



# MS4 Program Management Pollutant Reduction Plans (PRPs)

Southwest Pennsylvania Commission (SPC)  
North Huntingdon Municipal Building  
Irwin, PA 15642  
January 18, 2017



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Senior MS4 Program Manager/Analyst

# Agenda

Introduction, Background, and Preliminary Considerations

Pollutant Reduction Plans (PRPs) and Pollutant Control Measures (PCMs)

Implementation

Additional Considerations

Questions and Discussion



Pollutant Reduction Plans (PRPs)

# Introduction & Background

Municipal  
Separate  
Storm  
Sewer  
System



# Clean Water Act – It's about the streams

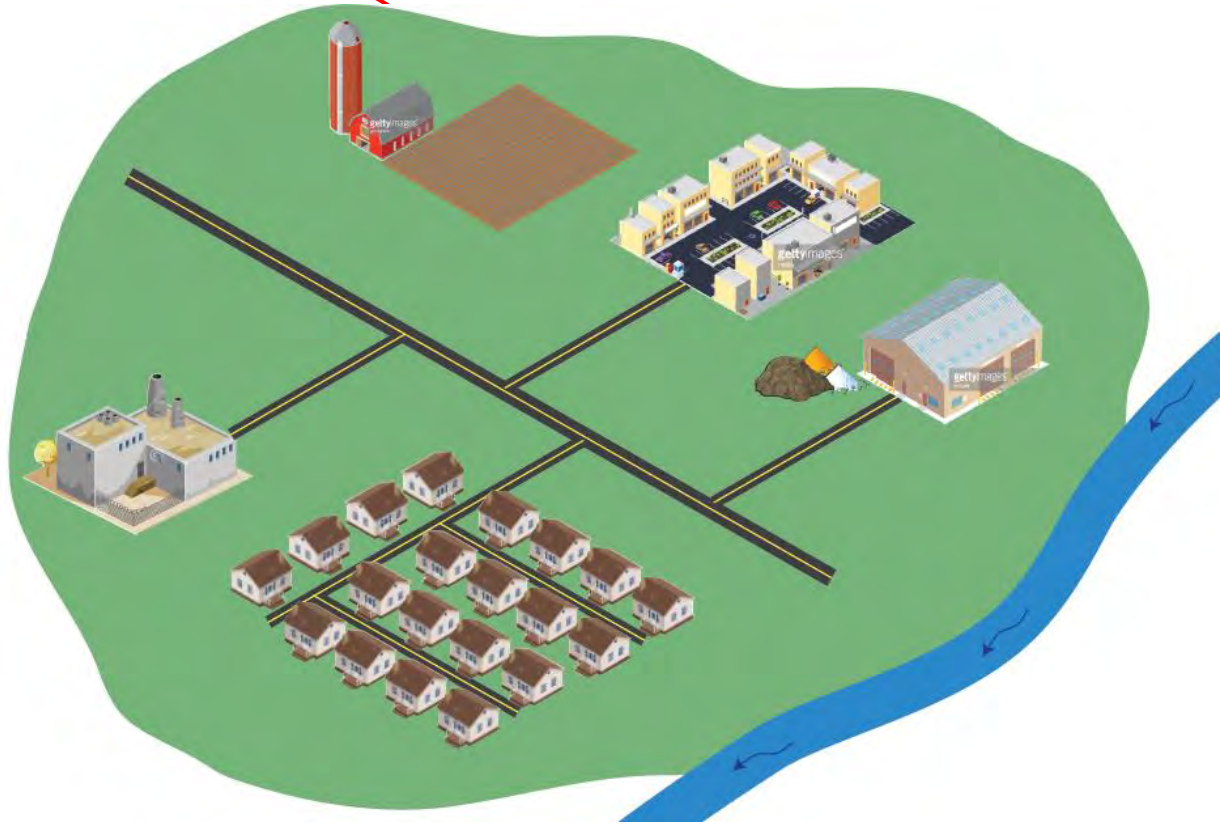
Primary purpose of the CWA:

- Protect the beneficial uses of surface waters (recreational, drinking supply, habitat, etc.)

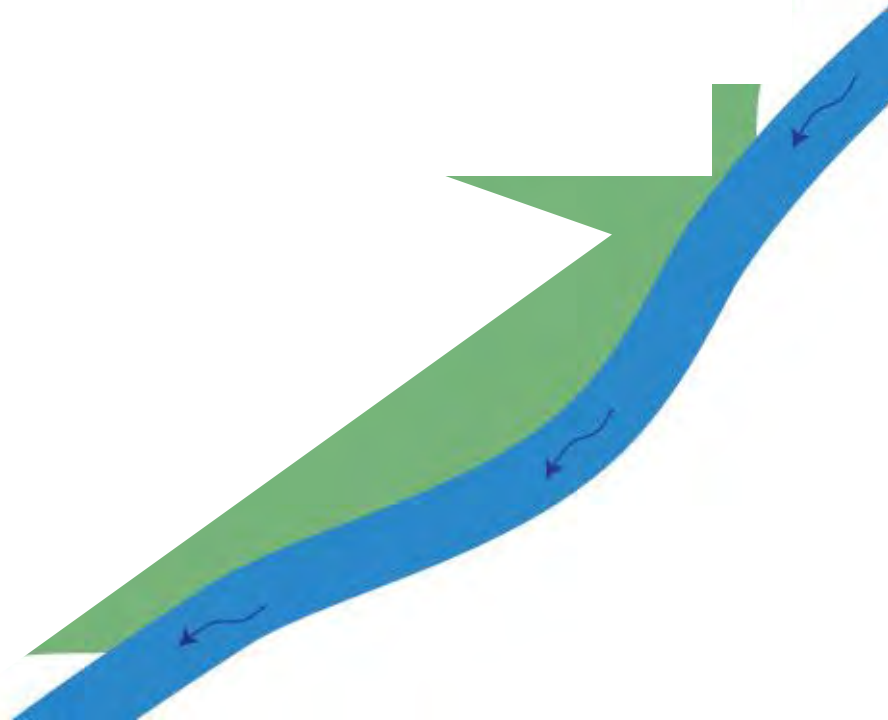
The primary pollution **control** strategy for point sources is the National Pollutant Discharge Elimination System (NPDES)



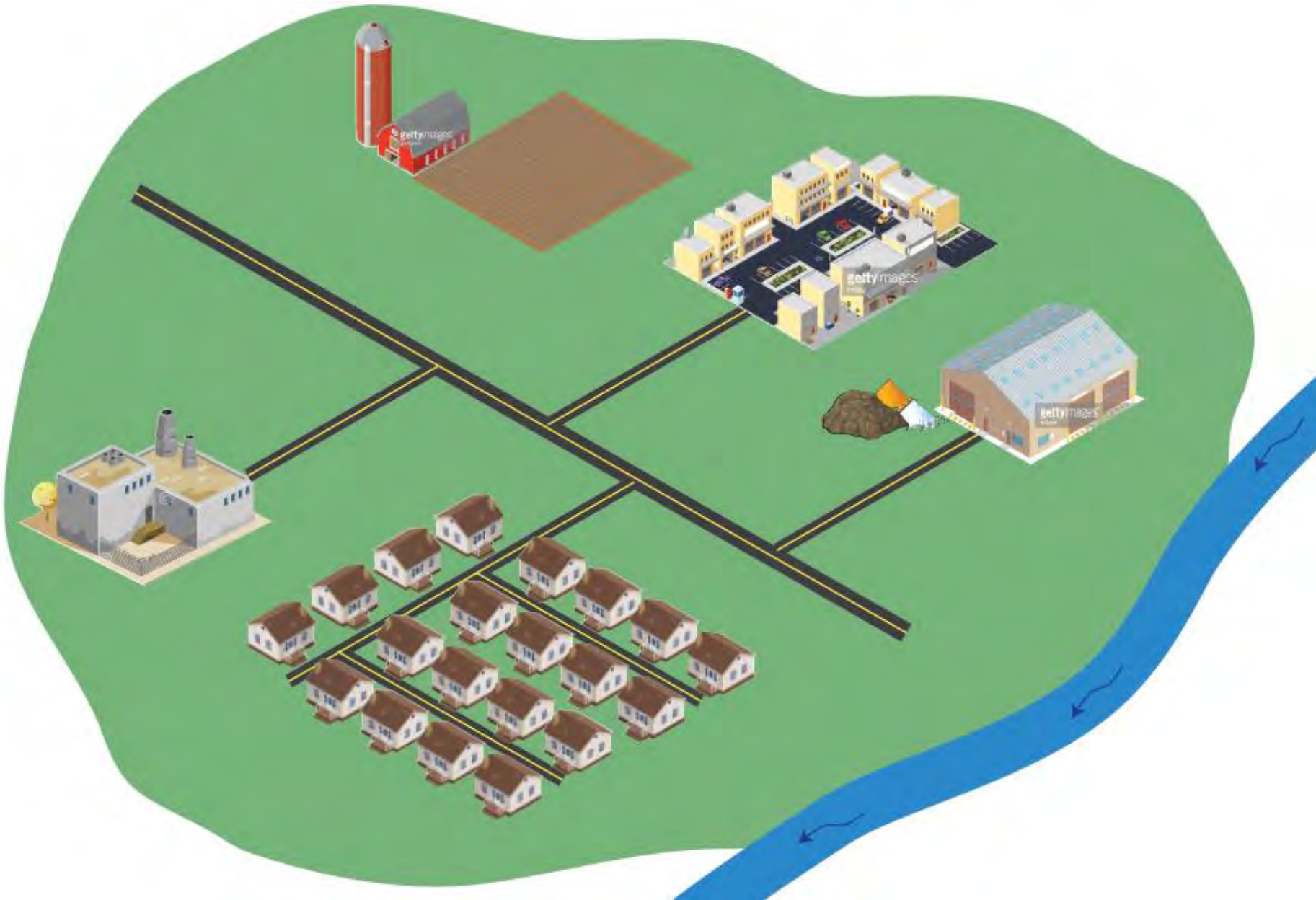
# “Hometown, USA”



# Clean Water Act – “It’s about the streams”

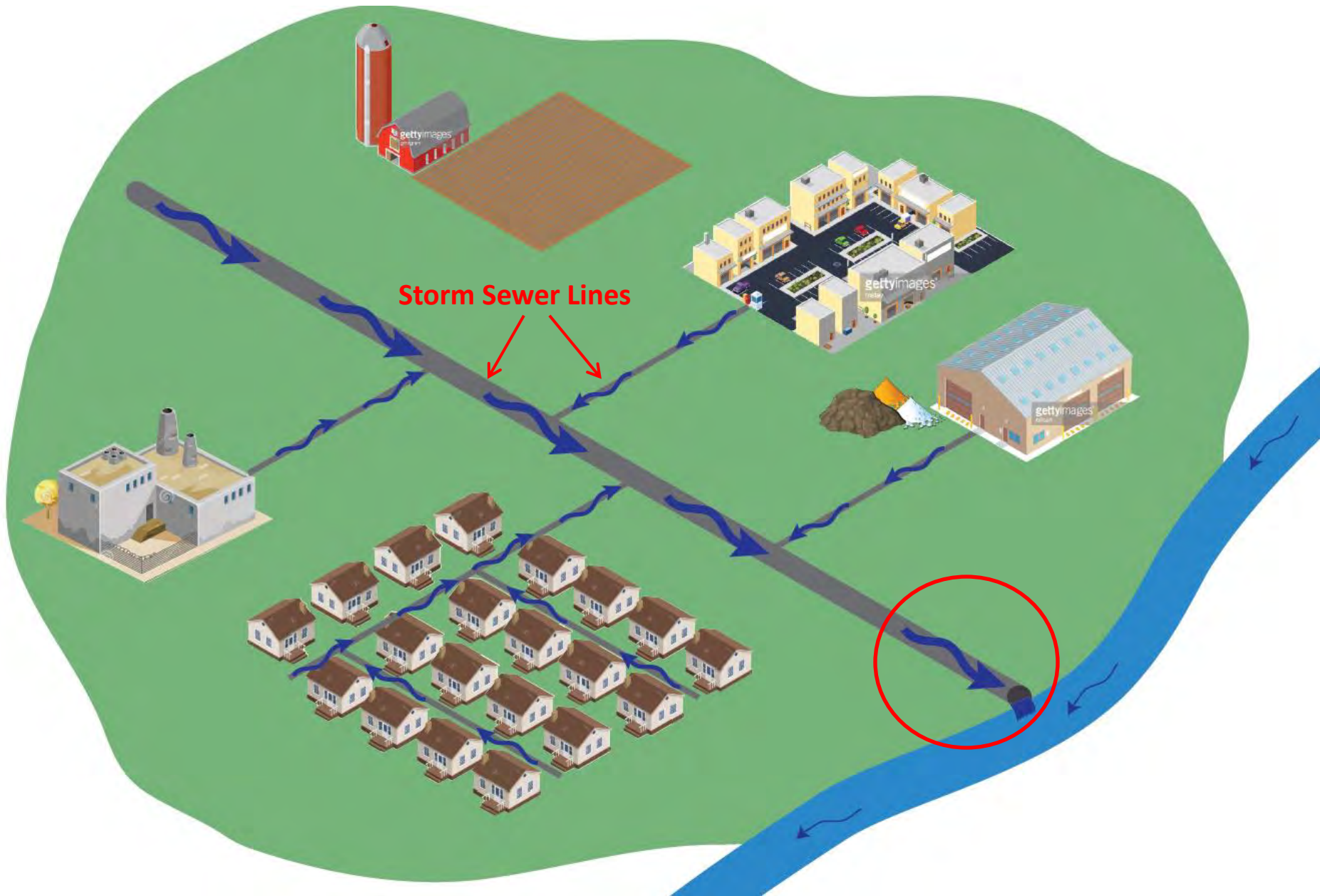


# “Hometown, USA”

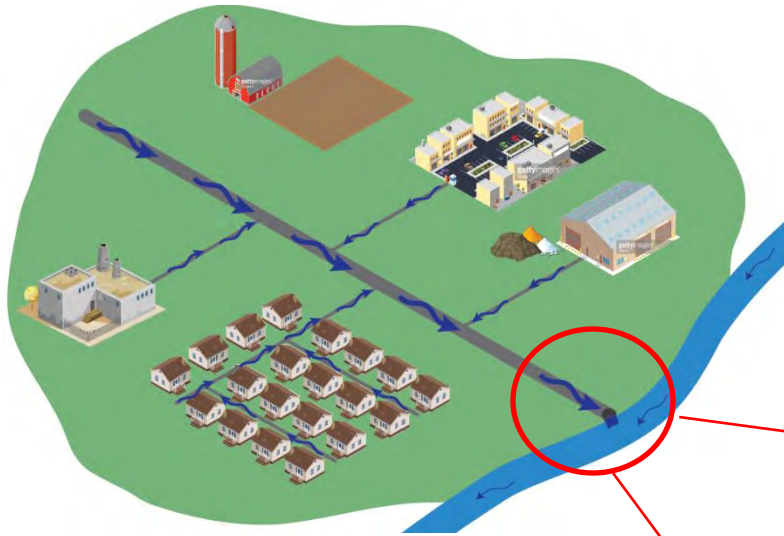




# “Hometown, USA” – Storm Sewer (or Storm Drain)



# “Hometown, USA” – MS4

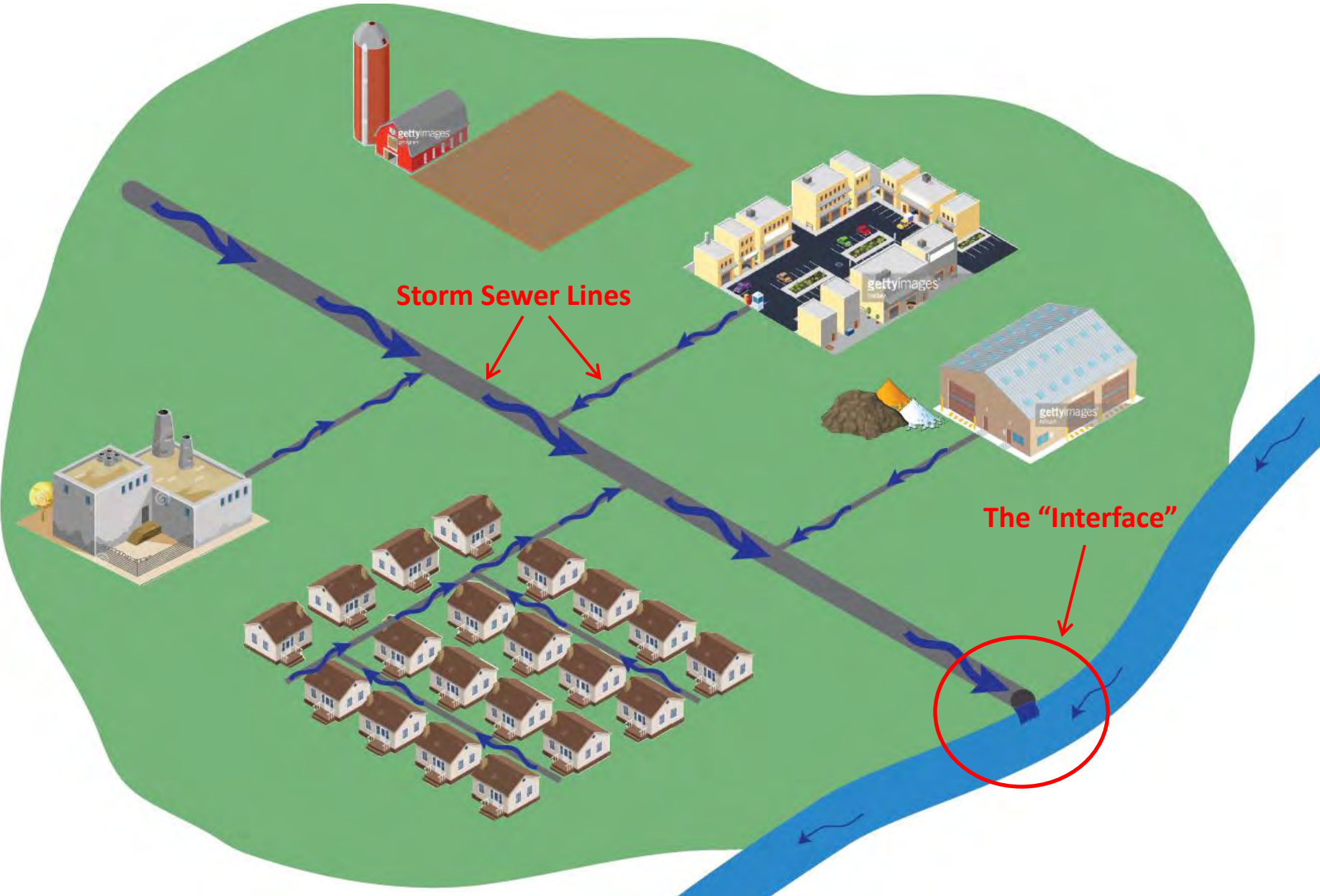


MS4 = Municipal Separate Storm Sewer System  
It is an “open” system

MS4 collects stormwater (or other run-off) and returns to the water cycle via direct discharge to a waterway.



