

# Stormwater Program Update



Waukesha County - 2012  
MS4 Stormwater Workshop

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U.S. EPA

# Topics

- Construction sites
  - Federal Effluent Guidelines
  - Federal Construction General Permit
- EPA Stormwater rulemaking
- Green Infrastructure
- Watershed-based MS4 permit
- Stormwater and TMDLs

# **Effluent Guidelines**

## **Stormwater Discharges from Construction Sites**

- **Technology-based standards for control of wastewater and stormwater discharges from various categories of dischargers**
- **Can be numeric standards (i.e., discharge limitations) and/or Best Management Practices**
- **Minimum requirements that apply nationally**
- **Improper control of stormwater discharges associated with construction activity contributes significant quantities of sediment, nutrients, and other pollutants to surface waters of the U.S.**

# Final Effluent Guidelines

December 1, 2009

- All construction sites will be required to meet a series of **non-numeric requirements** (BMPs)
- The December rule included a requirement that construction sites that disturb 10 or more acres of land would be required to comply with a numeric effluent limitation for turbidity (280 NTUs)
  - This requirement was later suspended
- **WDNR will issue a general permit to incorporate ELG requirements when the current permit expires**

# Narrative Requirements

## Stormwater Control Measures (BMPs)

- Erosion and Sediment Controls
- Soil Stabilization
- Dewatering
- Pollution Prevention
- Prohibited Discharges



Photo: Seattle Daily Journal

# Erosion/Sediment Control

- Control stormwater volume and velocity within the site to minimize soil erosion;
- Control stormwater discharges, including peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and streambank erosion;
- Minimize the amount of soil exposed during construction activity;
- Minimize the disturbance of steep slopes;
- ~~Minimize sediment discharges from the site;~~
- Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration, unless infeasible;
- Minimize soil compaction and preserve topsoil.



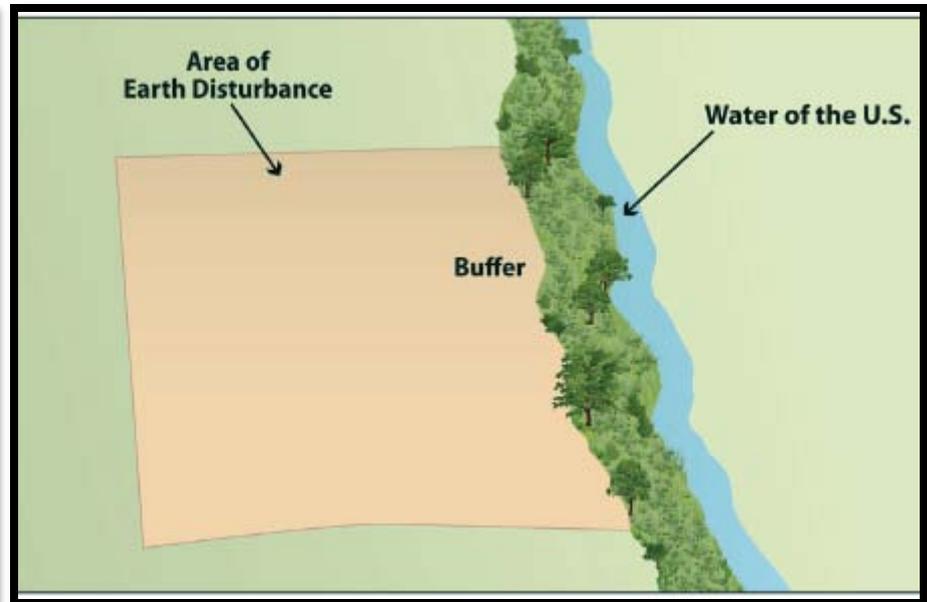
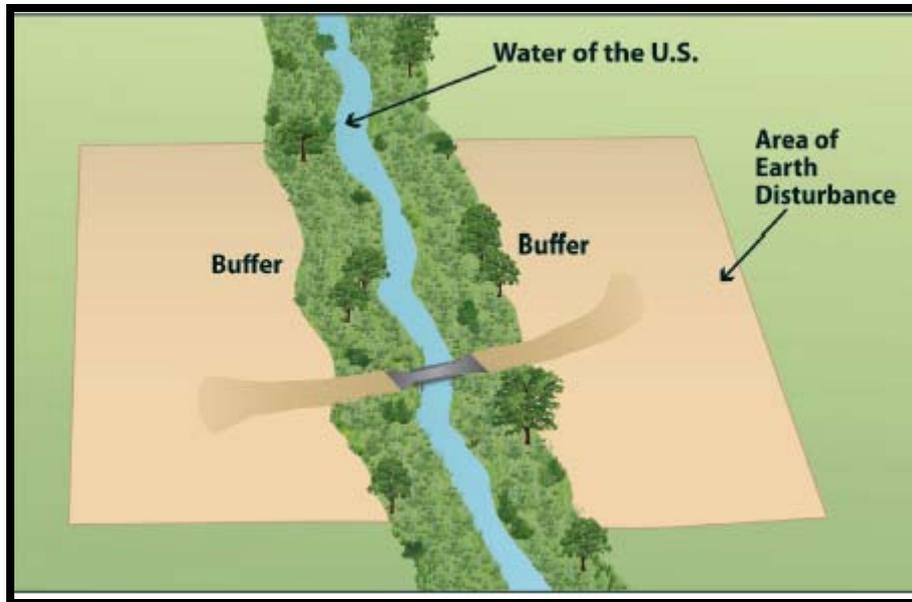
# Federal CGP Implements Effluent Guidelines

