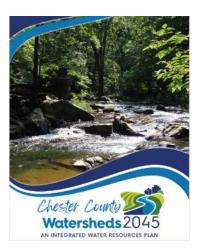
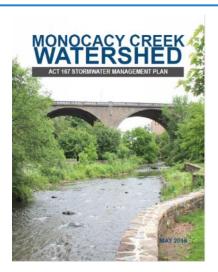
Planning for Stormwater Management and Flood Mitigation – A Multi-County Perspective

> APAPA – Annual Conference 10-14-2025



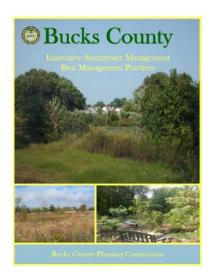


















## Session Speakers

Jamie Eberl, P.E. Environmental Group Manager Department of Environmental Protection - Bureau of Clean Water

Department of

**Environmental Protection** 

jeberl@pa.gov

Kate Hutelmyer – Water Resource Planner Chester County Water Resources Authority

khutelmyer@chesco.org



Jon Lesher, LEED Green Assoc. 

Environmental Planning Manager

Montgomery County Planning Commission

Jon.Lesher@montgomerycountypa.gov

Susan Myerov, AICP – Environmental Planning Director – Lehigh Valley Planning Commission

smyerov@lvpc.org

Evan Stone – Executive Director Bucks County Planning Commission

estone@buckscounty.org



# Agenda

- Objectives
- PA Act 167 Refresher
- County Approaches, Challenges & Plan Alignment
- PA DEP Resources
- Questions



# Objectives

Understand basics of Pennsylvania's Stormwater Management Act 167 requirements

Learn challenges of county wide stormwater management planning & its alignment with various plans

Learn about resources available from PA DEP





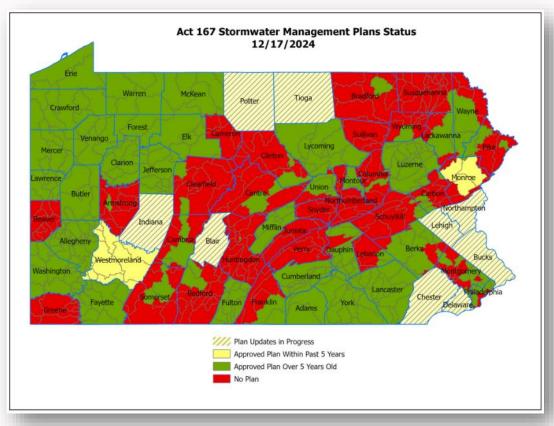
# The Pennsylvania Storm Water Management Act (Act 167)

Act 167 was enacted by the Pennsylvania Legislature in 1978 in response to the impacts of accelerated stormwater runoff resulting from land development throughout the state. The purpose of the Act was to:

- 1. Encourage planning and management of stormwater runoff in a manner consistent with sound water and land-use practices;
- 2. Authorize a comprehensive program of stormwater management to preserve and restore the flood carrying capacity of streams, to preserve to the maximum extent practicable natural stormwater runoff regimes, and to protect and conserve groundwaters and groundwater recharge areas; and
- 3. Encourage local administration and management of stormwater in a manner consistent with the Commonwealth's duty as trustee of natural resources and the people's constitutional right to the preservation of natural, economic, scenic, aesthetic, recreational and historic values of the environment.



### **Act 167 Plan Status**

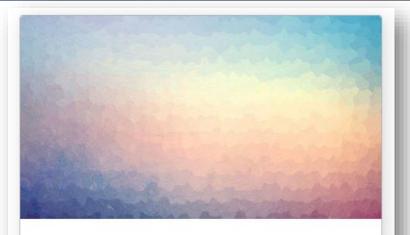


- Act 167 requires each county to prepare and adopt a
  watershed stormwater management plan for each
  watershed within the county, or for the county as a whole,
  and to review and revise the plan at least every five years.
- Initially after Act 167 was enacted, the General Assembly consistently appropriated funds for the Act 167 Program and DEP was able to provide funding to assist with the development of many plans. This funding ended in 2009, and consequently many counties ceased updating plans when funding was no longer available.
- Recent state budgets have appropriated funding for the Act 167 Program through the Clean Streams Fund.

# Bucks County Act 167 Stormwater Management Plan Update – An Integrated Approach

• <a href="https://connects.buckscounty.gov/act-167-stormwater-plan-update">https://connects.buckscounty.gov/act-167-stormwater-plan-update</a>





Last updated: 26 Jun, 2025

#### Bucks County Act 167 Stormwater Plan Update

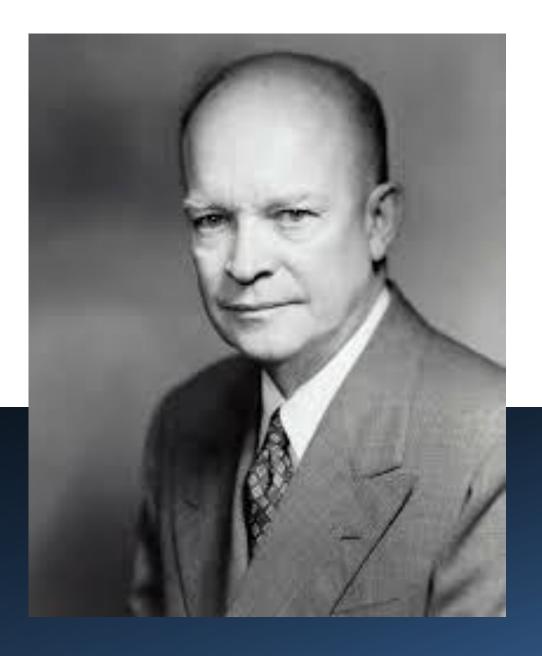
The BCPC is updating and consolidating nine separate county Act 167 plans into one unified countywide Act 167 stormwater management plan.