# “Hometown, USA” – Storm Sewer (or Storm Drain)



# The Interface - Outfall 101

An **outfall** is the discharge point of a waste stream into a body of water

**WWTP Outfall**



**MS4 Outfall**



# Outfall 201 (for MS4 Permits)

The point where a conveyance or system of conveyances that disposes stormwater that are owned or operated by a municipality; and is **designed or used for collecting or conveying storm water** to a defined and discernible point from which pollutants are or may be discharged—and that discharges to Waters of the United States/Surface Waters of the Commonwealth—is an ***Outfall***.

**Outfall**



**Not an outfall**



# Primary MS4 Permit Requirement

## Authorization to Discharge

- “2013 PAG-13” – Limitations on Coverage (part 2.j)
- “2018 PAG-13 (draft)” – Discharges Not Authorized (item 6)

**“The discharge is not, or will not, result in compliance with an applicable effluent limitation or water quality standard.”**

The operator must, at a minimum, develop, implement, and enforce a SWMP designed to reduce the discharge of pollutants from the MS4:

- to the maximum extent practicable (MEP),
- to protect water quality, and
- to satisfy the appropriate water quality requirements of the Clean Water Act. [40 CFR 122.34(a)]

# “Additional” PADEP MS4 Permit Requirements

## ----Stream Impairments----

- Total Maximum Daily Load (TMDL)
  - With applicable WLAs
- Metals and/or pH (AMD) PCMs – Appendix A
- Pathogens PCMs – Appendix B
- Priority Organic Compounds PCMs – Appendix C
- Nutrients and Sediment PRP
  - CBPRP – Appendix D
  - General – Appendix E

## *Acronyms*

-AMD	Acid Mine Drainage
-CBPRP	Chesapeake Bay Pollutant Reduction Plan
-PCMs	Pollutant Control Measures
-PRP	Pollutant Reduction Plan
-WLA	Waste Load Allocation

## *Notes*

- Priority Organic Compounds covers a variety of parameters including PCBs and pesticides.
- Nutrients are a general reference to Phosphorus and Nitrogen



# USEPA Expectations for an MS4 Permit Program

Stormwater Management for Small MS4s...are the following addressed?

- Applicability
- Limitations on Coverage
- Discharges to Water Quality Impaired Waters
- Stormwater Management Program (SWMP)
- Public Education and Outreach (MCM 1)
- Public Involvement/Participation (MCM 2)
- Illicit Discharge Detection & Elimination (MCM 3)
- Construction Site Stormwater Runoff Control (MCM 4)
- Post-Construction Stormwater Management in New Development and Redevelopment (MCM 5)
- Pollution Prevention/Good Housekeeping for Municipal Operations (MCM 6)
- Sharing Responsibility
- Reviewing and Updating SWMPs
- Monitoring
- Recordkeeping
- Reporting





# EPA "Protocol"

<b>11.0 Discharges to Water Quality Impaired Waters (MS4 - 3.1)</b>		
<p>The operator must comply with any more stringent effluent limitations in the permit, including permit requirements that modify, or are in addition to, the minimum control measures based on an approved total maximum daily load (TMDL) or equivalent analysis. [40 CFR 122.34(e)(1)]</p>	<p>Determine if a waterbody to which the MS4 discharges has been designated as a 303(d) listed water or a TMDL has been developed for the waterbody.</p> <p>If discharging to an impaired water, verify the SWMP discusses:</p> <ul style="list-style-type: none"><li>• How discharges of pollutants of concern will be controlled</li><li>• How the operator will ensure discharges will not cause or contribute to exceedances of water quality standards</li><li>• Measures and BMPs that will control these discharges</li></ul> <p>If a TMDL has been developed for</p>	<p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>

# 303(d) list

**2014 Pennsylvania Integrated Water Quality Monitoring and Assessment Report - Streams, Category 5 Waterbodies, Pollutants Requiring a TMDL**

<i>Stream Name</i>				
<small>HUC</small>				
<b>Use Assessed (Assessment ID) - Miles</b>	<b>Source</b>	<b>Cause</b>	<b>Date Listed</b>	<b>TMDL Date</b>
<b>Hydrologic Unit Code: 02040104-Middle Delaware</b>				
<b><u>Brodhead Creek</u></b>				
<small>HUC: 02040104</small>				
Recreational (17516) - 3.65 miles	Source Unknown	Pathogens	2014	2027
<b><u>Brodhead Creek Unnamed To (ID:26141298)</u></b>				
<small>HUC: 02040104</small>				
Aquatic Life (10754) - 2.86 miles	Package Plants	Organic Enrichment/Low D.O.	2002	2015
		Suspended Solids	2002	2015
<b><u>Brodhead Creek Unnamed To (ID:26175212)</u></b>				
<small>HUC: 02040104</small>				
Recreational (17516) - 0.24 miles	Source Unknown	Pathogens	2014	2027

# 303(d) lists - categories

Category 1: All Uses Attained

Category 2: At least One Use Attained

Category 3: Unassessed

Category 4a: Impaired for One or More Designated Uses; TMDL Complete

Category 4b: Impaired for One or More Designated Uses; expected to meet designated uses in a reasonable amount of time; TMDL Not Needed

Category 4c: Impaired for One or More Designated Uses; Pollution Impairments; TMDL Not Needed

Category 5: Impaired for One or More Designated Uses by any Pollutant; TMDL Required

# Stormwater Management Program (SWMP)

The SWMP is the programmatic document for managing the MS4 Permit and the quality of discharges....addresses and outlines rationale, decision processes, and so on.

## STORMWATER MANAGEMENT PROGRAM (SWMP)

for

### EPHRATA BOROUGH'S MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) PERMIT

PERMIT #: PAG133627

PERMIT YEAR: February 1 to January 31

*Prepared for:*

BOROUGH OF EPHRATA  
124 SOUTH STATE STREET  
EPHRATA, PA 17522

MANAGER: D. ROBERT THOMPSON, P.E.  
PHONE: 717-738-9202

*SWMP Prepared and Submitted by:*

LANDSTUDIES, INC.  
315 NORTH STREET  
LITITZ, PA 17543

PHONE: 717-627-4440  
MICHAEL T. LASALA, CPMSM, CSI

*SWMP Preparation Date:*

September 12, 2016

# Developed elements of a SWMP

- MCM Plans (non-structural BMP focus)
  - Public Education & Outreach Plan (PEOP), Public Involvement & Participation Plan (PIPP), and so on.
  
- Impaired Waters Plan (structural BMP focus)
  - TMDL Plan(s), Pollutant Reduction Plans (PRPs), and so on.



Pollutant Reduction Plans (PRPs)

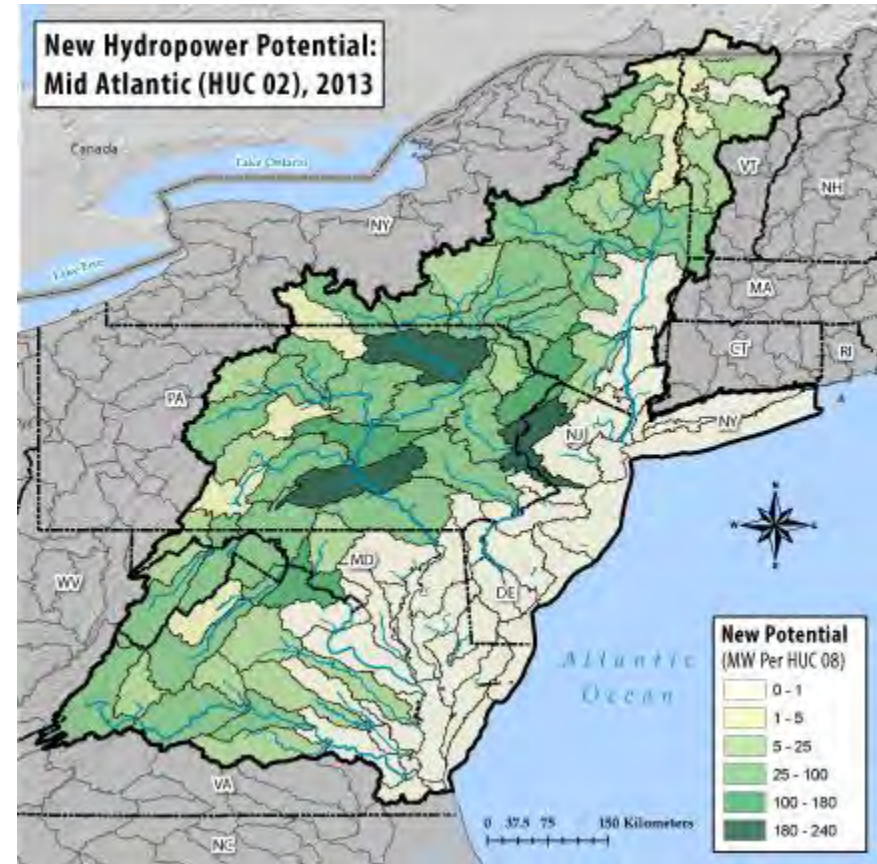
**Determining PRPs Needed**

# PADEP MS4 Requirements Table

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
<b>Montgomery County</b>						
ABINGTON TWP	PAG130012	Yes	TMDL Plan	Frankford Creek	Appendix C-PCB (4a), Appendix E-Organic Enrichment/Low D.O. (5)	Flow Alterations, Other Habitat Alterations, Water/Flow Variability (4c)
				Wissahickon Creek	Appendix E-Nutrients (4a), Appendix B-Pathogens (5)	Water/Flow Variability (4c)
				Wissahickon TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	Cause Unknown (4a)
				Pennypack Creek	Appendix B-Pathogens (4a), Appendix C-Priority Organics (4a), Appendix E-Organic Enrichment/Low D.O. (4a), Appendix E-Siltation (5)	Cause Unknown (5)
				Rockledge Branch	Appendix E-Siltation (5)	Cause Unknown (5)
				Meadow Brook	Appendix E-Siltation (5)	Cause Unknown (5)
				Robinhood Brook	Appendix E-Siltation (5)	Cause Unknown (5)
				Jenkintown Creek		Flow Alterations, Other Habitat Alterations, Water/Flow Variability (4c)
				Tacony Creek	Appendix E-Organic Enrichment/Low D.O. (5)	Flow Alterations, Other Habitat Alterations, Water/Flow Variability (4c)
				Terwood Run	Appendix E-Siltation (5)	Cause Unknown (5)
				Unnamed Tributaries to Wissahickon Creek		Flow Alterations, Other Habitat Alterations (4c)
				East Branch Jenkintown Creek		Flow Alterations, Other Habitat Alterations, Water/Flow Variability (4c)
Sandy Run	Appendix B-Pathogens (4a), Appendix E-DO/BOD, Nutrients (4a)	Other Habitat Alterations, Water/Flow Variability (4c)				
AMBLER BORO	PAG130036	Yes	TMDL Plan	Wissahickon Creek	Appendix E-Nutrients (4a), Appendix B-Pathogens (5)	Water/Flow Variability (4c)
				Wissahickon TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	Cause Unknown (4a)
				Unnamed Tributaries to Wissahickon Creek		Other Habitat Alterations (4c)
BRIDGEPORT BORO		No		Schuylkill River PCB TMDL	Appendix C-PCB (4a)	
BRYN ATHYN BORO	PAG130166	Yes	TMDL Plan	Southampton Creek TMDL	TMDL Plan-Nutrients, Organic Enrichment/Low D.O., Siltation (4a)	
				Pennypack Creek	Appendix E-Siltation (5)	Cause Unknown (5)
				Huntingdon Valley Creek	Appendix E-Siltation (5)	Cause Unknown (5)
				Southampton Creek		Flow Alterations, Other Habitat Alterations, Water/Flow Variability (4c)

# Watersheds

HUC-2 (1 <sup>st</sup> level):	Mid-Atlantic Region
HUC-4 (2 <sup>nd</sup> level):	Susquehanna River Subregion
HUC-6 (3 <sup>rd</sup> level):	Lower Susquehanna Basin
HUC-8 (4 <sup>th</sup> level):	Lower Susquehanna Subbasin
HUC-10 (5 <sup>th</sup> level):	Little Conestoga Creek
HUC-12 (6 <sup>th</sup> level):	Millers Run-Little Conestoga Creek West Branch Little Conestoga Creek-Little Conestoga Creek
HUC-10 (5 <sup>th</sup> level):	Chiques Creek
HUC-12 (6 <sup>th</sup> level):	Lower Chiques Creek





# Watersheds

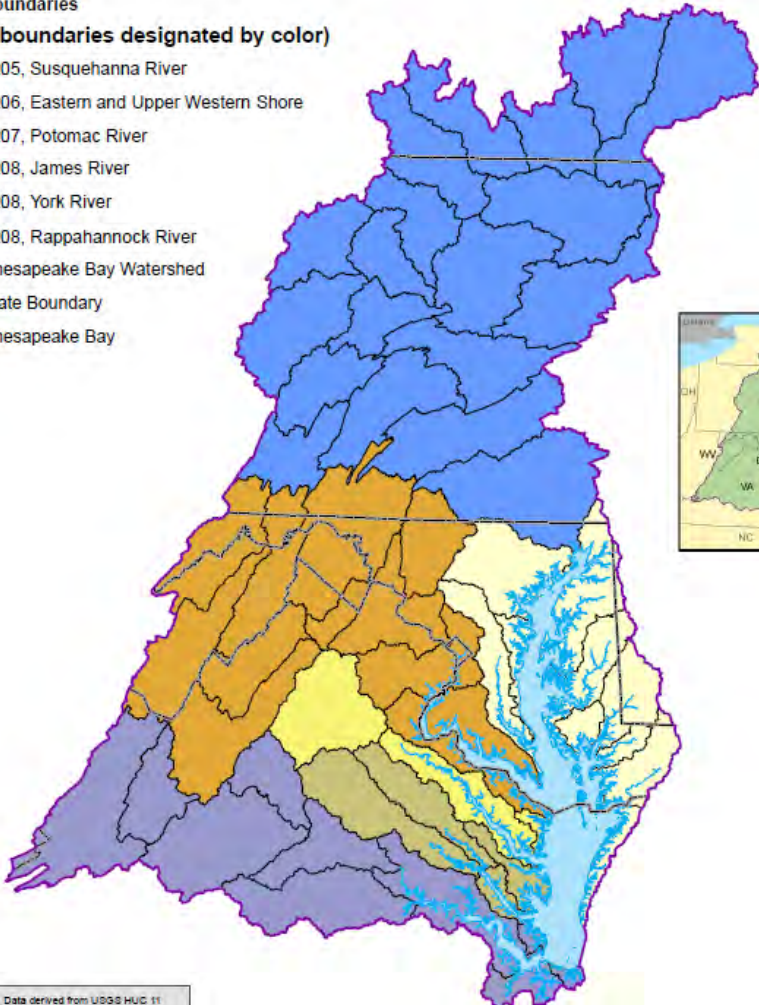
## Hydrologic Unit Boundaries - HUC 8

Chesapeake Bay Watershed

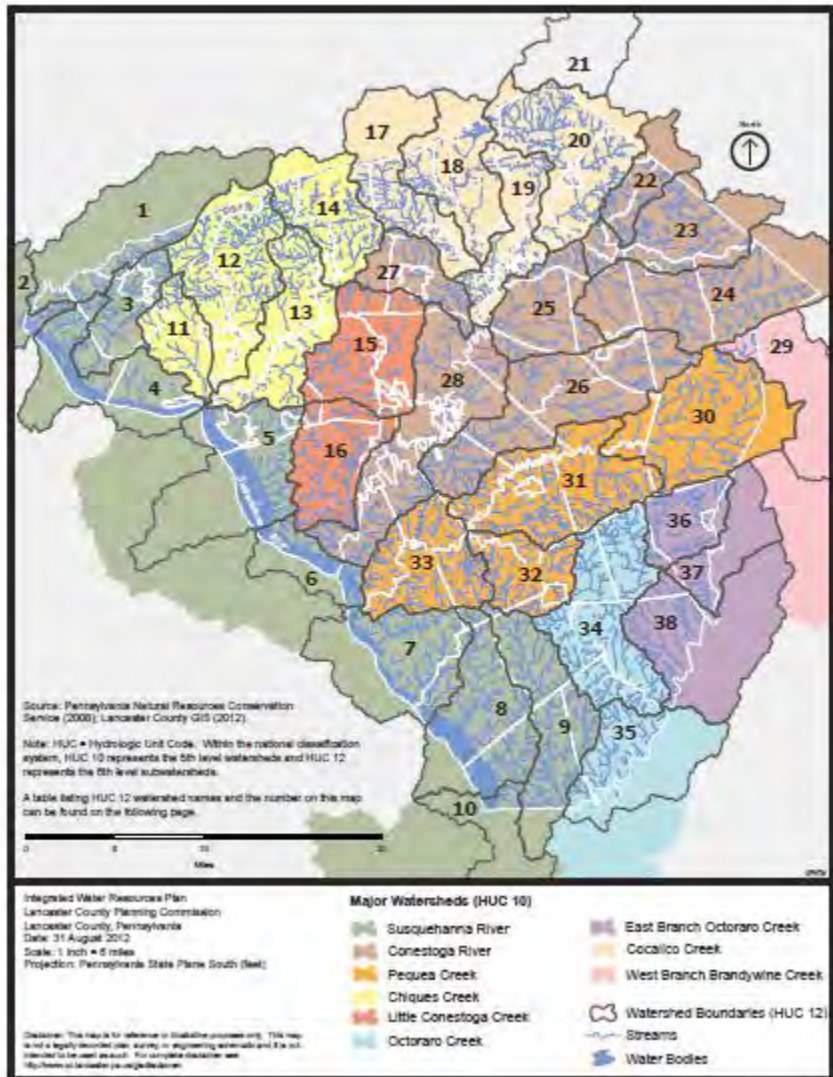


HUC 8 Boundaries  
(HUC 4 boundaries designated by color)

