

# Stormwater Basin Maintenance



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# Presentation Overview

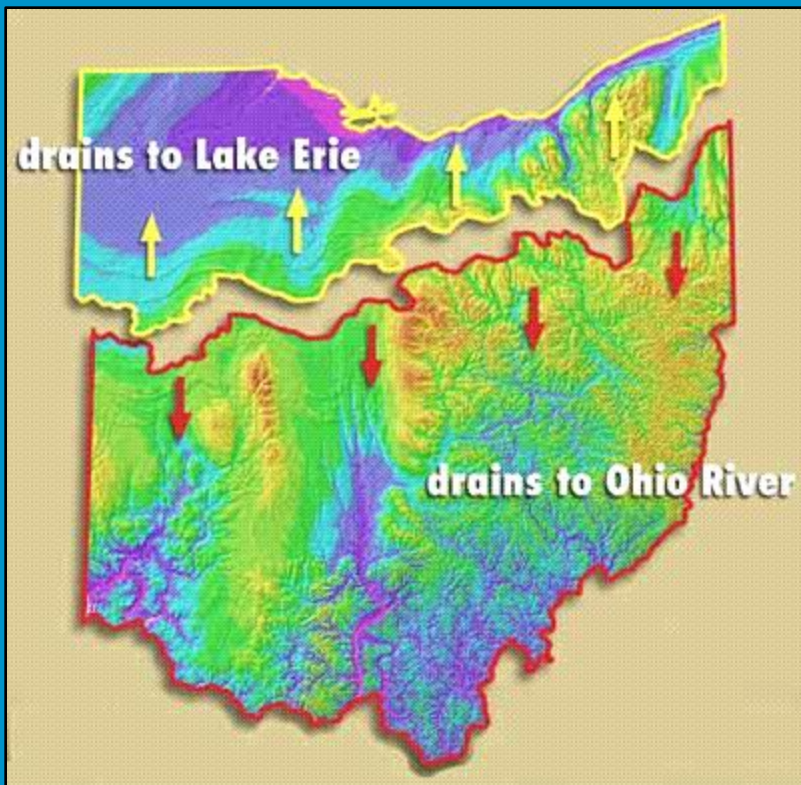
- Stormwater Overview
- Stormwater Basins
- Stormwater Basin Maintenance
  - Common
  - Non-Routine
- Good Basin Stewardship Habits
  - Lower Non-Routine Costs
- Questions





# Stormwater Overview:

## What is a watershed?





# Where does it go?

Our rooftops, lawns and driveways are directly connected to local creeks and streams, and ultimately to Lake Erie.

They form the headwaters of our urban stream systems, and it is our responsibility to give our local streams a clean, healthy start.





