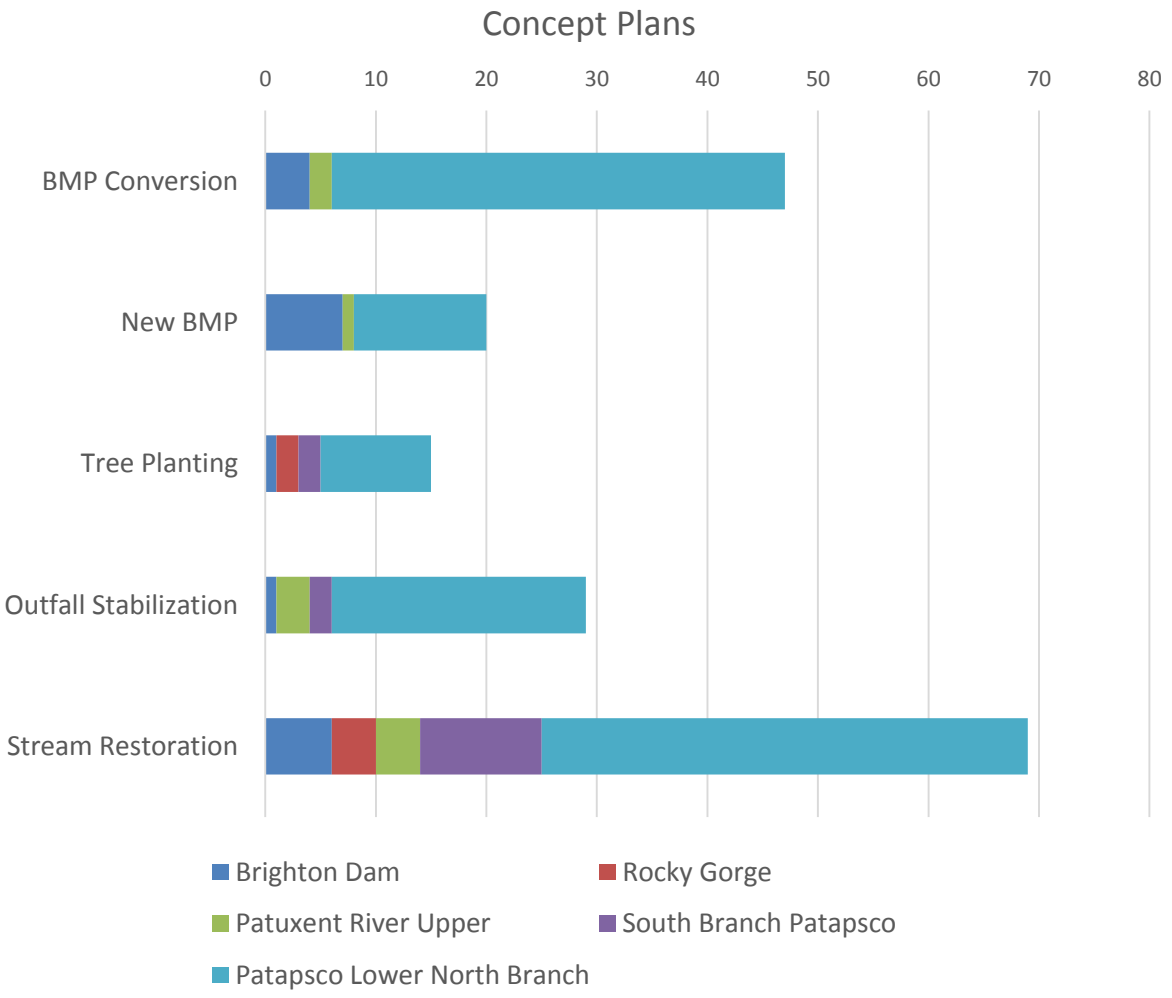
- Erosion factor (stream and outfall stabilization projects)
  - Length and severity of erosion

- Stream condition factors (stream projects)
  - Average Bank Erosion Hazard Index score
  - Habitat Assessment score
  - Number of other problems along reach (exposed pipes, pipe outfalls, unusual conditions, etc.)

