DEPARTMENT OF THE **ENVIRONMENT**

Restoration Plans for Non-tidal Sediment and PCBs in Patuxent River Watersheds

August 27, 2019

PRINCE GEORGE'S COUNTY, MARYLAND

Welcome

from

Jerry Maldonado

Section Head, Environmental Programs,
Stormwater Management Division

PURPOSE OF MEETING

- Review why watershed restoration plans are needed in Prince George's County.
- Inform the public of contents of the draft watershed restoration plans for Sediment and PCBs for the Patuxent River watershed.
- Answer questions on the draft Watershed Restoration Plan.

Photo Credit: M-NCPPC / Cassi Hayden

COUNTY GOALS AND OBJECTIVES

- Protect human health, safety, and property.
- Protect, restore, and enhance habitat for healthier ecosystems.
- Improve quality of life and recreational opportunities.
- Conduct restoration efforts with a balanced implementation of BMPs and programmatic actions.
- Integrate watershed protection/restoration into policy-making.
- Increase awareness and stewardship by the public and policymakers.
- Support compliance with regional, state, and federal regulatory requirements.

SPEAKERS / PANELISTS

- Speakers
  - Adrianna Berk, Outreach Specialist, Tetra Tech
  - Mark Sievers, Environmental Engineer, Tetra Tech
  - Sam Stribling, Biologist/Assessment Specialist, Tetra Tech

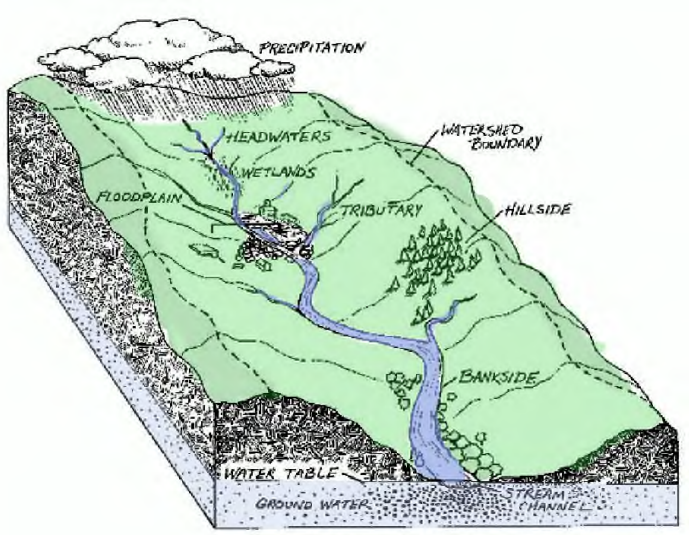
- Technical Panelists
  - Chris Clark, DoE
  - Jerry Maldonado, Section Head, DoE
  - Mark Sievers, Tetra Tech
  - Sam Stribling, Tetra Tech

Watershed Mechanics

WHAT IS A WATERSHED?

Watersheds are like sponges and drain like funnels . . .

- Land accumulates pollutants from urban, agricultural, and other areas.
- Whatever is on the land washes into the waterways directly or via storm drains during a precipitation event in the form of runoff.
- Impervious areas contribute additional runoff and pollutants.
- Appropriate land management practices can greatly reduce polluted runoff.



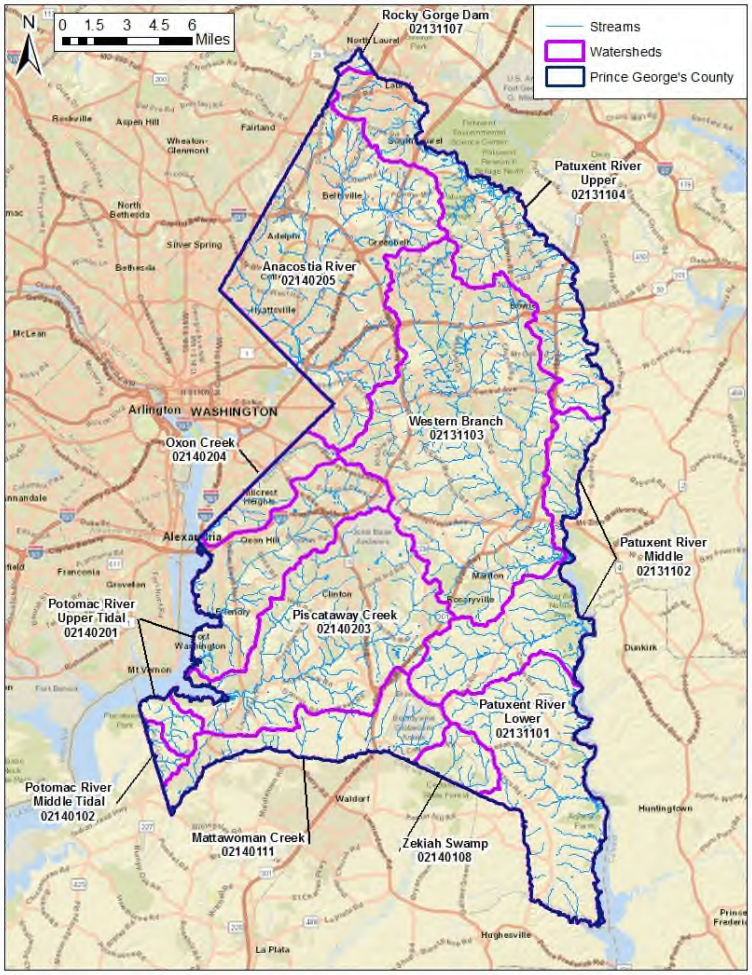
COUNTY WATERSHEDS

2014 Local TMDL Restoration Plans

- Anacostia River
- Patuxent River Upper & Rocky Gorge Reservoir
- Mattawoman Creek
- Piscataway Creek
- PCB-Impacted Water Bodies

2019 Local TMDL Restoration Plans

- Patuxent River, Lower & Middle
- Patuxent River

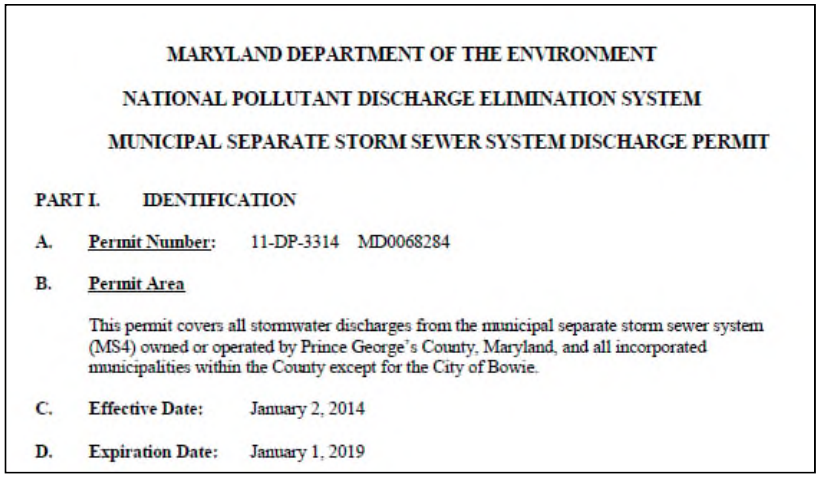


REGULATORY OVERVIEW

TWO REGULATORY DRIVERS

Under the Clean Water Act

1. Municipal Separate Storm Sewer System (MS4) Permit
2. Total Maximum Daily Loads (TMDLs) = *Pollution Diet*



MARYLAND DEPARTMENT OF THE ENVIRONMENT

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT

PART I. IDENTIFICATION

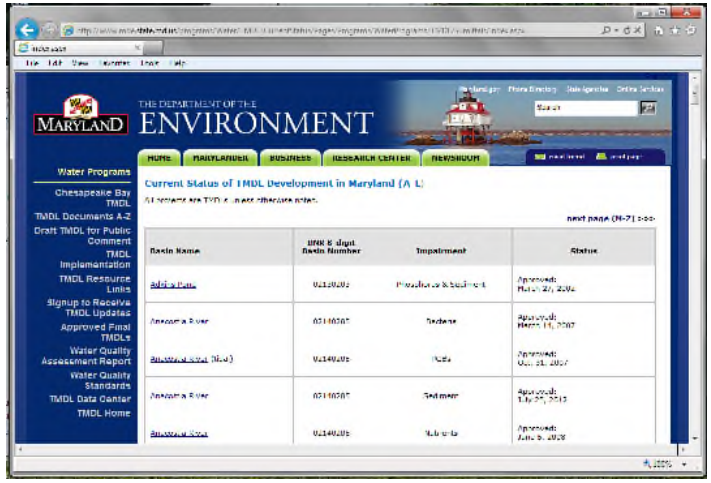
A. Permit Number: 11-DP-3314 MD0068284

B. Permit Area

This permit covers all stormwater discharges from the municipal separate storm sewer system (MS4) owned or operated by Prince George's County, Maryland, and all incorporated municipalities within the County except for the City of Bowie.