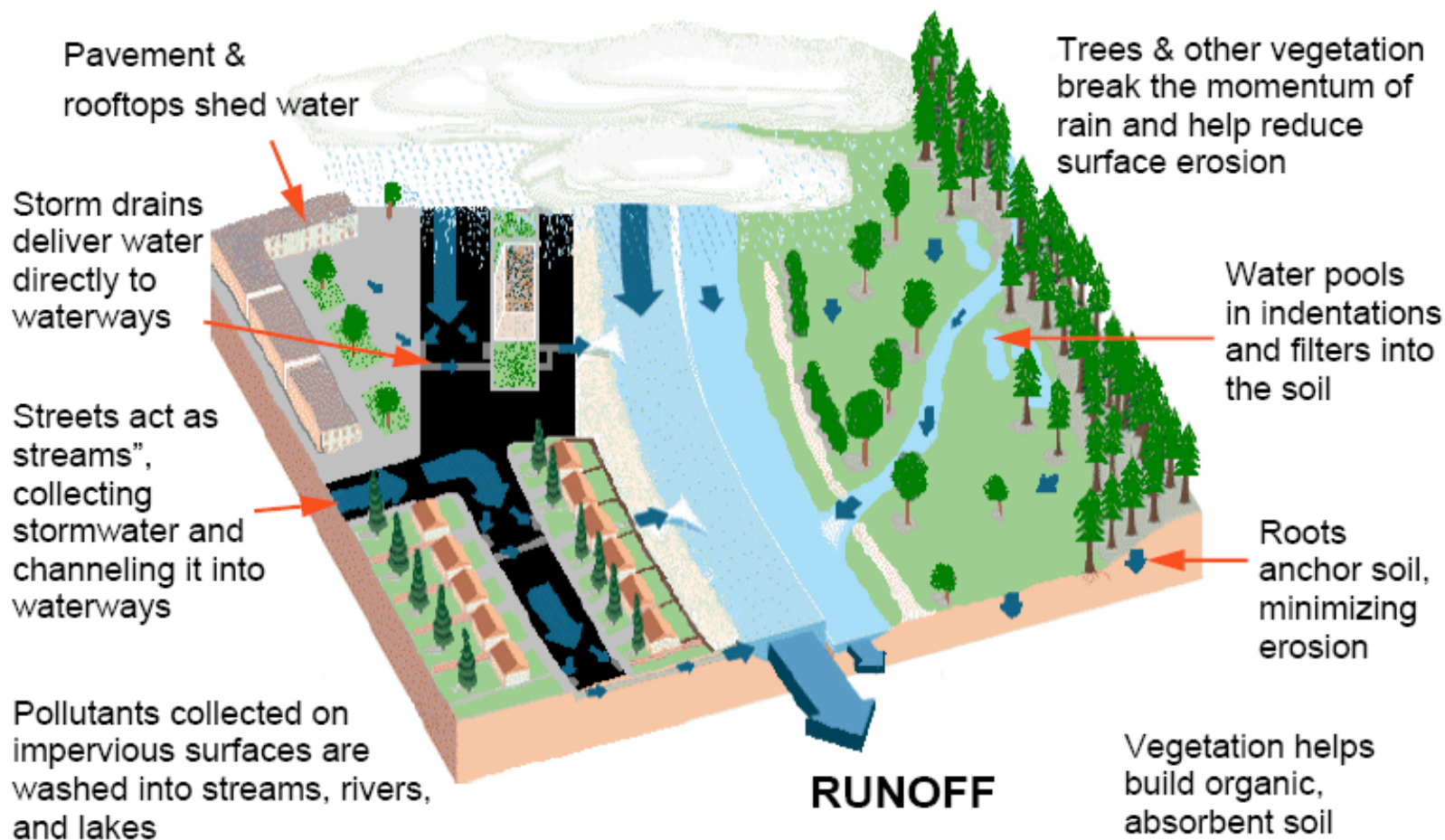
# Stormwater

## DEVELOPED LANDS

Rain pours more quickly off of city and suburban landscapes, which have high levels of impervious cover

## NATURAL LANDS

Trees, brush, and soil help soak up rain and slow runoff in undeveloped landscapes





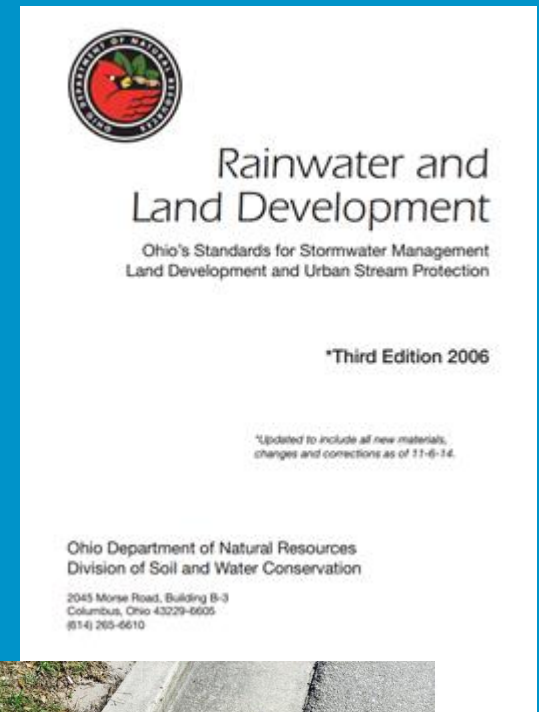
A satellite image of Lake Erie showing a massive algal bloom in October 2011. The water is a deep, dark blue-green color, indicating high concentrations of algae. The bloom is visible as a large, irregular mass covering much of the lake's surface. The surrounding land is a mix of brown and green, representing agricultural fields and forests. The text "Lake Erie Algal Bloom – October 2011" is overlaid in white on the image.

