

# Stormwater 101

Introduction to the Stormwater  
Program

Phase I and II

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# Agenda

- **Stormwater stats and basic information**
- **Industrial Program**
- **Construction Program**
- **Municipal Program**

# Why is Stormwater a Problem?

Urban Runoff is the Source of Problems in:

- 34,871 miles or 13% of all Impaired of Rivers and Streams
- 1,369,327 acres or 18% of all Impaired Lakes
- 5045 square miles or 32% of all Impaired Estuaries

# Effects of Development on Stormwater Runoff

## Increases:

- Impervious surface area
- Stormwater volume
- Stormwater velocity
- Deposition of pollutants

## Decreases:

- Stormwater quality
- Ground water recharge
- Base flow
- Natural drainage systems including riparian vegetative cover

# Common pollutants in urban stormwater

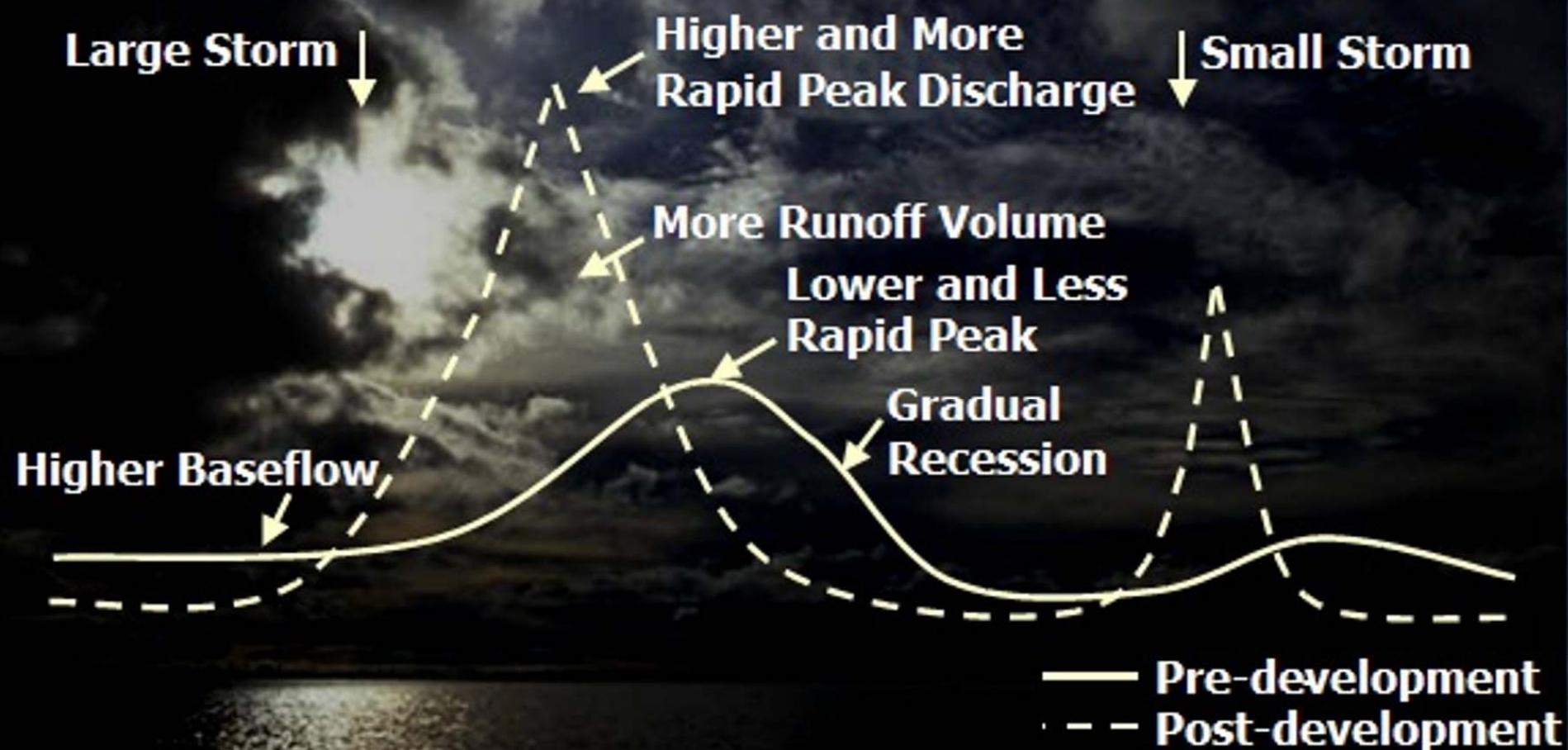
- Sediment
- Nutrients
- Oxygen-demanding substances
- Pathogens
- Trash
- Road Salts
- Oil and Grease
- Heavy Metals
- Heat
- PAHs