## Stream Buffers



# Stream Buffers

- ▶ Additional protection is required for any waters of the U.S. that are located on or immediately adjacent to the site



A photograph of a construction site near a large body of water. In the foreground, a yellow backhoe loader is parked on a dirt area. To its left, a worker in a high-visibility vest stands near a tree. In the background, another yellow excavator is visible, along with a red truck and a red car. The water is calm, and there are trees and hills in the distance under an overcast sky.

# Federal CGP

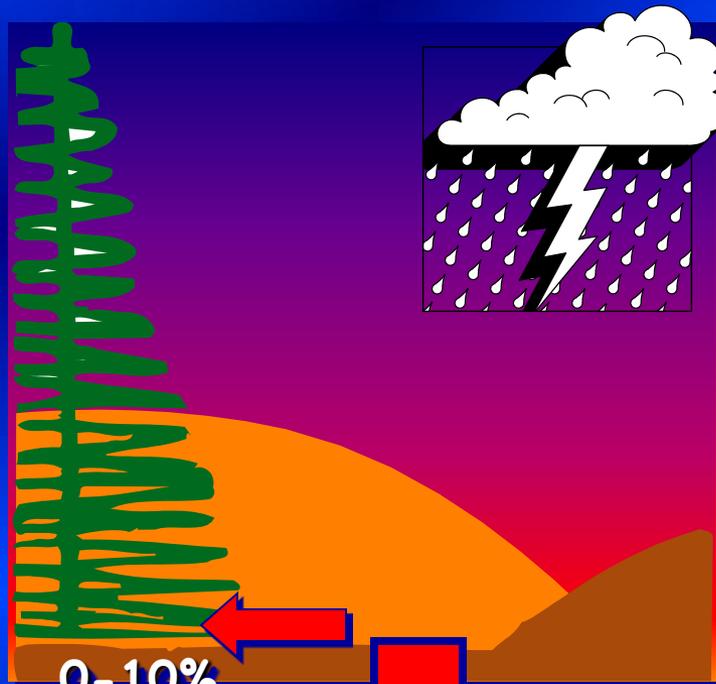
<http://cfpub.epa.gov/npdes/stormwater/cgp.cfm>