## Lake Erie Algal Bloom – October 2011



# Stormwater Rules

- Municipal Separate Storm Sewer System (MS4)
- Federal Clean Water Act
  - Regulates MS4s in urbanized areas
  - NPDES permit required to discharge from MS4
- Communities (MS4s) in urbanized areas
  - develop and enforce ordinances or resolutions
  - ensure Stormwater Control Measure (SCM) function
  - maintain publicly-owned SCMs
- Landowners
  - maintain privately-owned SCMs





# Stormwater Basins

## Purpose & Design

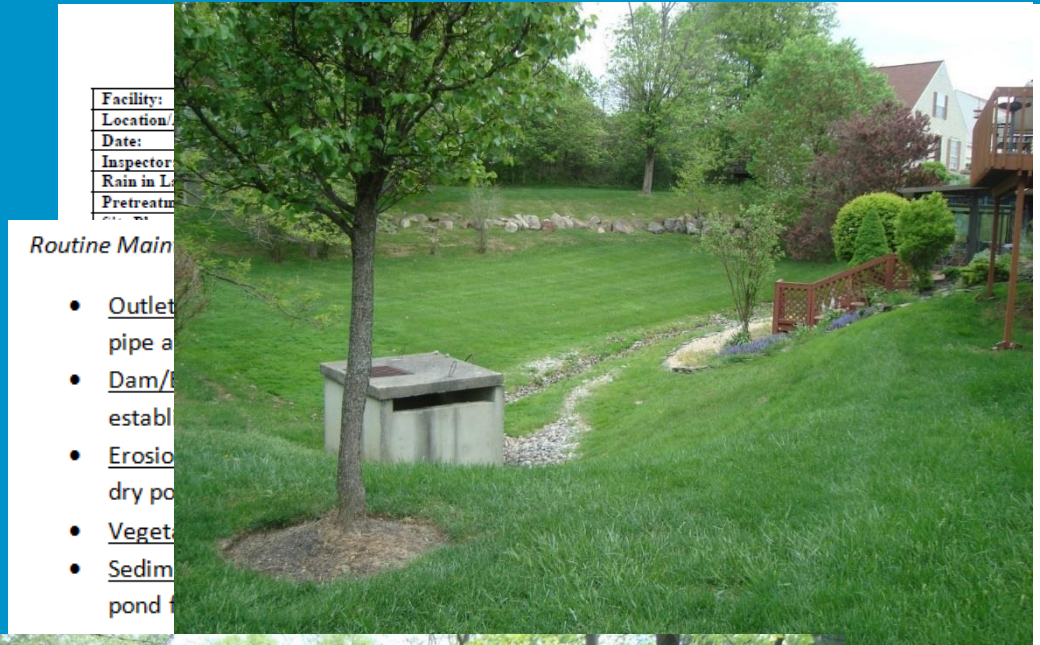
- Control runoff and flooding
- Water quality improvements
- Landscape and aesthetic value
- Designed by licensed engineers specialized for site conditions
  - Watershed size
  - Available space
  - Target pollutant removal
  - Soil types





# Needed for Proper Basin Function

- Maintenance Plan
- Annual Budget
- Regular inspection
- Specialized landscaping
  - Mowing height
- Specialized plant management
  - Think clean water
  - Avoid fertilizers and pesticides
- Water Level Management
- Stabilization Maintenance
- Protection from **sediment**
- Regular trash cleaning



Routine Main

- Outlet  
pipe a
- Dam/  
establ
- Erosio  
dry po
- Veget
- Sedim  
pond t



dry and ponding  
dry pond.  
ing area, side

pe inlets, pipe

s appear during  
dry pond.

<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
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# Elements of Basin Maintenance

- Not the same as Landscape Maintenance
- Trained staff that recognize early signs of problems
  - Erosion, clogged outlets, invasive plants, etc.
- Good Housekeeping – Prevention of problems
  - Inspect regularly
  - Use a maintenance checklist
  - Focus on preventative maintenance to avoid costly corrective repairs