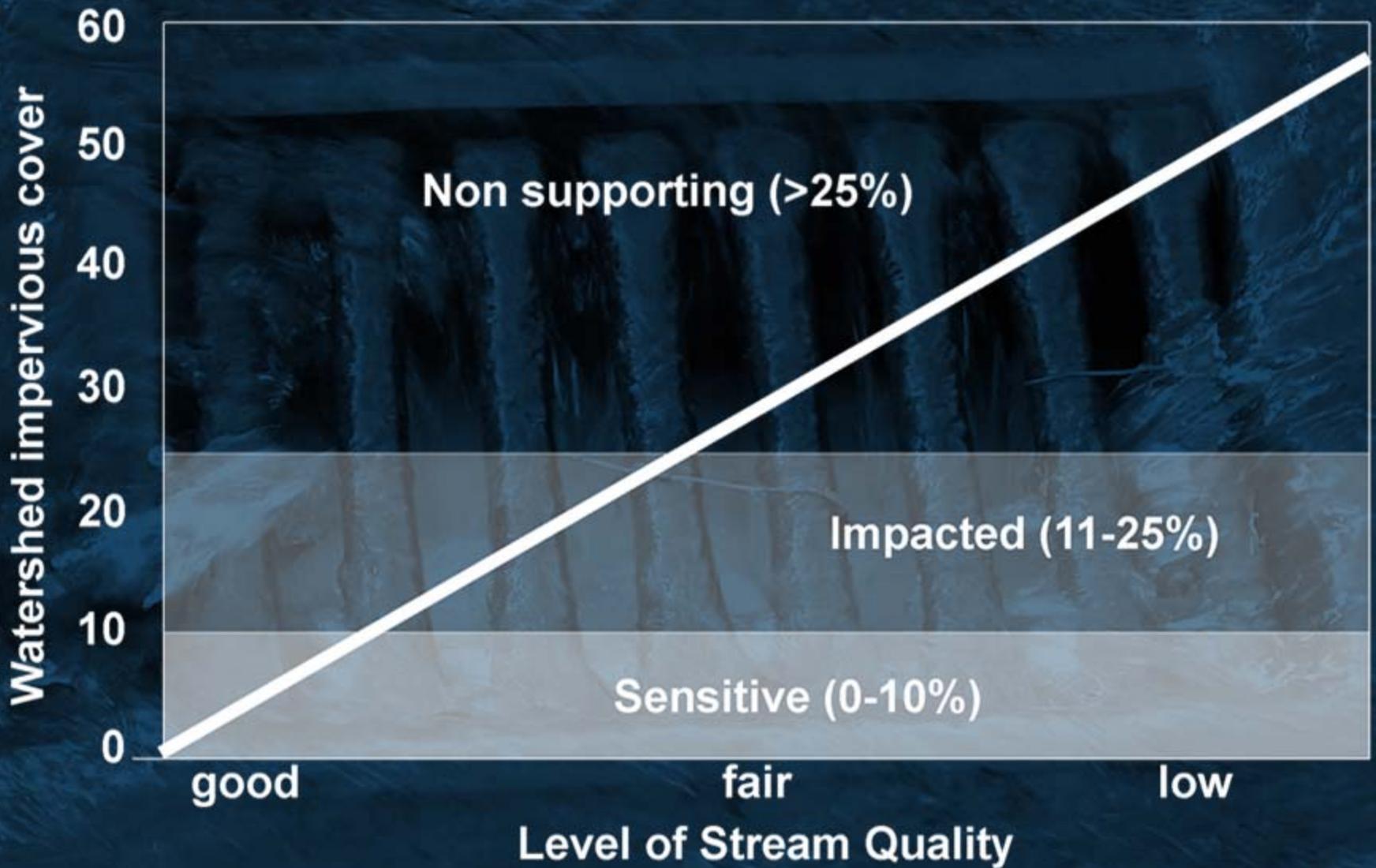
# Runoff Pollution



# Consequences of Development to Urban Streams



# Relationship Between Impervious Cover and Stream Quality

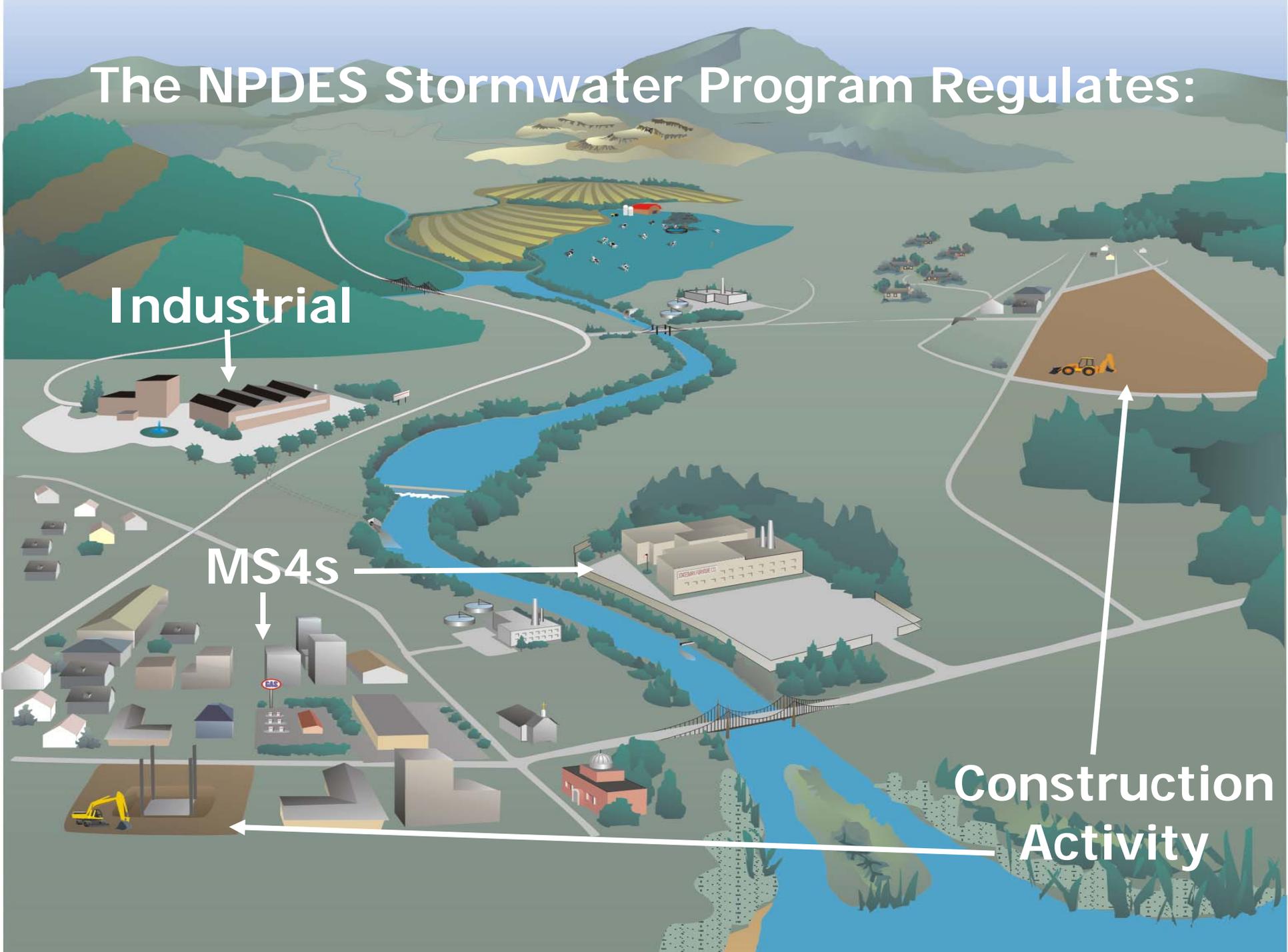


# The NPDES Stormwater Program Regulates:

Industrial

MS4s

Construction Activity





# Regulatory History

- Before 1987 stormwater considered a non-point source and not regulated
- Water Quality Act of 1987 required NPDES permitting of certain stormwater discharges
  - Medium and large municipalities (serving over 100,000 persons)
  - Industrial activities
  - Others, as determined by EPA, “to protect water quality”