# Managing Stormwater Discharge Volumes



**EPA's 2010 – 2012 NPDES  
Stormwater Rulemaking**

# Relationships Between Land Use and Water Resources

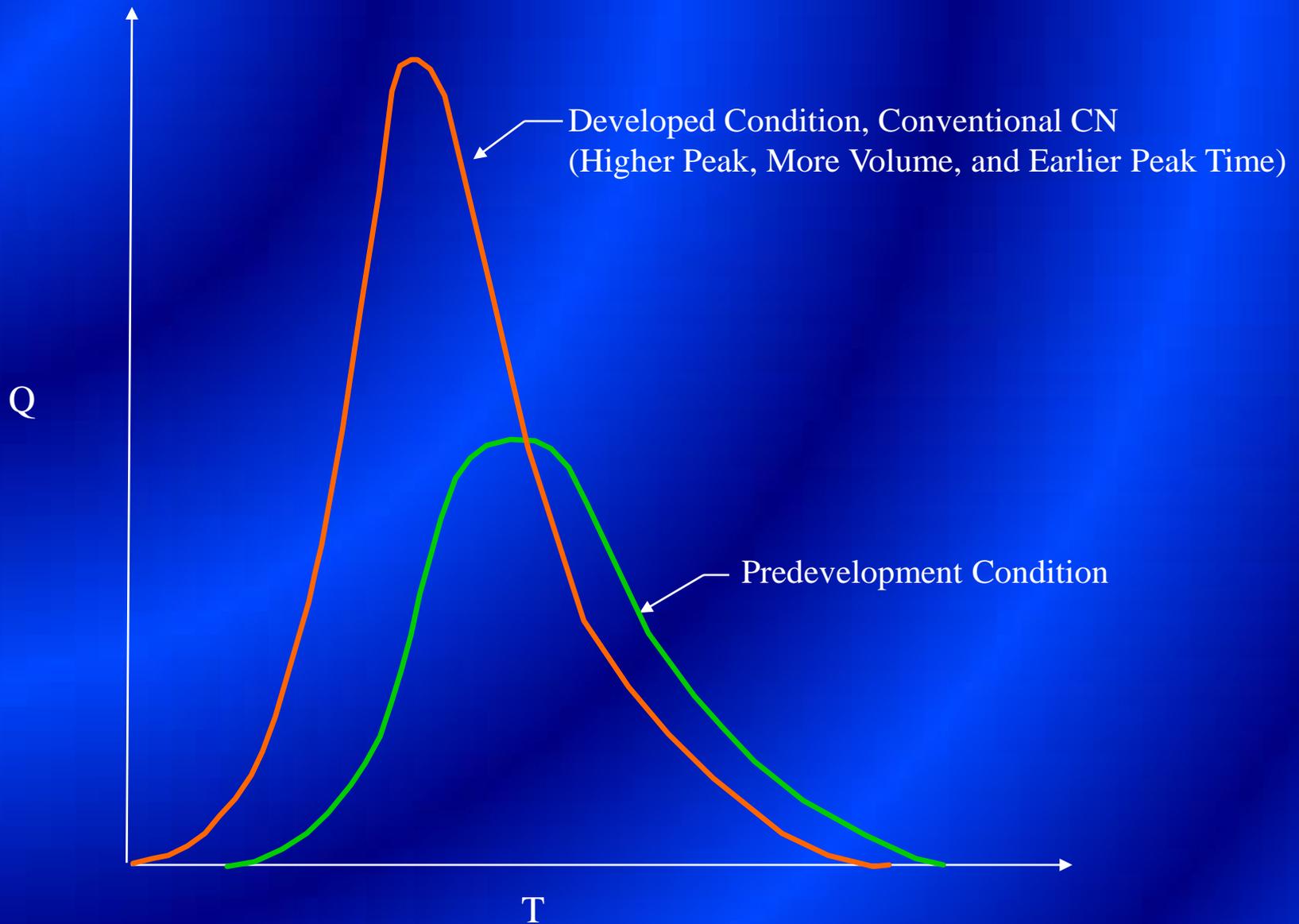


Development Increases Run-off

# Increased Run-off due to **Impervious Surfaces**



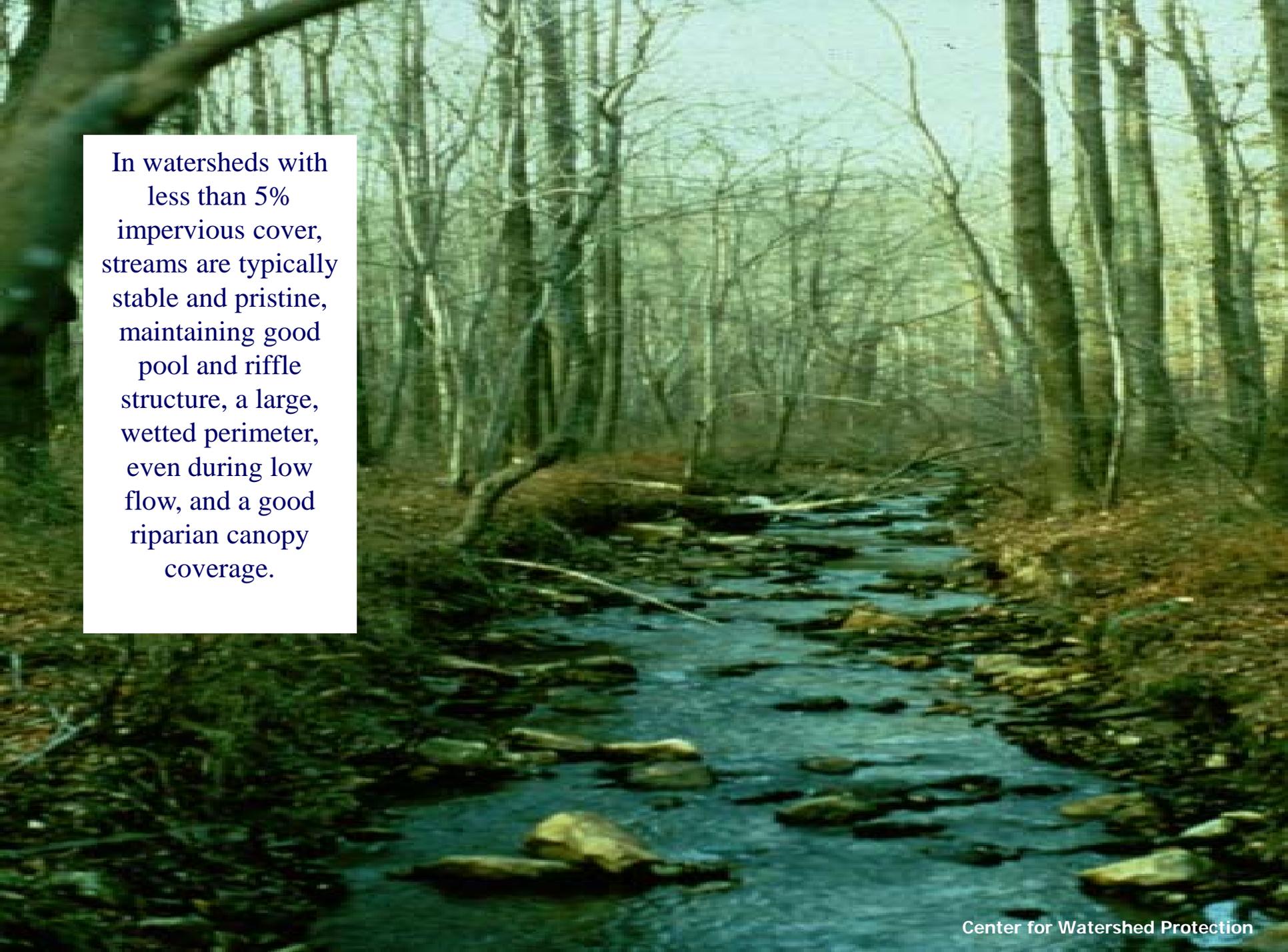
# Increased Run-off Changes Stream Flow Characteristics



# Effects of Higher Flow Volumes and Higher Flow Velocities...

- Stream widening and erosion
- Decreased channel stability
- Reduced fish passage