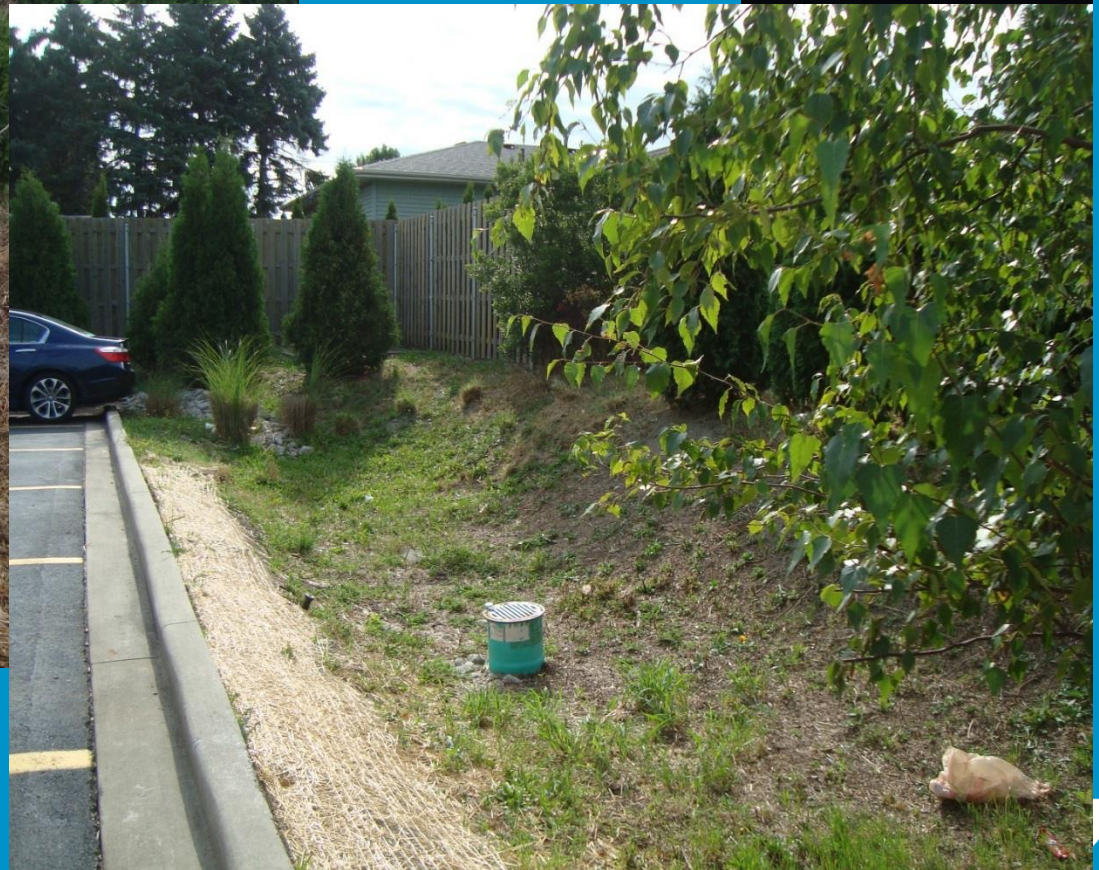




# Why Maintain?



**Before**

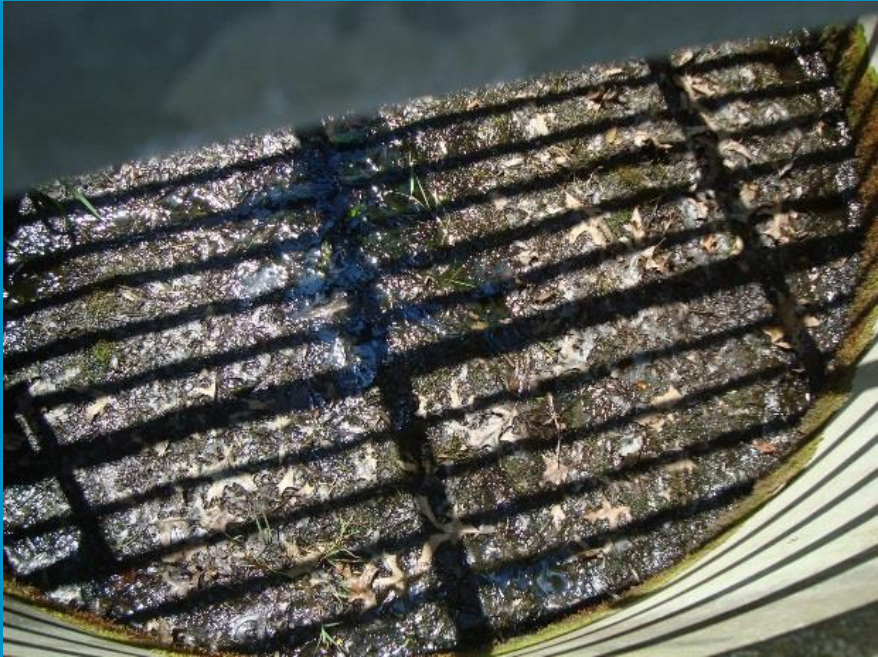


**After**



# Common Maintenance Issues

## Sediment Accumulation, Trash & Clogging



- Monthly & After Large Rain Events
- Outlet & Inflow Structures





# Common Maintenance Issues

## Vegetation Management

### Small shrubs for edges:

*Myrica gale* (sweetgale)

*Lindera benzoin* (northern spicebush)

*Ledum groenlandicum* (bog Labrador tea) evergreen, requires acidic soil (pH <6.8)

*Kalmia polifolia* (bog laurel) evergreen, requires acidic soil (pH <6.8)

*Hibiscus moscheutos* (crimsoneyed rosemallow)



*Vallisneria americana*



*Sagittaria latifolia*



*Pontederia cordata*



*Nymphaea odorata*



*Justicia americana*



*Hydrocotyle umbellata*



*Menyanthes trifoliata*



*Lobelia siphilitica*



*Equisetum hyemale*



*Carex stipata*



*Myrica gale*



*Hibiscus moscheutos*





# Common Maintenance Issues

## Stabilization & Erosion



- Repair soil erosion and scouring as it occurs
- Starts at inflow areas
- Refresh Vegetation/Turf
- Prevent Woody Vegetation growth on dams/banks





# Common Maintenance Issues

## Ponding Water Beyond Design Criteria



- Clogged Outlets
- Clogged Drains





# Common Maintenance Issues

## Pests



- Insect infestations
- Burrowing Animals
- Excessive Geese
  - Algal Blooms





# Common Maintenance Issues

## Pests

- Rodent Burrows
  - Fill animal burrows with clay
  - Hire trapper if needed
- Geese
  - Leave a vegetative buffer – less tasty grasses (tall fescue)
  - Hire a dog
  - Decoys/Sound
  - Don't feed
- Algae
  - Fertilize less
  - Don't fertilize near the basins
  - Aerate





# Common Maintenance Issues

## Pollution



- Foul odors
- Oil Sheens