# CWA Section 402(p)

- 402(p)(2) included:
  - Existing permitted facilities
  - Industrial activity
  - MS4s serving >250,000 people
  - MS4s serving >100,000 people
  - Others as determined by the permitting authority
- (p)(3)
  - Permit requirements, including MEP for MS4s
- (p)(4)
  - Application requirements, dates
- (p)(5)
  - Studies to determine who else to regulate
- (p)(6)
  - Regulations, reflecting results of Studies (5)

# NPDES Statutory Framework

All “point” sources  
“Discharging  
Pollutants”  
into “Waters of the  
U.S.”

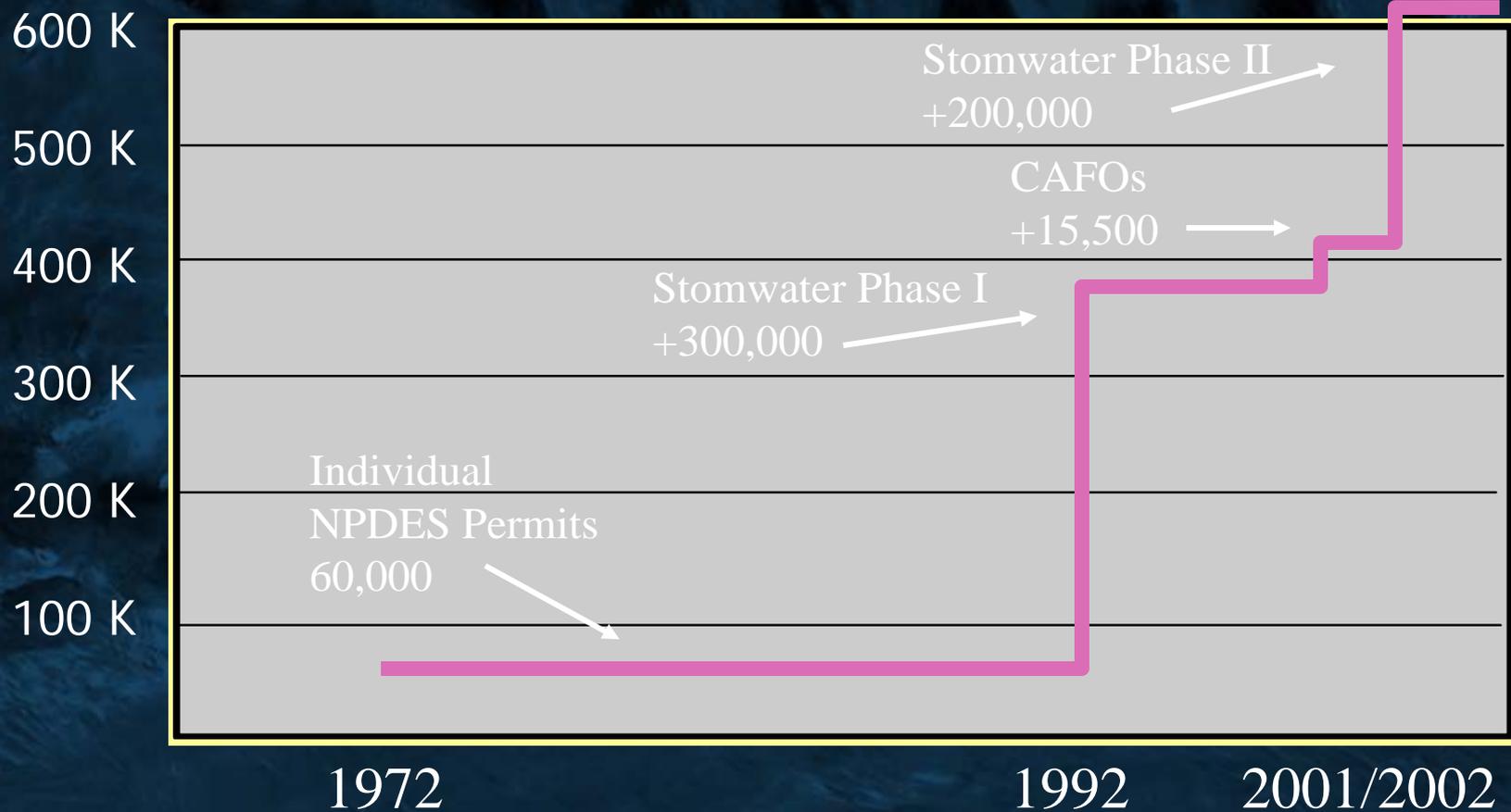


Must obtain  
an NPDES  
permit from  
an authorized  
State or EPA

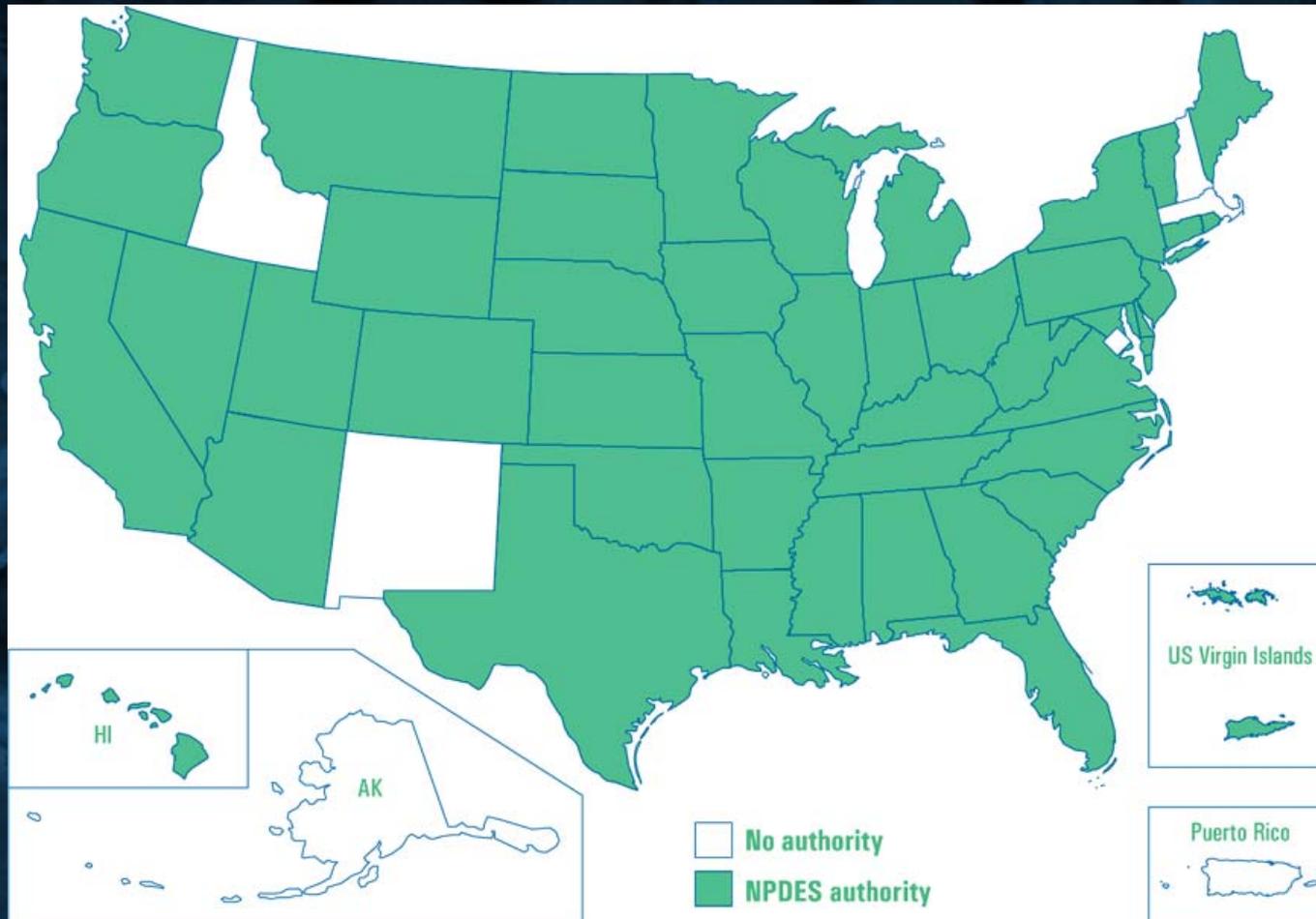
# Point Sources vs. Non-Point Sources

- Stormwater has expanded the definition of “point source”
- Some stormwater remains covered as “non-point source”
  - Agricultural
  - Small MS4s outside urbanized areas

