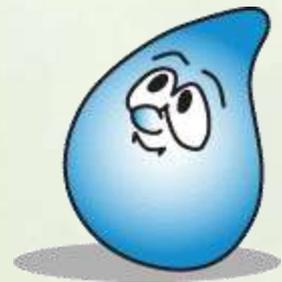


# Brooklyn Centre Naturalists

March 27, 2012



# NEORS Key Responsibilities

- Wastewater Treatment Plant Operation  
Easterly, Southerly, Westerly
- Interceptor Sewers
- Combined Sewer Overflow (CSO) Control
- Regional Stormwater Management



# NEORSD Key Responsibilities



- Wastewater Treatment Plant Operation  
Easterly, Southerly, Westerly

# NEORSD Key Responsibilities



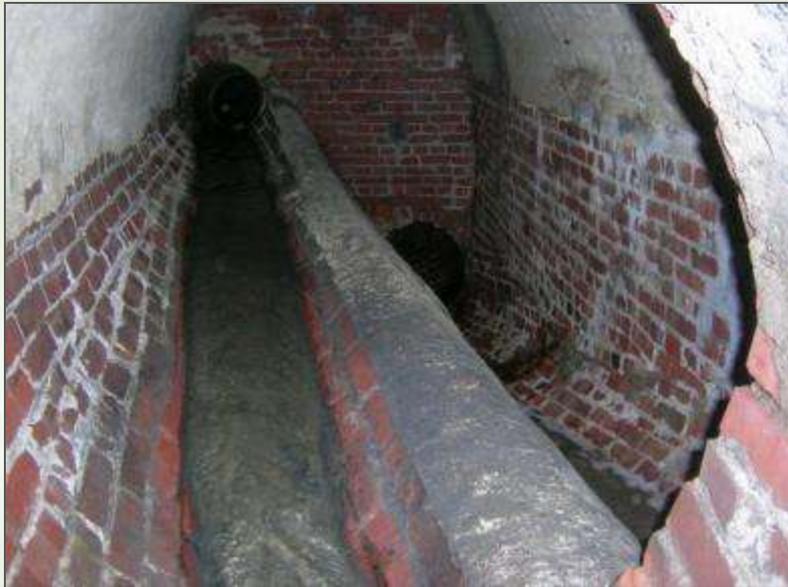
Interceptor Sewers

# NEORS Key Responsibilities



Interceptor Sewers

# NEORSD Key Responsibilities



Combined Sewer Overflow (CSO) Control

**WARNING:  
OVERFLOW EVENT  
PUBLIC ADVISORY**

STORMWATER AND SEWAGE OVERFLOWED TO THIS BEACH AREA ON [DATE]

As a result, the beach area and water may have been affected. Visitors – particularly children, the elderly, and those in ill health – are advised to avoid contact with the water and debris.

FOR MORE INFORMATION ABOUT COMBINED SEWER OVERFLOW (CSO):	FOR MORE INFORMATION ABOUT WATER QUALITY AND WATER CONSERVATION:
NEORSD PUBLIC RELATIONS & COMMUNITY OUTREACH DEPARTMENT (419) 438-7700   www.neorsd.org	COLUMBIANA COUNTY DEPARTMENT OF PUBLIC HEALTH (419) 494-4900
NEORSD PUBLIC RELATIONS & COMMUNITY OUTREACH DEPARTMENT (419) 438-7700   www.neorsd.org	NEORSD PUBLIC RELATIONS & COMMUNITY OUTREACH DEPARTMENT (419) 438-7700

THE BEACHES IN NEORSD ARE COLLECTED BY THE NORTHEAST OHIO REGIONAL SEWER DISTRICT

# NEORS Key Responsibilities

## Project Clean Lake

- Consent decree with EPA
  - 772 across the US have similar mandates
- 25 year program to meet Clean Water Act standards
- Address water-quality issues caused by sewage overflows (CSOs)

# NEORSRD Key Responsibilities

## Regional Stormwater Management

The program addresses the increasing:

- Flooding
- Erosion
- Water Quality Problems





# Regional Stormwater Management



**Paying For Stormwater Management:**

# **Impervious Surface Fee**

**Residential property:**



**Roof + driveway**

= 1.0 Equivalent Residential Unit (ERU)

= 3,000 square feet of impervious surface

**“The more you pave the more you pay.”**

# 2011 Stormwater Fee

**Total revenue required (\$)**

---

**Total impervious area  
(in ERUs)**



**\$4.75 per  
ERU per  
month**

# Stormwater Fees for Non-Residential Parcels

## Non-residential parcels



**Roof + parking lot**

= 120,000 sq. ft.