Concept Plans - Total

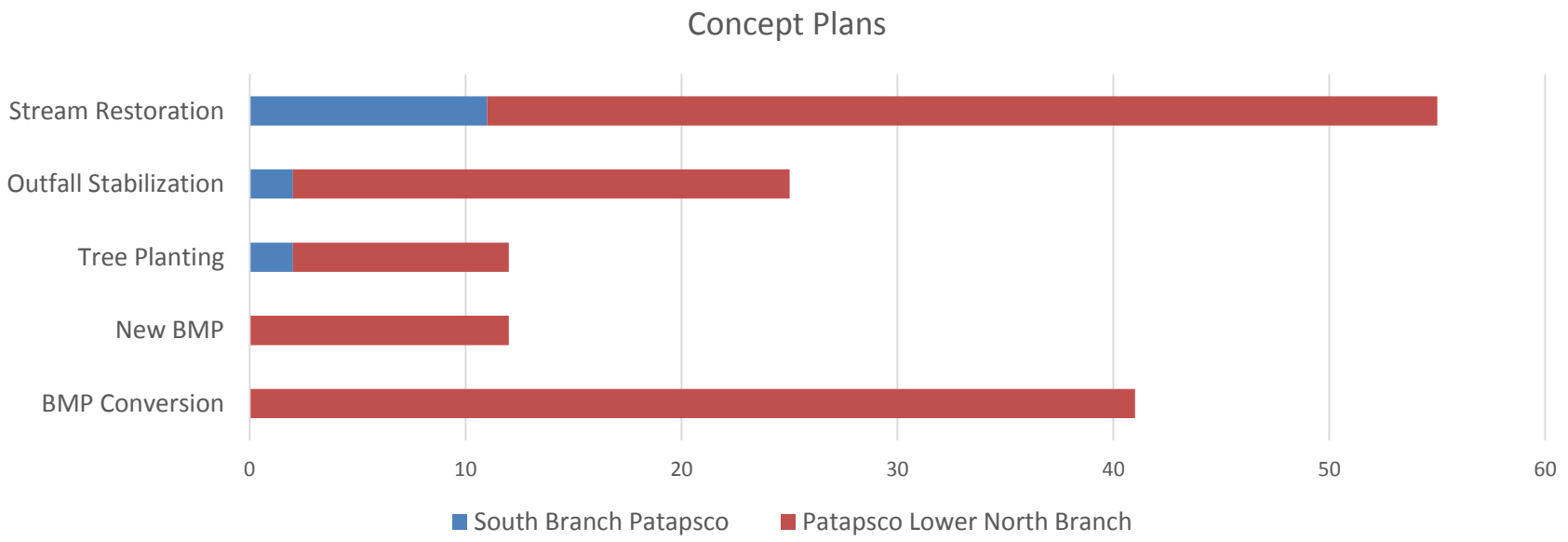
Concepts Prepared:

- 47 BMP conversions
- 20 New BMP sites
- 15 Tree planting sites
- 29 Outfall stabilizations
- 69 Stream restorations
- <u>180 Total</u>