# Growth of the NPDES Program (Number of facilities or sources)



# State NPDES Program Authority

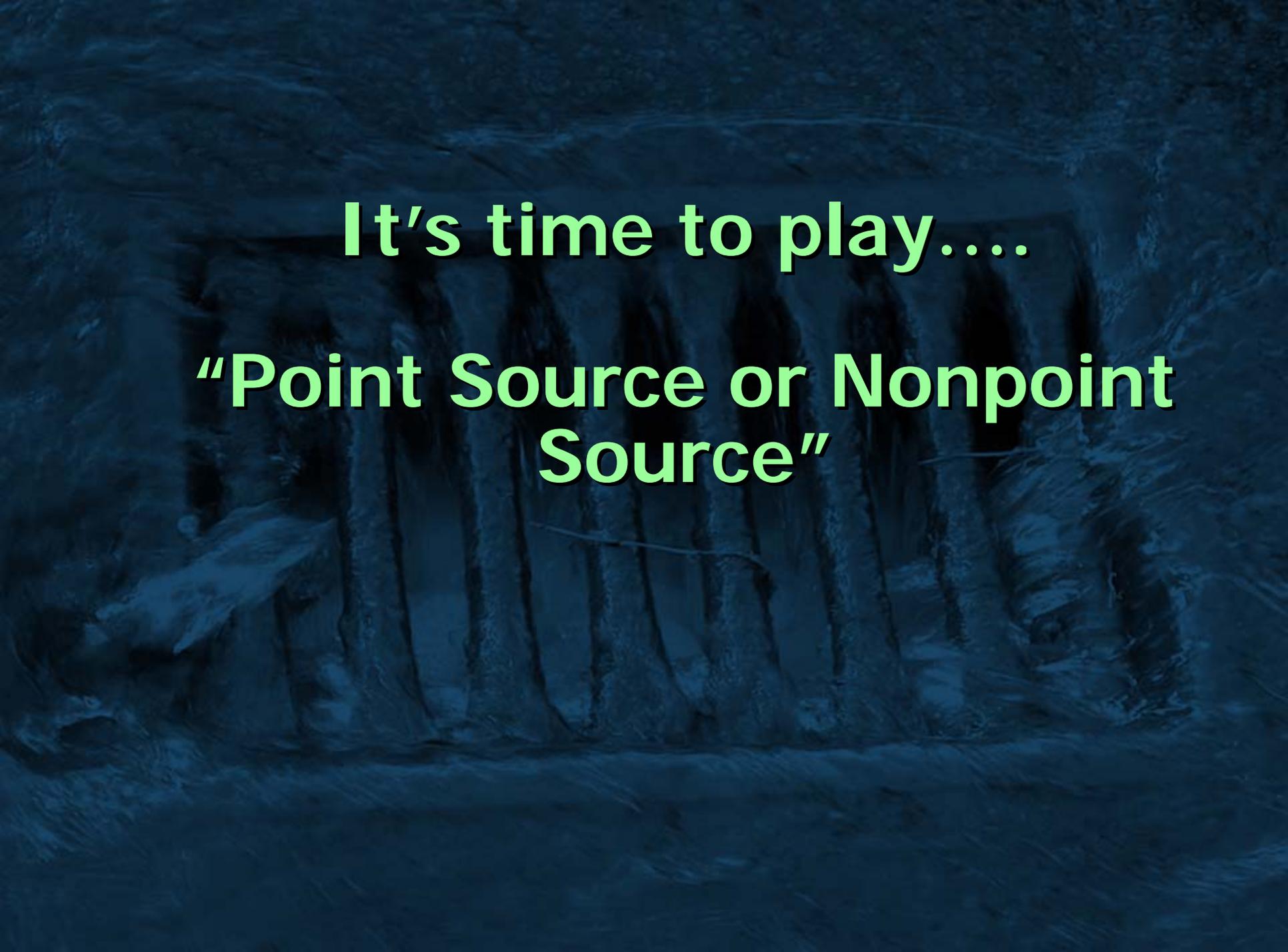


# The "Phases"

- **Phase I – 1990**
  - Medium and Large municipalities (over 100,000)
  - Industrial activity (11 categories, including construction over 5 acres)
  - Category 11 (light industry – only if exposure)
- **Phase II – 1999**
  - Smaller municipalities in "urbanized areas"
  - Construction sites (1-5 acres)
  - "No exposure" expanded, including notice

# Permitting Framework

- Three parts of the stormwater program
  - Municipal
  - Construction
  - Industrial
- All three emphasize pollution prevention and minimizing exposure