= 40 ERUs (\$4.75)

= \$190/month

= \$2,280/year

(less any credits)



# Stormwater Management

# Watershed Management

What is a  
**WATERSHED?**

An area of land where all water flows  
to a common waterbody.

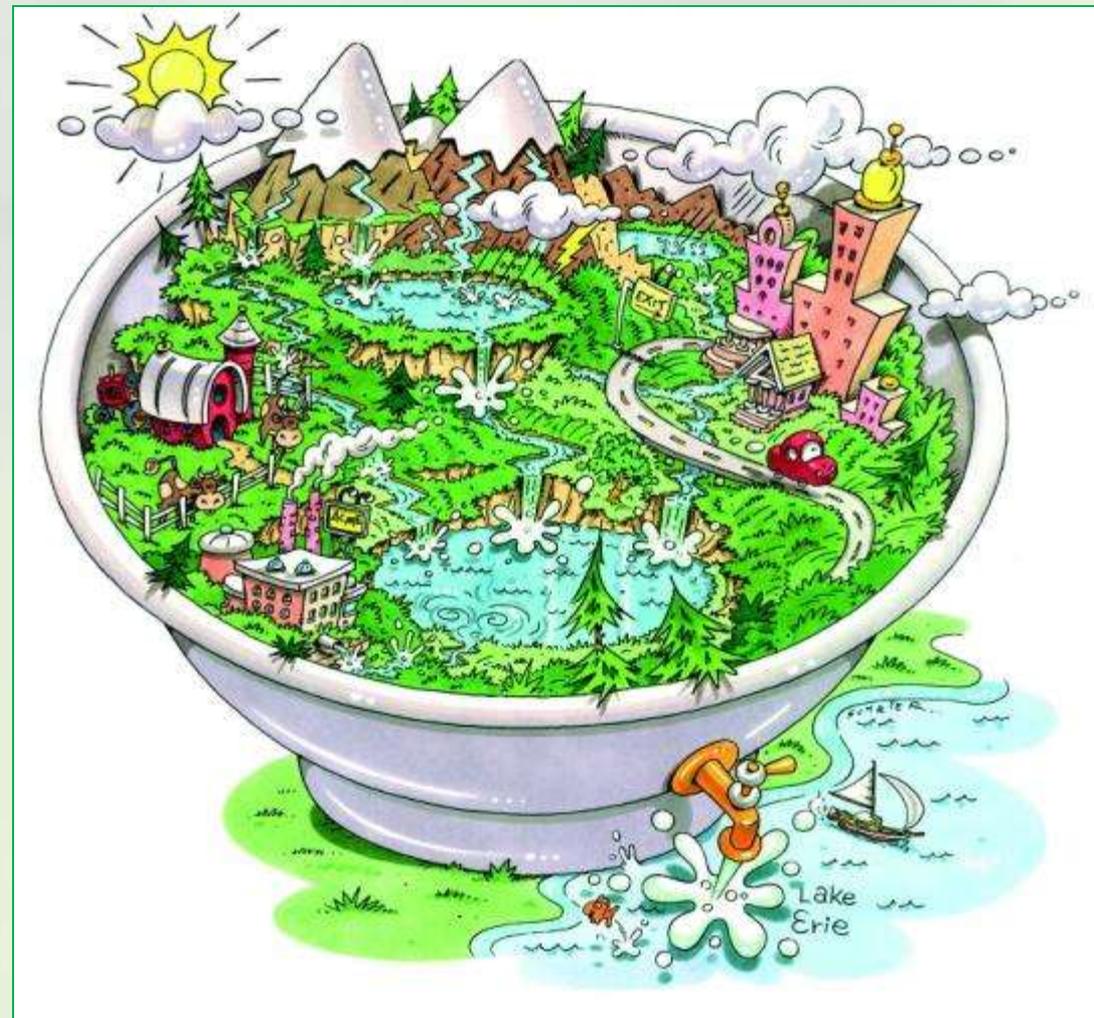
A watershed is a *geomorphological* structure.