- Loss of pool-riffle structure
- Lower summer base flows
- Loss of riparian tree canopy
  - Temperature impacts
- Decreased substrate quality
  - Embeddedness (fine sediments become embedded into the coarse substrate)



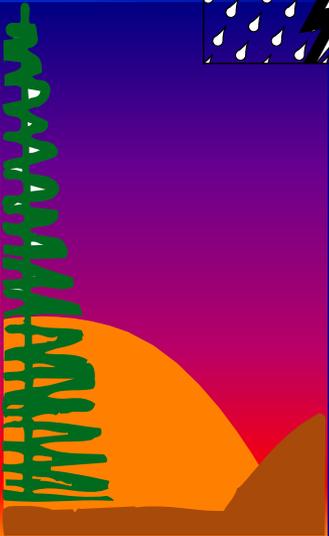
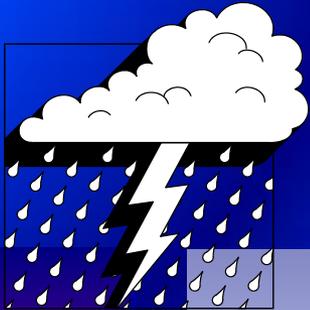


In watersheds with less than 5% impervious cover, streams are typically stable and pristine, maintaining good pool and riffle structure, a large, wetted perimeter, even during low flow, and a good riparian canopy coverage.