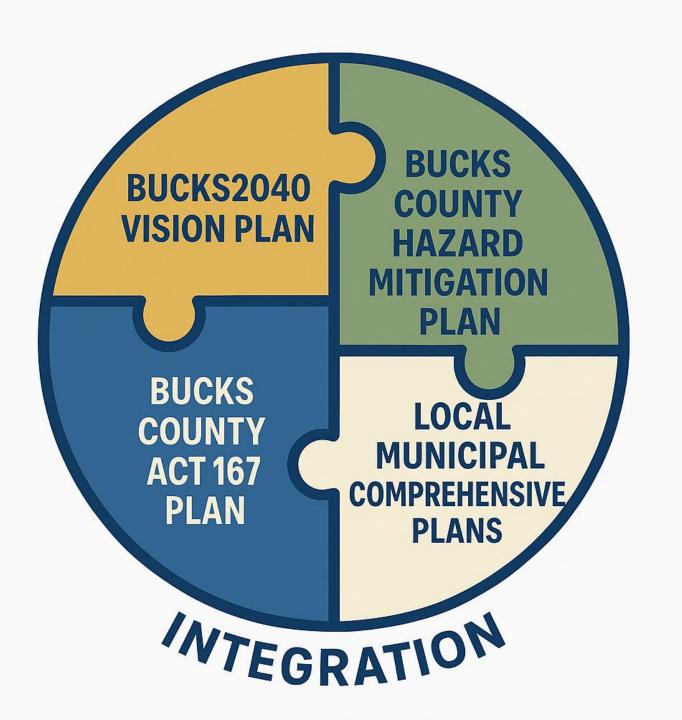




# Plans are worthless, but planning is everything.

**Dwight Eisenhower** 





Why Integration Matters

# July 15, 2023





# BUCKS COUNTY STORMWATER MANAGEMENT PLAN WATERSHED PLAN ADVISORY COMMITTEE (WPAC) WORKSHOP NO. 3 – PHASE 2 KICK-OFF

APRIL 10, 2025

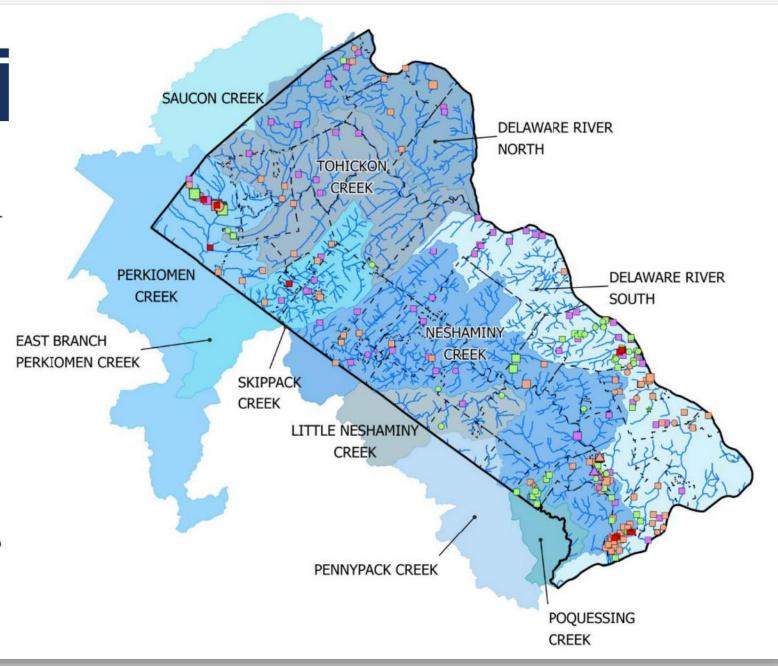


#### **SURVEY FINDINGS**

#### Stormwater Problem Sites -Legend

- Flooding Loss of Life -1 Day or Less
- Other More than One Owner - 1 Day or Less
- Groundwater Public 1 Day or Less
- ★ Water Pollution- Private- 1 Day or Less
- Accelerated Erosion Private 1 Day or Less
- Accelerated Erosion -Public - 1 Day or Less
  - Accelerated Erosion -
- More Than One Owner -1 Day or Less
- Accelerated Erosion More Than One Owner 1 Year
- Sedimentation Private 1 Day or Less
  - Sedimentation More
- ★ than one Owner 2 to 14 days

- Sedimentation More than One Owner - 1 Year or More
- Sedimentation Public -1 Year or More
- Flooding More than
  One Owner 1 Day or
- Flooding More Than
  One Owner 2 to 14
  Days
- Flooding More than One Owner - 14 to 30 Days
- Flooding More Than One Owner - 1 Year or More
- Flooding Public 1 Day or Less
- Flooding Public 2 to 14 Days
- Flooding Private 1
  Day or Less
- Flooding Private 2 to 14 Days
- Flooding Private 1 Year or More



#### **SURVEY SUMMARY**

	Number of each
	Problem Type
31	Sedimentation
66	Accelerated Erosion
205	Flooding
5	Water Recharge
1	Water Quality

Watershed	Total	Problems not included in a Previous Act 167
Delaware River South	100	62
Neshaminy Creek	81	65
Perkiomen Creek	21	21
Delaware River North	17	*
Tohickon Creek	13	6
East Branch Perkiomen Creek	11	4
Poquessing Creek	8	6
Pennypack Creek	0	
Saucon Creek	0	0
Skippack Creek	0	0



# Perkiomen Flood Mitigation

PROJECT BACKGROUND

 Flooding devastation after Hurricane Ida, September 1, 2021

 State Rep. Joe Webster secured funding from State for Perkiomen Watershed.

Flooding causes...

Recurring financial loss to residents and businesses

- Loss of life
- Risk to first responders
- Loss of property
- Water pollution





- 362 Square Miles
- 55 Municipalities
- 4 Counties
- ~38 miles long

#### **PERKIOMEN SUBWATERSHEDS**

- East Branch Perkiomen Creek
- Perkiomen Creek
- Skippack Creek
- Swamp Creek
- Unami/Ridge Valley Creek

#### **CONCURRENT STUDIES**

- Montgomery County Stormwater Management Plan
- Bucks County Act 167 Plan
- Lehigh County Act 167 Plan







"Coming together is the beginning. Keeping together is progress. Working together is success."