It's the landform! **how the earth is shaped.**

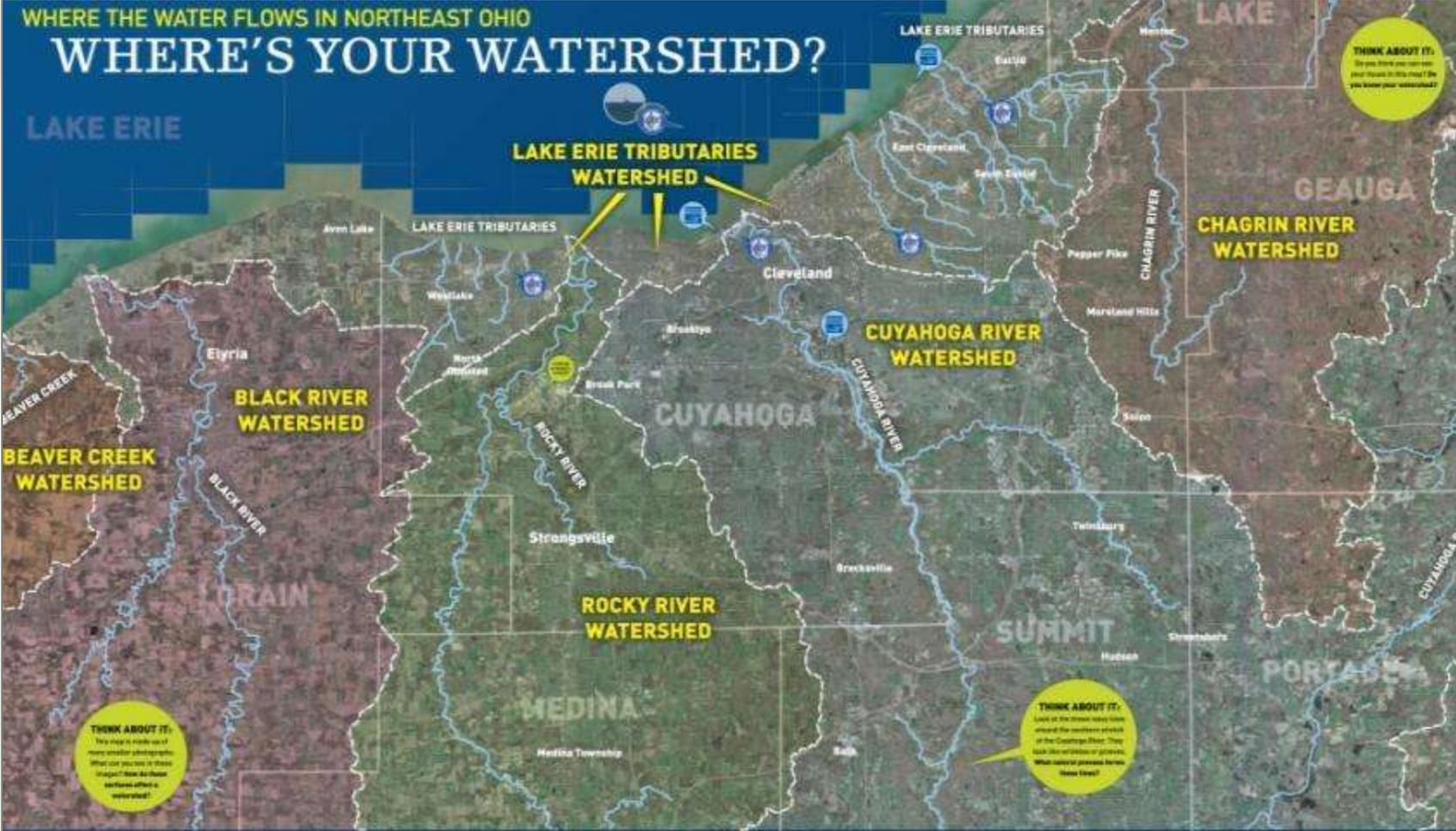
Ge = Earth      morph = form      logos = study

# What is a WATERSHED?

An area of land where all water flows to a common waterbody.



# Everyone lives in a WATERSHED!



YOU live in a WATERSHED!