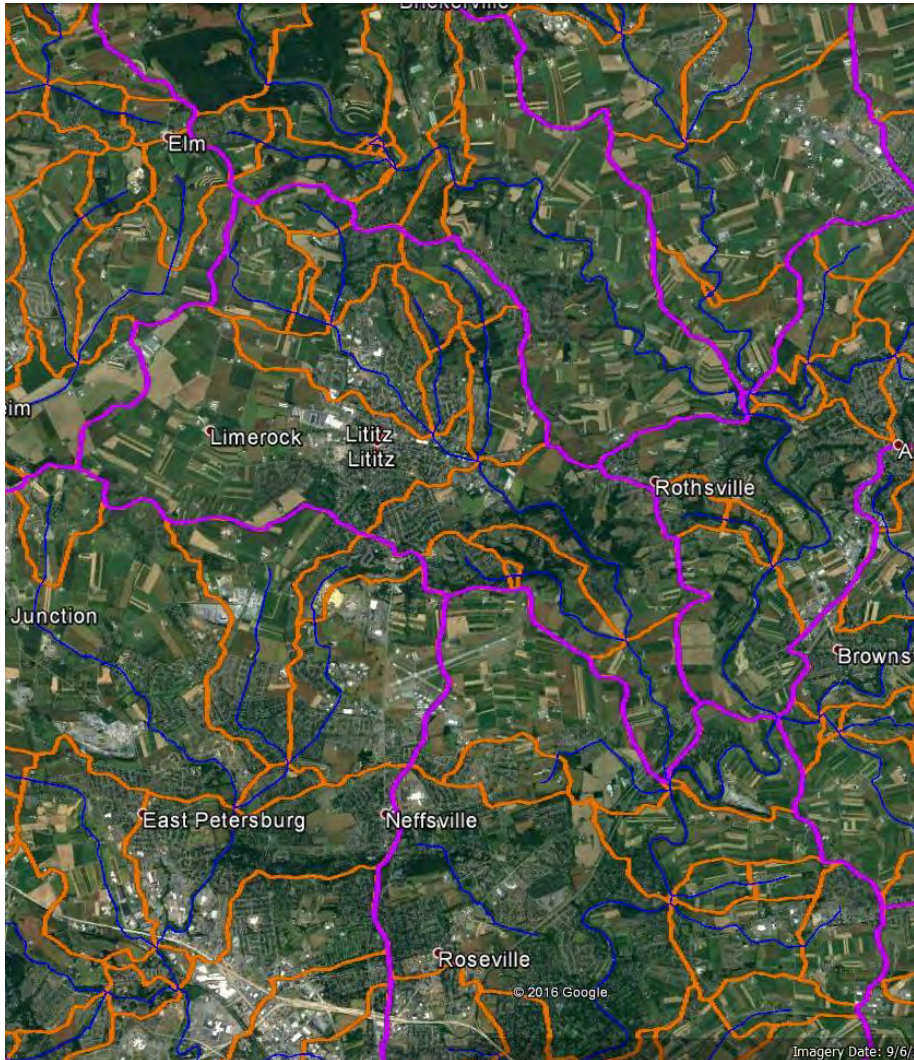
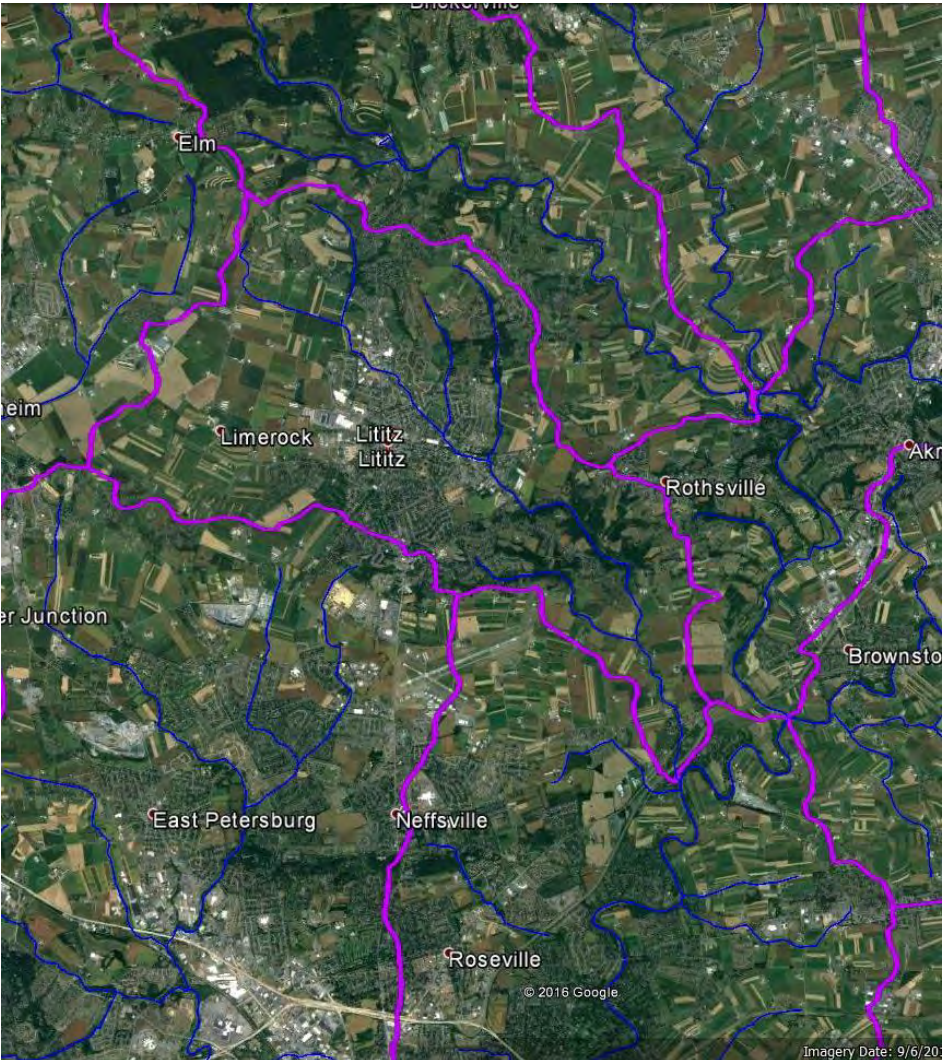
- 0205, Susquehanna River
- 0206, Eastern and Upper Western Shore
- 0207, Potomac River
- 0208, James River
- 0208, York River
- 0208, Rappahannock River
- Chesapeake Bay Watershed
- State Boundary
- Chesapeake Bay



Data Sources: Data derived from USGS HUC 11



# Catchments





# Municipal Separate Storm Sewershed (MS3)



# Drainage Area



# 303(d) list

## 2014 Pennsylvania Integrated Water Quality Monitoring and Assessment Report - Streams, Category 5 Waterbodies, Pollutants Requiring a TMDL

### Stream Name

HUC

Use Assessed (Assessment ID) - Miles

Source

Cause

Date Listed

TMDL Date

Hydrologic Unit Code: 02040104-Middle Delaware

### Brodhead Creek

HUC: 02040104

Recreational (17516) - 3.65 miles

Source Unknown

Pathogens

2014

2027

### Brodhead Creek Unnamed To (ID:26141298)

HUC: 02040104

Aquatic Life (10754) - 2.86 miles

Package Plants

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2002

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# PADEP - eMapPA

The screenshot displays the eMapPA web application interface. At the top, the browser address bar shows the URL [dep.state.pa.us/eMapPA](http://dep.state.pa.us/eMapPA). The header includes the Pennsylvania Department of Environmental Protection logo and navigation links for Tom Wolf, Governor; Patrick McDonnell, Acting Secretary; and DEP Home.

The main interface is divided into several sections:

- Left Panel:** Contains the Pennsylvania Department of Environmental Protection logo and the eMapPA title. Below this is a 'Layers' panel with a tree view of map layers. The 'eMapPA Layers' section is expanded, showing various categories such as 'Complaints', 'Federal EPA Sites', 'Regulated Facilities and Related Info', 'Areas POI - Geological', 'Areas POI - Environmental', 'Areas POI - General', 'Boundaries', 'Zip Code Points', 'DEP Regions', 'County Boundaries', 'Municipalities', 'Zip Codes', 'State House Boundaries', 'State Senate Boundaries', 'Congressional Boundaries', '7.5 Minute Quad Boundaries', 'Voting Districts', 'Census Tract 2010', 'Urban Areas 2010', and 'Urban Areas 2000'. Several layers are checked, including 'Boundaries', 'County Boundaries', 'Municipalities', 'Zip Codes', 'State House Boundaries', 'State Senate Boundaries', 'Congressional Boundaries', '7.5 Minute Quad Boundaries', 'Voting Districts', 'Census Tract 2010', 'Urban Areas 2010', and 'Urban Areas 2000'.
- Map Area:** The central map shows a street network with various colored overlays representing the selected layers. The map is titled 'eMapPA Query' and 'Advanced Query'. The 'CSRS Streets & Imagery' layer is selected, and the 'Imagery' sub-layer is active. The map shows a residential area with streets like 'Market St', 'N Cedar St', 'N Walnut St', 'N Locust St', 'N 1st St', 'N 2nd St', 'N 3rd St', 'N 4th St', 'N 5th St', 'N 6th St', 'N 7th St', 'N 8th St', 'N 9th St', 'N 10th St', 'N 11th St', 'N 12th St', 'N 13th St', 'N 14th St', 'N 15th St', 'N 16th St', 'N 17th St', 'N 18th St', 'N 19th St', 'N 20th St', 'N 21st St', 'N 22nd St', 'N 23rd St', 'N 24th St', 'N 25th St', 'N 26th St', 'N 27th St', 'N 28th St', 'N 29th St', 'N 30th St', 'N 31st St', 'N 32nd St', 'N 33rd St', 'N 34th St', 'N 35th St', 'N 36th St', 'N 37th St', 'N 38th St', 'N 39th St', 'N 40th St', 'N 41st St', 'N 42nd St', 'N 43rd St', 'N 44th St', 'N 45th St', 'N 46th St', 'N 47th St', 'N 48th St', 'N 49th St', 'N 50th St', 'N 51st St', 'N 52nd St', 'N 53rd St', 'N 54th St', 'N 55th St', 'N 56th St', 'N 57th St', 'N 58th St', 'N 59th St', 'N 60th St', 'N 61st St', 'N 62nd St', 'N 63rd St', 'N 64th St', 'N 65th St', 'N 66th St', 'N 67th St', 'N 68th St', 'N 69th St', 'N 70th St', 'N 71st St', 'N 72nd St', 'N 73rd St', 'N 74th St', 'N 75th St', 'N 76th St', 'N 77th St', 'N 78th St', 'N 79th St', 'N 80th St', 'N 81st St', 'N 82nd St', 'N 83rd St', 'N 84th St', 'N 85th St', 'N 86th St', 'N 87th St', 'N 88th St', 'N 89th St', 'N 90th St', 'N 91st St', 'N 92nd St', 'N 93rd St', 'N 94th St', 'N 95th St', 'N 96th St', 'N 97th St', 'N 98th St', 'N 99th St', 'N 100th St'. The map also shows 'Libitz' and 'Village Creek Dr'. A scale bar and the Esri logo are visible in the bottom right of the map area.
- Bottom Panel:** Contains the Windows taskbar with various application icons and the system tray showing the time as 12:41 PM on 9/27/2016.



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The screenshot displays the eMapPA web application interface. At the top, a navigation bar includes the Pennsylvania Department of Environmental Protection logo and the names of the Governor (Tom Wolf) and Acting Secretary (Patrick McDonnell). The main interface is divided into several sections:

- Left Panel (Layers):** A list of map layers with checkboxes. The "eMapPA Layers" section is expanded, showing options like "Complaints", "Federal EPA Sites", "Regulated Facilities and Related In" (with sub-options for Air, Land Reuse, Mining, Oil and Gas, Radiation, Sample Information System, Streams and Water Resources, Surface Water Related, Fish Information, Flooding Information, NHD HUC (National Hydrography)), "NHD Flowline", "NHD Areas", "NHD Waterbodies", "Hydrologic Unit Code (HL)", "Hydrologic Unit Code (HL)", "Water Monitoring", "Water Quality", "Storage Tanks", "Waste", "Water", "Areas POI - Geological", "Areas POI - Environmental", "Areas POI - General", "Boundaries", "Zip Code Points", "DEP Regions", and "County Boundaries".
- Map Area:** A street map of Lititz, Pennsylvania, showing a network of roads and a blue line representing a water feature. The map includes a scale bar (0 to 600 feet) and an ESRI logo in the bottom right corner.
- Top Panel (Map Tools):** Includes a search bar, a "Map" button, and a "Layers" panel with options for "ESRI Streets & Imagery", "Topographic", and "National Geographic".
- Bottom Panel (Taskbar):** Shows the Windows taskbar with various application icons and the system clock indicating 12:42 PM on 9/27/2016.

# PADEP - eMapPA

The screenshot displays the eMapPA web application. At the top, the Pennsylvania Department of Environmental Protection logo is visible, along with the names of the Governor (Tom Wolf) and Acting Secretary (Patrick McDonnell). The browser address bar shows the URL: `depgis.state.pa.us/eMapPA`.

The interface includes a navigation menu on the left with the following categories and items:

- Layers
- Legend
- Tasks
- Land Reuse
- Mining
- Oil and Gas
- Radiation
- Sample Information System
- Streams and Water Resources
  - Surface Water Related
  - Fish Information
  - Flooding Information
  - NHD HUC (National Hydrogra
  - Water Monitoring
  - Water Quality
  - Attaining Streams Assess
    - Approved
    - Tentative
  - Non Attaining Streams Ass
    - Approved
    - Tentative
  - TMDL Streams
    - Final
    - Tentative
  - Existing Use Streams
    - Cold Water Fish
    - Exceptional Value
    - High Quality
    - Troul Stocking
    - Warm Water Fish
    - Overlap
  - Existing Use Streams Mip
  - Designated Use Streams
  - Cold Water Fish

The main map area shows a street grid for the town of LITZ. A red line indicates an approved stream, and a green line indicates a tentative stream. The map includes a scale bar (0 to 600 feet) and an ESRI logo. The bottom status bar shows the system time as 12:42 PM on 9/27/2016.

# PADEP - eMapPA

The screenshot displays the eMapPA web application interface. At the top, the browser address bar shows `depgis.state.pa.us/eMapPA`. The header includes the Pennsylvania Department of Environmental Protection logo and navigation links for Tom Wolf, Governor, Patrick McDonnell, Acting Secretary, and DEP Home.

The main interface features a map of Lititz, PA, with various layers and tools. A pop-up window titled "Non Attaining Streams Assessments (1 of 9)" is open, displaying the following information:

- Assessment Unit ID: 7866
- GNIS Name: Santo Domingo Creek
- GNIS ID: 01186978
- Assessed Use: Aquatic Life
- Attain Use: Impaired
- Source Cause: Urban Runoff/Storm Sewers - Suspended Solids
- Attained: N
- ReachCode: 02050306001453
- COMID: 57462401
- Length Miles: 0.649487
- HUC: 02050306
- Map Symbology:
- Date Created: Null

The map shows a network of streets and streams. A red line indicates a stream segment, and a green line indicates another stream segment. The pop-up window is positioned over a stream segment. The map includes a scale bar (0 to 6000 feet) and an ESRI logo in the bottom right corner.