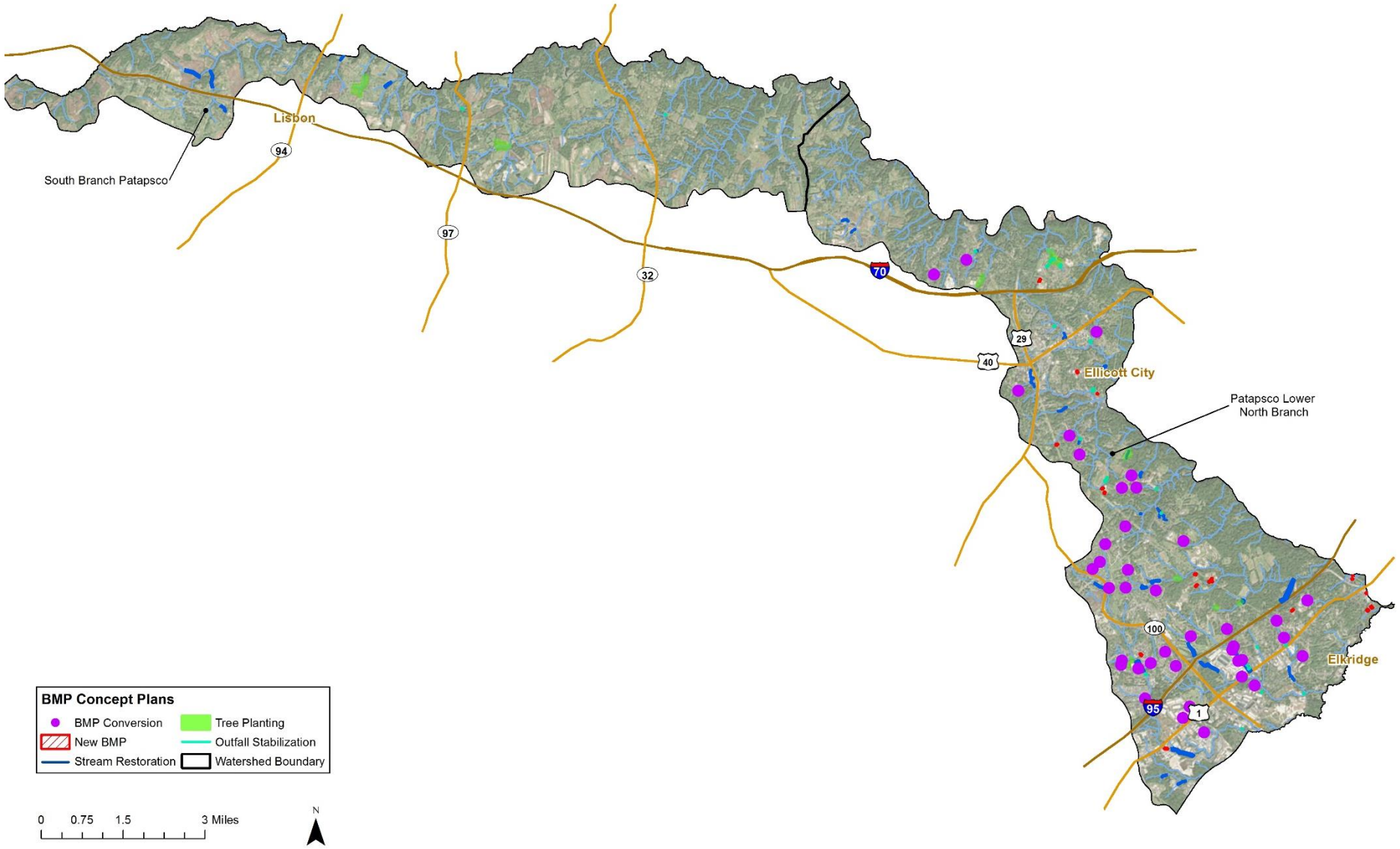


Concept Plans – Patapsco Watersheds

Project Type	Number of Concept Plans Developed	
	South Branch Patapsco	Patapsco River Lower North Branch
BMP Conversion	0	41
New BMP	0	12
Tree Planting	2	10
Outfall Stabilization	2	23
Stream Restoration	11	44
Total	**15**	**130**



Concept Plan Sites



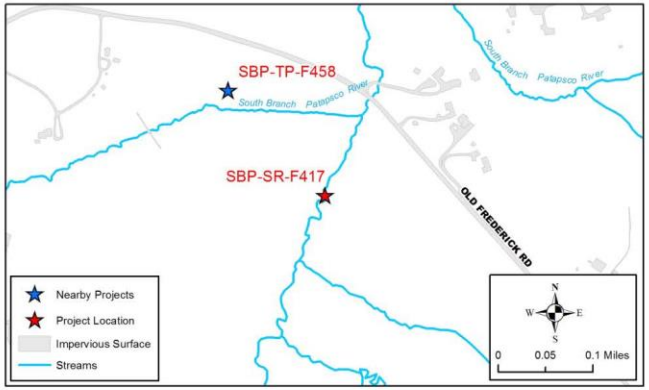
Howard County Watershed Assessment Concept Plan: Stream Restoration

Site ID: SBP-SR-F417
Site Name: Old Frederick Road Tributary 1
Contractor: Biohabitats
Watershed: South Branch Patapsco

Ownership: Private- Mixed Use
Single Owner

Existing Conditions:

This site consists of two separate stream assessments: SBP-SR-F417A and SBP-SR-F417B. The channel runs through a private property located at 14175 Old Frederick Rd, Sykesville, MD. The private property owned by the Oakland Farms Associates II Limited Partnership and is listed as agricultural. On the left bank there has been a recent tree planting site and a fence to exclude livestock offset between 100 and 200 ft. from the left bank. While the livestock exclusion and tree plantings have likely benefitted the stream health, the stream is still entrenched and has not fully recovered from the past land use. Bank erosion is moderate due to lack of adequate vegetation along both stream banks. Presently, the planted trees have not established the root systems necessary to improve bank stability. The existing channel currently exhibits moderate erosion with 3-5 ft. eroding banks and tight bends with recent bank erosion and deposition evident. The instream habitat within the existing channel scored in the suboptimal range. The epifaunal substrates consists of 40% - 70% stable habitat well suited for full colonization and adequate habitat with moderate embeddedness (25-50%) making these substrates moderate for colonization. The velocity/depth regime of the channel is suboptimal with all velocities present except fast-deep. Moderate sediment deposition throughout the channel is evident based on point bar formations throughout the portions of the channel. The channel flow status is suboptimal with water filling 75% of the channel and some riffle substrates exposed. Both stream banks are moderately unstable and eroding with limited vegetation. Both banks have 50% of their surface covered by vegetation due to continued erosion. Shading along the existing channel is poor (35%).