# Big Creek Watershed

Cleveland  
Metroparks Zoo

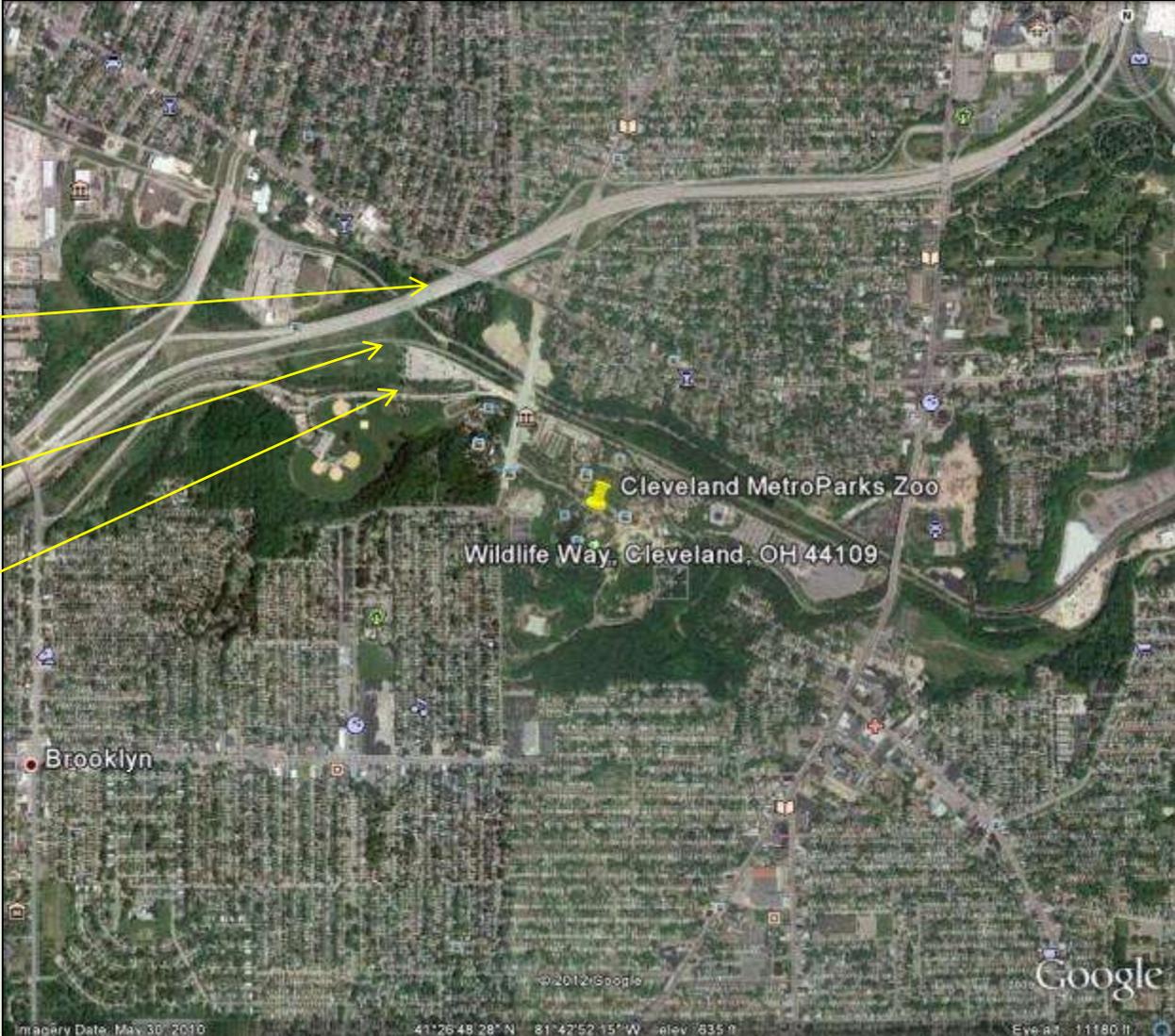


# YOU live in a WATERSHED!

I-71