- Best Management Practice (BMP) focus to limit exposure of pollutants to stormwater rather than “treatment systems”



**It's time to play....**

**"Point Source or Nonpoint Source"**







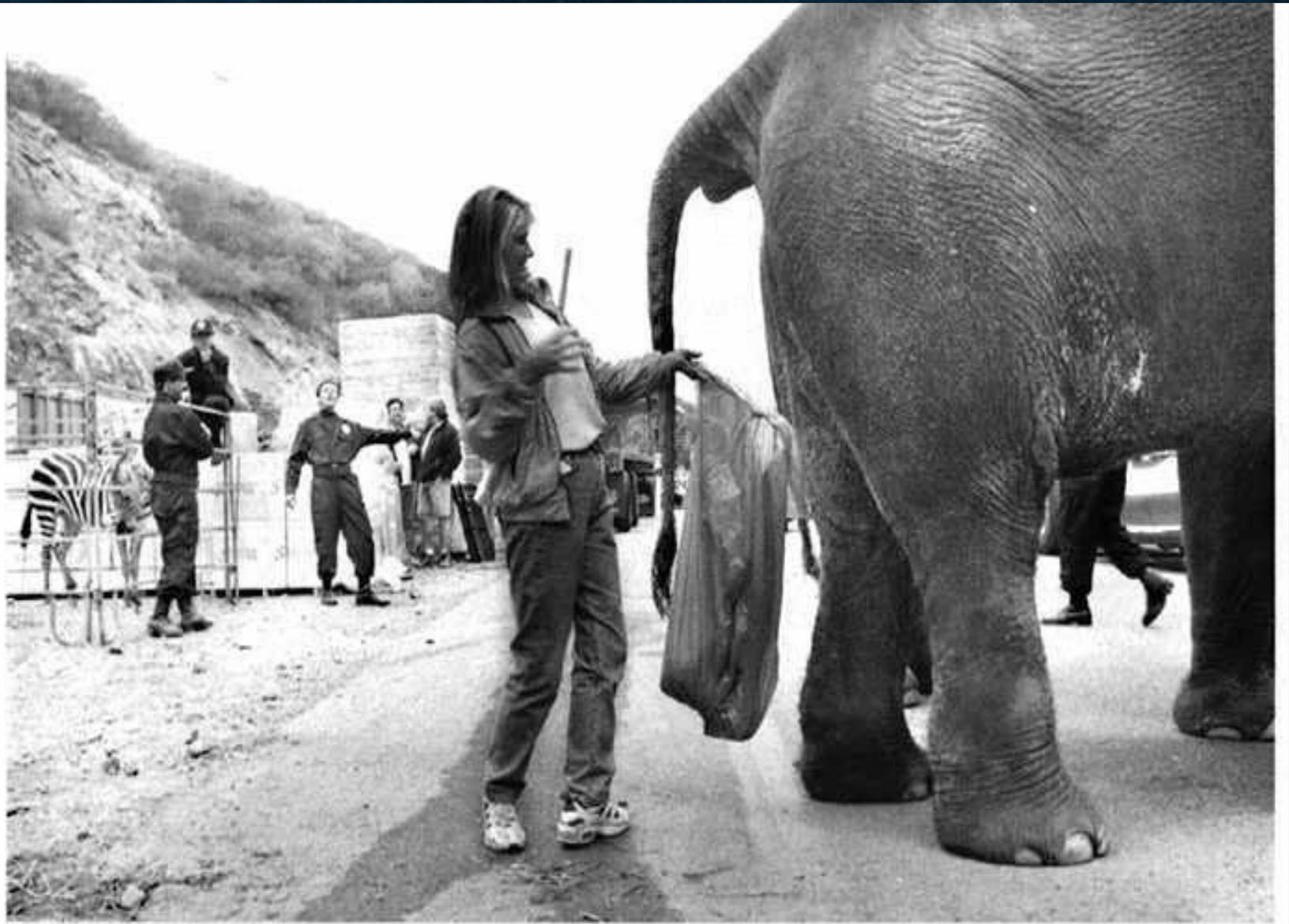












# Industrial Program

# Industrial Activities

- Covers 10 categories of industrial activities (“Industrial America”)
- Related to manufacturing, processing, or materials storage areas
- Includes federal, state, and municipally-owned and operated facilities
- Industrial facilities with “no exposure” of their industrial activities or materials to stormwater are not required to have permit coverage. Must certify no-exposure