Howard County Watershed Assessment Concept Plan: Stream Restoration

Site ID: SBP-SR-F417
Site Name: Old Frederick Road Tributary 1
Contractor: Biohabitats
Watershed: South Branch Patapsco

Facing upstream, displaying the poor bank protection and erosion.

Facing downstream, at a tight bend, displaying the poor bank protection, erosion, and insufficient buffer.

Howard County Watershed Assessment Concept Plan: Stream Restoration

Site ID: SBP-SR-F417
Site Name: Old Frederick Road Tributary 1
Contractor: Biohabitats
Watershed: South Branch Patapsco

Constraints/Utilities:

The stream is located on private property that uses the land as a pasture and for agriculture. Stream restoration on this site will require landowner permission to perform more active restoration of the stream. Minimal impact to trees is expected due to the low density of trees along the left bank. No utilities were observed.

Concept Description:

The objective for this project is to reduce bank erosion and improve the instream habitat for aquatic organisms. This project proposes approximately 1,536 lf. of restoration starting where the stream enters a heavily wooded area upstream of the pastures and extending downstream to the point where the stream intersects a tributary on the left bank. This will be accomplished by excavating a narrow floodplain with a hyporheic bench, grading banks back to a stable angle and stabilizing them with native vegetation to hold soil in place. Adding woody debris, cobble riffles, pools, and other nature-like habitat structures will reinforce the stream bed and banks, improve the flow diversity and structural complexity of the stream bed, and uplift the instream habitat. The proposed channel restoration work would occur predominately in the existing channel alignment; however, some minor realignment may be necessary at the tight meander bends. This work should not impact the existing fence to exclude animal grazing. With landowner approval, excavated material could be spoiled in open areas outside of the floodplain and replanted with native trees. This channel restoration has the potential to reduce the sediment supply, improve habitat and provide opportunities for nutrient uptake. The site can be accessed from Old Frederick Rd. There is fencing and a guard rail that would need to be temporarily taken down or moved for access. There is also a stream (SBP-SR-F416) that would need to be crossed in order to avoid tree removal along the right bank.

Nearby Opportunities:

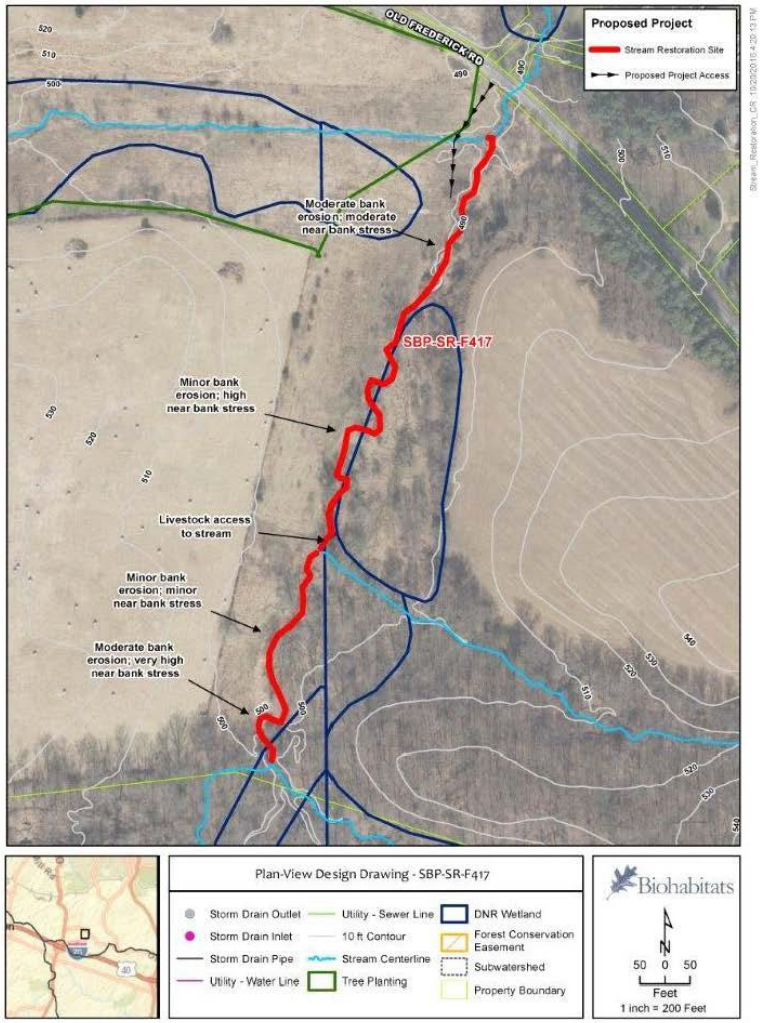
None recommended

Proposed Project Credit		Costs	
Length Restored (ft):	1,536	Estimated Design Cost:	$300,000
Impervious Area Treated Credit (ac.):	15.4	Estimated Construction Cost:	$691,200
Cost per Impervious Credit Acre:	$83,891	30% Contingency:	$297,360
		Estimated Total Cost:	$1,288,560