Railroad

Big Creek



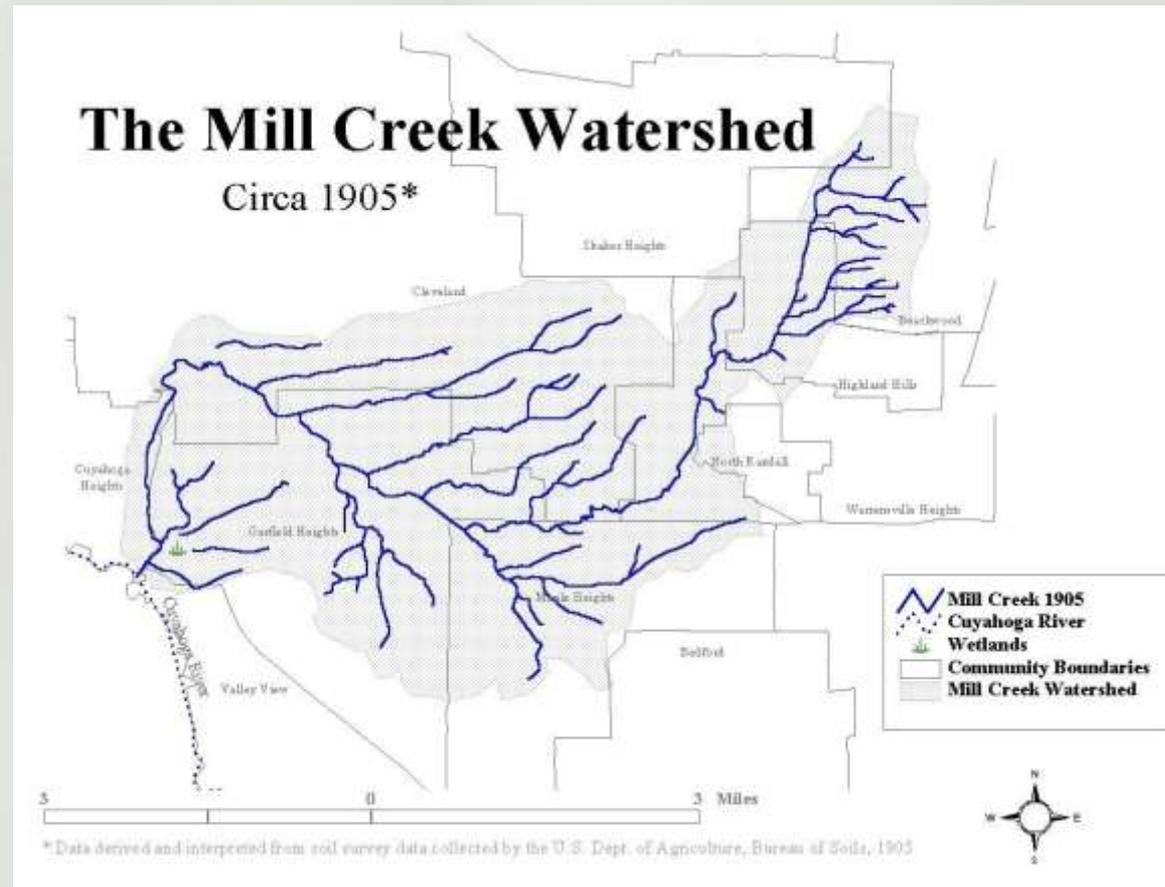
# Why do we need a Stormwater Management?