C. Effective Date: January 2, 2014

D. Expiration Date: January 1, 2019

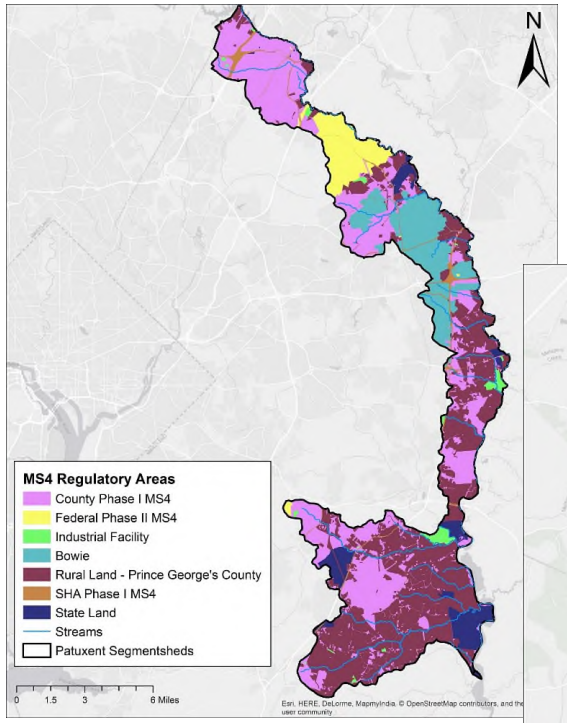


WHAT IS AN MS4?

Municipal Separate Storm Sewer System (MS4) = Conveyance system owned by a state, city, town, or other public entity that discharges to waters of the United States.

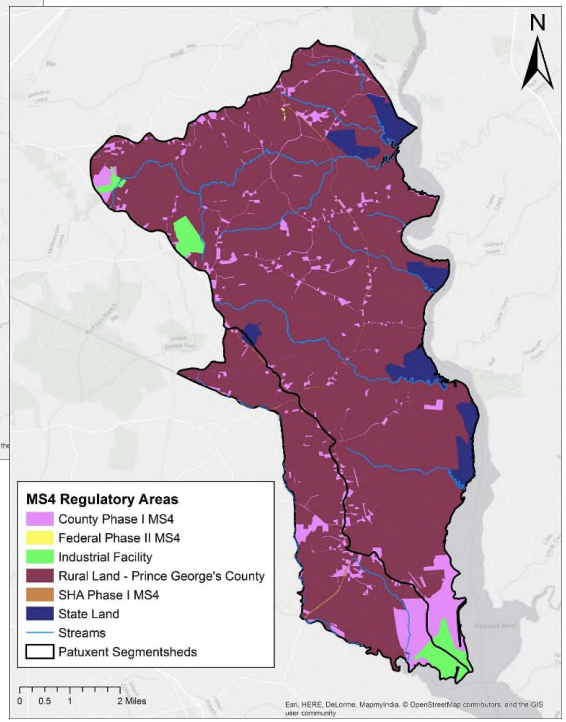
COUNTY'S MS4 REGULATED LANDS

- Excluded Properties:
  - Federal
  - State
  - SHA
  - M-NCPPC
  - Board of Education
  - Bowie



Patuxent River Tidal Freshwater (includes Patuxent River Middle)

Patuxent River Oligohaline and Mesohaline (includes Patuxent River Lower)



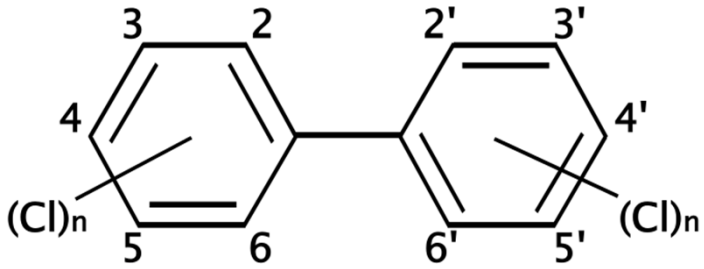
Pollutant Types

POLLUTANTS AND SOURCES

- **Bacteria** from animal waste and sewer leaks and overflows
- **Nutrients and Biochemical Oxygen Demand (BOD)** from sanitary waste, fertilizers, and organic material
- **Sediment** from construction sites, bare soils, and eroding streambanks
- **Trash** from littering
- **Toxics** (e.g., polychlorinated biphenyls [PCBs]) from legacy contaminated sites
- **ALL** can be contributed from urban stormwater

POLYCHLORINATED BIPHENYLS (PCBs)

- Group of similar chemicals
  - Are man made
  - Do not readily break down in environment
  - Tend to bioaccumulate and be associated with sediment
  - Are carcinogenic

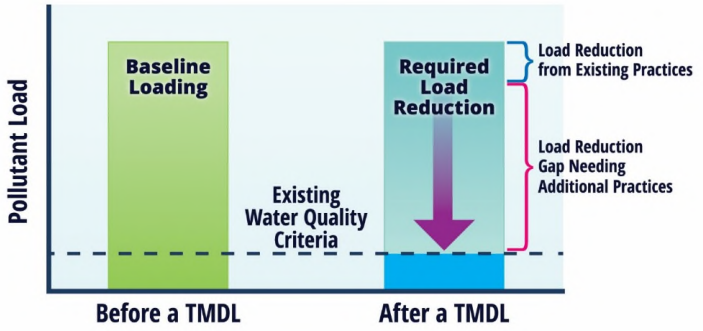


- **Uses**
  - Power transformers
  - PCB fluorescent light ballasts
  - Electrical insulation
  - Cooling applications
  - Hydraulic fluids
  - Heat transfer fluid
  - Lubricants
  - Caulk
  - Paints
- **Sources**
  - Contaminated upland soils/sites
  - Contaminated stream sediments
  - Facility point sources
  - Aerial deposition

Pollution & Impairment Limits

WHAT IS A POLLUTION DIET/TMDL?

- TMDL = Total Maximum Daily Load (Pollution Diet)
  - Addresses a single pollutant or stressor.
  - Allocations issued to natural, point, and nonpoint sources.
- The maximum amount of a pollutant that a water body can assimilate and still meet water quality standards and designated uses.
- If TMDL is met, then the water body should meet water quality criteria for that pollutant.



MARYLAND'S TMDL PROGRAM

- Maryland Department of the Environment (MDE) is the state's regulatory agency for TMDLs.
- Maryland is required under the Clean Water Act to list impaired waters and to take action to restore them.
- Impaired waters are identified every two years.
- A two-part process is used for restoration:
  - Establish and submit a TMDL to EPA.
  - Once TMDL is approved, develop a restoration plan.

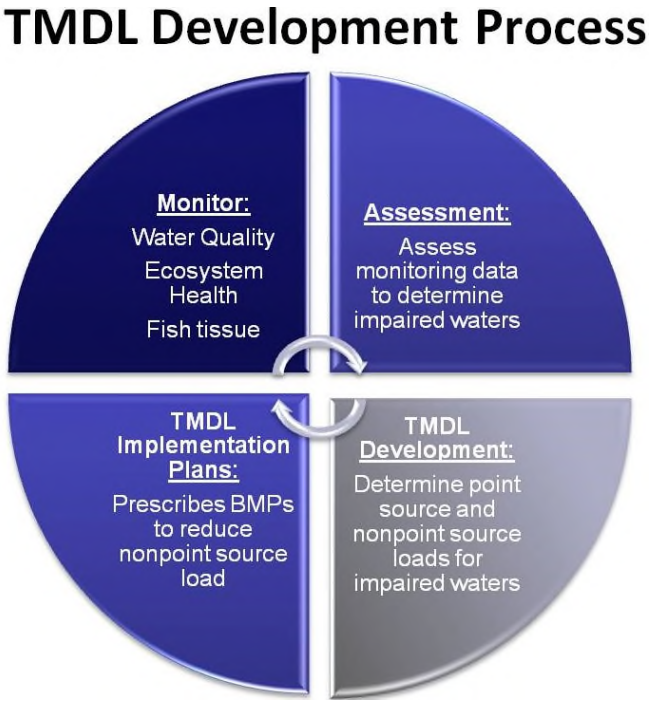


Figure Credit: Virginia Department of Environmental Quality

Restoration Approach & Strategies

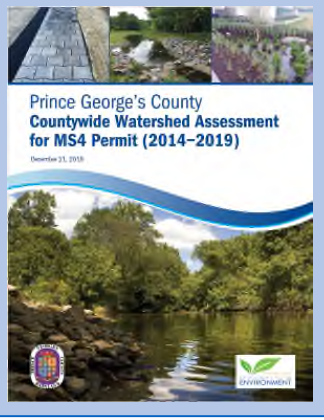
HOW WILL WE GET THERE?
RESTORATION PLANNING STEPS

Characterize Watershed
- Gather existing data
- Inventory TMDLs
- Create data inventory
- Identify data gaps
- Collect additional data, if needed
- Analyze data