# Stream Channel Erosion



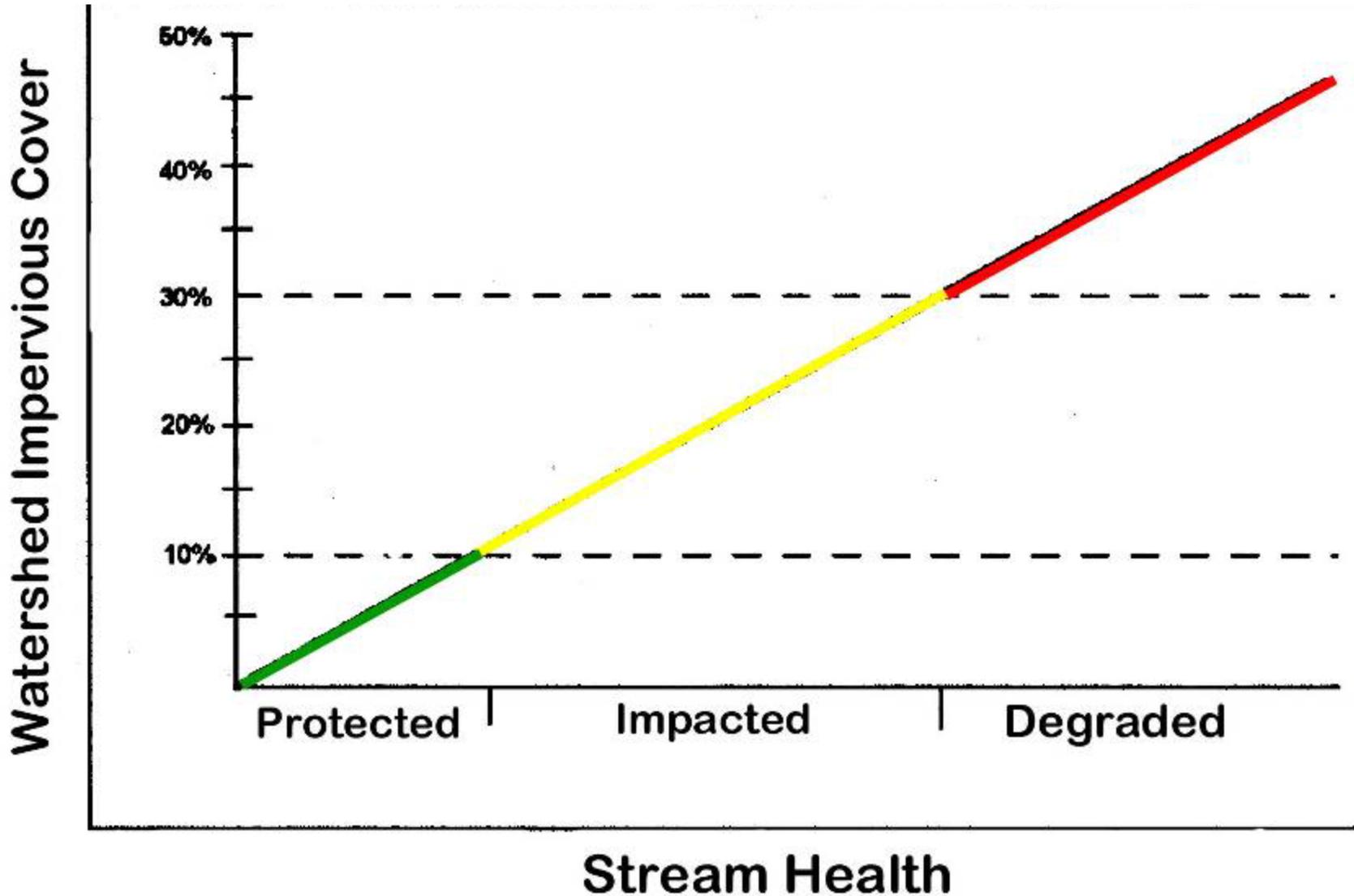
# Pollutants in Stormwater Discharges



- Nutrients
- Pathogens
- Sediment
- Toxic Contaminants
- Oil and Grease
- Thermal Stress



# Stormwater Volumes and Pollutant Loads Result in Water Quality Degradation



# **National Research Council Report**

## **Urban Stormwater Management in the United States**

**“Presently the regulation of stormwater is hampered by a statute that focuses primarily on specific pollutants and largely ignores the volume of discharges”**

# **EPA Stormwater Rulemaking Considerations**

- **Establish quantified post-construction stormwater management requirements for new and redevelopment sites**
- **Address stormwater discharges from existing development through retrofitting**
- **Extend MS4 areas to include areas where growth will be occurring**