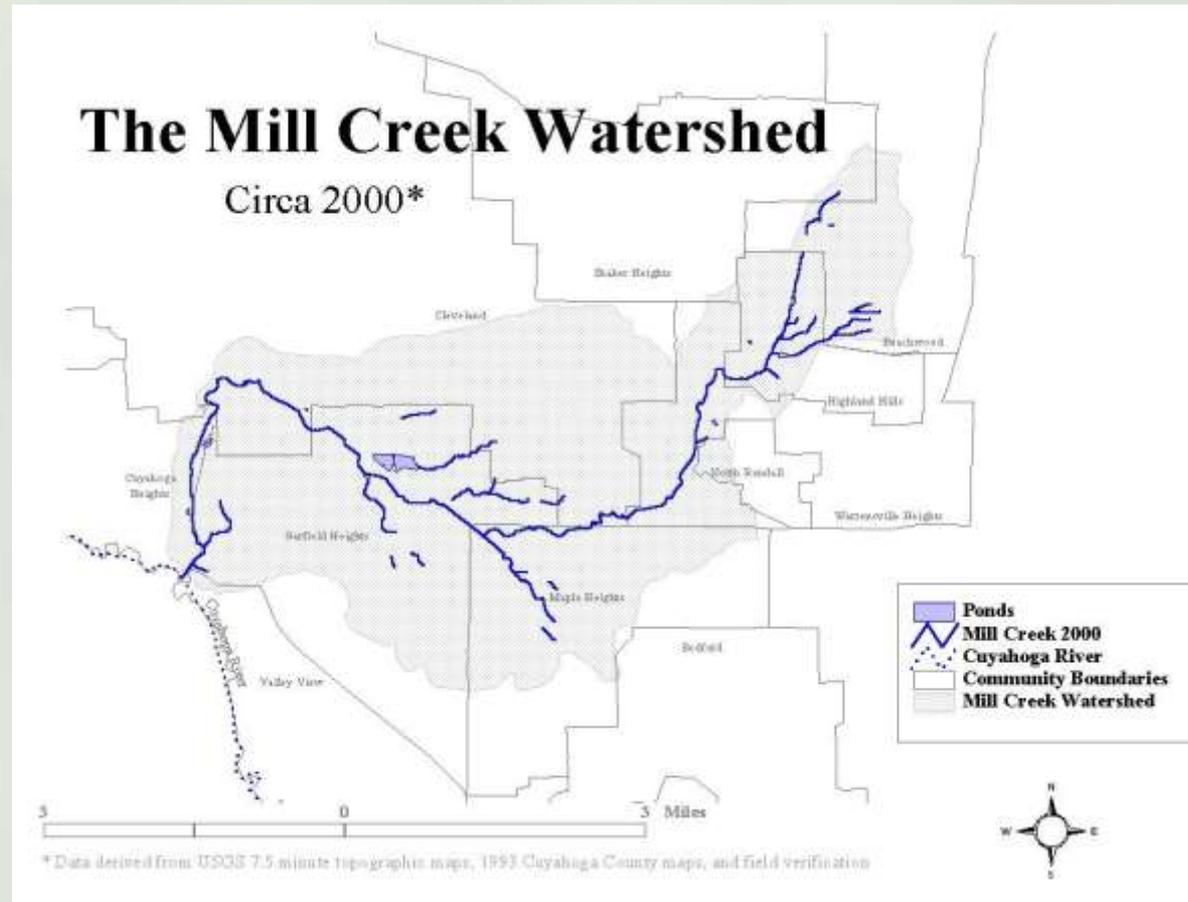
# Why do we need a Stormwater Management?



# Why do we need a Stormwater Management?



# Why do we need a Stormwater Management?



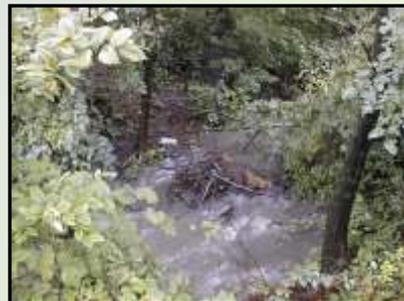
Urbanization can **reduce infiltration** and increase the volume of runoff, impacting streams and storm sewers by:

- ☔ Causing an increase in the volume of surface water that streams and sewer systems receive. In certain cases, if the sewer system is overloaded by surface water, a combination of sanitary and storm water (CSO) are released directly into the receiving water.
- ☔ The release of sanitary sewage into the environment due to CSO's compromises the water quality of the receiving water.



Urbanization can **increase the velocity** of stormwater to a receiving body of water because of the construction of efficient storm sewer systems and impervious surfaces.

- ☔ Increase in velocity and volume; reduces infiltration.
- ☔ Increases in velocity and volume increases flooding potential.
- ☔ Increases in velocity of the water will scour the stream bed, removing important biota.
- ☔ Increases in velocity and volume will accelerate stream side erosion.



## Urbanization reduces the amount of depression storage because of regrading.

- ☔ Depression storage like wetlands and ponds are useful in absorbing runoff and slowing stormwater flow.
- ☔ Loss of a wetland, nature's natural water filter, may impact local water quality.
- ☔ Wetlands are nurseries to many aquatic and terrestrial organisms. Loss of wetlands impacts the integrity of animal populations.



## Urbanization changes reduces **evapotranspiration** by removing vegetative cover.

- ☔ The removal of vegetative cover, and reduction of evapotranspiration increases surface water.
- ☔ The loss of vegetative cover along streambanks (riparian zones) promotes soil erosion.
- ☔ Vegetative cover along streams provides shelter and a cooling effect on the water. The removal alters terrestrial and aquatic habitats.



What can we do?

Nature has shown us how to effectively manage watersheds and stormwater!



## What can we do?

- **Trees and forests** reduce stormwater runoff by capturing and storing rainfall in the canopy and releasing water into the atmosphere through evapotranspiration.
- In addition, **tree roots and leaf litter** create soil conditions that promote the infiltration of rainwater into the soil.
- This helps to **replenish** our groundwater supply and maintain streamflow during dry periods.