- Henry Ford

Lehigh Valley Watersheds Assessment & Act 167 Plan Update



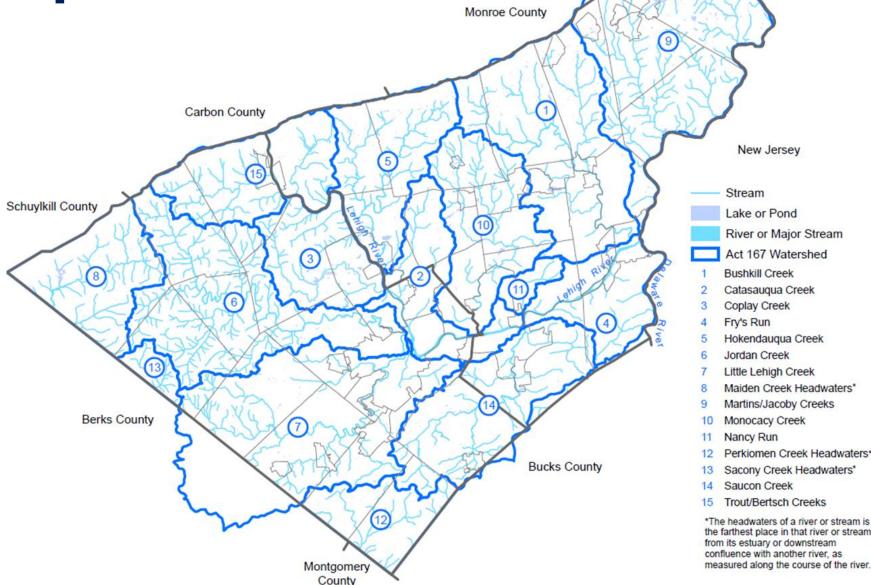












# Purpose and Goals

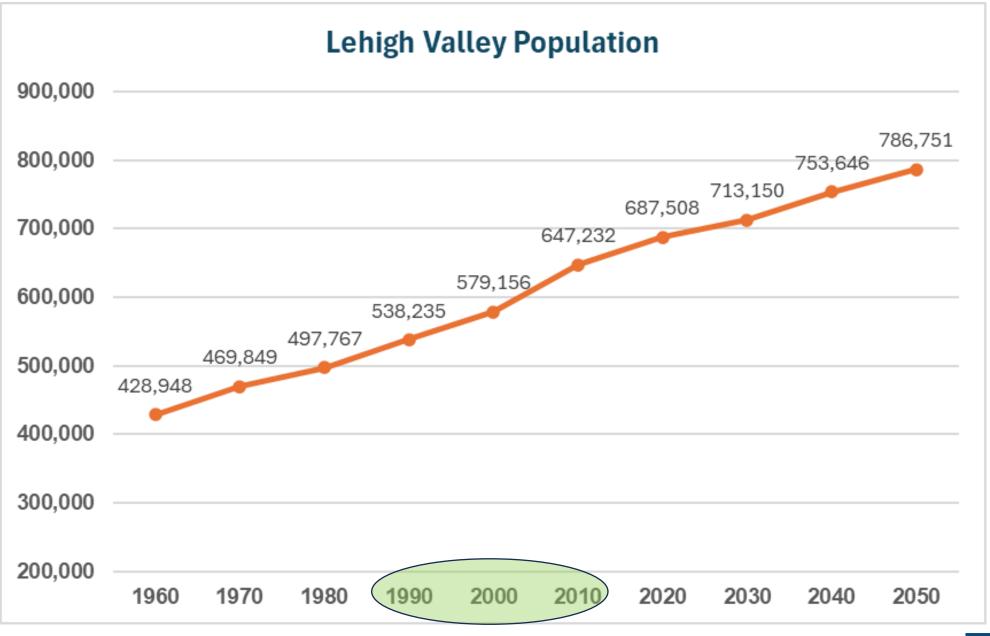
- Coordinate with all 62 municipalities, county conservation districts, equity communities, interested groups, and PA DEP
- Update hydrologic analysis to re-evaluate runoff control standards
- Create consistent, up-to-date stormwater ordinance including:
  - Green infrastructure & water balance standards
  - PA DEP post construction stormwater management guidance
  - Climate change considerations



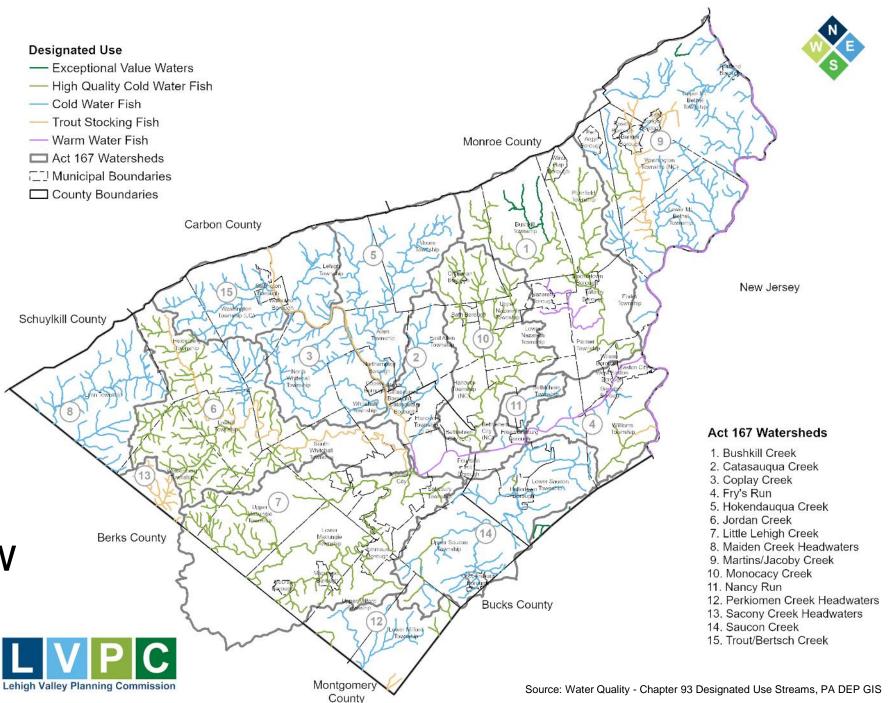
# Why Now?