# Regulated Industrial Activities

- Facilities Subject to Standards (i)
- Heavy Manufacturing (ii)
- Mining/Oil and Gas (iii)
- Hazardous Waste Facilities (iv)
- Landfills (v)
- Recycling Facilities (vi)
- Steam Electric Power Plants (vii)
- Transportation Industries (viii)
- Sewage Treatment Plants (ix)
- Light industry (xi)

# Industrial Activities: Light Industry (Category xi)

- Identified by SIC code
- Most likely for “No Exposure”
- Phase I - no exposure exempt
- Phase II no exposure notification required



# What is the “No Exposure” Provision?

- **Original no exposure exemption**
  - Only available to Category (xi) facilities with no exposure
  - No certification required
- **9th Circuit Court Decision**
  - Remanded for further rulemaking
- **Final Phase II Rule**
  - No exposure provision
    - Applies to all Categories, except construction
    - Requires certification of no exposure



# EPA's Multi-Sector General Permit (MSGP)

- Developed using industry-specific data from Phase I group application process (60,000+ applicants)
- Consolidated industry data into 29 industry sectors with tailored requirements
- Focuses on development and implementation of stormwater pollution prevention plans
- Published in 1995, again in 2000.
- Reissuance pending



# Construction Activities



**Construction  
Activity**

# Stormwater Construction Program is Designed to:

- Prevent or minimize impact of construction
- Minimize erosion during construction
- Control sedimentation
- Consider post-construction stormwater management



# Regulated Industrial Activities: Construction

- Large construction (>5 acres) in category (x) of industrial activity
- Small construction (1-5 acres) in stand alone section (Phase II)
- "Definition" of construction
  - Clearing, grading or excavating
- Activities part of a larger common plan of development
  - Multiple activities within a contiguous area
  - Includes activities taking place on different schedules



# Construction Permitting

- **Construction General Permit (CGP)**
  - Initially issued in 1992
  - Reissued in 1998 and again on July 1, 2003
- **Relies on NOI/NOT and site-specific SWPPP**
- **Waivers available for small construction only**
  - Low-erosivity waiver
  - Water-quality/TMDL waiver



# Municipal Stormwater

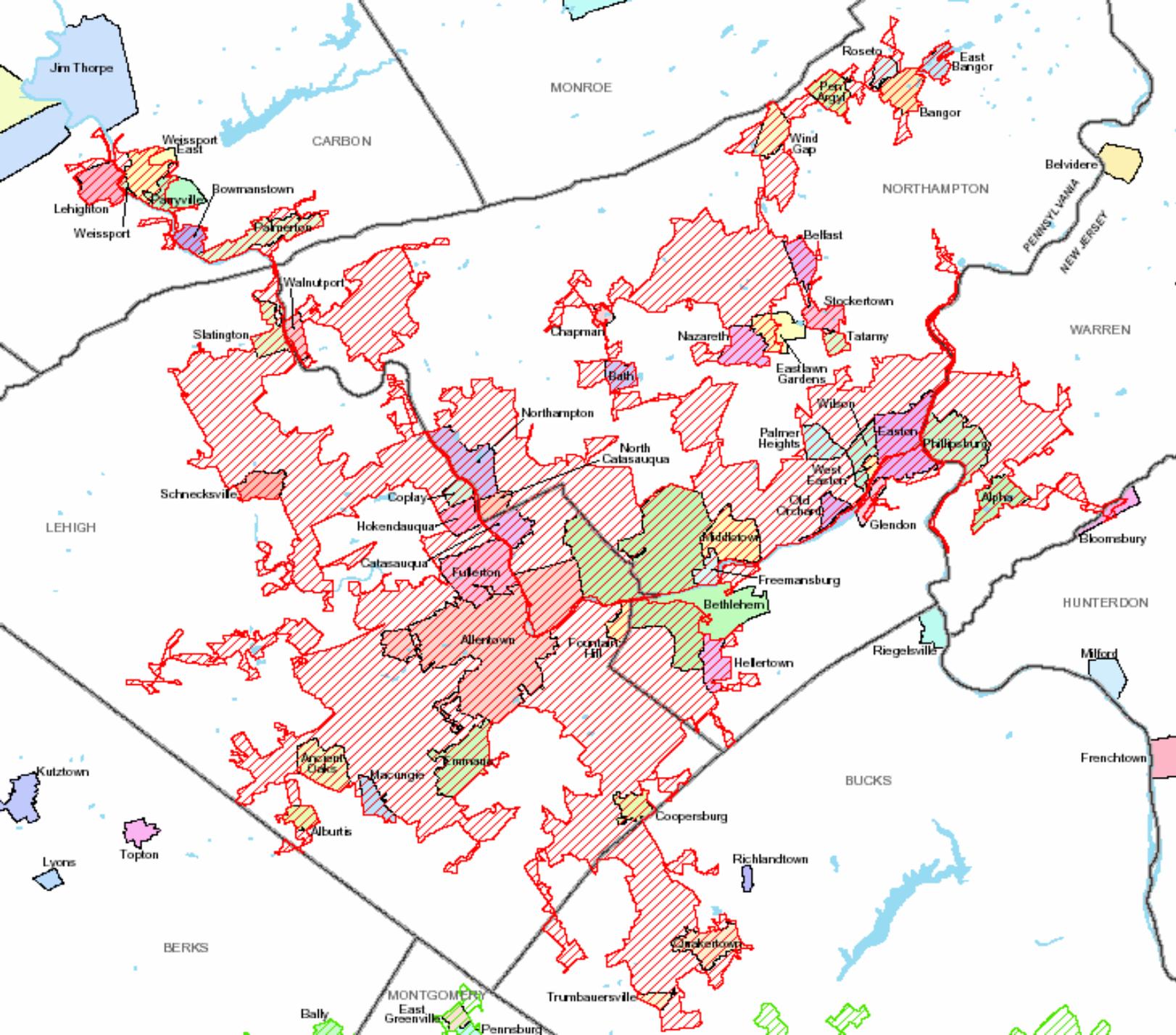
# What is an MS4?