At the bottom of the screen, the Windows taskbar is visible, showing the system tray with the time 12:43 PM and date 9/27/2016.

# Which PRP do I need?

WARWICK TWP	PAG133565	No	Bachman Run	Appendix B-Pathogens (5)
			Little Conestoga Creek	Appendix B-Pathogens (5), Appendix E-Nutrients, Siltation (5)
			Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)
			Cocalico Creek	Appendix E-Nutrients, Siltation (5)
			Conestoga River	Appendix B-Pathogens (5), Appendix E-Organic Enrichment/Low D.O., Siltation (5)
			Hammer Creek	Appendix E-Nutrients, Siltation (5)
			Lititz Run	Appendix E-Suspended Solids (4a), Appendix B-Pathogens (5)
			New Haven Run	Appendix E-Siltation (4a), Appendix B-Pathogens (5), Appendix E-Nutrients (5)
			Santo Domingo Creek	Appendix E-Suspended Solids (4a)

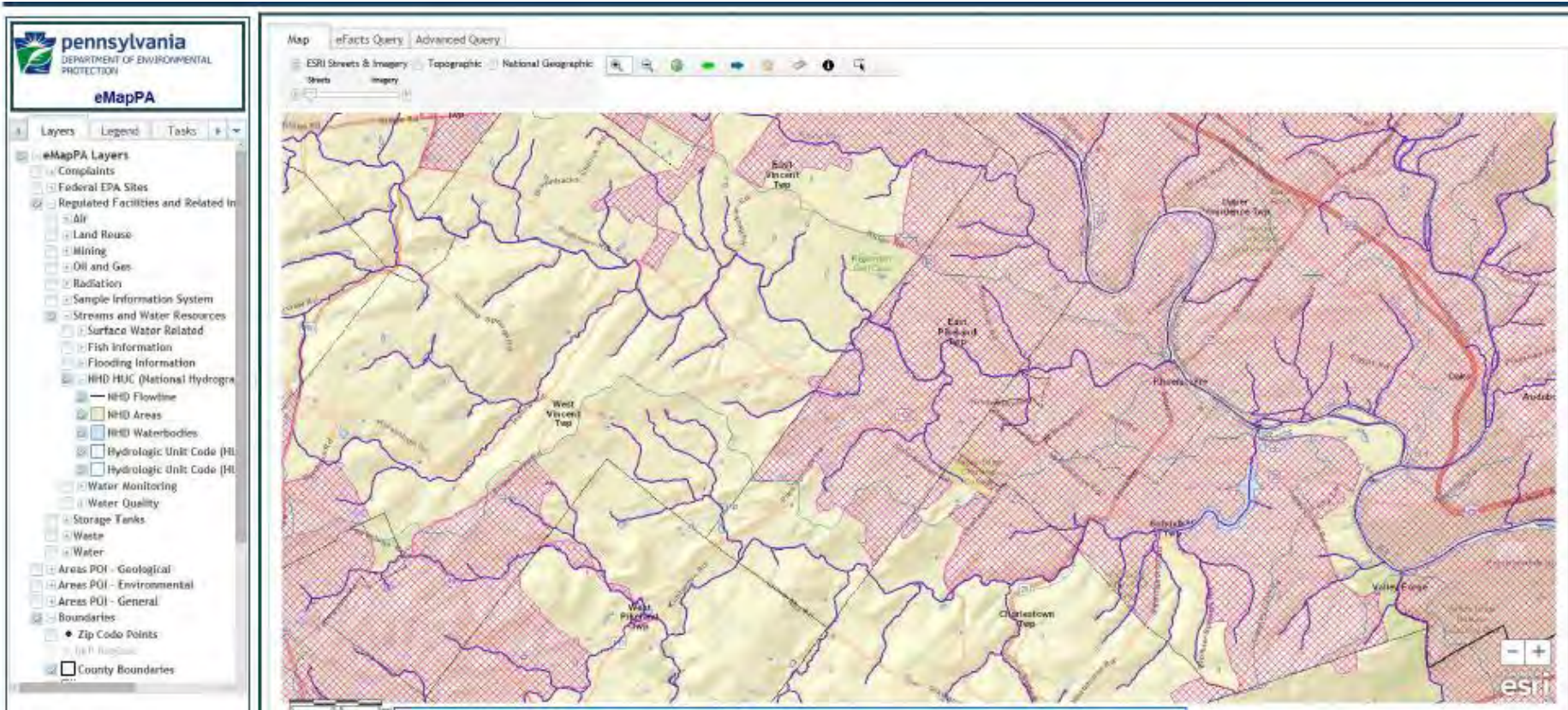
The screenshot shows a web-based GIS interface with a map of Warwick Twp. A popup window titled "TMDL Streams (4 of 6)" is open, displaying the following information for Lititz Run:

- TMDL GEN ID: 380
- TMDL Name: Lititz Run
- ReachCode: 02050306001449
- COMID: 57162135
- Status Final: Y
- Cause: Siltation ; Suspended Solids ; Turbidity
- TMDL Begin Date: 9/18/2004
- TMDL End Date: 11/17/2004
- Meeting Date: 9/28/2004
- Draft Date: Null
- Final Date: 10/29/2004
- TMDL URL Title: Lititz Run
- TMDL URL File: [Lititz TMDL.pdf](#)
- Info Sheet URL Title: Information Sheet for Lititz Run
- Info Sheet URL File: [Lititz INFO.pdf](#)
- Public Notice URL Title: Public Notice for Lititz Run
- Public Notice URL File: [Lititz PN.pdf](#)
- Other ID1 Title: Null
- Zoom to

Two items in the popup are circled in red: the "Cause" field and the "TMDL URL Title" field.

Imagery: undefined; ESRI Streets: Sources: Esri, HERE, DeLorme, USGS, Intermap, Increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

# Urbanized Area (UA) “Overlay”



The regulated system is in the UA...

- However, the drainage area may extend outside of the UA boundaries (this area “counts”).

# Impairments-related information

Appendix A: AMD Metals and pH

Appendix B: Pathogens

Appendix C: Priority Organic Compounds

Appendix D: Chesapeake Bay  
Nutrients/Sediment

Appendix E: Impaired Waters  
Nutrients/Sediment

Pollutant Reduction Plans (PRPs) associated with Appendix D and Appendix E (Nutrients and sediment) must be submitted with the NOI.



# PRPs vs. PCMs

## Pollutant Reduction Plan (PRP)

- **Planning** document prepared to guide selection and implementation of specific BMPs to reduce pollutant loadings to receiving waters.

## Pollutant Control Measure (PCM)

- **Activities** undertaken to identify and control pollutant loadings to impaired waters from MS4s (whether a TMDL has been approved or not)



# PCMs Considerations

The PCMs requirements are essentially a “PRP set-up.”

- Concentration on delineating MS3s.
- Building an inventory of sources
- Investigation of sources
- Develop general plan to address sources.

The requirements for PCMs are better described as “really good guidance” for SWMP implementation in general. When you have encountered an issue (whether there is a very specific permit requirement called out to address the pollutant or not), the regulations require you to address the issue.





Pollutant Reduction Plans (PRPs)

**AMD Metals and pH**

# Metals and/or pH (AMD)

## APPENDIX A

### POLLUTANT CONTROL MEASURES FOR WATERS IMPAIRED BY METALS AND/OR pH ASSOCIATED WITH ABANDONED MINE DRAINAGE (AMD)

The permittee shall implement the following Pollutant Control Measures (PCMs) within the storm sewershed of any outfall that discharges to waters impaired due to metals (Iron, Manganese, Aluminum and others as applicable) and/or acidity (low pH) associated with Abandoned Mine Drainage (AMD), regardless of whether there is an approved TMDL.



# Metals and/or pH (AMD)

**Stream Name**

HUC

**Use Assessed (Assessment ID) - Miles**

**Source**

**Cause**

**Date Listed**

**TMDL Date**

**Wildcat Run Unnamed To (ID:123863384)**

HUC: 05010006

Aquatic Life (1020) - 1.32 miles

Abandoned Mine Drainage

Metals  
pH

2002

2015

2002

2015

**Wildcat Run Unnamed To (ID:123863399)**

HUC: 05010006

Aquatic Life (1020) - 0.63 miles

Abandoned Mine Drainage

Metals  
pH

2002

2015

2002

2015

# Abandoned Mine Drainage (AMD)



# Waters impaired by AMD

Abandoned mine drainage is water that is polluted from contact with mining activity, and normally associated with coal mining. It is a common form of water pollution in areas where mining took place in the past.

Several types of abandoned mine drainage (AMD):

- Acid mine drainage (most common)
- Alkaline mine drainage
- Metal mine drainage

\*Remember:

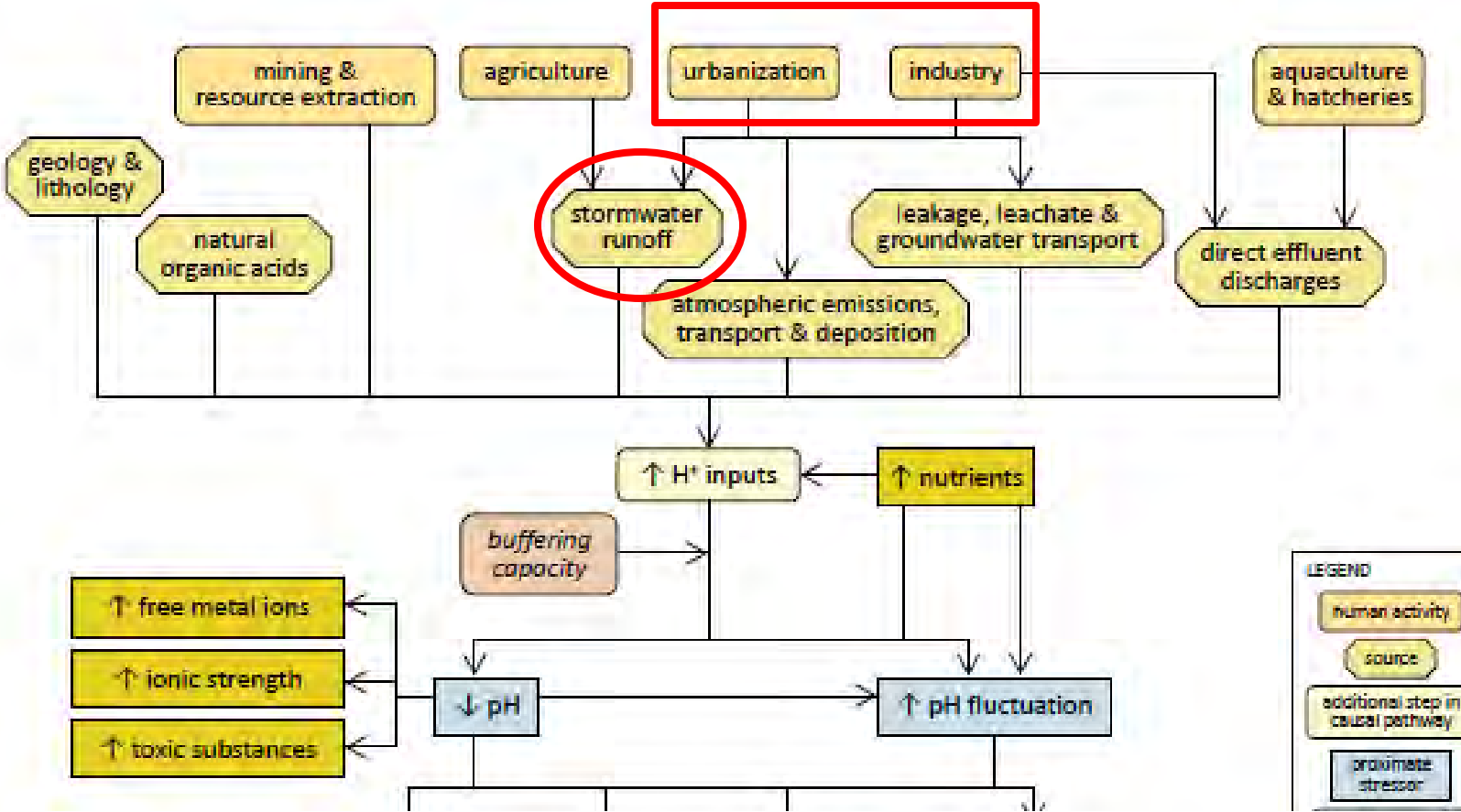
**Cannot cause and/or  
contribute to an impairment**



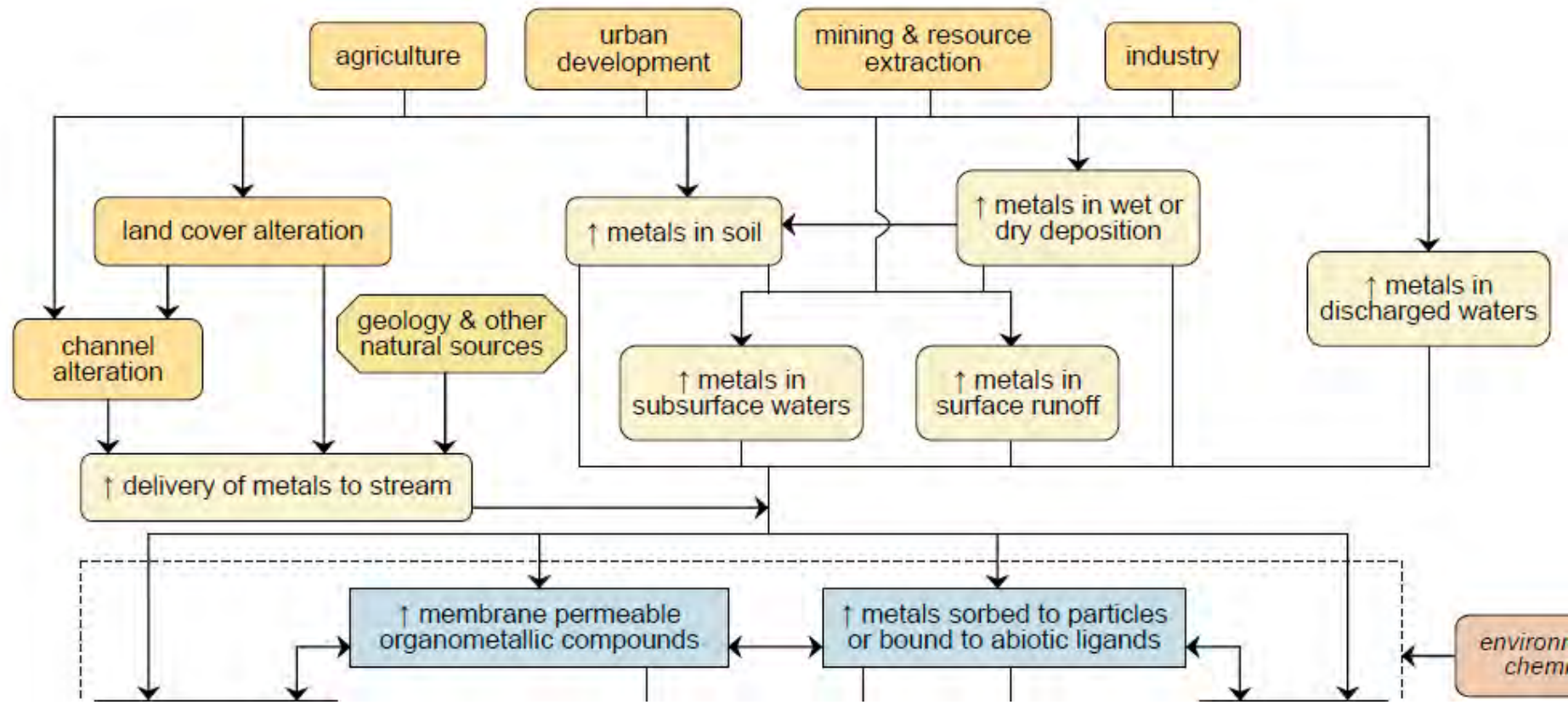
# Metals and/or pH (AMD) – Pollutant Control Measures

- A. Map and Inventory.
- B. The permittee shall complete an investigation of each suspected source.
- C. Where it is determined that sources of metals and/or acidity are being discharged in stormwater from industrial sites into the permittee's MS4, the permittee shall notify DEP in writing within 90 days of the permittee's findings.
- D. The permittee shall document the progress of its investigations, source control efforts and BMPs to control sources of metals and/or acidity in its Annual MS4 Status Reports.

# Low pH (acidic conditions)



# Metals





# Map & Inventory

## **MAP**

within its legal boundaries in developing a source inventory. For new permittees, the map(s) shall be submitted to DEP with an Annual MS4 Status Report that is due no later than two years following DEP's written approval of General Permit coverage. For existing permittees, the map(s) shall be submitted to DEP with an Annual MS4 Status Report due no later than September 30, 2019.

## **INVENTORY**

and any corrective action the permittee has taken or plans to take for any of these sources. For new permittees, the inventory shall be submitted to DEP with an Annual MS4 Status Report that is due no later than three years following DEP's written approval of General Permit coverage. For existing permittees, the inventory shall be submitted to DEP with an Annual MS4 Status Report due no later than September 30, 2020.