Howard County Watershed Assessment Concept Plan: Stream Restoration

Site ID: SBP-SR-F417 **Contractor:** Biohabitats

Site Name: Old Frederick Road Tributary 1 **Watershed:** South Branch Patapsco



Project Results – Patapsco Summary

	Number of Projects	Impervious Credit	Estimated Load Reductions		
			TN-EOS lbs	TP-EOS lbs	TSS-EOS lbs
Patapsco Lower North Branch	130	1,133	8,855	5,291	3,896,464
BMP Conversion	41	355	2,971	395	604,793
New BMP	12	15	150	17	23,535
Stream Restoration	44	711	5,329	4,832	3,197,385
Tree Planting	10	5	60	3	2,032
Outfall Stabilization	6	2	0	0	0
Outfall Stabilization - SPSC	17	46	345	45	68,719
South Branch Patapsco	15	178	1,488	1,162	770,614
Stream Restoration	11	165	1,275	1,156	765,135
Tree Planting	2	10	204	6	4,701
Outfall Stabilization	1	1	0	0	0
Outfall Stabilization - SPSC	1	1	9	1	778
Grand Total	**145**	**1,310**	**10,343**	**6,453**	**4,667,078**

Project Results – Patapsco Summary

Based on doing ALL 145 concept projects in the Patapsco Watershed:

Impervious Restoration

- 1,310 restored acres possible with implementation of all identified projects

Pollutant Load Reductions

- Baltimore Harbor (Nitrogen - TN)
  - TN is the toughest pollutant to reduce, BMP reduction efficiencies for TN are lower on average than for TP and TSS
  - Will require all projects identified plus an estimated 16 more to reach the 15% reduction target.
- Patapsco River Lower North Branch (Sediment - TSS and Bacteria)
  - Potential sediment reduction of approx. 3.8 million lbs will exceed the goal by 9 times the remaining reduction required (388,000 lbs)
  - Bacteria reductions from stormwater projects are minimal. Anticipated to meet 20% of the goal with stormwater projects
  - Majority of bacteria treatment will be from improved pet waste clean-up

Estimated Costs – Patapsco Concepts

	South Branch Patapsco		Patapsco Lower North Branch		Total	
	Number of Projects	Cost	Number of Projects	Cost	Number of Projects	Cost
BMP Conversion	0	$ -	41	$ 27,958,558	41	$ 27,958,558
New BMP	0	$ -	12	$ 4,685,914	12	$ 4,685,914
Stream Restoration	11	$ 13,716,755	44	$ 55,996,005	55	$ 69,712,760
Tree Planting	2	$ 1,159,600	10	$ 657,488	12	$ 1,817,088
Outfall Stabilization	1	$ 165,750	6	$ 860,925	7	$ 1,026,675
Outfall Stabilization - SPSC	1	$ 403,000	17	$ 6,591,000	18	$ 6,994,000
Total	15	$ 15,445,105	130	$ 96,749,890	145	$ 112,194,995

Watershed Assessment Summary:

- Identified restoration opportunities
- More need/potential projects in Patapsco than Patuxent
- Streams – scored higher, more cost efficient, and plentiful
- Approx. 60% of projects on private property
- 180 projects will make a dent in our permit requirements . . . and our checkbook

Watershed Study - Next Steps

- Master list for developing annual Capital Budget requests (included with Little Patuxent, Middle Patuxent, and new citizen generated projects)
- Help define total budget and manpower needs to meet permit conditions
- Valuable input to CIS restoration plan
- Factor in private property projects
- Public review and submittal to MDE

Can’t wait for restoration projects . . .

Restoration Toolbox

Bioretention

Pond Retrofit Project

Pond Retrofit Project

Outfall Stabilization

Stream Restoration

Riparian Buffer Enhancement

Alternative BMPs

Can we get credit from MDE?