Design Restoration Program
- Develop restoration strategies
- Develop restoration schedule and milestones
- Develop monitoring component and evaluation process
- Identify financial assistance needed

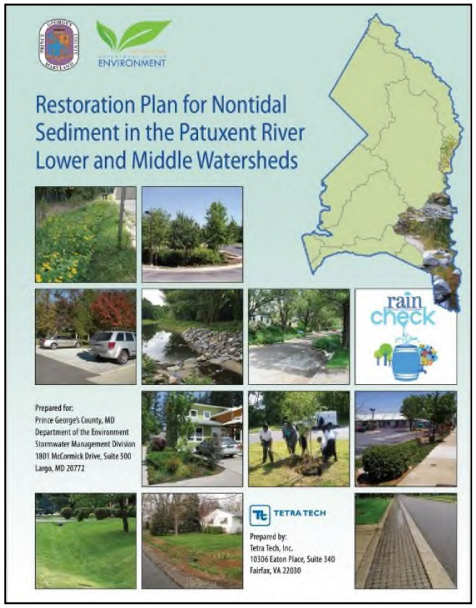
Implement Restoration Plan
- Implement management strategies
- Conduct monitoring
- Conduct outreach activities

Measure Progress and Make Adjustments (Adaptive Mgmt)
- Review and evaluate
- Share results
- Prepare annual plans
- Adjustments



ELEMENTS OF THESE PLANS

- Watershed Characterization
- Water Quality Conditions
- Watershed Conditions
- Current Management Activities
- Load Reduction Targets and Existing Gap
- Strategy Development
- Restoration Activities
- Proposed Restoration Plan Estimates
- Public Outreach and Involvement
- Tracking and Adaptive Management



http://pgcdoe.net/pgcountyfactsheet/Factsheet/Default

Current County Restoration Programs and Activities

EXISTING COUNTY PROGRAMS

- **Stormwater-Specific Programs**
  - Stormwater Management Program
  - Clean Water Partnership (CWP)
  - Rain Check Rebate and Grant Program
  - Alternative Compliance Program
  - Stormwater Stewardship Grant Program
  - Countywide Green/Complete Streets Program
  - Erosion and Sediment Control
  - Street Sweeping, Storm Drain Maintenance/Cleaning
  - Storm Drain Stenciling, Illicit Connection and Enforcement Program
- **Tree-Planting Programs**
  - Volunteer Tree Planting, Tree ReLeaf Grant Program, Neighborhood Design, Center, Arbor Day Every Day, Tree Planting Demonstrations
- **Public Education Programs**
  - Interactive Displays and Speakers for Community Meetings, Stormwater Audit Program, Master Gardeners, Flood Awareness Month

PRINCE GEORGE'S COUNTY | CORVIAS SOLUTIONS
CLEAN WATER PARTNERSHIP

rain check
DEPARTMENT OF ENVIRONMENTAL RESOURCES
SLOW IT DOWN.
SPREAD IT OUT.
SOAK IT IN.

"TURN COMMUNITIES GREEN" WITH TREES

Arbor Day

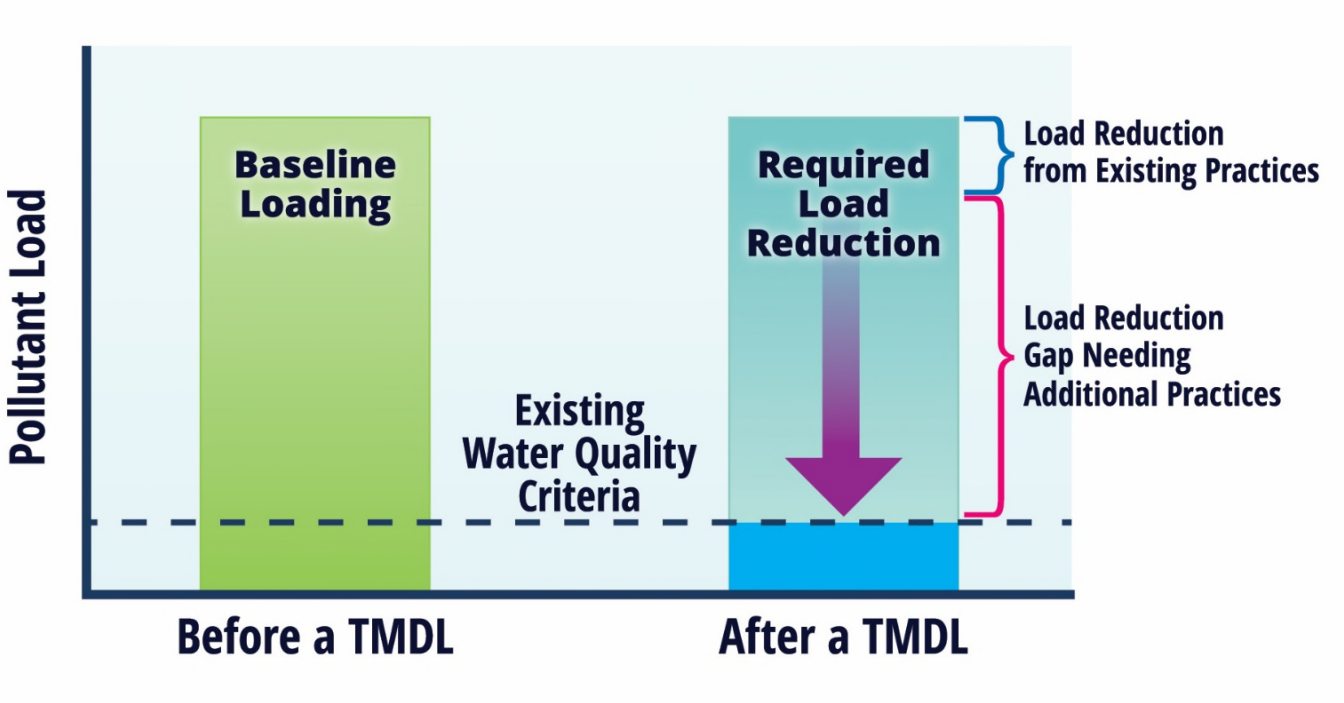
PRINCE GEORGE'S COUNTY
TREE ReLEAF
Grant Program
DEPARTMENT OF ENVIRONMENTAL RESOURCES