	ACT 167 Stormwater Management Plan						
Lehigh and Northampton Counties							
	Watershed	Last Full Update: Hydrology and Ordinance	Ordinance Only Update for Water Quality				
1	Bushkill Creek Watershed	1992	2006				
2	Catasauqua Creek Watershed + Lehigh River Subbasin 4	1997	2006				
3	Coplay Creek Watershed + Lehigh River Sub-basin 2	1994	2006				
4	Fry's Run - Delaware River Sub-basin 2 + Lehigh River Sub-basin 5	1999	2006				
5	Hokendauqua Creek Watershed + Lehigh River Sub-basin 3	1997	2006				
6	Jordan Creek Watershed	1992	2006				
7	Little Lehigh Creek Watershed	1999	2005				
8	Maiden Creek Headwaters	2010					
9	Martins/Jacoby Creeks Watershed + Delaware River Subbasin 1	1996	2006				
10	Monocacy Creek Watershed	2018					
11	Nancy Run Watershed	1989	2006				
12	Perkiomen Creek Headwaters	2009					
13	Sacony Creek Headwaters	2010					
14	Saucon Creek Watershed	1991	2006				
15	Trout/Bertsch Creeks Watershed + Lehigh River Subbasin 1	1995	2006				

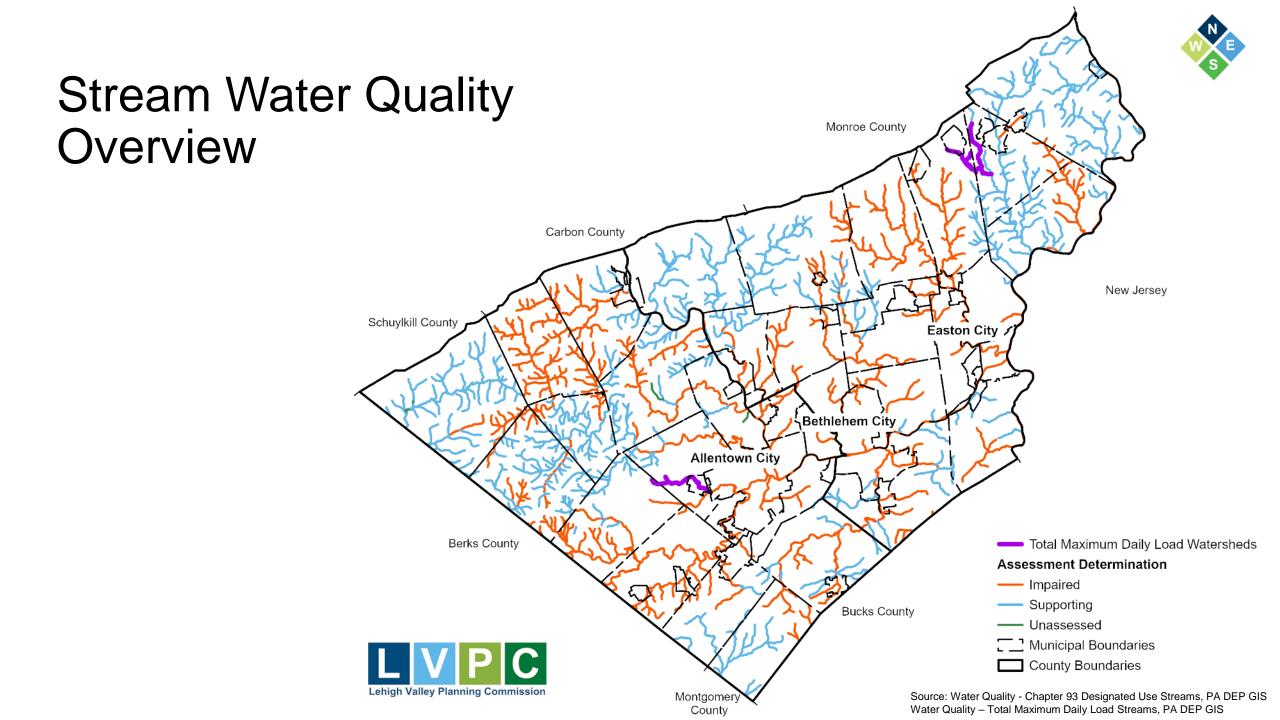








Stream Water Quality Overview









# Challenges









Pennsylvania Post-Construction Stormwater Management
(PCSM) Manual

Pennsylvania Department of Environmental Protection
400 Market Street, P.O. Box 8774
Harrisburg, PA 17105-8774