Pollutant Reduction Plans (PRPs)

**Pathogens**

# PCMs (PRP): Pathogens

## APPENDIX B

### POLLUTANT CONTROL MEASURES FOR WATERS IMPAIRED BY PATHOGENS

The permittee shall implement the following Pollutant Control Measures (PCMs) within the storm sewershed of any outfall that discharges to waters impaired due to Pathogens (e.g., Fecal Coliform), regardless of whether there is an approved TMDL:



# Pathogens



# Pathogens (Bacteria)

## **Middle Creek**

HUC: 02070009

Recreational (16858) - 10 miles

Source Unknown

Pathogens

2014

2027

---

## **Middle Creek Unnamed Of (ID:53321116)**

HUC: 02070009

Recreational (16858) - 0.96 miles

Source Unknown

Pathogens

2014

2027

---

## **Middle Creek Unnamed Of (ID:53321180)**

HUC: 02070009

Recreational (16858) - 0.67 miles

Source Unknown

Pathogens

2014

2027

---

# Pathogens - eMapPa

The screenshot displays the eMapPA web application interface. At the top, the browser address bar shows `depgis.state.pa.us/emappa`. The header includes the Pennsylvania Department of Environmental Protection logo and navigation links for Governor Tom Wolf and Acting Secretary Patrick McDonnell. The main interface features a map of Lititz, PA, with a pop-up window titled "Non Attaining Streams Assessments (2 of 4)".

**Map Interface:**

- Map Style: ESRI Streets & Imagery (selected), Topographic, National Geographic
- Layers Panel (Left):
  - Water Quality
    - Attaining (checked)
    - Non Attain (checked)
    - Approved (red line)
    - Tentative (dashed red line)
  - TMDL Streams
    - Existing Unimpaired (green line)
    - Existing Unimpaired (cyan line)
    - Designated (blue line)
    - Designated (magenta line)
    - Attaining (green square)
    - Non Attain (red square)
  - Storage Tanks
  - Waste
  - Water
  - Areas POI - Geologi

**Pop-up Window Data:**

- Assessment Unit ID: 18685
- GNIS Name: Santo Domingo Creek
- GNIS ID: 01186978
- Assessed Use: Recreational
- Attain Use: Impaired
- Source Cause: Source Unknown - Pathogens
- Attained: N
- ReachCode: 02050306001450
- COMID: 57462415
- Length Miles: 0.210644
- HUC: 02050306
- Map Symbology:
- Date Created: 10/21/2015 11:48:06 AM
- [Zoom to](#)

**Map Labels:** Lititz, Silver Creek Rd, N Walnut St, E Main St, Mulberry Ln, etc.

**Footer:** Imagery: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community; ESRI Streets: Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, HRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, HGCC, © OpenStreetMap contributors, and the GIS User Community

# Bacteria thresholds

**(Fecal coliforms/ 100 ml)—During the swimming season (May 1 through September 30), the maximum fecal coliform level shall be a geometric mean of 200 per 100 milliliters (ml) based on a minimum of five consecutive samples each sample collected on different days during a 30-day period. No more than 10% of the total samples taken during a 30-day period may exceed 400 per 100 ml. For the remainder of the year, the maximum fecal coliform level shall be a geometric mean of 2,000 per 100 milliliters (ml) based on a minimum of five consecutive samples collected on different days during a 30-day period.**

**(Coliforms/100 ml)—Maximum of 5,000/100 ml as a monthly average value, no more than this number in more than 20 of the samples collected during a month, nor more than 20,000/100 ml in more than 5% of the samples.**

# SIDEBAR: What do fecal coliform numbers tell us?

I use a sort of conversion chart developed by a gentleman named Art Ludwig to convey possibly what the fecal readings may indicate (the conversion may be received as unprofessional, but it was developed this way and does convey the readings in a different way), and it does help dial-in possible sources...

- First flush puddle of urban runoff: 3,360 col/100mL – equates to ~1/3 of an average “turd” floating in an average size swimming pool (in other words...just 1/3 of an average single “turd” in a swimming pool).
- Typical greywater readings: 4,000 col/100mL – equates to roughly 2/5 of an average “turd” in a swimming pool
- High reading in a lagoon associated with a beach area with presence of septic systems: 10,000 col/100mL – equates to 1 “turd” in a swimming pool.
- First flush of a river after seven dry months: 25,600 col/100mL – equates to roughly 2 ½ “turds” in a swimming pool
- Typical level in bathwater: 400,000 col/100mL – equates to roughly 40 “turds” in a swimming pool
- Possible (and actual) reading of raw sewage: 5,000,000 col/100mL – equates to 500 “turds” in a swimming pool



# Pathogens – Pollutant Control Measures

- A. Map and Inventory.
- B. The permittee shall complete an investigation of each suspected source.
- C. The permittee shall enforce ordinances that prohibit illicit and illegal connections and discharges of sewage
- D. If not already established in its Stormwater Management Ordinance (municipal permittees) or SOP (non-municipal permittees), the permittee shall enact an ordinance or develop and adopt an SOP that requires proper management of animal wastes on property owned by the permittee. If an ordinance or SOP already exists that
- E. The permittee shall document the progress of its investigations, source control efforts and BMPs to control sources of pathogens in its Annual MS4 Status Reports.

# Waters impaired by Pathogens

Soooo many possible sources:

- Raw sewage/septic systems
- Water (condensation) drip from air vents above cooking facilities
- Runoff from rain interaction with dumpsters (or similar containers) with rotting food
- Washwater bins/buckets
- Temporary sanitary facilities
- Rotting landscape waste
- “Natural” sources
- And on...and on....and on

\*Remember:

**Cannot cause and/or  
contribute to an impairment**



Pollutant Reduction Plans (PRPs)

**Priority Organic Compounds**

# PCMs (PRP): Priority Organic Compounds (POC's)

## APPENDIX C

### POLLUTANT CONTROL MEASURES FOR WATERS IMPAIRED BY PRIORITY ORGANIC COMPOUNDS

The permittee shall implement the following Pollutant Control Measures (PCMs) within the storm sewershed of any outfall that discharges to waters impaired due to Priority Organic Compounds, including but not limited to Polychlorinated Biphenyls (PCBs), Pesticides, and any other organic compound listed at 40 CFR Part 423, Appendix A, regardless of whether there is an approved TMDL:

# Priority Organic Compounds (POC's)

Appendix A to Part 423—126 Priority Pollutants

- 001 Acenaphthene
- 002 Acrolein
- 003 Acrylonitrile
- 004 Benzene
- 005 Benzidine
- 006 Carbon tetrachloride (tetrachloromethane)
- 007 Chlorobenzene
- 008 1,2,4-trichlorobenzene
- 009 Hexachlorobenzene
- 010 1,2-dichloroethane
- 011 1,2-dichlorobenzene
- 012 Hexachlorocyclopentadiene
- 013 1,1-dichloroethane
- 014 1,1,2-trichloroethane
- 015 1,1,2,2-tetrachloroethane
- 016 Chloroethane
- 017 1,1-dichloroethene
- 018 1,2-dichloroethene
- 019 1,1,1-trichloroethene
- 020 1,1,2-trichloroethene
- 021 1,2-dichloroethane
- 022 Perchloroethylene
- 023 Chloroform
- 024 1,1,1-trichloroethane
- 025 1,2-dichloroethane
- 026 1,2-dichlorobenzene
- 027 1,2-dichloroethane
- 028 1,2-dichlorobenzene
- 029 1,2-dichlorobenzene
- 030 1,2-dichlorobenzene
- 031 1,2-dichlorobenzene
- 032 1,2-dichlorobenzene
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- 035 1,2-dichlorobenzene
- 036 1,2-dichlorobenzene
- 037 1,2-dichlorobenzene
- 038 1,2-dichlorobenzene
- 039 Fluorobenzene
- 040 1,2-dichlorobenzene
- 041 1,2-dichlorobenzene
- 042 1,2-dichlorobenzene
- 043 1,2-dichlorobenzene
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- 125 1,2-dichlorobenzene
- 126 1,2-dichlorobenzene

- ## Appendix A to Part 423—126 Priority Pollutants
- 001 Acenaphthene
  - 002 Acrolein
  - 003 Acrylonitrile
  - 004 Benzene
  - 005 Benzidine
  - 006 Carbon tetrachloride (tetrachloromethane)
  - 007 Chlorobenzene
  - 008 1,2,4-trichlorobenzene
  - 009 Hexachlorobenzene
  - 010 1,2-dichloroethane

# Priority Organic Compounds (POC's)

## Polychlorinated biphenyl (PCB)

A polychlorinated biphenyl is an organic chlorine compound with the formula  $C_{12}H_{10-x}Cl_x$ . Polychlorinated biphenyls were once widely deployed as dielectric and coolant fluids in electrical apparatus, carbonless copy paper and in heat transfer fluids.

## Other “common” POC's:

- Benzene(s)
  - 1,2-dichlorobenzene
  - Ethylbenzene
  - 1,12-benzoperylene
- Phenol(s)
  - 2,4-dichlorophenoxyacetic acid (2-4-D)
  - 4-nitrophenol
- Methyl compounds
  - Methyl bromide

...and on and on and on



# Priority Organic Compounds

**Cobbs Creek Unnamed To (ID:25601155)**

HUC: 02040202

Aquatic Life (17115) - 0.38 miles

Urban Runoff/Storm Sewers	Cause Unknown	2002	2015
	Siltation	2002	2015

Fish Consumption (17453) - 0.38 miles

Source Unknown	PCB	2014	2027
----------------	-----	------	------

**Cobbs Creek Unnamed To (ID:25615860)**

HUC: 02040202

Aquatic Life (17114) - 1.32 miles

Municipal Point Source	Cause Unknown	1999	2012
Urban Runoff/Storm Sewers		2002	2015
	Siltation	1999	2012

Fish Consumption (17453) - 1.32 miles

Source Unknown	PCB	2014	2027
----------------	-----	------	------

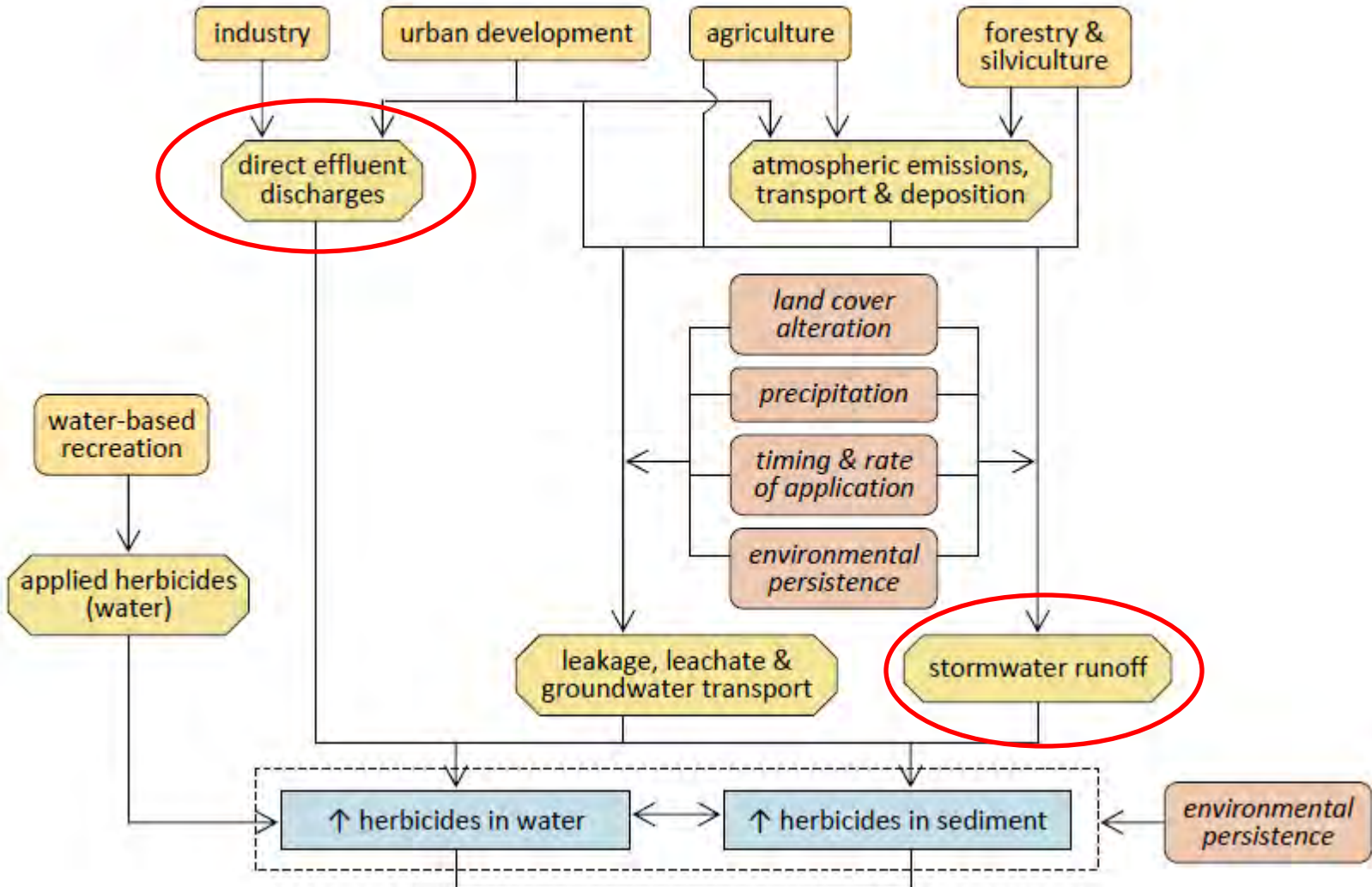
**Indian Creek Unnamed To (ID:25966052)**

HUC: 02040203

Aquatic Life (10180) - 1 miles

Golf Courses	Cause Unknown	2002	2015
Road Runoff	Siltation	2002	2015
Small Residential Runoff	Cause Unknown	2002	2015

# Herbicides





# POCs – Pollutant Control Measures

A. Map and Inventory.

B. The permittee shall complete an investigation of each suspected source.

C. Where it is determined that sources of Priority Organic Compounds are being discharged in stormwater from industrial sites into the permittee's MS4, the permittee shall notify DEP in writing within 90 days of the permittee's

D. The permittee shall document the progress of its investigations, source control efforts and BMPs to control sources of Priority Organic Compounds in its Annual MS4 Status Reports.

# Waters impaired by POCs

High number of possible sources and possible compounds,  
but recommend focusing initial efforts on industrial sources  
that discharge to the regulated MS4

\*Remember:

**Cannot cause and/or  
contribute to an impairment**



Pollutant Reduction Plans (PRPs)

**Nutrients & Sediment**

# Nutrients & Sediment

**Stream Name**

HUC

**Use Assessed (Assessment ID) - Miles**

**Source**

**Cause**

**Date Listed**

**TMDL Date**

**North Branch Bermudian Creek Unnamed Of (ID:57466939)**

HUC: 02050306

Aquatic Life (5212) - 0.67 miles

Agriculture

Nutrients

2004

2017

Siltation

2004

2017

Recreational (17007) - 0.67 miles

Source Unknown

Pathogens

2014

2027

**West Branch Susquehanna River Unnamed Of (ID:66913349)**

HUC: 02050206

Aquatic Life (8443) - 0.85 miles

Agriculture

Siltation

1998

2011

**Bermudian Creek Unnamed To (ID:57468283)**

HUC: 02050306

Aquatic Life (12032) - 1.58 miles

Agriculture

Nutrients

2006

2019

# Nutrients & Sediment (Add'l impairment “names”)

**Brush Run**

HUC: 02050306

Aquatic Life (11590) - 6.71 miles

Agriculture	Organic Enrichment/Low D.O.	2006	2019
-------------	-----------------------------	------	------

**Codorus Creek**

HUC: 02050306

Aquatic Life (3594) - 5.32 miles

Urban Runoff/Storm Sewers	Siltation	2004	2017
---------------------------	-----------	------	------

Aquatic Life (3598) - 4.14 miles

Urban Runoff/Storm Sewers	Unknown Toxicity	2004	2017
---------------------------	------------------	------	------

Aquatic Life (3696) - 5.9 miles

Urban Runoff/Storm Sewers	Excessive Algal Growth	2004	2017
---------------------------	------------------------	------	------

	Unknown Toxicity	2004	2017
--	------------------	------	------

**Musser Run Unnamed To (ID:57465447)**

HUC: 02050306

Aquatic Life (7981) - 0.33 miles

Agriculture	Suspended Solids	1998	2011
-------------	------------------	------	------

Other		1998	2011
-------	--	------	------

**Indian Creek Unnamed Of (ID:69915465)**

HUC: 05020006

Aquatic Life (9363) - 0.29 miles

Abandoned Mine Drainage	TDS	2002	2015
-------------------------	-----	------	------

Removal of Vegetation	Siltation	2002	2015
-----------------------	-----------	------	------

	Turbidity	2002	2015
--	-----------	------	------

# PRP: Nutrients and/or Sediment

## APPENDIX E

### POLLUTANT REDUCTION PLAN REQUIREMENTS FOR DISCHARGES TO WATERS IMPAIRED FOR NUTRIENTS AND/OR SEDIMENT

MS4 permittees with at least one stormwater discharge to surface waters considered impaired for nutrients (nitrogen and phosphorus) and/or sediment, in which a TMDL has not been developed or the TMDL has not identified a wasteload allocation (WLA) for the permittee, must develop and submit a Pollutant Reduction Plan (PRP) with the NOI to reduce the pollutant loads to those waters. In the event the permittee also has at least one stormwater discharge to surface waters within the Chesapeake Bay watershed, the PRP may be combined with the CBPRP described in Appendix D.