EXAMPLES OF RECENT BMPS

Photo Credits: Clean Water Partnership

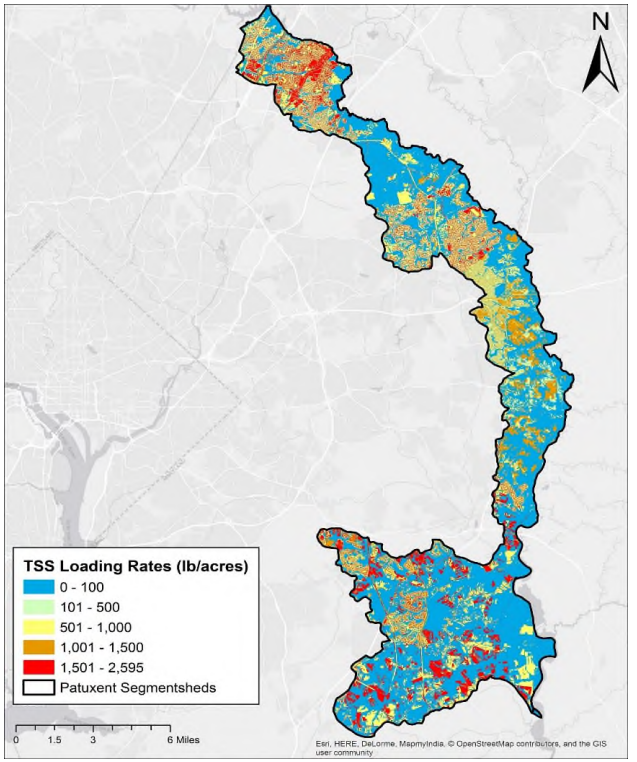
Load Reduction Targets

OVERVIEW OF LOAD REDUCTIONS



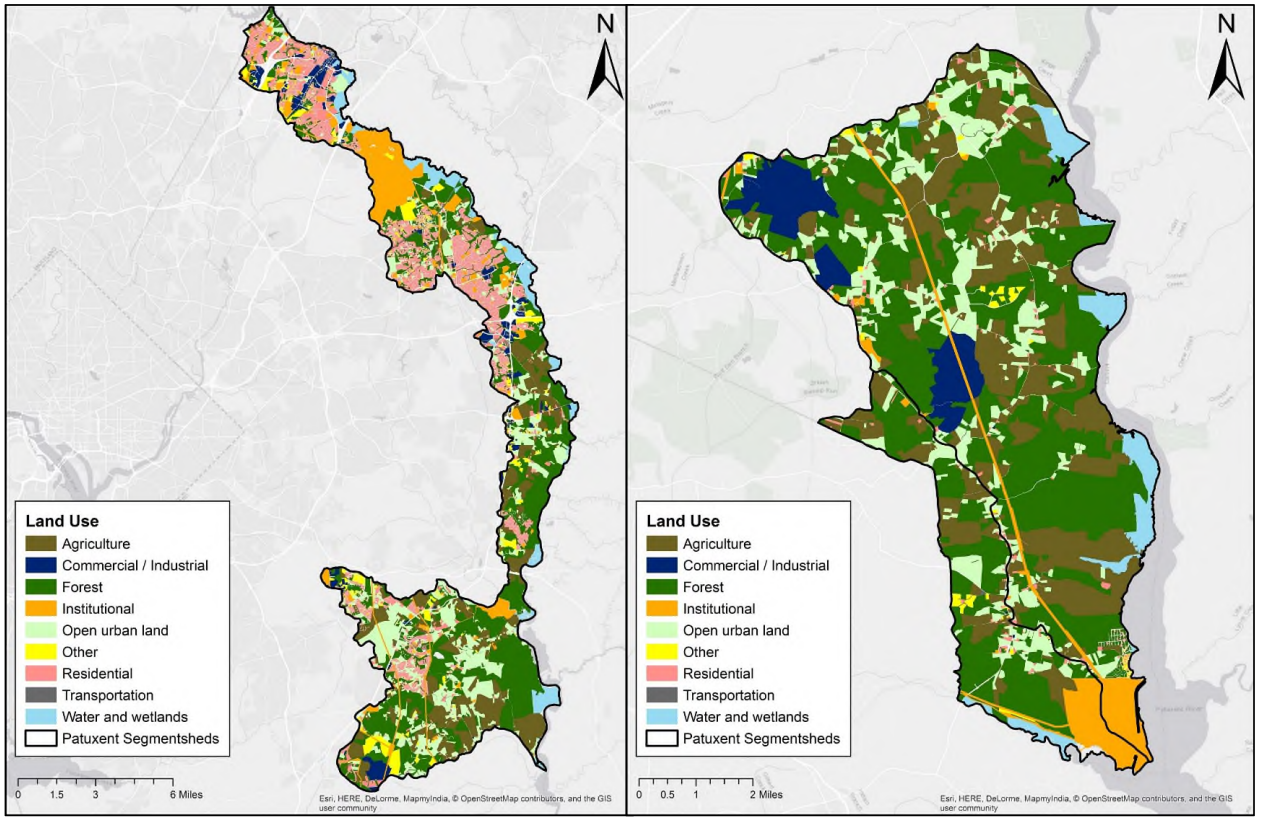
CALCULATING POLLUTANT LOADS

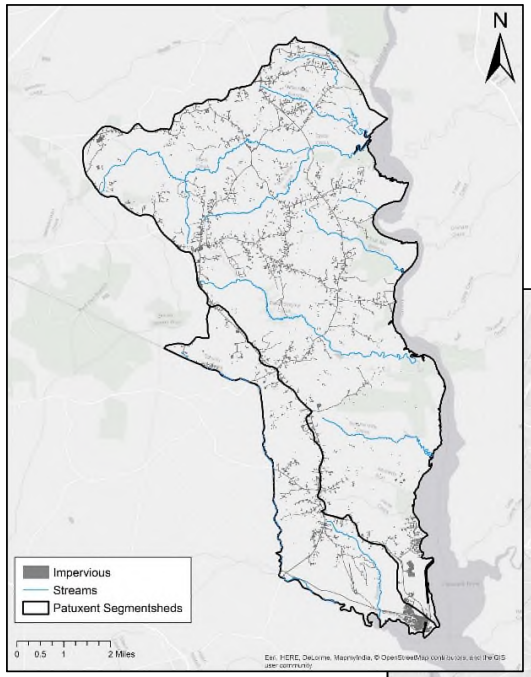
- Different land uses deliver different amounts of sediment per acre to a stream during a rain event.
- Loading rates = pounds / acre
  - Depends on how much sediment is produced and how easy it runs off the land
- Highest sediment loading rates
  - Rural areas: Highest from agricultural
  - Urban areas: Highest from impervious areas

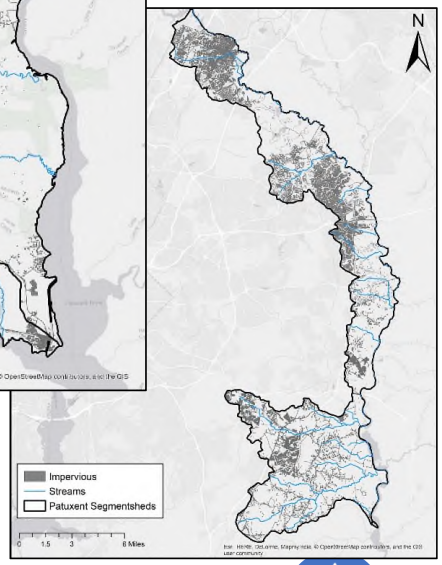


Example of sediment loading rates.

PATUXENT LAND USES / IMPERVIOUS AREAS







LOAD REDUCTION TARGETS

Measure	PR-Lower		PR-Middle		PCB Segmentsheds	
	TSS (tons/yr)	% of Target	TSS (tons/yr)	% of Target	PCBs (g/yr)	% of Target
Baseline Load (2010)	360.4	163.9%	599.4	178.6%	21.1	100.1%
Target Load (2025)	140.5	63.9%	263.7	78.6%	0	0.1%
Required Load Reduction	219.8	100.0%	335.7	100.0%	21.1	100.0%
Load Reduction to Date (2010-2018)	1.7	0.8%	2.7	0.8%	1.9	9.2%
Current Load (Credit for BMPs installed 2010-2018)	358.7	163.1%	596.7	177.8%	19.2	90.9%
Current Load Reduction Gap (2018)	218.1	99.2%	333	99.2%	19.1	90.8%
Load Removed from BMPs in Planning / Design	0	0.0%	82.8	24.7%	2.2	10.6%
Initial Load Reduction Gap	218.1	0.8%	250.2	25.5%	16.9	80.2%

Proposed Strategies & Activities

DETERMINE RESTORATION STRATEGIES

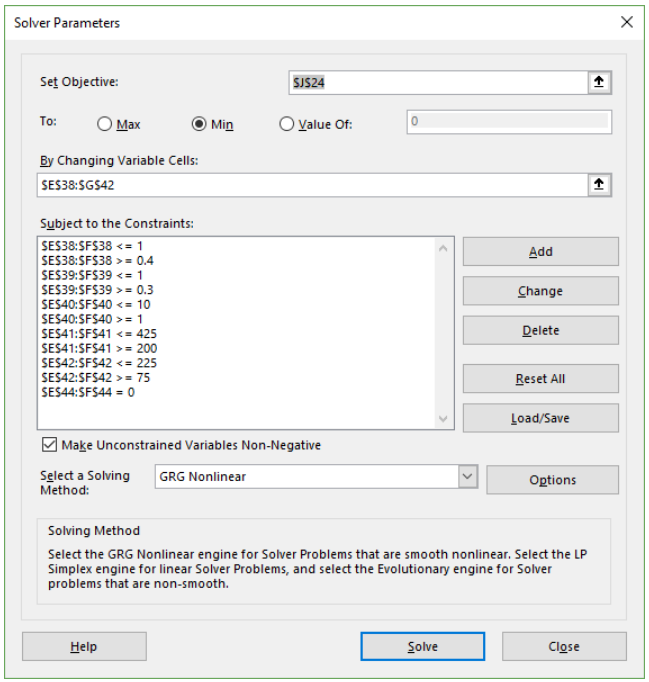
- Keep effective current and planned BMPs and programmatic initiatives.
  - Clean Water Partnership, Rain Check Rebate Program, Alternative Compliance Program.
- Find restoration opportunities.
- Engage the public.
- Assess future BMP possibilities.
  - New BMPs on County property.
  - New right-of-way BMPs through County programs.
  - Partner with public and private institutions to install BMPs.