## What can we do?

Urban areas could reduce their stormwater runoff potentially save millions of dollars by **increasing their tree cover.**

A Fayetteville, Arkansas study revealed that by:

- An increase tree canopy from 27% to 40%
- Reduction in their stormwater runoff could reach 31%
- Realize a value at a \$43 million in capital improvement savings

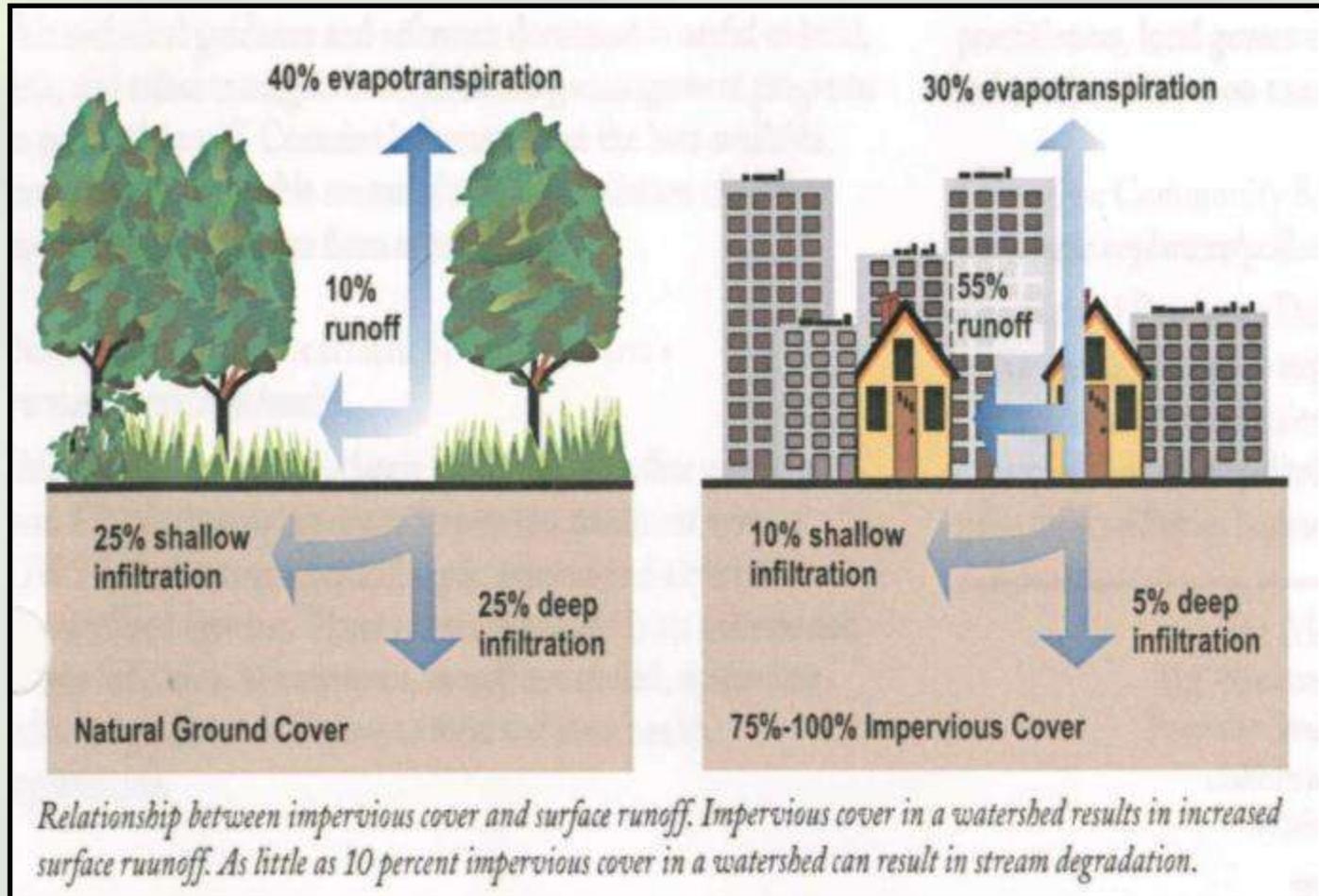
*American Forests, UEA of Benton and Washington Counties, Arkansas, 2002)*



## What can we do?

- **Infiltration** refers to the movement of **water** into the **soil** layer.
- The rate of this movement is called the **infiltration rate**.
- If **rainfall intensity** is greater than the infiltration rate, water will accumulate on the surface and **runoff** will begin.