- Sediment
- Total Phosphorus (TP)



# Nutrients/Sediment PRP

A. The permittee shall achieve the pollutant load reduction(s) (lbs/year) proposed in its PRP within 5 years following DEP's approval of coverage under the General Permit (identified on page 1). The minimum percent reduction for pollutant loadings of sediment and Total Phosphorus (TP) shall be 10% and 5%, respectively. If the surface water is impaired for both sediment and nutrients, both sediment (10%) and TP (5%) reductions must be achieved. If the surface water is impaired for sediment alone, a sediment (10%) reduction must be achieved. If the cause of impairment is nutrients, a TP (5%) reduction must be achieved. Pollutant reduction efficiencies for selected BMPs shall be in accordance with the BMP Effectiveness Values document published by DEP (3800-PM-BCW0100m) or Chesapeake Bay Program Office expert panel reports. The permittee shall submit a report demonstrating implementation of the PRP as an attachment to the first Annual MS4 Status Report that is due following completion of the 5<sup>th</sup> year of General Permit coverage.

- 10% sediment reduction
- 5% Total Phosphorus reduction



# Nutrient-Sediment PRP Development Schedule

Model input deck set-up, loading/drainage areas (or MS3s) – 1/5

Request municipal info review and confirmation /changes – 1/9

Municipal input provided on model data, parsed areas – 1/24

Baseline loadings finalized – 2/9

Reduction approach determined – 2/24

Reduction BMP options presented – 3/17

Reduction BMPs selected – 4/7

Draft PRP generated and submitted for review & approval – 5/5

Draft PRP approved – 5/26

Public comment period mechanism finalized - 5/30

Issue public notice – 6/1

Public comment period begins (30-day comment period) – 6/6

Public comment period ends – 7/7

Public comments reviewed, addressed, and incorporated into PRP/CBPRP – 8/3

Preliminary final version submitted for review & approval – 8/4

Final approval – 9/1

Packaging – 9/8

PRPs submission (with NOI) – 9/13



# Required PRP Elements

Each PRP must include the following elements. The paragraph numbers in these instructions correspond to the organization of the PRP. For example, Section A of the PRP must be "Public Participation," Section B must be the map, Section C must be "Pollutants of Concern," etc.

# Required PRP Elements: Section A

A. **Public Participation.** The MS4 shall complete the following public participation measures listed below, and report in the PRP that each was completed.

- The applicant shall make a complete copy of the PRP available for public review.
- The applicant shall publish, in a newspaper of general circulation in the area, a public notice containing a statement describing the plan, where it may be reviewed by the public, and the length of time the permittee will provide for the receipt of comments. The public notice must be published at least 45 days prior to the deadline for submission of the PRP to DEP. Attach a copy of the public notice to the PRP.
- The applicant shall accept written comments for a minimum of 30 days from the date of public notice. Attach a copy of all written comments received from the public to the PRP.
- The applicant shall accept comments from any interested member of the public at a public meeting or hearing, which may include a regularly scheduled meeting of the governing body of the municipality or municipal authority that is the permittee.
- The applicant shall consider and make a record of the consideration of each timely comment received from the public during the public comment period concerning the plan, identifying any changes made to the plan in response to the comment. Attach a copy of the permittee's record of consideration of all timely comment received in the public comment period to the PRP.

For PRPs developed on a regional scale by multiple MS4 permittees or by co-permittees, the collaborating permittees may implement these public participation requirements as a joint effort as long as the notice of the availability of the PRP and the notice of a public meeting or hearing reaches the target audience groups of all permittees involved in the joint effort.

# Required PRP Elements: Section B

- B. **Map.** Attach a map that identifies **land uses and/or impervious/pervious surfaces** and the **storm sewershed boundary** associated with each MS4 outfall that discharges to impaired surface waters, or surface waters draining to the Chesapeake Bay (see note below), and calculate the storm sewershed area that is subject to Appendix D and/or Appendix E. In addition, the map must identify the proposed location(s) of structural BMP(s) that will be implemented to achieve the required pollutant load reductions.

The map may be the same as that used to satisfy MCM #3 of the PAG-13 General Permit, with the addition of land use and/or impervious/pervious surfaces, the storm sewershed boundary, and locations of proposed BMPs, or may be a different map.

The map must be sufficiently detailed to identify the “planning area” relevant to satisfying the requirements of Appendix D and/or Appendix E, and to demonstrate that BMPs will be located in appropriate storm sewersheds to meet the requirements. For a single MS4, the study area constitutes the combined storm sewersheds of all MS4 outfalls within the permittee’s jurisdiction. For MS4s participating in a joint PRP, the study area constitutes the combined sewersheds of all MS4 outfalls within the jurisdictions of all MS4s in the joint effort.

**NOTE** – Delineation of storm sewersheds associated with individual MS4 outfalls is typically necessary in order to determine the combined storm sewershed (i.e., planning area, the drainage areas of all MS4 outfalls that discharge to a specific surface water or to waters within the Chesapeake Bay watershed). The MS4 may display the storm sewershed for each MS4 outfall or just the combined storm sewershed, at its discretion. In cases where there are no local surface water impairments but the entire municipality is located in the Chesapeake Bay watershed, the map can display the entire storm sewershed within the municipality, without distinction between discharges to various local surface waters. In addition, a municipality entirely within the Chesapeake Bay watershed with no local surface water impairments may elect to consider the entire municipality as part of the storm sewershed, and calculate existing loading from the entire municipality.

# Required PRP Elements: Section B

The map may show areas that are to be “parsed” from the planning area. In other words, at the MS4’s discretion (subject to DEP rules), certain areas may be shown on the map that are within the storm sewershed but are not included in the calculation of land area and existing pollutant loading. Guidance on parsing is contained in **Attachment A**. Note that if parsing is done, BMPs implemented within the parsed area will not count toward achieving pollutant reduction objectives.

# Loading Area Considerations

- Can generate in a GIS platform, or hand-draw on a topographic map.
- Some water quality modeling programs (such a MapShed) are building a drainage area module into the program that delineates drainage areas for you.
- Other NPDES Permits (e.g. PennDOT MS4 Permit) should be parsed out (a.k.a. removed or delineated out from the MS3).
- A primary objective of mapping out loading areas is to determine the land area of the drainage area (e.g. acres)
- For a PRP, you want to spell out in the narrative your process (including how the land area was calculated).



# Loading Area (delineated MS3) “mapped”

MS3-029 is 10.9 acres



# Loading Area (delineated MS3) “parsing”



PennDOT R-O-W

MS3-029

- Gross area: 10.9 acres
- PennDOT parsed area: 0.7 acres
- Net area:  $10.9 - 0.8 = 10.2$  acres

# Loading Area (delineated MS3) “land types”



PennDOT R-O-W

## MS3-029

- Total Area: 10.2 acres
- Impervious: 6.2 acres
- Pervious: 4.0 acres



# Required PRP Elements: Section C

C. **Pollutants of Concern.** Identify the pollutants of concern for each storm sewershed (see Section I.B of these instructions).

## I. General Information

A. **Terms:** The term “nutrients” refers to “Total Nitrogen” (TN) and “Total Phosphorus” (TP) unless specifically stated otherwise in DEP’s latest [Integrated Report](#). The terms “sediment,” “siltation,” and “suspended solids” all refer to inorganic solids and are hereinafter referred to as “sediment.”

B. **Pollutants of Concern and Required Reductions:** For all PRPs, MS4s shall calculate existing loading of the pollutant(s) of concern, in lbs/year; calculate the minimum reduction in loading, in lbs/year; select BMP(s) to reduce loading; and demonstrate that the selected BMP(s) will achieve the minimum reductions.

For Chesapeake Bay PRPs (Appendix D), the pollutants of concern are sediment, TN and TP and the minimum reductions in loading are 10%, 5% and 3%, respectively. Permittees are encouraged to select appropriate BMPs to achieve the 10% sediment loading reduction objective, as it expected that, overall within the Bay watershed, the TP (5%) and TN (3%) goals will be achieved when a 10% reduction in sediment is achieved.

For PRPs developed for impaired waters (Appendix E), the pollutant(s) are based on the impairment listing, as provided in the MS4 Requirements Table. If the impairment is based on siltation only, a minimum 10% sediment reduction is required. If the impairment is based on nutrients only or other surrogates for nutrients (e.g., “Excessive Algal Growth” and “Organic Enrichment/Low D.O.”), a minimum 5% TP reduction is required. If the impaired is due to both siltation and nutrients, both sediment (10% reduction) and TP (5% reduction) must be addressed.

# Required PRP Elements: Section D

- D. **Determine Existing Loading for Pollutants of Concern.** Identify the date associated with the existing loading estimate (see Section I.C of these instructions). Calculate the existing loading, in lbs per year, for the pollutant(s) of concern in all storm sewersheds.

There are several possible methods to estimate existing loading, ranging from simplistic to very complex. One simple method to estimate existing loading that is acceptable to DEP is to determine the percent impervious and pervious surface within the urbanized area of the storm sewershed and calculate existing loading by multiplying the developed impervious and developed pervious land areas (acres) by pollutant loading rates (lbs/acre/year). Outside of the urbanized area, the MS4 may use loading rates for undeveloped land. Where structural BMPs are currently in place and are functioning, the existing loading estimate may be adjusted to account for pollutant reductions from those BMPs.

# PADEP “Simplified Approach”

DEVELOPED LAND LOADING RATES FOR PA COUNTIES<sup>1,2,3</sup>

County	Category	Acres	TN lbs/acre/yr	TP lbs/acre/yr	TSS (Sediment) lbs/acre/yr
Adams	impervious developed	10,373.2	33.43	2.1	1,398.77
	pervious developed	44,028.6	22.99	0.8	207.67
Bedford	impervious developed	9,815.2	19.42	1.9	2,034.34
	pervious developed	19,425	17.97	0.68	301.22
Berks	impervious developed	1,292.4	36.81	2.26	1,925.79
	pervious developed	5,178.8	34.02	0.98	264.29
Blair	impervious developed	3,587.9	20.88	1.73	1,813.55
	pervious developed	9,177.5	18.9	0.62	267.34
Bradford	impervious developed	10,423	14.82	2.37	1,880.87
	pervious developed	23,709.7	13.05	0.85	272.25
Cambria	impervious developed	3,237.9	20.91	2.9	2,155.29
	pervious developed	8,455.4	19.86	1.12	325.3
Cameron	impervious developed	1,743.2	18.46	2.98	2,574.49
	pervious developed	1,334.5	19.41	1.21	379.36
Carbon	impervious developed	25.1	28.61	3.97	2,177.04
	pervious developed	54.2	30.37	2.04	323.36
Centre	impervious developed	7,828.2	19.21	2.32	1,771.63
	pervious developed	15,037.1	18.52	0.61	215.84
Chester	impervious developed	1,838.4	21.15	1.46	1,504.78
	pervious developed	10,439.8	14.09	0.36	185.12
Lancaster	impervious developed	4,918.7	38.53	1.55	1,480.43
	pervious developed	21,649.7	22.24	0.36	190.93

# Estimating the sediment load in the MS3



TSS loading from PADEP Att. B:

- Impervious dev.: 1,480.43 lbs/ac/yr
- Pervious dev.: 190.93 lbs/ac/yr

MS3-029

- Total Area: 10.2 acres
- Impervious: 6.2 acres
- Pervious: 4.0 acres

Loading calculations:

- Impervious:  
 $1,480.43 \text{ lbs/ac/yr} \times 6.2 \text{ acres} = 9,178.67 \text{ lbs/yr}$
- Pervious:  
 $190.93 \text{ lbs/ac/yr} \times 4.0 \text{ acres} = 763.72 \text{ lbs/yr}$
- Total sediment loading:  $9,178.67 \text{ lbs/yr} + 763.72 \text{ lbs/yr} = 9,942.39 \text{ lbs/yr}$

# PADEP “Simplified Approach” – reduction needed

Sediment loading: 9,942.39 lbs/yr

10% sediment reduction:  $9,942.39 \text{ lbs/yr} \times 10\% = 994.2 \text{ lbs/yr}$

## **SIDEBAR: Context**

- “Generic” rain garden
- Reduces ~728 lbs/yr of sediment for each 1 acre of impervious surface treated (+ ~4 acres of pervious)
- Up-front cost of ~\$25,600
- “Fairly” large rain garden needed\*

# Modeling (MapShed) – sediment

	Land Use Loading Rate (lb/ac)
Hay/Pasture	162.2
Cropland	588.2
Forest	18.7
Wetland	4.7
Disturbed	88.5
Turfgrass	31.8
Open Land	
Bare Rock	
Sandy Areas	
Unpaved Roads	
LD Mixed	6.1
MD Mixed	20.3
HD Mixed	20.3
LD Residential	6.1
MD Residential	20.3
HD Residential	20.4
Water	
<b>Subtotal</b>	
Streambank	

LD = “low density” (<25% impervious)

MD = “medium density” (25%-75% impervious)

HD = “high density” (>75% impervious)

# Modeling (MapShed) – sediment

	Land Use Loading Rate (lb/ac)
Hay/Pasture	162.2
Cropland	588.2
Forest	18.7
Wetland	4.7
Disturbed	88.5
Turfgrass	31.8
Open Land	
Bare Rock	
Sandy Areas	
Unpaved Roads	
LD Mixed	6.1
MD Mixed	20.3
HD Mixed	20.3
LD Residential	6.1
MD Residential	20.3
HD Residential	20.4
Water	
<b>Subtotal</b>	
Streambank	

MS3-029 is ~60% impervious, so:

MD = “medium density” (25%-75% impervious)



# Modeling (MapShed) – sediment

Loading calculations:

- MD Mixed Use:  
 $20.3 \text{ lbs/ac/yr} \times 10.2 \text{ acres} = 207.06 \text{ lbs/yr}$



Sediment loading: 207.06 lbs/yr

10% sediment reduction:  $207.06 \text{ lbs/yr} \times 10\% = 20.7 \text{ lbs/yr}$



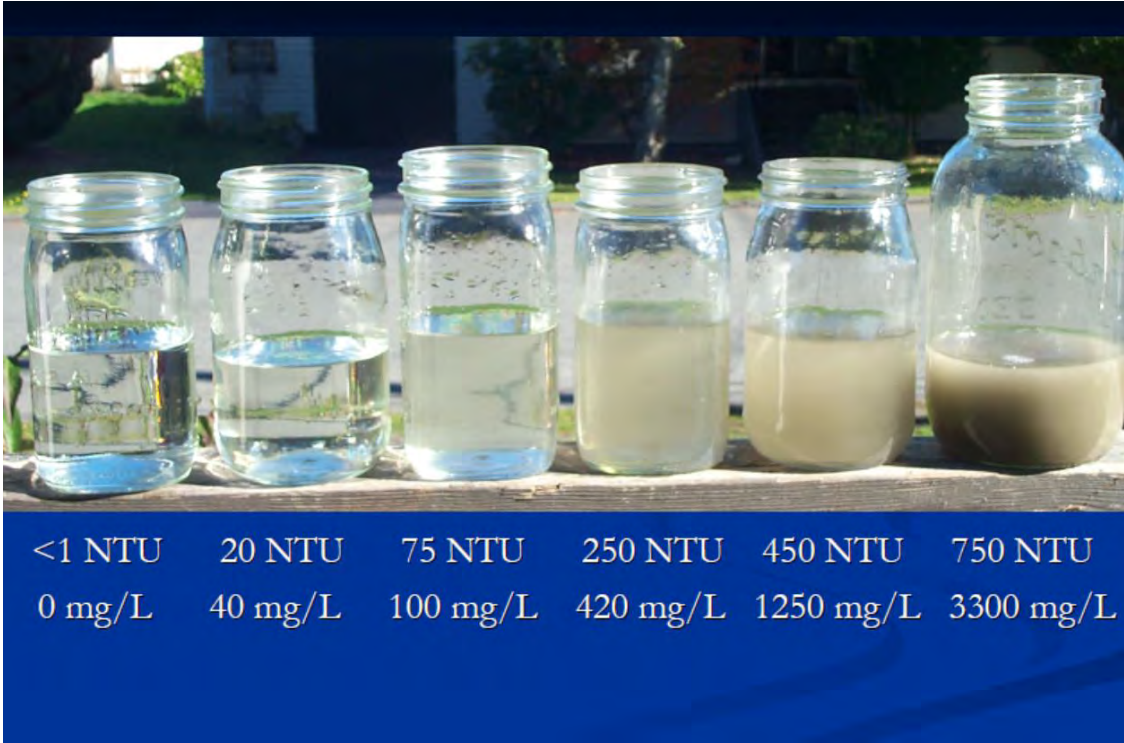
# Modeling (MapShed) – considerations

	Land Use Loading Rate (lb/ac)	Acres	Total Load (lb)
Hay/Pasture	162.2	15	2433
Cropland	588.2	2	1176.4
Forest	18.7	82	1533.4
Wetland	4.7	0	0
Disturbed	88.5	0	0
Turfgrass	31.8	0	0
Open Land		0	0
Bare Rock		0	0
Sandy Areas		0	0
Unpaved Roads		0	0
LD Mixed	6.1	0	0
MD Mixed	20.3	7	142.1
HD Mixed	20.3	0	0
LD Residential	6.1	0	0
MD Residential	20.3	7	142.1
HD Residential	20.4	0	0
Water		0	
<b>Subtotal</b>		<b>113</b>	<b>5427</b>
Streambank			28439.17
<b>Total</b>			<b>33866.17</b>



# Real data

Parameters	Results	Flag	Units	RDL	Method
<b>WET CHEMISTRY</b>					
Ammonia-N	0.952		mg/L	0.100	D6919-09
Nitrate/Nitrite-N	1.1		mg/L	0.20	EPA 300.0
Phosphorus, Total	0.17		mg/L	0.10	EPA 365.1
Total Kjeldahl Nitrogen	ND		mg/L	1.0	S4500NH3G-11
Total Nitrogen	ND		mg/L	2.10	Calculation
Turbidity	19.1		NTU	0.10	S2130B-01



# Quantifying to begin “right-sizing” BMPs

- MS3-029 is 10.9 acres
- Storm 1 loading: 0.09 lb/acre of sediment for ~1/2” of rain
- Storm 2 loading: 1.25 lb/acre of sediment for ~2” of rain
- Loading assessment (42” rain/year)
  - High: 26.25 lbs/ac/yr
  - Low: 7.56 lbs/ac/yr
- Reality assessment (hybrid of the loadings from the two different storms, extrapolated with actual rain events across the year)
  - 11.3 lbs/ac/yr



# Real Data - sediment

Loading calculations:

- MS3-029:  
 $11.3 \text{ lbs/ac/yr} \times 10.2 \text{ acres} = 115.26 \text{ lbs/yr}$



Sediment loading: 115.26 lbs/yr

10% sediment reduction:  $115.26 \text{ lbs/yr} \times 10\% = 11.5 \text{ lbs/yr}$

# Streambank Loading

	Land Use Loading Rate (lb/ac)	Acres	Total Load (lb)
Hay/Pasture	162.2	15	2433
Cropland	588.2	2	1176.4
Forest	18.7	82	1533.4
Wetland	4.7	0	0
Disturbed	88.5	0	0
Turfgrass	31.8	0	0
Open Land		0	0
Bare Rock		0	0
Sandy Areas		0	0
Unpaved Roads		0	0
LD Mixed	6.1	0	0
MD Mixed	20.3	7	142.1
HD Mixed	20.3	0	0
LD Residential	6.1	0	0
MD Residential	20.3	7	142.1
HD Residential	20.4	0	0
Water		0	
<b>Subtotal</b>		<b>113</b>	<b>5427</b>
Streambank			28439.17
<b>Total</b>			<b>33866.17</b>

# MS3-029 – stream area



Restored floodplain...no streambank erosion in this location.