Above: Bioretention in a right-of-way makes this a green street.

Below: Permeable pavement along parking lot.

RESTORATION OPTIMIZATION

- Identified restoration strategies and potential load reductions
  - Stream restoration and outfall stabilization
  - Tree planting
  - New wet ponds and ESD practices
- Created Excel spreadsheet to meet load reduction targets at the lowest costs through different scenarios
  - *Solver* processes a set of constraints to meet the objectives
  - Ran different scenarios using constraints (e.g., 50-150 acres of wet ponds)
  - Identified the top 8 scenarios and reported the median in restoration plan



RESTORATION PLAN OVERVIEW

Measure or practice	PR-Lower		PR-Middle		PCB Segmentsheds	
	TSS (tons/yr)	% of Target	TSS (tons/yr)	% of Target	PCB (mg/yr)	% of Target
Baseline load (2010)	360.4	163.90%	599.4	178.60%	21,091	100.10%
Target load (2025)	140.5	63.90%	263.7	78.60%	14	0.10%
Required load reduction	219.8	100.00%	335.7	100.00%	21,078	100.00%
Load reduction to date (2010-2018)	1.7	0.80%	2.7	0.80%	1,939	9.20%
Current load (Credit for BMPs installed 2010-2018)	358.7	163.10%	596.7	177.80%	19,152	90.90%
Current load reduction gap (2018)	218.1	99.20%	333	99.20%	19,138	90.80%
Load removed from BMPs in planning / design	0	0.00%	82.8	24.70%	2,242	10.60%
Initial load reduction gap	218.1	0.80%	250.2	25.50%	16,897	80.20%
Restoration Plan						
Stream restoration / outfall stabilization	82.7	37.60%	28.6	8.50%	1,330	6.30%
Tree planting	1.6	0.70%	1.7	0.50%	20	0.10%
New wet ponds	59.7	27.10%	136.3	40.60%	5,429	25.80%
ESD practices	74.2	33.80%	83.6	24.90%	10,117	48.00%
Total restoration plan	218.1	99.20%	250.2	74.50%	16,897	80.20%
Total Restoration Activities						
Current BMPs, planned BMPs, and restoration plan BMPs	219.8	100.00%	335.7	100.00%	21,078	100.00%

Required load reduction calculations

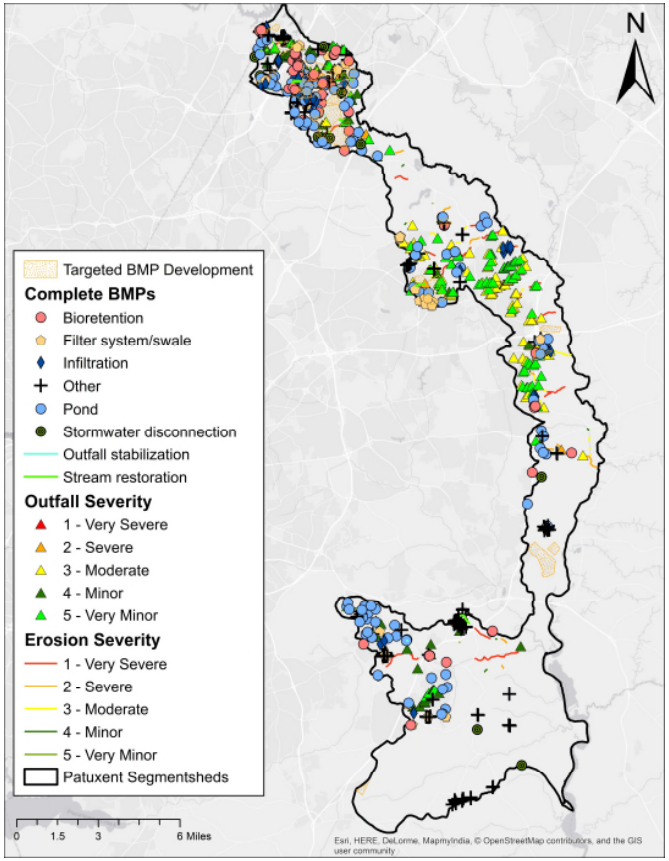
New BMPs to meet load reduction gap

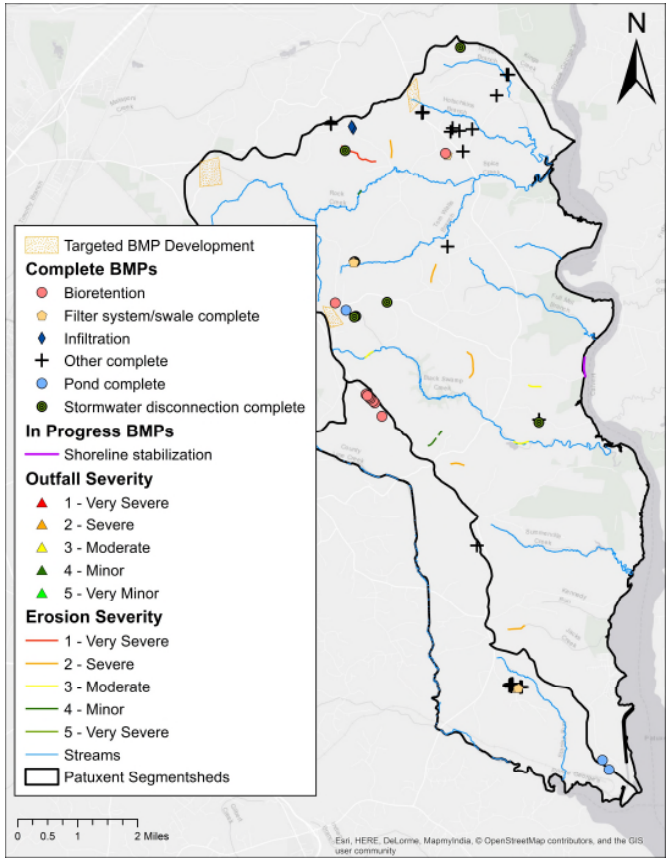
Complete implementation

EXISTING AND POTENTIAL BMPS

Maps Contain

- *Locations of existing BMPs*
- *Areas to target BMP implementation*
  - *Areas of poor biological health*
  - *Untreated impervious areas*
- *Known erosion and outfall issues*
  - *Stream Corridor Assessments*





BMPS CO-BENEFITS

BMPs are not just for load reductions!

- Air quality
- Biodiversity/habitat
- Education
- Energy efficiency
- Flood mitigation
- Groundwater recharge
- Property values
- Recreation