Countywide Implementation Strategy (CIS) - Continued

Countywide Implementation Strategy (CIS)

Chapter 4 – Load Reductions/Impervious Treated

- Summaries based on Actual Implementation and Planned Implementation
- Bay TMDL and Local TMDLs
- By BMP types and subwatershed
- **Compare results to goals**

20% Impervious Acre Goal

Planned Projects - Countywide

- A selected suite of projects to meet the goal of 2,032 acres in 2019 (FY2017 to end of 2019)
- Total Cost of $50 million
- Per NPDES Permit - Meeting 20% impervious acre goal => Bay TMDL requirements are met

Number of BMPs (FY2017-2019)	**Brighton Dam**	**Little Patuxent**	**Middle Patuxent**	**Patapsco LNB**	**Patuxent Upper**	**Rocky Gorge Dam**	**S Branch Patapsco**	**Countywide**
Number of Restoration BMPs	1	34	10	26	1	0	0	72
FY17 Credit Year		*8*	*4*	*7*				*19*
FY18 Credit Year	*1*	*7*	*5*	*9*				*22*
FY19 Credit Year		*19*	*1*	*10*	*1*			*31*
Cost (FY2017-2019)								
Total Cost	$1,850,000	$27,168,234	$4,893,016	$15,149,167	$611,000		$0	$0 $49,671,417
FY17 Credit Year		*$6,503,600*	*$1,046,202*	*$2,817,959*				*$10,367,761*
FY18 Credit Year	*$1,850,000*	*$5,555,112*	*$2,075,806*	*$6,389,764*				*$15,870,682*
FY19 Credit Year		*$15,109,522*	*$1,771,008*	*$5,941,444*	*$611,000*			*$23,432,974*

20% Impervious Acre Goal

	Brighton Dam	Little Patuxent River	Middle Patuxent River	Patapsco River L N Br	Patuxent River upper	Rocky Gorge Dam	S Branch Patapsco	Countywide
Impervious Baseline and Target (Impervious Credit Acres)								
County MS4 Impervious Area	**1,378.5**	**7,080.1**	**2,506.9**	**2,971.4**	**311.0**	**426.2**	**552.2**	**15,226.4**
Impervious Baseline Treated	**288.3**	**3,145.0**	**574.0**	**747.8**	**79.0**	**86.0**	**144.6**	**5,064.7**
Impervious Baseline Untreated	**1,090.2**	**3,935.1**	**1,932.9**	**2,223.7**	**232.0**	**340.2**	**407.6**	**10,161.7**
20% Restoration Target	**218.0**	**787.0**	**386.6**	**444.7**	**46.4**	**68.0**	**81.5**	**2,032.3**
FY2016 Progress Impervious Restoration (Impervious Credit Acres)								
FY2016 Total Progress Restoration	**101.7**	**508.3**	**235.6**	**133.0**	**7.1**	**22.5**	**19.5**	**1,027.7**
% Impervious Treated	**9.3%**	**12.9%**	**12.2%**	**6.0%**	**3.1%**	**6.6%**	**4.8%**	**10.1%**
Planned Impervious Restoration (FY2017 – End of 2019) (Impervious Credit Acres)								
Total Restoration BMPs	64.0	379.0	73.7	194.7	6.0	0.0	0.0	717.5
FY17 Credit Year		*58.0*	*20.5*	*43.3*				*121.8*
FY18 Credit Year	*64.0*	*44.6*	*33.2*	*96.0*				*237.8*
FY19 Credit Year		*276.4*	*20.0*	*55.4*	*6.0*			*357.8*
Rain Barrels	0.04	0.30	0.09	0.13	0.01	0.02	0.61	1.2
Septic Pump-outs	38.6	38.6	38.6	38.6	38.6	38.6	38.6	270.0
Septic Upgrades	4.5	4.5	4.5	4.5	4.5	4.5	4.5	31.2
Total Planned Impervious Restoration	**107.1**	**422.3**	**116.8**	**237.9**	**49.0**	**43.0**	**43.6**	**1,019.9**
% Impervious Treated	**9.8%**	**10.7%**	**6.0%**	**10.7%**	**21.1%**	**12.7%**	**10.7%**	**10.0%**
Total Impervious Restoration to 2019 (Impervious Credit Acres)								
FY2016 Progress	**101.7**	**508.3**	**235.6**	**133.0**	**7.1**	**22.5**	**19.5**	**1,027.7**
FY2017-2019 Planned	**107.1**	**422.3**	**116.8**	**237.9**	**49.0**	**43.0**	**43.6**	**1,019.9**
Total Impervious Restoration	**208.8**	**930.6**	**352.5**	**370.8**	**56.2**	**65.6**	**63.1**	**2,047.6**
% Impervious Treated	**19.2%**	**23.6%**	**18.2%**	**16.7%**	**24.2%**	**19.3%**	**15.5%**	**20.2%**