# Required PRP Elements: Section D cont'd

Use of DEP's simplified method will streamline DEP's review of PRPs, but is not required. Any methodology that calculates existing pollutant loading in terms of lbs per year, evaluates BMP-based pollutant reductions utilizing the BMP effectiveness values contained in 3800-PM-BCW0100m or Chesapeake Bay Program expert panel reports, uses average annual precipitation conditions and is based on sound science may be considered acceptable.

If a modeling tool will be used to estimate existing loading, the same tool should be used to estimate future pollutant loading for different BMP implementation scenarios to ensure consistency with input parameters between existing and future loading.

MS4s may, if desired, use data obtained through stormwater sampling to assist in estimating pollutant loading or calibrating models. MS4s considering the use of stormwater sampling to estimate existing loading are encouraged to contact DEP's Bureau of Clean Water during development of a sampling plan to ensure the sampling effort will meet DEP's expectations.

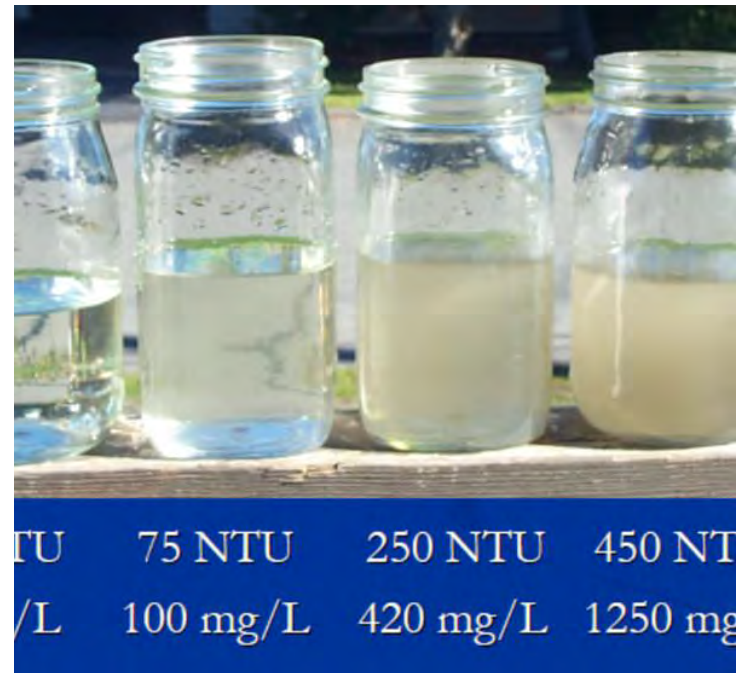
Just make sure you spell out the exact process in this section of the PRP (if you select the hybrid approach)

# Hybrid Approach (recommendation)

1. “Map” out loading areas/MS3s
2. Estimate loadings using MapShed (or similar model) or PADEP simplified method.
3. Conduct a discharge characterization exercise (wet weather discharges)...
  - a. Can be visual (focus on sediment)
4. Results of discharge characterization dial-in areas for focus
5. As part of implementation...
  - a. Monitoring program to dial-in loadings and reduce what can actually be reduced.

## WET CHEMISTRY

Ammonia-N	0.303	mg/L
Nitrate/Nitrite-N	0.36	mg/L
Phosphorus, Total	0.42	mg/L
Total Kjeldahl Nitrogen	2.0	mg/L
Total Nitrogen	2.36	mg/L
Total Suspended Solids	220	mg/L





# “Right-sizing” consideration

A permittee may discover, through sampling, that an MS4 Outfall discharges 100 lbs/year of sediment. The permittee chose to implement a BMP within the system that drains to that outfall. The paperwork calculation indicates a reduction of 150 lbs/year of sediment will be achieved through implementation of the BMP. This is impossible. If the outfall is discharging no more than 100 lbs/year of sediment, you cannot reduce discharges more than 100 lbs/year (and very difficult to obtain 100% reduction in reality). Without using the MEP tool appropriately, a permittee just wasted money and resources trying to reduce an additional 50 lbs/year of sediment that does not exist.

# PRP development considerations

- Nutrient/Sediment PRPs are HUC-12 focused.
- CBPRP is municipal specific.
- Can develop a single document that encompasses all PRPs (and CBPRP if applicable).
- Repeat loading area mapping and loading estimating across all drainage areas/MS3s within a given HUC-12 watershed into a section of the PRP
- Meet local reduction requirements (Appendix E) first...however, local reductions also count for the CBPRP (if applicable)



# Quality Control Document

Quality Assurance Project Plan (QAPP)  
East Petersburg Borough – MS4 SWMP  
Discharge Monitoring Program QC  
Lancaster County, Pennsylvania



# Required PRP Elements: Section D cont'd

MS4s may claim “credit” for structural BMPs implemented prior to development of the PRP to reduce existing loading estimates. In order to claim credit, identify all such structural BMPs in Section D of the PRP along with the following information:

- A detailed description of the BMP;
- Latitude and longitude coordinates for the BMP;
- Location of the BMP on the storm sewershed map;
- The permit number, if any, that authorized installation of the BMP;
- Calculations demonstrating the pollutant reductions achieved by the BMP;
- The date the BMP was installed and a statement that the BMP continues to serve the function(s) it was designed for; and
- The operation and maintenance (O&M) activities and O&M frequencies associated with the BMP.

The MS4 permittee may optionally submit design drawings of the BMP for previously installed or future BMPs with the PRP.

Legacy BMP's should be a focus here.

# Required PRP Elements: Section E

- E. **Select BMPs To Achieve the Minimum Required Reductions in Pollutant Loading.** Identify the minimum required reductions in pollutant loading (see Section I.B of these instructions). Applicants must propose the implementation of BMP(s) or land use changes within the storm sewershed that will result in meeting the minimum required reductions in pollutant loading within the storm sewershed(s) identified by the MS4. These BMP(s) must be implemented within 5 years of DEP's approval of coverage under the PAG-13 General Permit, and must be located within the storm sewersheds of the applicable impaired waters, on either public or private property. If the applicant is aware of BMPs that will be implemented by others (either in cooperation with the applicant or otherwise) within the storm sewershed that will result in net pollutant loading reductions (i.e., typically not E&S BMPs to satisfy DEP's Chapter 102 requirements), the applicant may propose those BMPs within its PRP.

Historic street sweeping practices should not be considered in calculating credit for future practices. All proposed street sweeping practices may be used for credit if the minimum standard is met for credit (see 3800-PM-BCW0100m). In other words, if sweeping was conducted 1/month and will be increased to 25/year in the future, the MS4 does not need to use the "net reduction" resulting from the increased sweeping; it may take credit for the full amount of reductions from 25/year sweeping.

The names and descriptions of BMPs and land uses reported in the PRP should be in accordance with the Chesapeake Bay Program Model. The names and descriptions are available through [CAST](http://www.casttool.org) (log into [www.casttool.org](http://www.casttool.org), select "Documentation," select "Source Data" and see worksheets named "Land Use Definitions" and "BMP Definitions").

# Where to start...

- Remember, PRPs are sub-watershed focused (HUC-12)...
  - Probably have several stream segments and multiple outfalls.
- If you followed the guidance in previous section, may have 2 or 3 outfalls/MS3s/drainage areas that are focus areas
  - Loadings and reductions needed have been calculated.
  - Now need to consider new facilities/BMPs or retrofits.



## **Important Note....**

---this is where the mandated reductions break down and essentially force you into implementing BMPs that reduce “ghost” pollutant loads or loads that do not exist---

# Facility/BMP selection

- Basin retrofits
- Infiltration basins/trenches
- Filter strips
- Rain gardens
- Bioswales
- Permeable pavement
- Vegetated channels
- Street sweeping
- Hydrodynamic structures
- Flow-through facilities (filter strip/vegetated channel hybrid)
- Stream/floodplain restoration
- ...and so on



# Facility/BMP selection

- Stream restoration
- Floodplain restoration
- Wetlands\*



Combine your drainage areas into a “Planning Area.”  
Plus, you are actually addressing the issue.

Placing BMPs where they do not reduce anything  
(but shows it reduces on paper) will not correct the  
problem or make it go away.



# Required PRP Elements: Section E

**NOTE** – In calculating future pollutant loading the applicant must be cognizant of planned changes to land uses or BMPs. For example, if a tract of land (< 1 acre) currently in pasture will be converted within the next few years to residential land use, and there are no ordinances in place to control the rate, volume or quality of stormwater draining from the tract, the potential net increase in pollutant loading must be factored into the future loading estimate; this means that BMPs must be implemented on the tract or elsewhere within the storm sewershed to compensate for this change.

# Required PRP Elements: Section F

- F. **Identify Funding Mechanism(s).** Prior to approving coverage DEP will evaluate the feasibility of implementation of an applicant's PRP. Part of this analysis includes a review of the applicant's proposed method(s) by which BMPs will be funded. Applicants must identify all project sponsors and partners and probable funding sources for each BMP. DEP does not expect that guaranteed sources are identified in the PRP, but does expect that applicants propose their preferred funding options with alternatives in the event the preferred options do not materialize.

**If you use the simplified approach for calculating loadings...follow the \$47/lb (average) for each pound of sediment that needs reduced as the guidance for amount of funding needed to implement BMPs.**

# Required PRP Elements: Section G

G. **Identify Responsible Parties for Operation and Maintenance (O&M) of BMPs.** Once implemented the BMPs must be maintained in order to continue producing the expected pollutant reductions. Applicants must identify the following for each selected BMP:

- The party(ies) responsible for ongoing O&M;
- The activities involved with O&M for each BMP; and
- The frequency at which O&M activities will occur.

MS4 permittees will need to identify actual O&M activities in Annual MS4 Status Reports submitted under the General Permit.

Should include a discussion of the life cycle of a BMP to be implemented in this section...and how the end of life cycle will be handled.

# Recommended PRP Attachments

- Copy of public notice, meeting minutes, etc. associated with the public comment and response period (if a high number of public comments are received, would attach in lieu of inserting into the first section of the PRP).
- Map(s)
- Implementation Schedule
- Calculations for loadings and reductions
- Calculations for BMPs
- BMP Inventory (spreadsheet)
  - Type, location, O&M references, performance notes, etc.

Pollutant Reduction Plans (PRPs)

**Chesapeake Bay PRP**

## APPENDIX D

### POLLUTANT REDUCTION PLAN REQUIREMENTS FOR DISCHARGES TO THE CHESAPEAKE BAY WATERSHED

MS4 permittees with at least one stormwater discharge to surface waters within the Chesapeake Bay watershed must develop and submit a Chesapeake Bay Pollutant Reduction Plan (CBPRP) with the NOI to reduce the load of nutrients (nitrogen and phosphorus) and sediment to surface waters. In the event the permittee also has at least one stormwater discharge to local surface waters that are considered impaired for nutrients and/or sediment, the CBPRP may be combined with the PRP for localized nutrient and/or sediment impairment as described in Appendix E.

- Sediment
- Total Phosphorus (TP)
- Total Nitrogen (TN)



# CBPRP

- A. The permittee shall achieve the pollutant load reduction(s) (lbs/year) proposed in its CBPRP within 5 years following DEP's approval of coverage under the General Permit (identified on page 1 of the General Permit). The minimum percent reduction for pollutant loadings of sediment, Total Phosphorus (TP), and Total Nitrogen (TN) shall be 10%, 5%, and 3%, respectively, over the 5-year period following DEP's approval of coverage. Pollutant reduction efficiencies for selected BMPs shall be in accordance with the BMP Effectiveness Values document published by DEP (3800-PM-BCW0100m) or Chesapeake Bay Program Office expert panel reports. The permittee shall submit a report demonstrating implementation of the CBPRP as an attachment to the first Annual MS4 Status Report that is due following completion of the 5<sup>th</sup> year of General Permit coverage.

- 10% sediment reduction
- 5% Total Phosphorus reduction
- 3% Total Nitrogen reduction



Pollutant Reduction Plans (PRPs)

# Public Participation



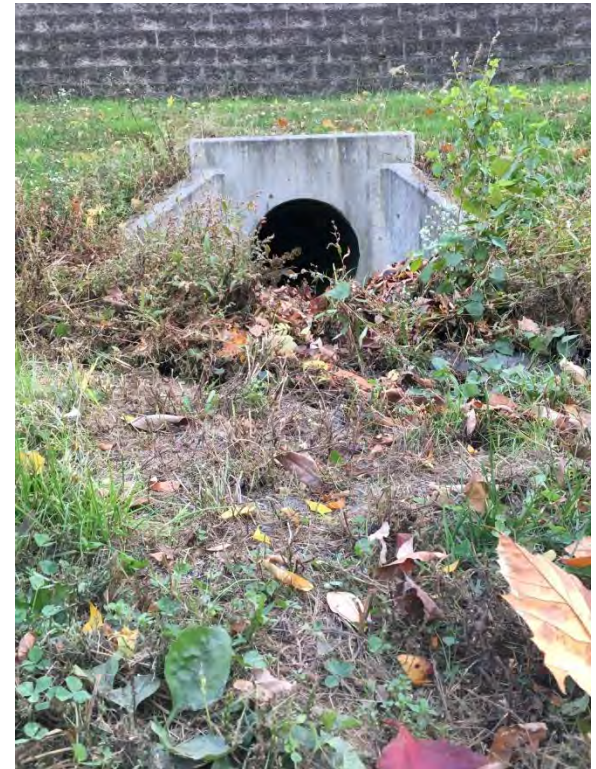
# PRP Clarifications

Appendix A (AMD-related), Appendix B (Pathogens), and Appendix C (POC's) are classified in the permit as Pollutant Control Measures (PCMs).

PCMs are a PRP in disguise, just not as much development considerations required (e.g. public comment period).

Public comments and responses:

- Applies only to the CBPRP and Nutrient/Sediment PRPs
- May need to adjust a component, item, planned BMP, etc. within a PRP based on a received comment.
- Need to respond to all comments.
- Insert public comments and corresponding responses into the PRP(s).



# Public Comment and Responses

Public Comments and Responses applies to:

- CBPRP (Appendix D)
- Nutrient/Sediment PRP (Appendix E)
- TMDL Plan



Highly recommend a public meeting (or planned council/board meeting) include a public comment/input period during the public review period.

# Required PRP Elements: Section A

A. **Public Participation.** The MS4 shall complete the following public participation measures listed below, and report in the PRP that each was completed.

- The applicant shall make a complete copy of the PRP available for public review.
- The applicant shall publish, in a newspaper of general circulation in the area, a public notice containing a statement describing the plan, where it may be reviewed by the public, and the length of time the permittee will provide for the receipt of comments. The public notice must be published at least 45 days prior to the deadline for submission of the PRP to DEP. Attach a copy of the public notice to the PRP.
- The applicant shall accept written comments for a minimum of 30 days from the date of public notice. Attach a copy of all written comments received from the public to the PRP.
- The applicant shall accept comments from any interested member of the public at a public meeting or hearing, which may include a regularly scheduled meeting of the governing body of the municipality or municipal authority that is the permittee.
- The applicant shall consider and make a record of the consideration of each timely comment received from the public during the public comment period concerning the plan, identifying any changes made to the plan in response to the comment. Attach a copy of the permittee's record of consideration of all timely comment received in the public comment period to the PRP.

For PRPs developed on a regional scale by multiple MS4 permittees or by co-permittees, the collaborating permittees may implement these public participation requirements as a joint effort as long as the notice of the availability of the PRP and the notice of a public meeting or hearing reaches the target audience groups of all permittees involved in the joint effort.