Photo Credits: Clean Water Partnership

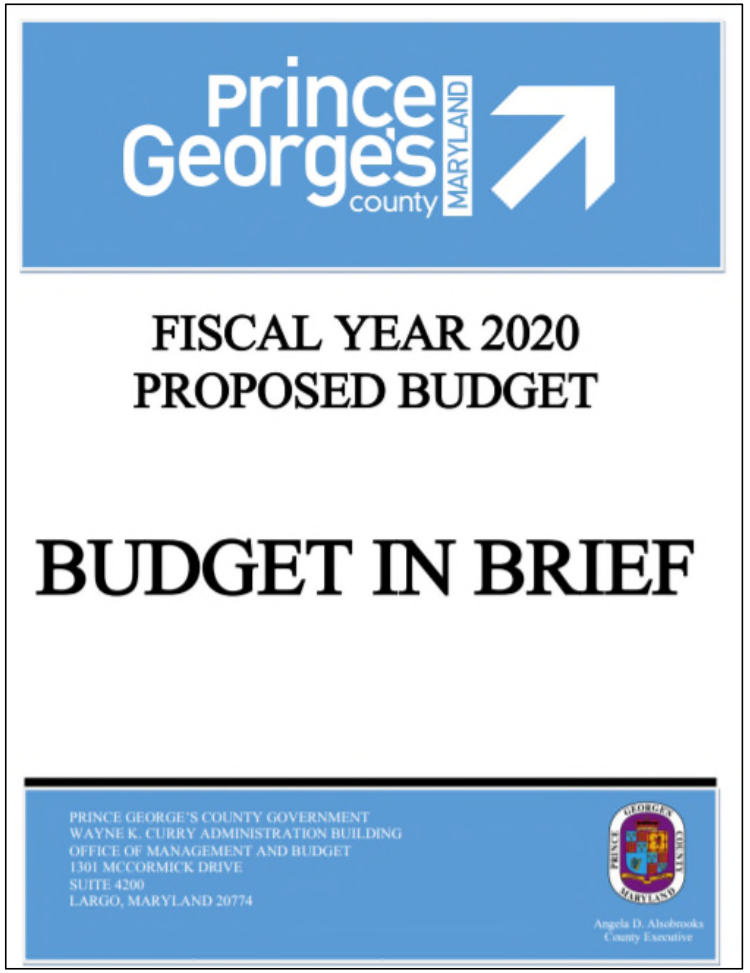
Restoration Implementation Costs

COST ESTIMATE FOR RESTORATION

- Approach (Programmatic & Structural BMPs)
  - Estimated costs to implement future restoration.
  - BMP costs were adapted from the University of Maryland Center for Environmental Science report Costs of Stormwater Management Practices in Maryland Counties, prepared for MDE (King and Hagan 2011). Converted to January 2018 dollars.
- Sediment for Patuxent River (Lower/Middle): $70.5M
- PCBs for Patuxent River segmentsheds: $782M

COVERING COSTS

- How will the County pay for this work?
  - Current funds include:
    - Capital Improvement Program (CIP) budget
    - Clean Water Act fee
    - Stormwater ad valorem tax
  - Additional sources will include
    - Grants
    - Watershed restoration partners
    - Sale of municipal bonds



Projected Timeline and Annual Costs

SCHEDULE FACTORS

- Restoration plans in Anacostia River, Piscataway Creek, Mattawoman Creek, Rocky Gorge Reservoir, Upper Patuxent River, and other PCB-impacted watersheds.
- Assumed can retrofit an average of 2% of untreated impervious area per year for each watershed.
- Expect fluctuations per year depending on funding, program capacity, and availability of sites.
- Adaptive management

TSS IMPERVIOUS ACRE RESTORATION GOALS

Fiscal Year	PR-Lower			PR-Middle		
	Impervious acres treated	TSS (ton/year)	Estimated budget ($M)	Impervious acres treated	TSS (ton/year)	Estimated budget ($M)
2021	13.18	18	$1.99	14.06	21	$1.60
2022	26.37	36	$3.99	28.13	42	$3.20
2023	39.55	55	$5.98	42.19	63	$4.80
2024	52.73	73	$7.97	56.25	83	$6.40
2025	65.92	91	$9.96	70.31	104	$8.01
2026	79.10	109	$11.96	84.38	125	$9.61
2027	92.28	127	$13.95	98.44	146	$11.21
2028	105.47	145	$15.94	112.50	167	$12.81
2029	118.65	164	$17.94	126.56	188	$14.41
2030	131.83	182	$19.93	140.63	208	$16.01
2031	145.02	200	$21.92	154.69	229	$17.61
2032	158.20	218	$23.92	168.75	250	$19.21
2033	171.38	236	$25.91	182.81	271	$20.81
2034	184.57	254	$27.90	196.88	292	$22.42
2035	197.75	273	$29.89	210.94	313	$24.02
2036	210.93	291	$31.89	225.00	334	$25.62
2037	224.12	309	$33.88	239.06	354	$27.22
2038	237.30	327	$35.87	253.13	375	$28.82
2039	250.48	345	$37.87	267.19	396	$30.42
2040	263.67	364	$39.86	267.38	396	$30.44
2041	265.13	366	$40.08	--	--	--

PCB IMPERVIOUS ACRE RESTORATION GOALS

Fiscal Year	Impervious acres treated	PCBs (g/year)	Estimated budget ($M)
2021	138.7	1.41	$20.42
2022	277.4	2.82	$40.84
2023	416.1	4.22	$61.26
2024	554.8	5.63	$81.68
2025	693.5	7.04	$102.10
2026	832.2	8.45	$122.52
2027	970.9	9.86	$142.94
2028	1,109.60	11.26	$163.36
2029	1,248.30	12.67	$183.78
2030	1,387.00	14.08	$204.20
2031	1,525.70	15.49	$224.62
2032	1,664.40	16.90	$245.03
2033	1,803.10	18.31	$265.45
2034	1,941.80	19.71	$285.87
2035	2,080.50	21.12	$306.29
2036	2,219.20	22.53	$326.71
2037	2,357.90	23.94	$347.13
2038	2,496.60	25.35	$367.55
2039	2,635.30	26.75	$387.97
2040	2,774.00	28.16	$408.39

Fiscal Year	Impervious acres treated	PCBs (g/year)	Estimated budget ($M)
2041	2,912.70	29.57	$428.81
2042	3,051.40	30.98	$449.23
2043	3,190.10	32.39	$469.65
2044	3,328.80	33.79	$490.07
2045	3,467.50	35.20	$510.49
2046	3,606.20	36.61	$530.91
2047	3,744.90	38.02	$551.33
2048	3,883.60	39.43	$571.75
2049	4,022.30	40.83	$592.17
2050	4,161.10	42.24	$612.59
2051	4,299.80	43.65	$633.01
2052	4,438.50	45.06	$653.43
2053	4,577.20	46.47	$673.85
2054	4,715.90	47.87	$694.27
2055	4,854.60	49.28	$714.68
2056	4,993.30	50.69	$735.10
2057	5,132.00	52.10	$755.52
2058	5,270.70	53.51	$775.94
2059	5,312.00	53.93	$782.03

Tracking Progress

TRACKING PROGRESS

- Three Main Activities
  - Track with required annual MS4 report
    - Document restoration BMP installation and activities such as outreach
  - Environmental monitoring
    - Biological, physical habitat, and water quality
  - Georeferenced database
    - Project locations, type, amount of imperviousness surface treated, monitoring data, etc.

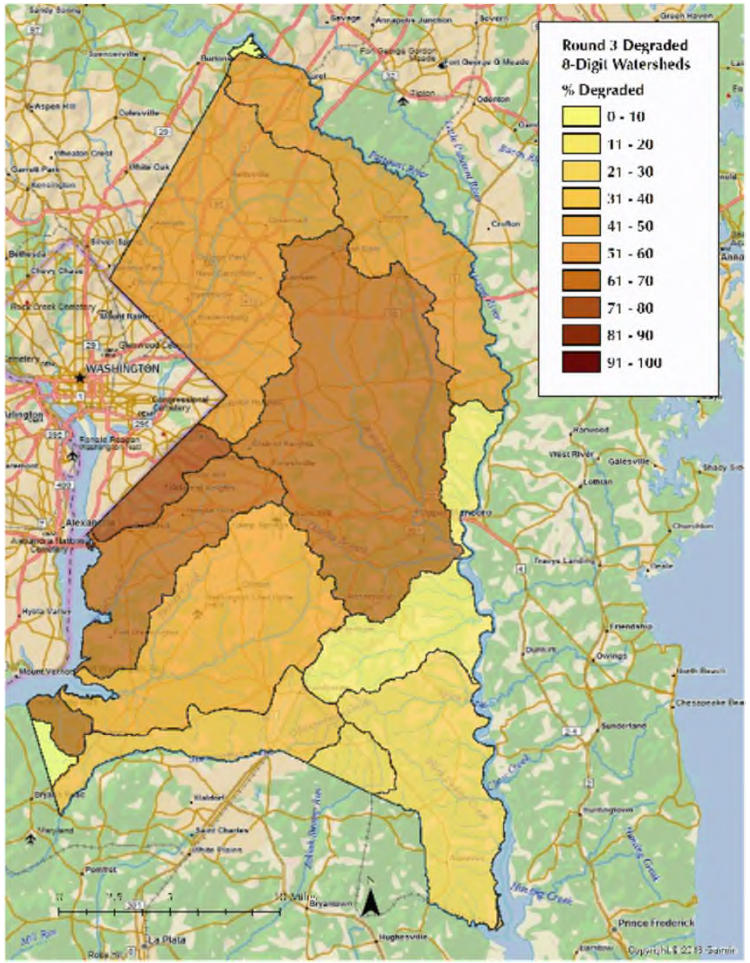
WATER QUALITY MONITORING

- Conducted in a priority subwatershed with restoration activities.
  - County working with MDE to move the required NPDES monitoring locations from Bear Branch (Upper Patuxent) to selected priority area.
- Currently monitor nitrate/nitrite, TKN, total phosphorus, TSS, BOD, TPH, Cu, Pb, Zn, hardness, pH, temp, and *E. coli*.
  - Expected to change in next MS4 permit.