# Why do we need a Stormwater Management?



# Why do we need a Stormwater Management?

**Centralized,  
efficient  
control of  
large floods.  
Uses curb and  
gutter systems  
leading to  
storm sewers.**



**Traditional Stormwater Management**

What can we do?

## Rain Barrels

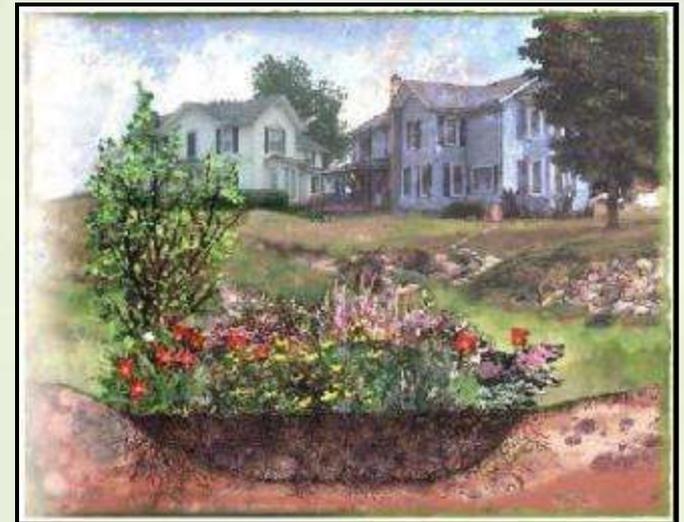
- Capture the rain water from roofs
- Reduce the water that gets to storm drains and streams
- Provide a source of natural rain water for watering gardens



# What can we do?

## Rain Gardens

- Improves infiltration and reduces runoff.
- Require less maintenance than lawns because they do not need to be mowed, fertilized, or watered once established.
- Reduce storm drain overload and flooding if adopted on a community or neighborhood scale.
- Provide habitat for wildlife and, with the proper plants, increase the number and diversity of birds and butterflies for those who enjoy watching them.
- Provide an attractive and creative alternative to traditional lawn landscapes.

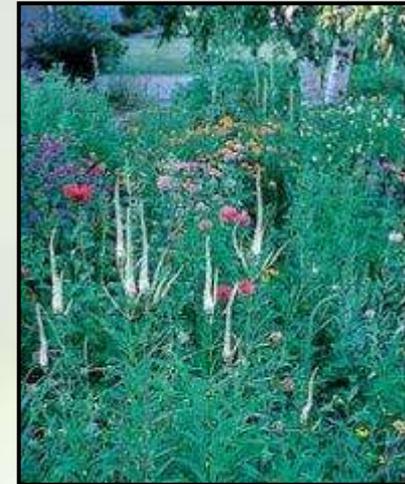


*Michigan Artist Ruth Zachary*

## Reduce Lawns

Reducing lawns to the minimum size needed, maybe even do away with a lawn entirely. Traditional mowed lawn landscape can become. Consider one or more of these environmentally friendly alternatives:

- create or expand beds of native flowers and shrubs
- plant a wildflower meadow or another form of native groundcover
- **Plant TREES!**



# What can we do?

## Cleveland Metroparks Zoo

~A stormwater management demonstration project

### Features:

- Downspout disconnection and realign gutter
- 550 gallon cistern
- Soaker hoses (drip tubes)
- Overflow drain to rain garden
- Two rain gardens
- Bioswale
- Educational signage



# What can we do?

## Northeast Ohio Regional Sewer District

### Features:

- Re-use black granite
- Reduce impervious surface by removing 500 SF of cement
- Re-use electrical and sprinkler systems
- Disconnect downspout from awning
- Trench drain to view water conveyance from disconnect
- Rain garden
- Native plant/ non-invasive plant species
- Re-use redwood timbers from Southerly aeration tanks for footbridge
- Pervious pavers
- Plant markers
- Educational signage



What can we do?

# Green Infrastructure:

A TOOL FOR EFFECTIVE  
STORMWATER MANAGEMENT

- **Water Quantity Control**
- **Water Quality Control**
- **Environmental Improvement**



QUESTIONS?