www.dep.pa.gov







### **Lessons Learned So Far**



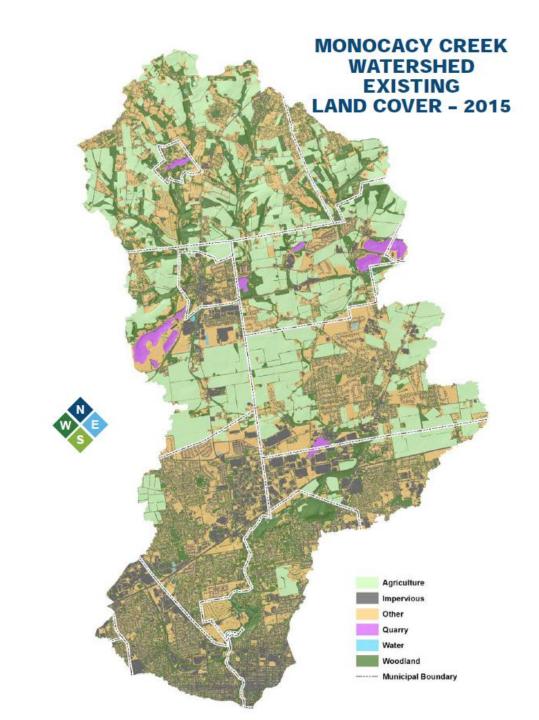
Acknowledge Municipal Differences



Understand & Respect Perspectives



Consensus Building Critical



# Next steps.....





**Modeling** 

Ordinance Revisions

Plan Updates

**County Adoption** 

**DEP Review** 

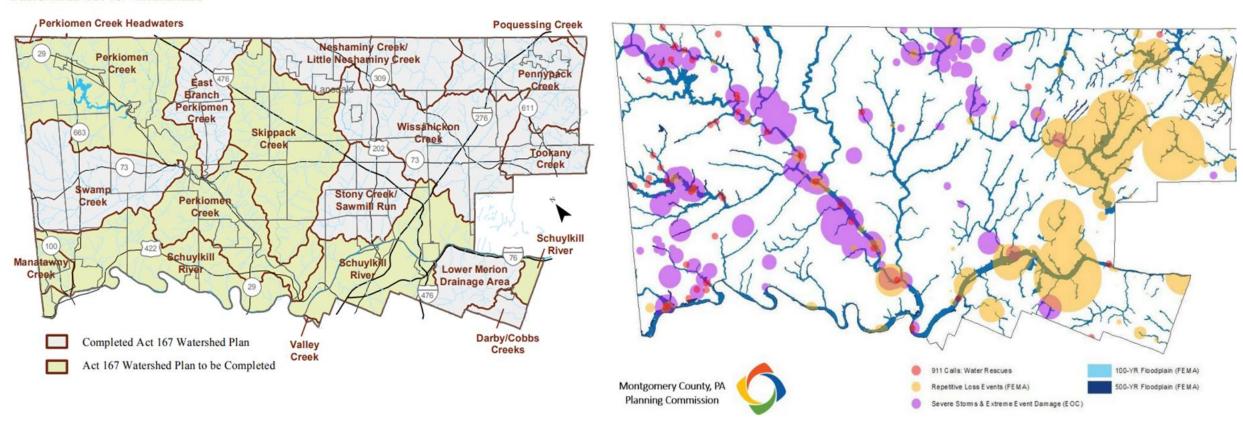
Municipal Ordinance Adoption

**Implement** 

https://lvpc.org/natural -%2B-water-resources

### **Montgomery County Context**

#### DESIGNATED ACT 167 WATERSHEDS



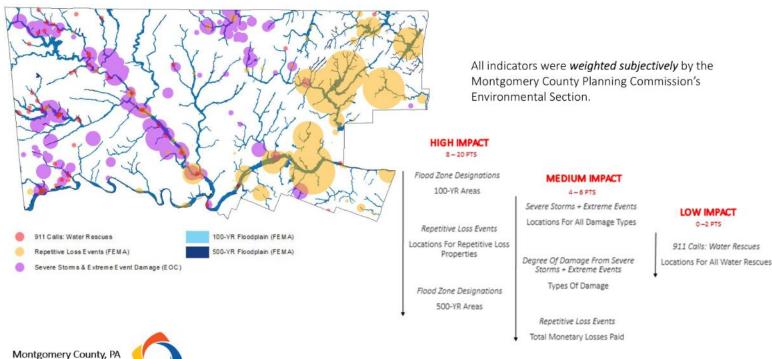
### Opportunistic

- Model ordinances
- Guidebooks
- Events
- Linking climate change
- Watershed planning



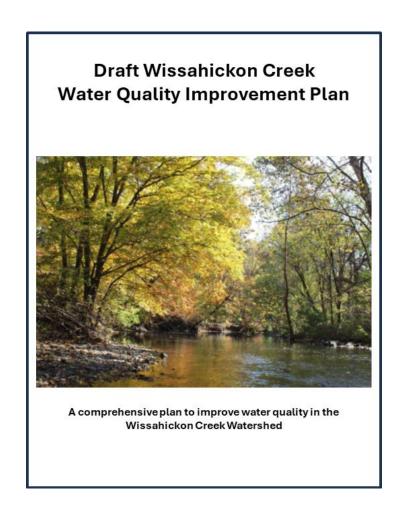
#### FLOOD RISK DATA INPUTS

Planning Commission

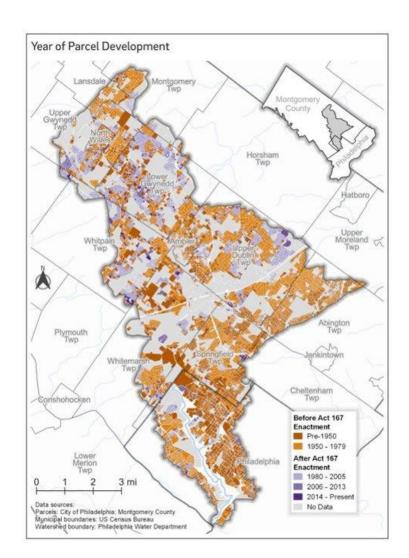


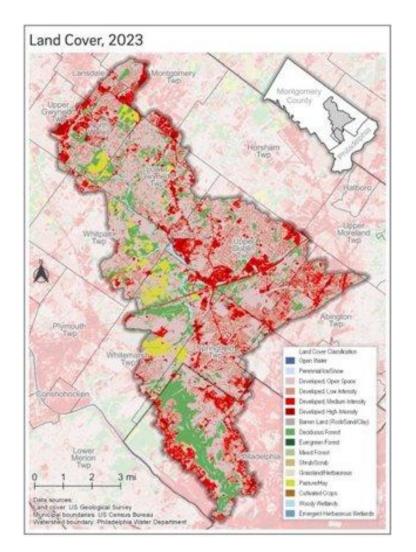
## Wissahickon Watershed Water Quality Improvement Plan

- A "TMDL Alternative" to Phosphorus
- The Wissahickon Watershed Clean Water Partnership was formed in 2014
  - Goal to "improve water quality conditions in the Wissahickon Creek watershed through implementation of an adaptive management approach to controlling stormwater flow rates and volumes"
- Developed the Wissahickon Watershed Water Quality Improvement Plan

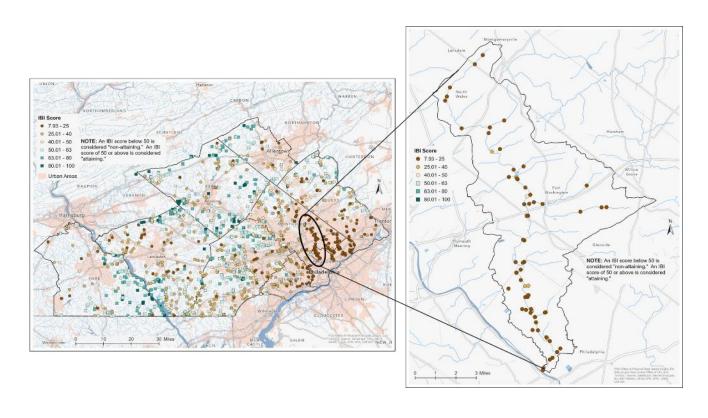


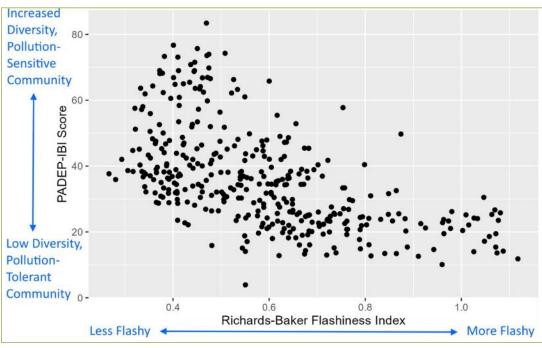
### Phosphorus or watershed characteristics?