- A municipal separate storm sewer system (MS4) is:
- A conveyance or system of conveyances... owned by a state, city, town, or other public entity that discharges to waters of the U.S. and is:
  - designed or used for collecting or conveying stormwater
  - not a combined sewer
  - not part of a Publicly Owned Treatment Works (POTW)

This is an MS4!



# Allentown - Bethlehem, PA - Urbanized Area Storm Water Entities as Defined by the 2000 Census



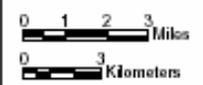
## 2000 Census Urbanized

- Allentown - Bethlehem, PA - NJ
- Philadelphia, PA - NJ -
- Municipal Boundaries
- County Boundaries
- Major Waterbodies

SOURCE: US Census Bureau TIGER data, 2000 Census

PROJECTION: State Plane Coordinate System - Pennsylvania Horizontal datum - NAD83

MAP DESIGN: September 23, 2002



# Phase I Coverage

- Covers municipalities with populations over 100,000
- Many interconnected small MS4s also permitted
- Approximately 275 permits covering 1,000 MS4s have been issued



# Phase I Program

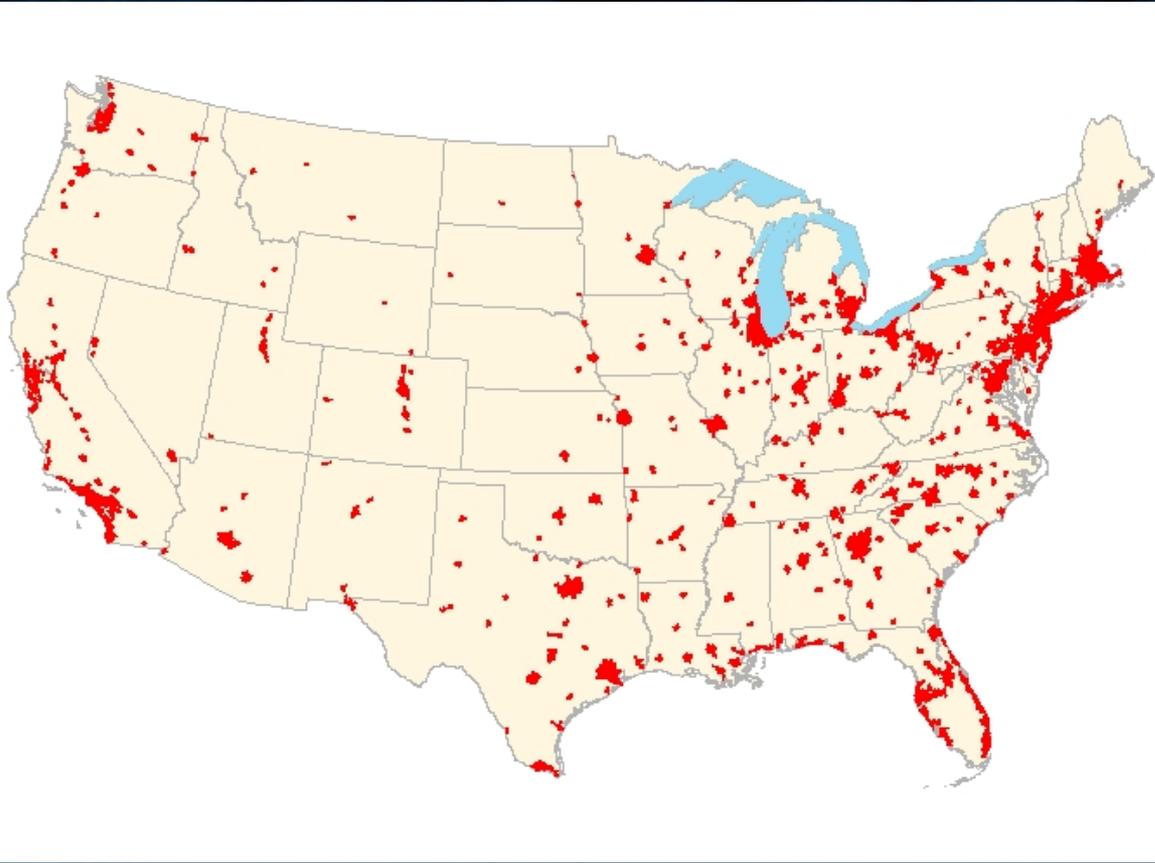
- Extensive two-part permit application
- Stormwater management program must reduce the discharge of pollutants to the maximum extent practicable (MEP)
- Individual permits to be issued by
  - May 1993 for large MS4s
  - May 1994 for small MS4s

# Phase II Coverage

- Covers more than 5,000 smaller MS4s in “urbanized areas”
- Urbanized areas based on decennial census
- Permitting authorities can also designate additional small MS4s that are outside of urbanized areas
- Includes non-traditional MS4s



# Urbanized Areas in the U.S.



- 464 UAs
- 5,000+ Communities
- 197 million people
- 70% of the population
- 2% of the land area

# Phase II Program

- Permitting authority issues general permit (in most instances)
- MS4s develop stormwater management programs to reduce pollutants to the maximum extent practicable (MEP)
- MS4s submit NOIs addressing the six basic elements or "minimum control measures"

# Six Minimum Measures

- Public Education and Outreach
- Public Involvement and Participation
- Illicit Discharge Detection and Elimination
- Construction Site Runoff Control
- Post-Construction Storm Water Management for New and Re-development
- Pollution Prevention/Good Housekeeping for Municipal Operations



# MS4 Permitting Summary

- **Phase I**
  - Most permits now in second or third permitting cycle
- **Phase II**
  - Small MS4s were required to apply for permit coverage by March 10, 2003
  - Small MS4s have five years to get programs fully up and running