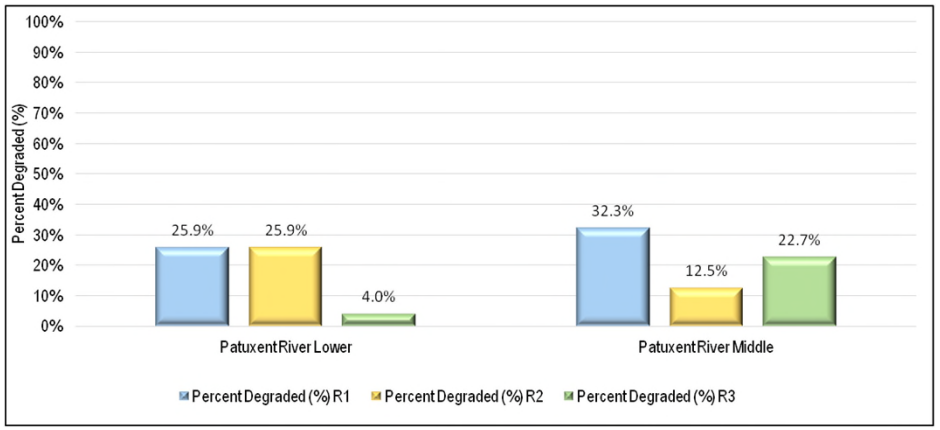
HOW WILL BIOLOGICAL MONITORING BE USED TO TRACK CHANGES?

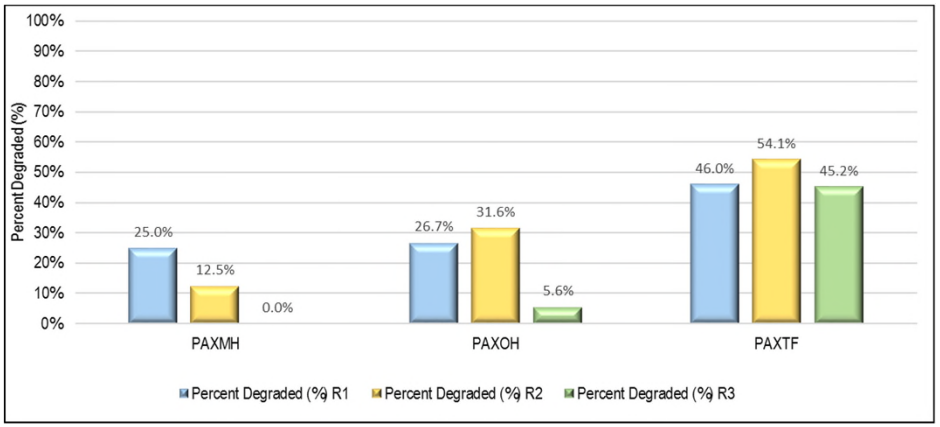
- Round 4 biological monitoring.
- County will look for substantial reductions in "percent biological degradation".
- Setting goals for reduced percent degradation.
- Interpret monitoring and assessment results in context of…
  - Improved habitat and water chemistry conditions
  - Effectiveness of overall restoration activities (different from implementation effectiveness)

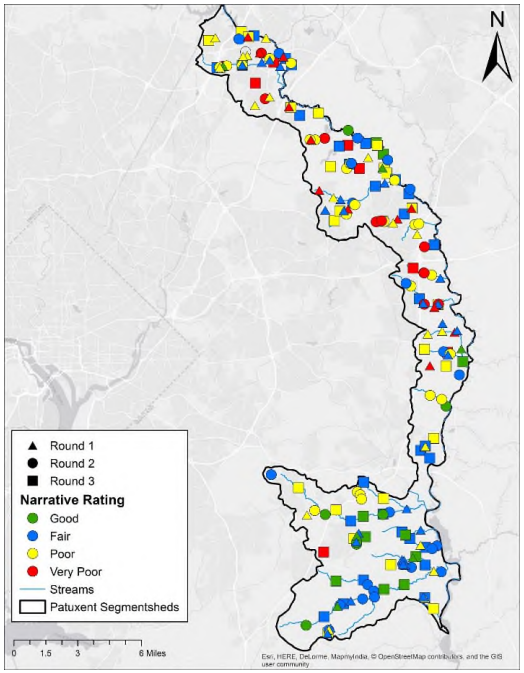
Watershed Status, Biological Condition (2017)