## Addressing the issue with science





# How to make change?



How do we pay for it? How do we share credit for the work? Consortium Agreement is currently being drafted while the regulators review the WQIP

### Montgomery County Stormwater Management Plan

- ARPA funding
- Countywide Stormwater Management Plan
  - Review of existing plans and ordinances
  - Identify and Evaluate significant county level stormwater issues
  - Consider changes in frequency & intensity of rainfall
  - Consider changes in regulatory requirements
  - Provide planning-level mitigation solutions & recommendations
- Coordinate with Municipalities and other Stakeholders
- Gather information that may be used in future Act 167 Planning efforts

### Montgomery County Stormwater Management Plan



MCPC HRG

### Montgomery County Stormwater Management Plan

#### **CONCEPTUAL MITIGATION SOLUTION (NO-2)**

MUNICIPALITY OF NORRISTOWN

#### GENERAL INFORMATION

Ownership: Problem Type:

Responsible Entity: Municipality of Norristown Watershed: Plymouth Creek-Schuvlkill

Priority Level: Project Type: Green Infrastructure.

Regional Collaboration, Basin Retrofit

#### PROBLEM AREA DESCRIPTIVE LOCATION

Latitude: 40.11162807 Longitude: -75.33902319

The problem area is located along E Lafayette Street in Norristown, PA.

#### PROBLEM AREA ISSUE

The existing storm sewer system struggles to handle runoff from frequent rainfall events, leading to localized flooding and ponding that affect both residents and commuters. The area's proximity to the Schuylkill River and its flat topography exacerbate these issues, as stormwater has limited pathways for efficient drainage. Additionally, the lack of green/open spaces and permeable surfaces accelerate runoff accumulation. overwhelming the existing system's capacity. These conditions not only pose safety hazards but also strain municipal resources due to the need for frequent maintenance and emergency

#### PROBLEM AREA PHOTO



Photo 1: Looking towards Lafayette Street, several outfalls can be seen partially submerged in low flow conditions.

#### CONCEPT MITIGATION SOLUTIONS

Concept 1: Installation of Green Stormwater Infrastructure (GSI). GSI effectively reduces flooding from small to moderate rainfall events (1-2 inches) by capturing and infiltrating stormwater on-site. When combined with conventional infrastructure (e.g., pipes, culverts, bridges). GSI can also help manage larger storm events. Examples include rain gardens. bioswales, permeable pavement, and green roofs, all of which reduce runoff volume and ease pressure on storm drains. The contributory drainage area is approximately 2,800 acres, with approximately 750 acres of impervious surface. Installing GSI throughout this drainage area will help alleviate flooding from frequent storm events by reducing runoff at the source.

Concept 2: A regional approach to stormwater management, supported by inter-municipal collaboration, offers significant advantages by managing stormwater at the watershed scale rather than within the limits of the Township alone (see drainage area map in Appendix X). This comprehensive perspective enables the development and implementation of more effective, integrated strategies for stormwater capture, infiltration, and treatment. Through coordinated planning, municipalities can strategically site large stormwater management facilities, green infrastructure, and other BMPs to reduce runoff volume, slow peak flows, and enhance groundwater recharge across the entire watershed. This coordinated effort can substantially reduce both stream flooding (by managing regional hydrologic response) and localized flooding (by improving local drainage and infiltration) in a consistent and unified manner. Implementing a regional and collaborative stormwater management framework presents a viable pathway toward more sustainable, resilient, and long-term solutions to flooding and water quality challenges.



Concept 3: Upstream Basin Retrofits. New developments are required to follow current stormwater management regulations and practices and some of these practices can be applied to existing stormwater basins via retrofits to improve rate and volume control within watersheds. Modifications to the basins can include providing supplemental plantings and modifying the operation and maintenance schedules to accommodate more naturalized basin bottoms. In addition, basin outlet structures can be modified where appropriate to provide better rate and volume control to provide larger watershed-scale improvements to alleviate downstream runoff issues to a certain extent.

	Impacts		Opinion of	Regional Interconnectivity			
Concept #	Site <sup>1</sup>	Permitting	Probable Construction Costs <sup>2</sup>	Localized Benefit	Regional Benefit	Upstream Collaboration	Downstream Benefits
Concept 1	±750 AC	PADEP Chapter 102	\$226,000,000- \$340,000,000 3	Yes	Yes	No	Yes
Concept 2	Regional Approach/ Collaboration	Varies depending on proposed regional strategies/facilities	Varies depending on proposed regional strategies/facilities	Yes	Yes	Yes	Yes
Concept 3	Upstream Basins (TBD)	PADEP Chapter 102	Varies depending on proposed basin modifications	Yes	Yes	Yes	Yes

- Downstream impacts resulting from the proposed concept were not evaluated in this study; further assessment is needed to evaluate any resulting changes.
- 2 Planning-Level Estimate provided, Detailed Costs should be evaluated in subsequent engineering design phases
- Oosts assume full treatment of impervious areas to manage the 1.5" rainfall event, based on average unit costs from references to the Philadelphia Water Department's GSI projects. A feasibility study is recommended to assess opportunities for scaling down from full buildout while still meeting runoff reduction goals.