# Retrofits – Seattle Example



**Retrofit: Narrower Street + Swales**  
**Before Photo**

# Seattle Street – After



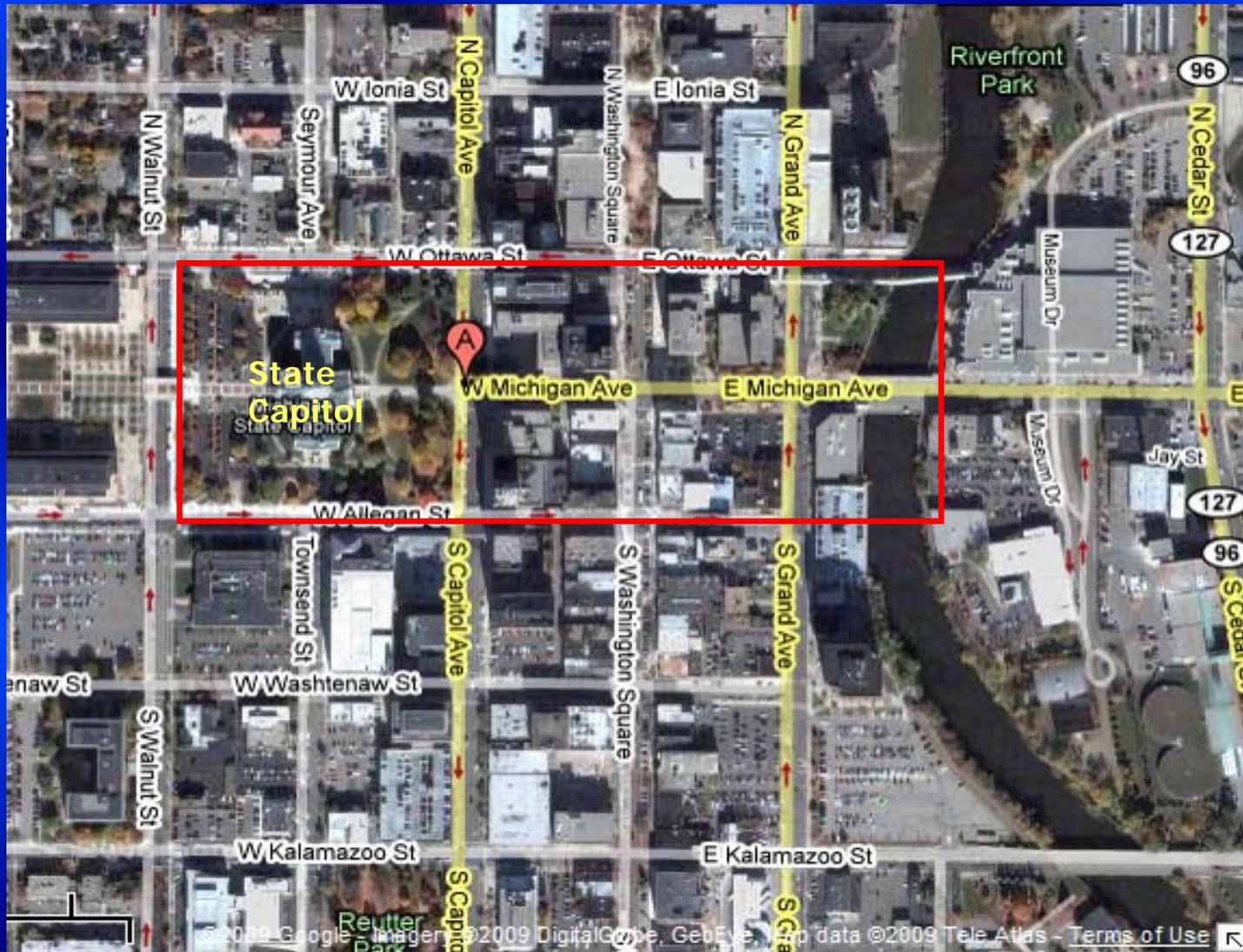


Seattle street retrofit  
monitoring results for  
two years:

**98-99%**

reduction in  
total runoff  
volume

# Michigan Avenue, Lansing, MI



# Michigan Avenue

TetraTech and C2AE



Before





# Michigan Avenue

- 4 city blocks, both sides
- Typical garden, no overflow for 1-inch event
- 600 block north side, no overflow for 4.1-inches (25-year event)

# **Extending the Area Included in the MS4 Program**

- **Currently: Based on “Urbanized Area” as defined by U.S. Census (will change every 10 years)**
- **Jurisdictional boundaries of the Phase II MS4 rather than urbanized area boundary?**
- **Urban clusters as defined by Census?**
- **Watersheds which overlap with urbanized area?**