# Public Comment and Responses

4. **Comment:** Page 7. The second bullet point states, “the applicant should report “050” for Clear Creek.” Does that mean that the creek gets an ID number or does it mean that the MS4 must state that they have 50 outfalls to Clear Creek in the annual report? (46)

**Response:** The referenced sentence has been clarified. In this example, for Clear Creek the applicant would report “050” in the column for “Outfall No.”.

5. **Comment:** The outfall IDs must correspond to the outfall numbers on the applicant’s map. Many MS4 have been using a numbering system for their outfalls and collection system for a number of years. To require that they re-number their entire system is unreasonable. (46)

**Response:** See response to Comment No. 1.

6. **Comment:** Page 7. Stormwater Discharge Information. The permit instruction does not include a definition of “Outfalls”. As this is a basis of the regulatory compliance, and may be the initial permit package for new permittees, this is a critical definition. (7)

**Response:** The definition of “Outfall” is part of the PAG-13 General Permit and has been added to the NOI Instructions.

- Can attach a copy of the public notice (recommended in an appendix, attachment, etc.) or insert into the section.
- If you have a public meeting with a component geared towards the PRPs (or TMDL Plan), attach the minutes as well.

# Nutrient-Sediment PRP Development Schedule

Model input deck set-up, loading/drainage areas (or MS3s) – 1/5

Request municipal info review and confirmation /changes – 1/9

Municipal input provided on model data, parsed areas – 1/24

Baseline loadings finalized – 2/9

Reduction approach determined – 2/24

Reduction BMP options presented – 3/17

Reduction BMPs selected – 4/7

Draft PRP generated and submitted for review & approval – 5/5

Draft PRP approved – 5/26

Public comment period mechanism finalized - 5/30

Issue public notice – 6/1

→ Public comment period begins (30-day comment period) – 6/6

→ Public comment period ends – 7/7

→ Public comments reviewed, addressed, and incorporated into PRP/CBPRP – 8/3

Preliminary final version submitted for review & approval – 8/4

Final approval – 9/1

Packaging – 9/8

PRPs submission (with NOI) – 9/13

Pollutant Reduction Plans (PRPs)

# Implementation

# Structural and Non-Structural BMPs

**STRUCTURAL BMPS:** Think of structural BMPs just as it is described...the physical and actual facilities handling and managing water quality and/or water quantity.



**NON-STRUCTURAL BMPS:** Think of non-structural BMPs as the mechanisms, related activities, and strategies in place that allow appropriate structural BMPs to be implemented and operate efficiently.




# Several PRP Non-Structural BMPs

## PRP Development:

- Schedule
- Implementation Tasks (e.g. hybrid approach for BMP identification, design-construction requirements)
- Discharge Characterization
- Partnering Identification
- Maintenance Approach
- Other
- Public Input\*

## PRP Implementation:

- Schedule
- Design-Permit-Construction
- Long-term maintenance
- Monitoring 
- Other
- Final Report progression
- Execute partner agreements\*\*

\* Public comment and response period

\*\* Okay to outline you will partner in the PRP and execute an Intergovernmental Cooperation Agreement (or similar) during PRP implementation.



# Sidebar: quantitative monitoring and sampling

## Quantified data provides the basis of choosing approaches and measuring performance.

EPA memorandum regarding “interim approach for water quality-based effluent limitations in storm water permits (such as an MS4 Permit):

**QUESTION 9:** The interim permitting approach states that permits should include monitoring programs to generate necessary information to determine the extent to which permits are providing for the attainment of water quality standards. What types of monitoring should be included and how much monitoring is necessary?



# Sidebar: quantitative monitoring and sampling

**ANSWER 9:** The amount and types of monitoring necessary will vary depending on the individual circumstances of each storm water discharge. EPA encourages dischargers and permitting authorities to carefully evaluate monitoring needs and storm water program objectives so as to select useful and cost-effective monitoring approaches. For most dischargers, storm water monitoring can be conducted for two basic reasons:

- 1) to identify if problems are present, either in the receiving water **or in the discharge**, and to characterize the cause(s) of such problems; and
- 2) to assess the effectiveness of storm water controls in reducing contaminants and making improvements in water quality.



# Quality Control Document

Quality Assurance Project Plan (QAPP)  
East Petersburg Borough – MS4 SWMP  
Discharge Monitoring Program QC  
Lancaster County, Pennsylvania



Pollutant Reduction Plans (PRPs)

# NOI Considerations

# PADEP MS4 Requirements Table

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
<b>Montgomery County</b>						
ABINGTON TWP	PAG130012	Yes	TMDL Plan	Frankford Creek	Appendix C-PCB (4a), Appendix E-Organic Enrichment/Low D.O. (5)	Flow Alterations, Other Habitat Alterations, Water/Flow Variability (4c)
				Wissahickon Creek	Appendix E-Nutrients (4a), Appendix B-Pathogens (5)	Water/Flow Variability (4c)
				Wissahickon TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	Cause Unknown (4a)
				Pennypack Creek	Appendix B-Pathogens (4a), Appendix C-Priority Organics (4a), Appendix E-Organic Enrichment/Low D.O. (4a), Appendix E-Siltation (5)	Cause Unknown (5)
				Rockledge Branch	Appendix E-Siltation (5)	Cause Unknown (5)
				Meadow Brook	Appendix E-Siltation (5)	Cause Unknown (5)
				Robinhood Brook	Appendix E-Siltation (5)	Cause Unknown (5)
				Jenkintown Creek		Flow Alterations, Other Habitat Alterations, Water/Flow Variability (4c)
				Tacony Creek	Appendix E-Organic Enrichment/Low D.O. (5)	Flow Alterations, Other Habitat Alterations, Water/Flow Variability (4c)
				Terwood Run	Appendix E-Siltation (5)	Cause Unknown (5)
				Unnamed Tributaries to Wissahickon Creek		Flow Alterations, Other Habitat Alterations (4c)
				East Branch Jenkintown Creek		Flow Alterations, Other Habitat Alterations, Water/Flow Variability (4c)
Sandy Run	Appendix B-Pathogens (4a), Appendix E-DO/BOD, Nutrients (4a)	Other Habitat Alterations, Water/Flow Variability (4c)				
AMBLER BORO	PAG130036	Yes	TMDL Plan	Wissahickon Creek	Appendix E-Nutrients (4a), Appendix B-Pathogens (5)	Water/Flow Variability (4c)
				Wissahickon TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	Cause Unknown (4a)
				Unnamed Tributaries to Wissahickon Creek		Other Habitat Alterations (4c)
BRIDGEPORT BORO		No		Schuylkill River PCB TMDL	Appendix C-PCB (4a)	
BRYN ATHYN BORO	PAG130166	Yes	TMDL Plan	Southampton Creek TMDL	TMDL Plan-Nutrients, Organic Enrichment/Low D.O., Siltation (4a)	
				Pennypack Creek	Appendix E-Siltation (5)	Cause Unknown (5)
				Huntingdon Valley Creek	Appendix E-Siltation (5)	Cause Unknown (5)
				Southampton Creek		Flow Alterations, Other Habitat Alterations, Water/Flow Variability (4c)

# eMapPa - TMDL

The screenshot shows the eMapPa web application interface. The browser address bar displays [dep.state.pa.us/emappa](http://dep.state.pa.us/emappa). The top navigation bar includes the Pennsylvania Department of Environmental Protection logo and the text "Tom Wolf, Governor Patrick McDonnell, Acting Secretary DEP Home".

The main interface features a "Layers" panel on the left with the following categories and items:

- Streams and Water Resources
  - Surface Water Related
  - Fish Information
  - Flooding Information
  - NHD HUC (National Hydrogra
  - Water Monitoring
  - Water Quality
    - Attaining Streams Assess
    - Non Attaining Streams Ass
    - TMDL Streams
      - Final
      - Interim
      - Existing Use Streams
      - Designated Use Streams
      - Designated Use Streams
    - Attaining Lakes
    - Non Attaining Lakes
    - TMDL Lakes
    - Existing Use Lakes
    - Designated Use Lakes
- Storage Tanks
- Waste
- Water
- Areas POI - Geological
- Areas POI - Environmental
- Areas POI - General
- Boundaries
  - Zip Code Points
  - DEP Regions
  - County Boundaries
  - Municipalities

The map displays a street grid and a cyan-colored stream labeled "Libitz". A pop-up window titled "TMDL Streams (1 of 5)" provides the following details:

- TMDL GEN ID: 380
- TMDL Name: Libitz Run
- ReachCode: 02050306004586
- COMID: 57462417
- Status Final: Y
- Cause: Siltation ; Suspended Solids ; Turbidity
- TMDL Begin Date: 9/18/2004
- TMDL End Date: 11/17/2004
- Meeting Date: 9/28/2004
- Draft\_Date: Null
- Final\_Date: 10/8/2004
- TMDL URL Title: Libitz Run
- TMDL URL File: [Libitz\\_TMDL.pdf](#)
- Info Sheet URL Title: Information Sheet for Libitz Run
- Info Sheet URL File: [Libitz\\_INFO.pdf](#)
- Public Notice URL Title: Public Notice for Libitz Run
- Public Notice URL File: [Libitz\\_PN.pdf](#)
- Other TMDL Title: null
- Zoom to

**Total Maximum Daily Load (TMDL)  
Lititz Run  
Lancaster County**

**Pennsylvania Department of Environmental Protection  
Central Office  
Office of Water Management**



**August 2004**

*Table 6. Sediment Waste Load Allocations for MS4 Designated Areas within Little Run*

Pollutant Source	Acres	Unit Area Loading Rate (lbs/ac/yr)		Pollutant Loading (lbs/yr)	
		Current	Allowable	Current	Allowable (WLA)
Hay/Pasture	814.00	76.66	59.19	62,401.24	48,180.66
Cropland	2,758.00	1,267.93	533.18	3,496,950.94	1,470,510.44
Developed	2,010.00	89.12	449.51	179,131.20	903,511.10

From Table 6:

WLA (sediment) = 351,495 lbs/yr (sewer discharge) + 2,422,202.20 lbs/yr (MS4)

WLA (sediment) = 2,773,697.20 lbs/yr



# TMDL (sidebar)

**Table 14. TMDLs for Pequea Creek**

Pollutant	TMDL (lbs/yr)	WLA (lbs/yr)	LA (lbs/yr)	MOS (lbs/yr)
<b>Subbasin 1</b>				
Phosphorus	35,518	3,908	29,474.2	2,135.8
Sediment	7,248,622	0	6,523,759.8	724,862.2
<b>Subbasin 2</b>				
Phosphorus	41,020	2,938	34,449.0	3,633
Sediment	8,371,424	0	7,534,281.6	837,142.4

**Table 12. TMDL Allocations for Subbasin 2**

Land Use	Area (ac)	Phosphorus			Sediment		
		Current Loads (lbs/yr)	LA (lbs/yr)	% Reduction	Current Load (lbs/yr)	LA (lbs/yr)	% Reduction
Hay/Past	14614.58	9123.08	4969.0	45	3706007.34	1232739.8	67
Cropland	16899.40	54283.20	25349.1	53	31079847.84	5876766.4	81
Conif For	467.90	5.51	5.51	0	3000.90	3000.90	0
Mixed For	588.23	10.14	10.14	0	5648.19	5648.19	0
Decid For	8652.53	620.82	620.82	0	371819.20	371819.20	0
Quarry	19.35	38.36	38.36	0	23404.92	23404.92	0
Transition	8.45	12.35	12.35	0	5747.39	5747.39	0
Developed	606.68	499.78	382.2	23	23090.31	15154.9	34
Ground-water	--	3061.52	3061.52	0	--	--	--
Point Source	--	1349.3	2939	0	--	--	--
<b>TOTAL</b>	<b>41857.12</b>	<b>69004.05</b>	<b>37388</b>	<b>46</b>	<b>35218566.09</b>	<b>7534281.7</b>	<b>79</b>

# Individual MS4 Permit

In certain cases, such as where a permittee's regulated small MS4s discharge to a "Special Protection" watershed, an NPDES MS4 IP is required. A permittee's SWMP must be fully implemented in the first permit term and it must be continued and improved during subsequent permit terms. If your regulated small MS4s discharge stormwater into any receiving waters with approved Total Maximum Daily Loads (TMDLs), you must develop, implement, and enforce an MS4 TMDL Plan that achieves consistency with the assumptions and requirements of any applicable Wasteload Allocations (WLAs) of the TMDLs. Your MS4 TMDL Plan must be submitted with your application for an NPDES MS4 IP.

**"Special Protection" (High Quality or Exceptional Value)**

# 25 Pa. Code Chapter 93

<b>Stream</b>	<b>Zone</b>	<b>County</b>	<b>Water Uses Protected</b>	<b>Exceptions To Specific Criteria</b>
1—Susquehanna River	Main Stem, Juniata River to PA-MD State Border	York- Lancaster	WWF, MF	None
2—Unnamed Tributaries to Susquehanna River	Basins, Juniata River to Muddy Run	Perry- Cumberland- Dauphin- York- Lancaster	WWF, MF	None
2—Little Juniata Creek	Basin	Perry	CWF, MF	None
2—Sherman Creek	Basin, Source to Cisna Run Village	Perry	HQ-CWF, MF	None
2—Sherman Creek	Main Stem, Cisna Run Village to Mouth	Perry	WWF, MF	None

Pollutant Reduction Plans (PRPs)

# Additional Considerations

# General Guidelines for MS4 Collaborative Efforts

- Written agreement (Intergovernmental Cooperation Agreement)
- Scope of agreement
  - Complete PRP implementation or individual BMP implementation)
- Roles and responsibilities
  - Project selection process, contracting and/or consultant selection processes, long-term O&M, adaptive management, etc.
- Allocations of cost and pollutant reductions
  - Methodologies described
- Schedule (timeline(s) for implementation)
- Other ICL agreement requirements

As long as BMPs are implemented in MS4 planning area(s) and address the pollutant(s) of concern, the pollutant reductions afforded by the BMPs may be shared between collaborating MS4s.

# Joint Approach Considerations

- Do not need to a joint permit\*
- Contiguous municipalities is not an absolute requirement...watershed relationship plays a role
- Share of costs breakdown that has been gaining steam is:
  - Share is based on the percent of the loading and reduction requirement of an individual municipality as an overall share of the loadings and reductions of all the joint partners.

\*May be appropriate to consider for a joint individual permit



# Contiguous Municipalities

Hello Mike,

It is my current understanding from central office that there is NOT a contiguous requirement for collaborative efforts as long as the participants are within a reasonably sized watershed. HUC-12 was thrown out there, but not set in stone. If they are within the Pequea Creek watershed, then that would definitely qualify.

# Lime Spring Farm Development





**Worksheet 13 - Pollutant Reduction Through BMP Applications\***

\*Fill this worksheet out for each BMP type with different pollutant removal efficiencies. Sum pollutant reduction achieved for all BMP types on final sheet.

BMP Type: Floodplain Restoration

Disturbed Area Controlled by this BMPs (AC)	97.73
---	-------

**Disturbed Area Controlled by this BMPs:**

	Land Cover Classification	Pollutant			Cover (Acres)	Runoff Volume (AF)	Pollutant Load**		
		TSS EMC (mg/l)	TP EMC (mg/l)	Nitrate- Nitrite EMC (mg/l as N)			TSS** (LBS)	TP** (LBS)	NO <sub>3</sub> (LBS)
<b>Pervious Surfaces</b>	Forest	39	0.15	0.17					
	Meadow	47	0.19	0.30	12.57	0.1446	18.34	0.07	0.12
	Fertilized Planting Area	55	1.34	0.73					
	Native Planting Area	55	0.40	0.33					
	Lawn, Low-Input	180	0.40	0.44	35.36	0.0499	24.27	0.05	0.06
	Lawn, High-Input	180	2.22	1.46					
	Golf Course Fairway/Green	305	1.07	1.84					
	Grassed Athletic Field	200	1.07	1.01					
<b>Impervious Surfaces</b>	Rooftop	21	0.13	0.32	15.00	3.1248	177.18	1.10	2.70
	High Traffic Street/Highway	261	0.40	0.83	4.80	0.9999	704.65	1.08	2.24
	Medium Traffic Street	113	0.33	0.58					
	Low Traffic/Residential Street	86	0.36	0.47					
	Res. Driveway, Play Courts, etc.	60	0.46	0.47					
	High Traffic Parking Lot	120	0.39	0.60	30.00	6.2496	2,024.87	6.58	10.12
	Low Traffic Parking Lot	58	0.15	0.39					
	<b>TOTAL LOAD TO THIS BMP TYPE</b>							<b>2,949.31</b>	<b>8.89</b>
<b>POLLUTANT REMOVAL EFFICIENCIES FROM APPENDIX A. STORMWATER MANUAL (%)</b>							N/A	N/A	N/A
<b>POLLUTANT REDUCTION ACHIEVED BY THIS BMP TYPE (LBS)</b>							<b>169,779.00</b>	<b>88.80</b>	<b>5,077.00</b>
<b>POLLUTANT REDUCTION ACHIEVED BY ALL BMP TYPES (LBS)</b>									
<b>REQUIRED REDUCTION from WS12 (LBS)</b>							<b>2,506.91</b>	<b>7.55</b>	<b>7.62</b>

\*Pollutant Load = [EMC, mg/l] X [Volume, AF] X [2.7, Unit Conversion]

\*\*TSS and TP calculations only required for projects not meeting CG1/CG2 or not controlling less than 90% of the disturbed area

# Final Thoughts and Questions?

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