### Perkiomen Watershed Mapping & Flood Study

Funded through \$1,000,000 grant thru Senator Joe Webster's Office

#### **PROJECT OBJECTIVES**

#### **DESIRED OUTCOME**

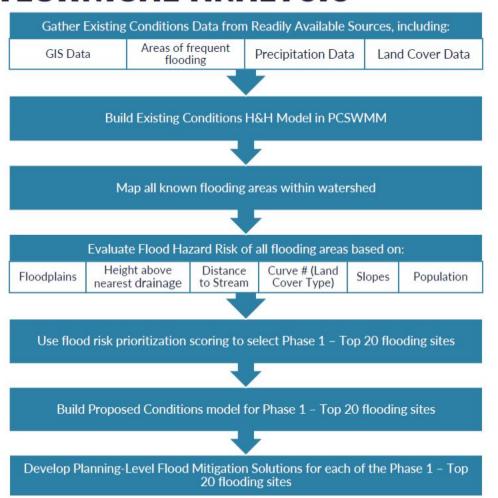
- Identify, document, and prioritize flooding issues in the full watershed
- Develop planning-level solutions for 20 Phase 1 severe flooding areas
- Identify planning level mitigation strategies
- Develop an implementation strategy
- Complete 1 demonstration project
- Coordinate with 55 municipalities, 3 other counties
- Achieve Stakeholder support
- Increase Public awareness & support



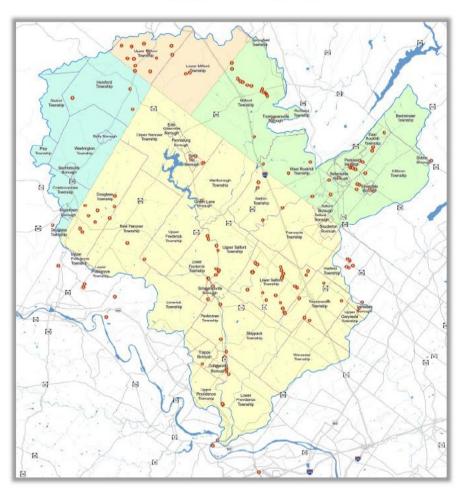


# Perkiomen Watershed Mapping & Flood Study

#### **TECHNICAL ANALYSIS**



#### **Known Flooding Areas**



### Perkiomen Watershed Mapping & Flood Study

#### **DEMONSTRATION PROJECT # 1**

Grassland Buffer

REIFF PARK PHASE 2: FLOODPLAIN RECONNECTION, LOWER SALFORD TOWNSHIP

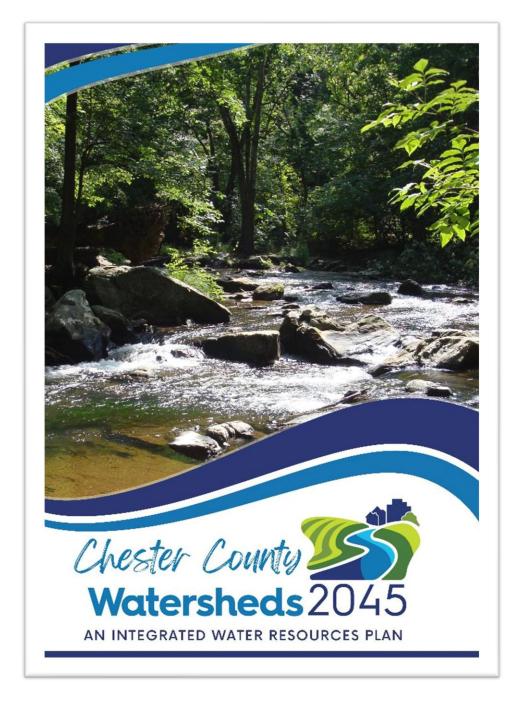




### CHESTER COUNTY'S ACT 167 STORMWATER MANAGEMENT PLANNING

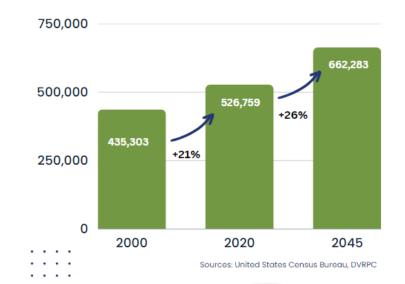
- Integrated into County-wide integrated water resources plan, Watersheds 2045
  - Adopted in January 2024
  - Includes the 2022 Chester County Model Stormwater Ordinance





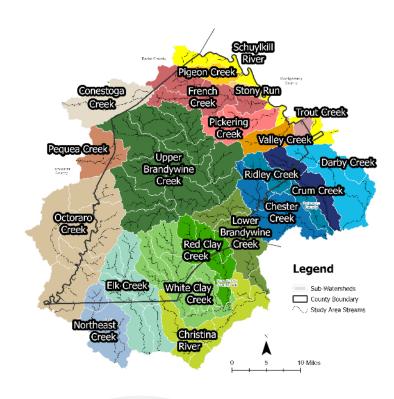
### WHAT'S HAPPENING IN CHESCO

# POPULATION GROWTH IN CHESTER COUNTY



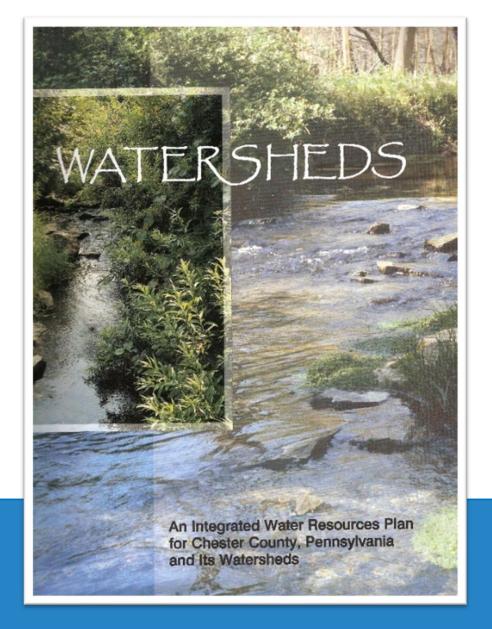


AVERAGE ANNUAL PRECIPITATION IN PA HAS INCREASED 5-10% OVER THE PAST CENTURY





PRECIPITATION FROM EXTREMELY HEAVY STORMS IN THE NORTHEAST HAS INCREASED 70% SINCE 1958





#### 2000+ ag BMPs installed



42,000+ acres preserved



Water quality increases & delistings

## WHY NOW FOR CHESCO?

COUNTY-WIDE ACT 167 STORMWATER MANAGEMENT PLAN ADDENDUM

to

Watersheds
An Integrated Water Resources Plan for Chester County, PA and Its Watersheds

March 27, 2013

Adopted March 27, 2013
Chester County Board of Commissioners
Ryan Costello
Kathi Cozzone
Terence Farrell