[www.epa.gov/npdes/stormwater/rulemaking](http://www.epa.gov/npdes/stormwater/rulemaking)



# What Measures Could Be Implemented to Meet Performance Standards?

## Green infrastructure practices to manage stormwater

- Increase Infiltration
- Increase Evapotranspiration
- Harvest and Re-use Stormwater
- Reduce Volume of Runoff



# Infiltration Practices

## Rain Gardens



Maplewood, MN

# Permeable Pavement Parking

Morton Arboretum, Lisle, IL



# Storing and Reusing Rainwater Cisterns



# Green Roofs

## Chicago City Hall

- 20,300 sf intensive green roof with 20,000 plants of more than 100 native species
- Installed in 2000
- Decreases air and roof surface temperatures
- Retains 75% of a one-inch rainfall event
- Provides habitat

# Costs

## Green vs. Grey Infrastructure

Project	Conventional vault cost estimate*	Rain garden cost
Bloedel Donovan Park parking lot (4400 ft <sup>3</sup> wet vault)	\$52,800	\$12,800
City Hall parking lot (2300 ft <sup>3</sup> wet vault)	\$27,600	\$5,600

\* City of Bellingham's estimate using approximate cost of \$12.00/ft<sup>3</sup> for an in-ground storage and treatment device and based on construction costs for similar projects in the Bellingham area

# Local Codes and Ordinances

- Remove barriers to green practices
- Create incentives
- Often pursued via code reviews or audits

## Sustainability Audit of Zoning Ordinance

# The City of Cleveland Heights

Prepared by:  
CAMIROS



# WATER QUALITY SCORECARD

Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scales



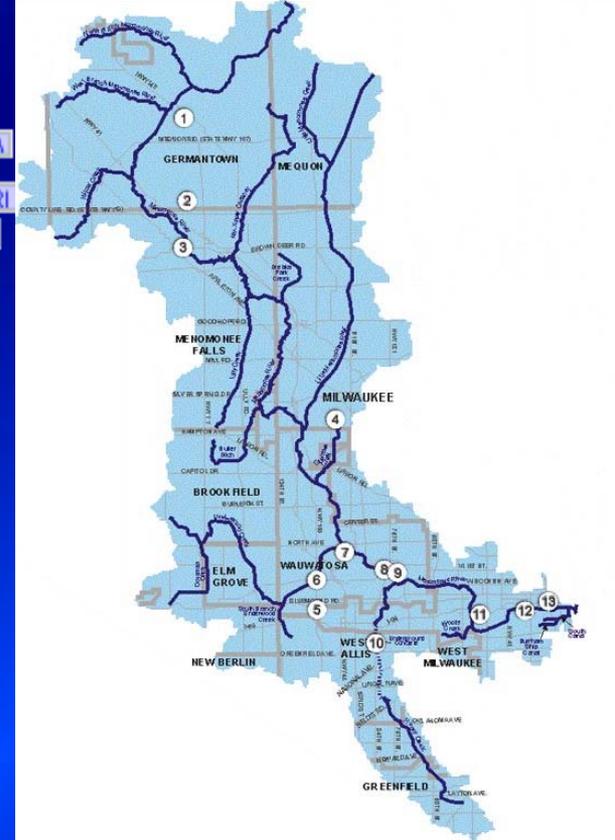
# **Watershed-based Stormwater Permitting**

- **Tailor the stormwater permit requirements to the specific needs of the watershed**
- **One stop shopping - Effectively link stormwater requirements, TMDL, and watershed management plan in a watershed permit**
- **Prioritize Actions - Focus stormwater management actions that lead to the most cost effective WQ results**
- **Save Money- Benefit from economies of scale and collaboration**

# 3 Pilots

Ramsey Washington  
Watershed District

Menomonee River Watershed



Middle Rio Grande,  
Albuquerque, NM

# Menomonee Watershed Pilot

- Working with municipalities to discuss what provisions should be included in the watershed permit and address implementation issues, such as:
  - Cities that are partly in the watershed (and partly outside the watershed)
  - Accountability
  - Establishing priorities, planning projects (e.g., anticipating upcoming TMDLs for bacteria and TSS)
- Seeking to sketch out permit provisions and then issue a permit in 2012
- Grant funding from EPA Region 5 to MMSD, SWWT, and SEWRPC for work with the communities and work on permit terms