Local TMDL Goals

	Baltimore Harbor		Little Patuxent	Patapsco R LN Branch		Patuxent R Upper	Rocky Gorge Reservoir	Triadelphia Reservoir (Brighton Dam)
	TN-EOS lbs/yr	TP-EOS lbs/yr	TSS-EOS lbs/yr	TSS-EOS lbs/yr	Bacteria MPN/100 mL/yr	TSS-EOS lbs/yr	TP-EOS lbs/yr	TP-EOS lbs/yr
Baseline Loads and Target Reductions								
TMDL Baseline Year	1995	1995	2005	2005	2003	2005	2000	2000
Calibrated Baseline Load	107,059	6,546	10,346,821	6,123,442	21,826	145,902	861	2,654
Target Percent Reduction	**15.0%**	**15.0%**	**48.1%**	**10.0%**	**75.0%**	**11.4%**	**15.0%**	**15.0%**
Calibrated Target Reduction	16,059	982	4,976,821	612,344	16,370	16,633	129	398
Calibrated TMDL WLA	91,000	5,564	5,370,000	5,511,098	5,457	129,269	732	2,256

Local TMDL Goals

Planned Projects

- Additional projects build on the impervious restoration progress to meet local TMDL goals
- FY2017 to end of 2019

Number of Planned BMPs	Baltimore Harbor	Little Patuxent	Middle Patuxent	Patapsco R LN Branch	Patuxent R Upper	Rocky Gorge Reservoir	Triadelphia Reservoir	Total*
Planned Projects	**181**	**58**	**10**	**159**	**1**	**2**	**1**	**253**
FY17 Credit Year	7	8	4	7				19
FY18 Credit Year	9	7	5	9			1	22
FY19 Credit Year	10	19	1	10	1			31
2015 Concepts - Inventory		24						24
2016 Concepts - Inventory	139			124		2		141
Additional Required Projects	16			9				16
Planned Costs	**$137,533,214**	**$44,330,000**	**$4,893,016**	**$114,832,701**	**$611,000**	**$1,287,549**	**$1,850,000**	**$190,504,778**
FY17 Credit Year	$2,817,959	$6,503,600	$1,046,202	$2,817,959				$10,367,761
FY18 Credit Year	$6,389,764	$5,555,112	$2,075,806	$6,389,764			$1,850,000	$15,870,682
FY19 Credit Year	$5,941,444	$15,109,522	$1,771,008	$5,941,444	$611,000			$23,432,974
2015 Concepts - Inventory		$17,161,766						$17,161,766
2016 Concepts - Inventory	$105,911,931			$90,466,826		$1,287,549		$107,199,480
Additional Required Projects	$16,472,116			$9,216,708				$16,472,116

*Patapsco R LNB is located within Baltimore Harbor watershed; therefore, projects/costs in Patapsco R LNB are part of the Baltimore Harbor numbers

Local TMDL Goals Met

	Baltimore Harbor		Little Patuxent	Patapsco R LN Branch		Patuxent R Upper	Rocky Gorge Reservoir	Triadelphia Reservoir (Brighton Dam)
	TN-EOS lbs/yr	TP-EOS lbs/yr	TSS-EOS lbs/yr	TSS-EOS lbs/yr	Bacteria MPN/100 mL/yr	TSS-EOS lbs/yr	TP-EOS lbs/yr	TP-EOS lbs/yr
Baseline Loads and Target Reductions								
Target Percent Reduction	15.0%	15.0%	48.1%	10.0%	75.0%	11.4%	15.0%	15.0%
FY2016 Progress Reductions								
Restoration Reductions	3,112	517	3,235,928	223,739	22	11,924	84	166
Restoration BMPs	*2,335*	*206*	*3,055,184*	*139,920*	*22*	*4,526*	*28*	*103*
Street Sweeping	*778*	*311*	*180,744*	*83,818*	*0*	*7,398*	*56*	*63*
Restoration Reduction Percent	2.9%	7.9%	31.3%	3.7%	0.1%	8.2%	9.8%	6.2%
Planned Reductions								
Planned Reductions	13,015	8,135	2,211,506	4,784,877	19,638	27,000	69	435
FY17 Credit Year	*307*	*187*	*133,952*	*138,778*	-	-	-	-
FY18 Credit Year	*718*	*584*	*140,076*	*397,253*	-	-	-	*435*
FY19 Credit Year	*585*	*290*	*1,149,331*	*230,023*	*31*	*27,000*	-	-
2015 Concepts - Inventory	-	-	*788,147*	-	-	-	-	-
2016 Concepts - Inventory	*9,805*	*6,027*	-	*3,606,051*	*2,864*		*69*	
Additional Placeholder Projects	*1,601*	*1,047*	-	*412,772*	*373*	-	-	-
Pet Waste					*16,370*			
Restoration Reduction %	12.2%	124.3%	21.4%	78.1%	90.0%	18.5%	8.0%	16.4%
Totals								
Reduction (Progress+Planned)	16,128	8,652	5,447,434	5,008,616	19,660	38,924	152	601
Reduction Percent (Progress + Planned)	15.1%	132.2%	52.6%	81.8%	90.1%	26.7%	17.7%	22.6%