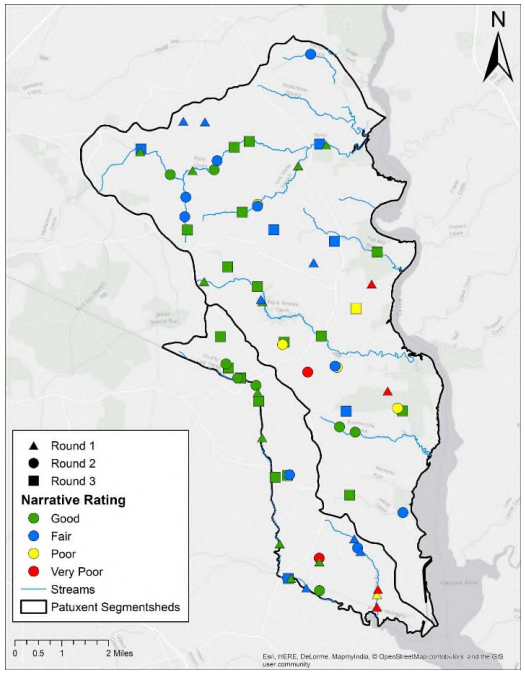


PATUXENT BIOLOGICAL RESULTS







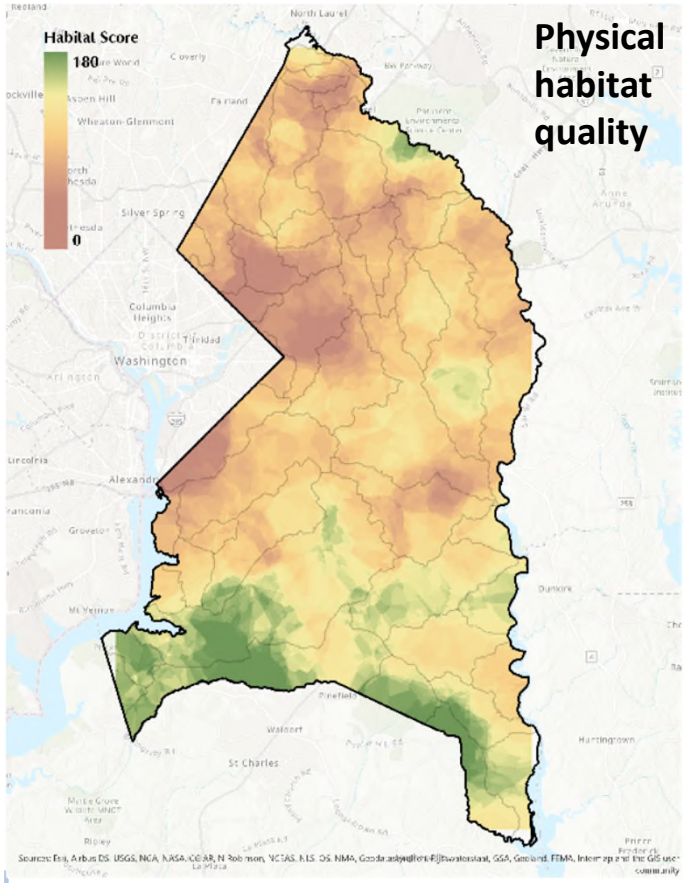


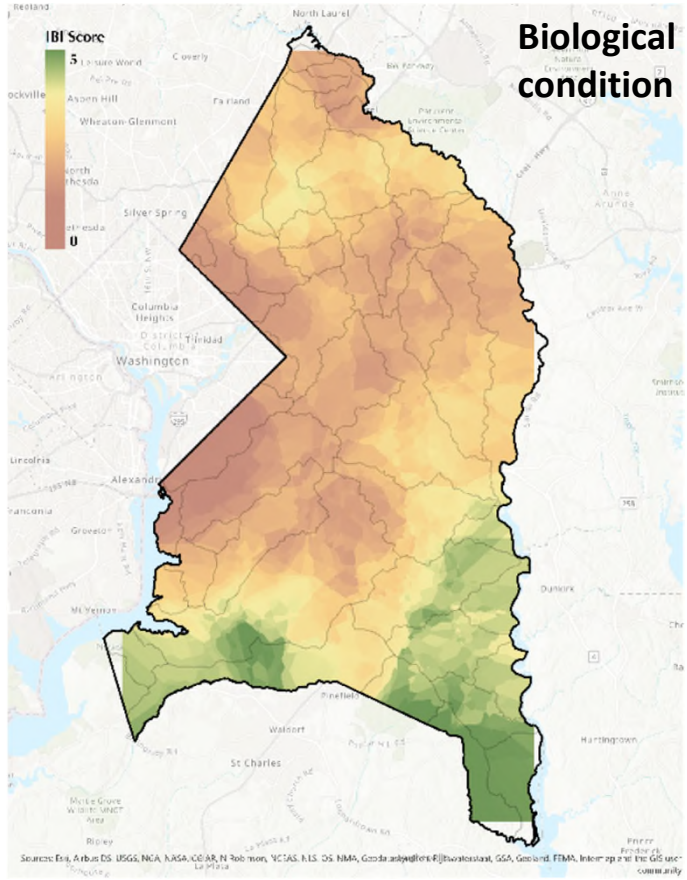
COUNTYWIDE BIOLOGICAL RESULTS

Kriging maps show smooth transitions in ecological condition.

Here is readily apparent that better conditions are in the south/ southeastern parts of the County.

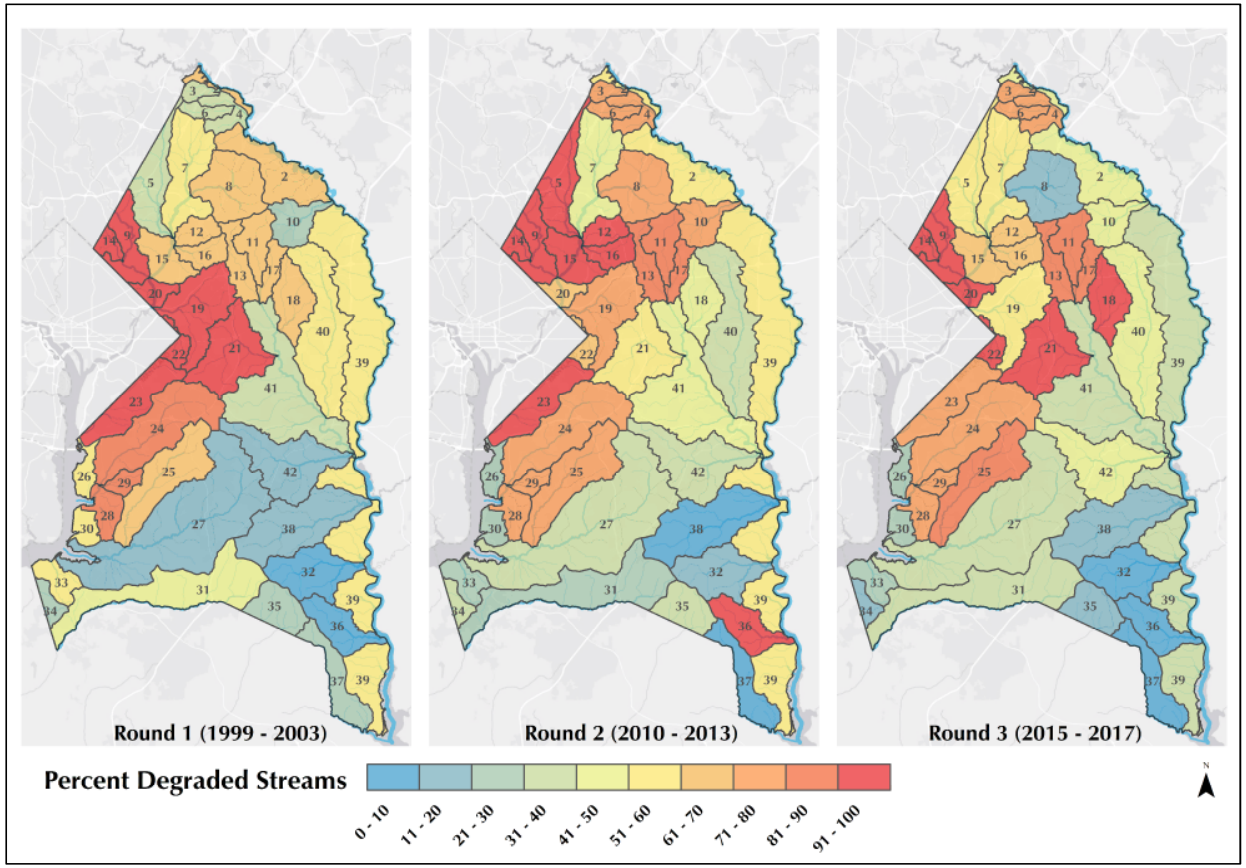
Data are from Round 3 (2015-2017).



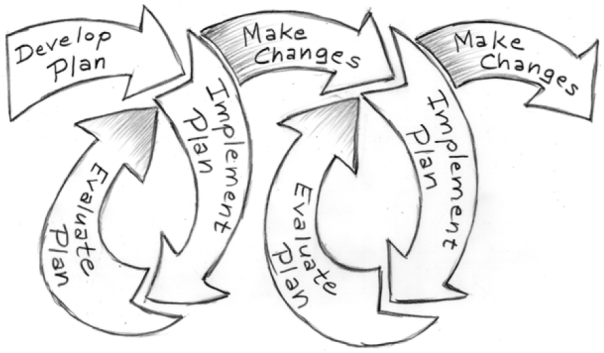


COUNTYWIDE BIOLOGICAL RESULTS

Percent degradation has changed over time.



ADAPTIVE MANAGEMENT



- Learn and change as we go.
- After strategies are in place, evaluate changes in:
  - Pollutants loads
  - Biological integrity
- Advances in technology will provide more effective, smaller, cheaper reduction measures.
- Multiple bottom-line benefits.
- Determine needs for additional controls.
- Continue monitoring and evaluation.

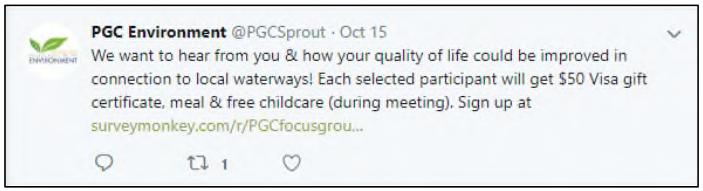
What Is Next?

YOUR ROLE IN RESTORATION

- Become informed.
- Support implementation by preventing stormwater pollution.
  - Pick up after pets, plant trees, install rain barrels, leave grass clippings on lawn, don't litter, smart use of fertilizers/herbicides /pesticides, etc.
- Use County Click (http://countyclick.princegeorgescountymd.gov/).

STAY INFORMED

- Subscribe to DoE updates on Twitter, Instagram, and Facebook for information and to get involved!
- Lots of DoE programs
  - Comprehensive Community Cleanup Program
  - Tree ReLEAF Grant Program
  - Rain Check Rebate Program
  - and more!
- DoE has speakers for meetings & interactive exhibits. https://www.princegeorgescountymd.gov/351/Community-Outreach



30-DAY COMMENT PERIOD

- Public comment period open till September 13, 2019.

- Submit Comments:
  - Tonight:
    - Comment forms (official comments)
    - Orally at hearing (unofficial comments)
  - After Tonight:
    - Email: tbhuiyan@co.pg.md.us
    - Regular mail:

      Attn: Tanvir Bhuiyan
      Prince George's County Government
      Stormwater Management Division
      Department of the Environment
      1801 McCormick Drive, Suite 500
      Largo, MD 20774

QUESTIONS?

- Contact:

  Tanvir Bhuiyan, Ph.D., P.E.
  301.636.2069
  tbhuiyan@co.pg.md.us
- https://www.princegeorgescountymd.gov/261/Stormwater-Management

- Comments due September 13, 2019

Thank you for attending!

Please remember to sign in if you have not done so already and turn in your comment forms!

CONTACT US

Prince George's County Department of the Environment
1801 McCormick Drive, Suite 500
Largo, Maryland
(301) 883-5810