# TMDLs and Stormwater Permits

## TMDL Allocation

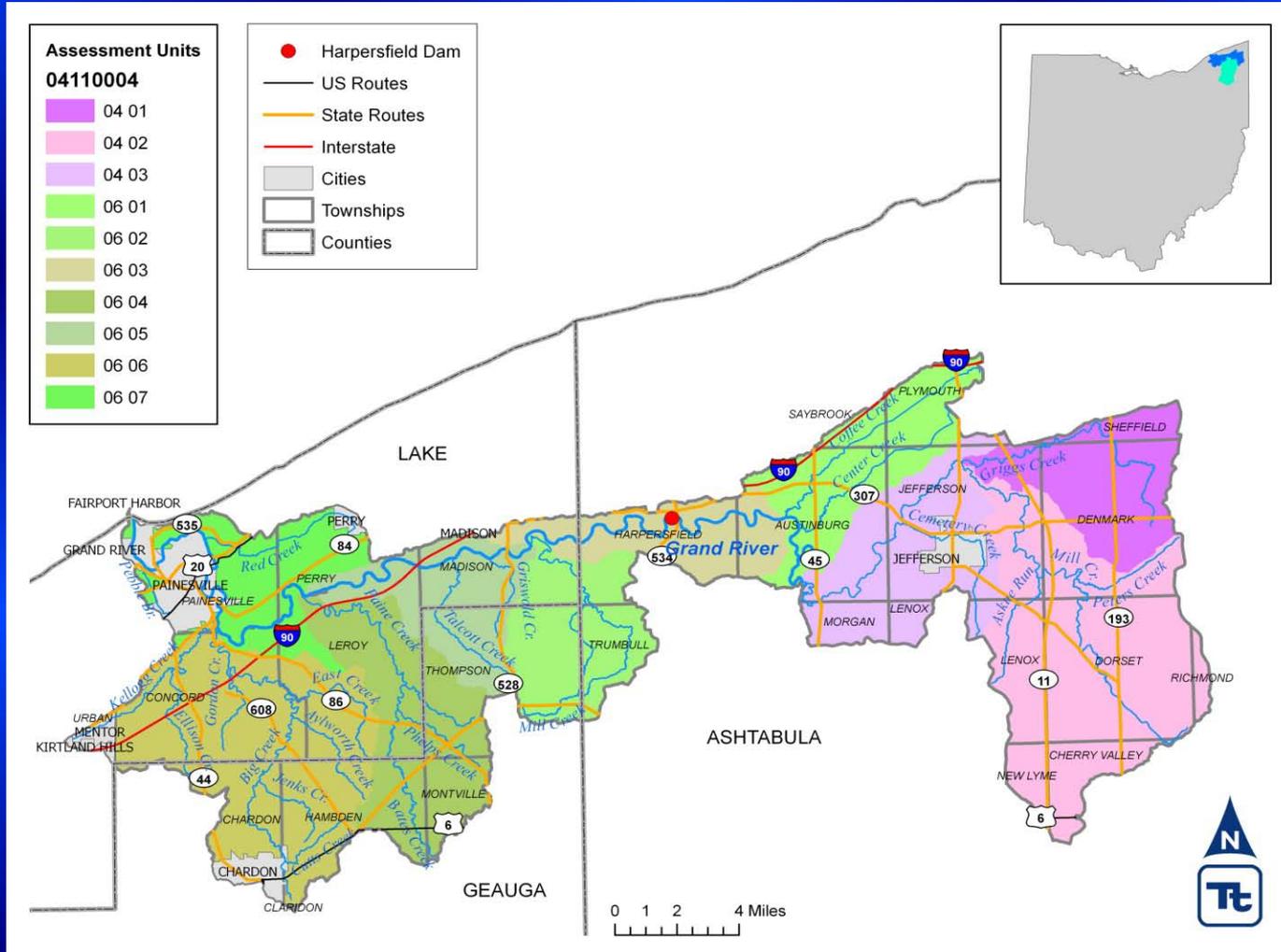
- NPDES Stormwater must have WLA
- Non-NPDES Stormwater may be addressed as LA
- Allocation for NPDES Stormwater may be expressed as a “categorical” wasteload allocation or as an individual allocation.
- Individual allocations are preferred – facilitates implementation

## NPDES Permits

- NPDES permits must be consistent with assumptions and requirements of WLA in a TMDL.
- Discharge requirements, reflecting the TMDL WLA, may be expressed as BMPs
- Can also be expressed in the permit as a numeric effluent limit
- Permit must specify the monitoring necessary to determine compliance with effluent requirements.

# TMDLs May Drive Stormwater Controls

## Example-The lower Grand River in Ohio





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