# Resources and Tools for Communities

# Resources and Tools

- EPA Stormwater Website ([www.epa.gov/npdes/stormwater](http://www.epa.gov/npdes/stormwater))
- Menu of Best Management Practices (BMPs)
- Measurable Goals Guidance
- Urbanized Area Maps
- Outreach Materials (Stormwater Month)



Construction Activities  
-2003 Construction  
General Permit

Industrial Activity  
-Who's Covered?  
-Application  
Requirements

Municipal MS4s  
-Large & Medium  
-Small

Stormwater Month  
Outreach Materials

Phase I & Phase II  
-Menu of BMPs  
-Urbanized Area Maps

Storm Water Home

**U.S. Environmental Protection Agency**

## National Pollutant Discharge Elimination System (NPDES)

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### Storm Water Program

#### OVERVIEW

Storm water discharges are generated by runoff from land and impervious areas such as paved streets, parking lots, and building rooftops during rainfall and snow events that often contain pollutants in quantities that could adversely affect water quality. Most storm water discharges are considered point sources and require coverage by an NPDES permit. The primary method to control storm water discharges is through the use of best management practices.

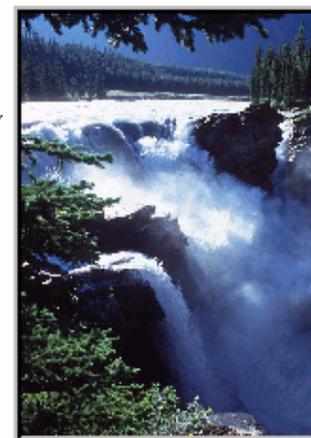
#### WHAT CAN I FIND ON THIS WEB SITE?

This page contains technical and regulatory information about the NPDES storm water program. It is organized according to the three types of regulated storm water discharges and provides a link to Stormwater Month outreach materials:

- [Construction activities](#)
- [Industrial activities](#)
- [Municipal separate storm sewer systems](#)
- [Stormwater Month Outreach Materials and Reference Documents](#)

Information specific to the [Phase I and Phase II](#) storm water regulations is also available.

**New!** [Factsheet: Stormwater Discharges Regulated as Class V Wells](#) [PDF Format] - This new fact sheet describes



#### Storm Water Information

[Recent Additions](#)

[FAQs](#)

[Publications](#)

[Regulations](#)

[Training & Meetings](#)

[Links](#)

[Contacts](#)



The documents on this site are best viewed

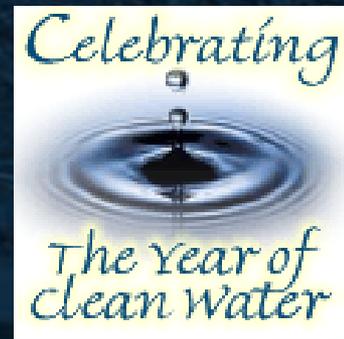
# Menu of BMPs

- Comprehensive document illustrating ways municipalities can meet six minimum control measures
- Hundreds of fact sheets covering:
  - Public outreach
  - Public participation
  - Illicit Discharge
  - Construction
  - Post-construction
  - Municipal operations
  - etc.
- [www.epa.gov/npdes/stormwater/menuofbmps](http://www.epa.gov/npdes/stormwater/menuofbmps)

# Measurable Goals

- EPA Guidance on developing measurable goals for MS4 stormwater programs
- Allows municipalities and permitting authorities to gauge the effectiveness of major elements of municipal programs
- Goals should be periodically evaluated and revised/improved as needed

# Outreach Materials



- Materials developed for "Stormwater Month"
- Do-it-yourself kit with CD of products that can be customized to include name, address, and telephone of municipality
- Materials for homeowners, commercial facilities, kids, construction sites, etc.
- [www.epa.gov/npdes/stormwatermonth](http://www.epa.gov/npdes/stormwatermonth) to download files or order copies of the CD

# Outreach Materials

*After the Storm*

*A Citizen's Guide to Understanding Stormwater*

## Stormwater and the Construction Industry

### Protect Natural Features

Bad

Good

- Minimize clearing.
- Minimize the extent of exposed soil.
- Identify and protect areas where existing vegetation, such as trees, will not be disturbed by construction activity.
- Protect streams, streams buffers, wild woodlands, wetlands, or other sensitive areas from any disturbance or construction activity by fencing or otherwise clearly marking these areas.

### Construction Phasing

Bad

Good

- Sequence construction activities so that the soil is not exposed for long periods of time.
- Schedule or limit grading to small areas.
- Install key sediment control practices before site grading begins.
- Schedule site stabilization activities, such as revegetating, to be completed immediately after the land has been graded in that section.

### Vegetative Buffers

Bad

Good

- Protect and install vegetative buffers along waterbodies to slow and filter stormwater runoff.
- Monitor buffers by mowing or spraying periodically to assure their effectiveness.

### Silt Fencing

Bad

Good

- Inspect and maintain silt fences after each rainstorm.
- Make sure the bottom of the silt fence is buried in it.
- Securely attach the material to the stakes.
- Don't place silt fences in the middle of a roadway or a back-ditch.
- Make sure construction is not blocking around the silt fence.

### Construction

Bad

- Barriers and mulch are better than water a practice.
- Properly use concrete SMI.
- Make sure that the concrete is cured.

### Site Stabilization

Bad

Good

- Stitch, or otherwise stabilize, all exposed areas and shorelines before being graded.

### Inlet Protection

Bad

Good

- Use a grate to cover the storm drain inlet.
- Programs (county programs) usually make these regulations.

Make your home  
The  
**SOLUTION TO STORMWATER POLLUTION!**

A homeowner's guide to healthy habits for clean water

United States Environmental Protection Agency

# News and Contacts

- NPDES News – Sign up at [www.epa.gov/npdes](http://www.epa.gov/npdes)
- NPS-Stormwater Listserve – email to [lyris@lists.epa.gov](mailto:lyris@lists.epa.gov) with: subscribe NPSINFO [your first name] [your last name] in the subject or body
- Nikos Singelis  
EPA Office of Water  
[singelis.nikos@epa.gov](mailto:singelis.nikos@epa.gov)  
202-564-0692