Countywide Implementation Strategy (CIS)

Chapter 5 – Technical/Financial Assistance Needs

- Technical assistance
- **Implementation cost summary**
- Funding sources

Cost Summary **Estimate**

Cost - Design and Construction Combined

Watershed	Little Patuxent	Middle Patuxent	Patuxent River Upper	Rocky Gorge Reservoir	Triadelphia Reservoir	Baltimore Harbor		Total
						South Branch Patapsco	Patapsco LNB*	
Local TMDL Target Year	2025	NA	2019	2019	2020	2029		
FY2017 to FY2019 Near Term Planning Shown as Fiscal Year Budget Costs								
FY2017	$3,690,663	$2,221,004			$850,000		$4,225,629	$10,987,296
FY2018	$8,295,336	$1,800,000	$260,000	$376,200	$1,000,000		$5,974,230	$17,705,766
FY2019	$10,934,027		$351,000	$931,158			$3,690,948	$15,907,132
FY2020 to FY2027 Out Years Planning Shown as Credit Year Costs**								
FY2020	$4,298,529					$2,369,220	$11,056,360	$17,724,109
FY2021	$4,298,529					$2,369,220	$11,056,360	$17,724,109
FY2022	$4,298,529					$2,369,220	$12,635,840	$19,303,589
FY2023	$4,298,529					$2,369,220	$12,635,840	$19,303,589
FY2024						$2,369,220	$14,215,320	$16,584,539
FY2025						$2,369,220	$14,215,320	$16,584,539
FY2026						$1,579,480	$15,005,059	$16,584,539
FY2027						$1,579,480	$14,215,320	$15,794,799
FY2028								
FY2029								
Total	$40,114,143	$4,021,004	$611,000	$1,307,358	$1,850,000	$17,374,279	$118,926,223	$184,204,007

*Patapsco Lower North Branch sediment local TMDL target year also 2029

** Out Years include the full cost of the completed project, actual FY budget allocations will be adjusted as needed

Countywide Implementation Strategy (CIS)

Chapter 6 – Public Participation/Education

- Lists current environmental outreach
- This meeting is part of Public Outreach
- **30-day public review/comment period**

Chapter 7 – Implementation Schedule

- Lists various milestones
- **Provides possible schedule for attaining goals**

Project Schedule Summary

Number of Projects - by Credit Year*

Watershed	Little Patuxent	Middle Patuxent	Patuxent River Upper	Rocky Gorge Reservoir	Triadelphia Reservoir	Baltimore Harbor		Total
						South Branch Patapsco	Patapsco LNB**	
Local TMDL Target Year	2025	NA	2019	2019	2020	2029		
FY2017	8	4					7	19
FY2018	7	5			1		9	22
FY2019	19	1	1	2			10	33
FY2020	6					3	14	23
FY2021	6					3	14	23
FY2022	6					3	16	25
FY2023	6					3	16	25
FY2024						3	18	21
FY2025						3	18	21
FY2026						2	19	21
FY2027						2	18	20
FY2028								
FY2029								
Total	58	10	1	2	1	22	159	253

* All projects listed by credit year, i.e. the year the project is complete
** Patapsco Lower North Branch sediment local TMDL target year also 2029

Goals met?

Based on all projections and assumptions in CIS:

- 20% impervious acres – MS4 permit condition met by end of 2019
- Local TMDLs – known TMDLs met by 2027 (some earlier)
- Bay TMDL (Urban Stormwater Sector)
  - By the numbers: TP, TSS met; TN partially met by 2025
  - By MS4 permit – all met if achieve 20% impervious treatment goal

Countywide Implementation Strategy (CIS)

Chapter 8 – Load Reduction Evaluation Criteria

- 2-year interim milestone reporting (State)
- Annual NPDES reporting
- Triennial BMP inspections
- **Regular evaluation and adaptive management**

Chapter 9 – Monitoring

- Current monitoring – biological, chemical, physical
- Stormwater Design Manual

In Summary:

- CIS is a comprehensive summary of County's current and proposed efforts for environmental restoration and permit compliance
- **Planning document** including possible schedule and anticipated costs
- Detailed watershed assessments complete for entire County

Want to learn more about stormwater?

Office of Community Sustainability

www.cleanwaterhoward.com

SWM Division Website

www.howardcountymd.gov/SWM.htm

- Meeting #1 and #2 Powerpoints
- Watershed Assessment Reports
- CIS Report

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