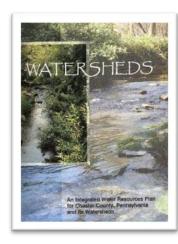
Approved July 2, 2013

Pennsylvania Department of Environmental Protection
Harrisburg, PA

# Building on a legacy

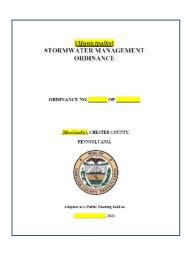
Watersheds: An Integrated Water Resources Plan for Chester County (2002)

## From the beginning...









Original Watersheds plan released (2002)

Darby-Cobb Creek Act 167 Plan (2005)

Crum Creek Act 167 Plan (2012)

New PA Model Ordinance (2018)

ChesCo Model Ordinance adopted (2022)

Chester Creek Act 167 Plan (2003)

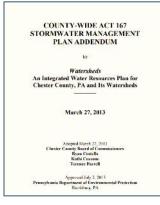
Valley Creek Act 167 Plan (2011)

County-wide Act 167 plan adopted (2013)

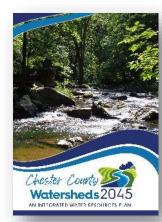
**WPAC** preliminary convening (2019)







Watersheds 2045 plan adopted (2024)



### PLANNING INPUTS

### **Current Conditions**

- Existing land use & trends
- Pollutant loadings (modeled)
- Water quality & quantity data (monitored)

### **Future Conditions**

- Down-scaled climate projections
- Population change projections
- Pollutant loading change estimates

### Stakeholder Input

- Public meetings, surveys, & comment solicitation
- Key stakeholder listening sessions
- WPAC engagement
- Multi-sector, multidisciplinary steering committee



### WATERSHEDS 2045 PLAN GOALS









ENGAGE AND EDUCATE INDIVIDUALS, COMMUNITIES, BUSINESSES, & GOVERNMENTS

EXPAND WATER-BASED RECREATIONAL OPPORTUNITIES & ACCESS TO LOCAL WATER FEATURES CONSERVE &
PROTECT THE
COUNTY'S NATURAL
RESOURCES FOR
CLEAN WATER

IMPROVE
SURFACE WATER
& GROUNDWATER
QUALITY







REDUCE STORMWATER
RUNOFF & MITIGATE
THE IMPACTS OF
FLOODING

INTEGRATE WATER
RESOURCES, NATURAL
RESOURCES
PROTECTION, & LAND
USE PLANNING

ENSURE SAFE,
SUSTAINABLE WATER
SUPPLY & WASTEWATER
DISPOSAL

# NEW PADEP ACT 167 FUNDING FOR COUNTY-LEVEL PLANNING



#### Storm event analysis

**COMPLETED** – updated localized projections including climate change scenarios through 2100



County-wide public flood mapping tool

IN PROGRESS – building on the Brandywine Flood Study mapping tool to expand public sourcing of flood problems



Stormwater infrastructure GIS data repository

IN PROGRESS – compiling municipal stormwater infrastructure mapping into a central repository (voluntary program)



Hydraulic/hydrologic studies for priority watersheds

**COMING SOON** – similar to Brandywine Flood Study, prioritization criteria to be determined

## COUNTY-WIDE PLAN, LOCAL-LEVEL IMPLEMENTATION

#### Actions Municipalities Can Take

- Evaluate if your local policies meet your water management goals
- Identify local flooding hotspots and potential mitigation strategies
- Prioritize waterways and their adjacent lands for protection and preservation
- Collaborate across jurisdictional boundaries and sectors for bigger solutions

#### Resources Municipalities Can Use

- Get context around local water resource challenges
- Identify potential project partners
- Use content to educate residents and community members
- Reference this plan in grant applications for funding
- Participate in future reviews & updates





## **Funding Availability**

- Under Section 17 of Act 167, DEP is authorized to award grants to municipalities and counties for reimbursement of costs associated with the development and updating of Act 167 Plans when funds are appropriated by the General Assembly for this purpose.
- When funding is available, grant awards are limited so that the total of State and Federal grants to the municipality or county does not exceed 75% of the allowable costs.
- Current funding for Act 167 Plan development and revision is through the "Clean Streams Fund"
  - The Act 167 Program receives 4% from the Clean Streams Fund (FY 2023-2024 = \$2M)
  - Development or update of an Act 167 Plan is a two-phased process, so funding is also awarded in multiple phases.



## **Funding Availability**

### Ph 1 – Scope of Study

- Phase 1: determination of level of effort and cost that will be required to satisfactorily develop or update an Act 167 Plan (25 Pa. Code § 111.14)
- Funding Eligibility: \$40,000 \$60,000; 25% match requirement
- How to Apply: eGrants application (Instructions included in Growing Greener Plus grant guidance)

# Ph 2 – Act 167 Plan Development or Update

- Phase 2: Act 167 Plan development or update; must include all required components listed in Section 5 of Act 167
- Funding Eligibility: Funding is dependent on costs identified in the approved Phase 1 and funding availability; 25% match required
- How to Apply: eGrants application (Application timeline varies)

# Municipal Reimbursements

- Municipal Reimbursement:
   reimbursement for eligible
   expenses incurred while
   participating in Plan development
   and adopting the county ordinance
- Funding Eligibility: 75% of eligible expenses, up to \$10,000 per municipality
- How to Apply: Municipal
   Reimbursement Form (available on
   DEP Act 167 website)



### **More Information**

- Storm Water Management Act (Act of Oct. 4, 1978, p.l. 864, no. 167)
  - Section 5: Required Components of an Act 167 Plan
  - Section 17: Funding
- 25 Pa. Code Ch 111. Stormwater
   Mangement Grants and Reimbursement
  - § 111.14. Phase I scope of study requirements
  - § 111.21 24 Municipal reimbursements

#### PADEP Act 167 Website

- Act 167 FAQ
- Act 167 Status list (approved plans with date)
- Act 167 Status map
- Current Act 167 Plans (Monroe County)
- Grant information



### **Get In Touch**

Jamie Eberl P.E.
Bureau of Clean Water / NPDES Permitting
RCSOB, 400 Market St
Harrisburg, PA 17101

(717) 787-5017/ jeberl@pa.gov

The Department of Environmental Protection's mission is to protect Pennsylvania's air, land and water resources and to provide for the health and safety of its residents and visitors, consistent with the rights and duties established under the Environmental Rights Amendment (Article 1, Section 27 of the Pennsylvania Constitution).



# Questions?