- Discoloration of water





# Non-Routine Maintenance Issues

## Invasive Species



**Phragmites**



**Cattail**

- **Constant maintenance required \$\$\$**
  - Remove invasive mat-forming vegetation
  - Remove algae (can be composted!)
- **Consider subletting aquatic weed control**
  - Mechanical and chemical options
  - License required for herbicide application





# Non-Routine Maintenance Issues

## Sediment Removal

- Once 25% pool volume lost
  - Loss of storage issues
- Eutrophication
- Plans
  - What is design depth?
- Survey
- Dredge
- 15-20 years
- \$\$\$





# SCM Stewardship: Good Habits

- No neglect
- No dumping
- Keep the watershed clean
- No pet waste
- Vegetate bare soils
- Don't over fertilize
- Protect from salt
- Plan for snow storage
- Plant native vegetation



= \$\$\$ Savings Long-Term





# Aeration

- Provide Oxygen
- Bacteria Break Down Muck
- Less to Dredge Over Time





# Take Home Messages

- ✓ Create an Annual Budget for Basin Maintenance
- ✓ Create a Maintenance Plan and provide contractors with inspection checklists
- ✓ Hire educated management and contracting teams
- ✓ Keeping your property “clean” = lower long-term basin maintenance costs
- ✓ Utilize Cuyahoga SWCD and Local Resources





# Resources

- Cuyahoga SWCD: <http://www.cuyahogaswcd.org/>
- Maintaining Stormwater Control Measures:  
<http://www.cuyahogaswcd.org/files/assets/scmownermanual-draft.pdf>
- Geese: <https://ohioline.osu.edu/factsheet/W-3>
- Native Plants: Landscaping for Biodiversity with Ohio Native Plants: A Species Guide for Plantings. – Cleveland Metroparks
- Invasive Plants:  
<https://www.invasivespeciesinfo.gov/resources-indexed>







# Questions?

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