Rain Barrels and Rain Gardens

Stormwater Pollution Solutions

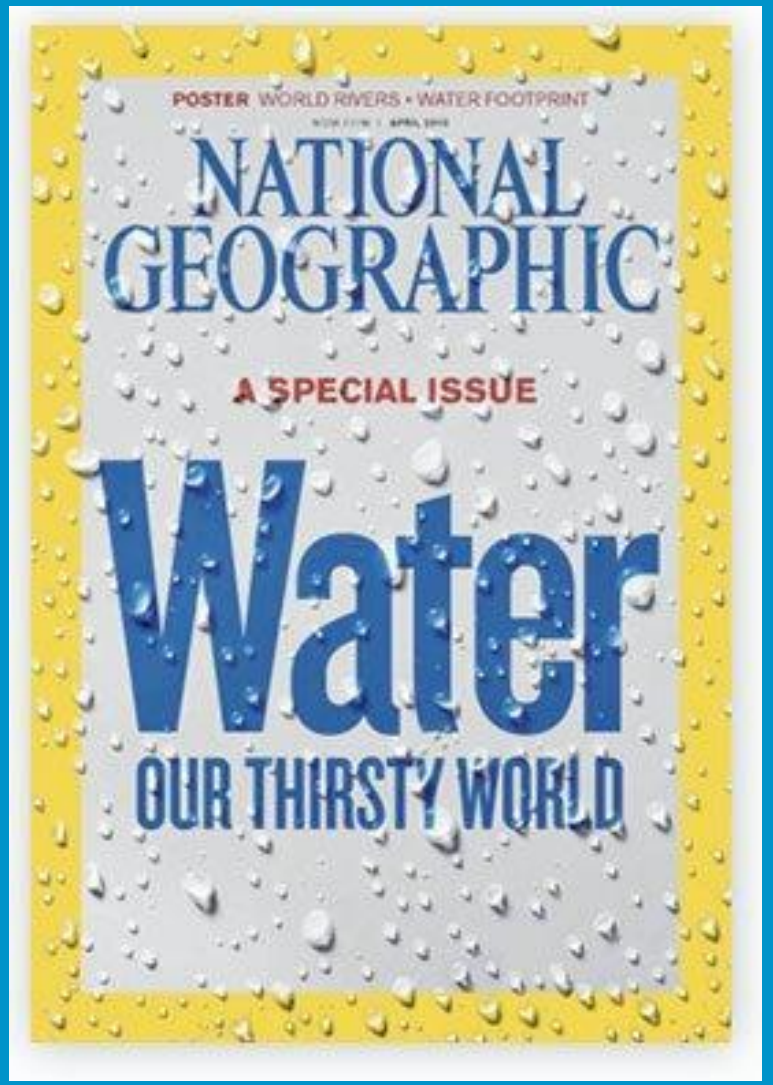
Amy Roskilly: Cuyahoga Soil & Water Conservation District

cuyahoga SOIL&WATER conservation district

Advocate and implement best management practices for conservation of land and aquatic resources in a developed environment through education, stewardship and technical assistance.

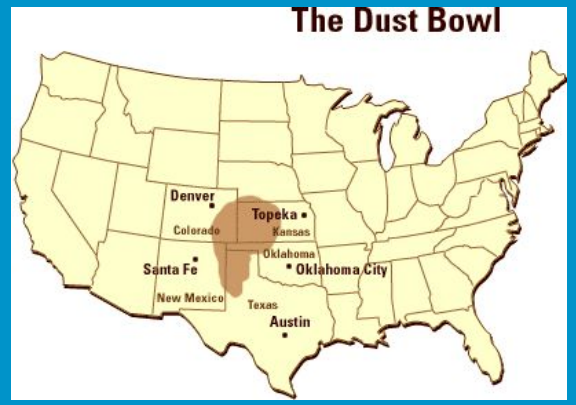
www.cuyahogaswcd.org

September 2008



April 2010

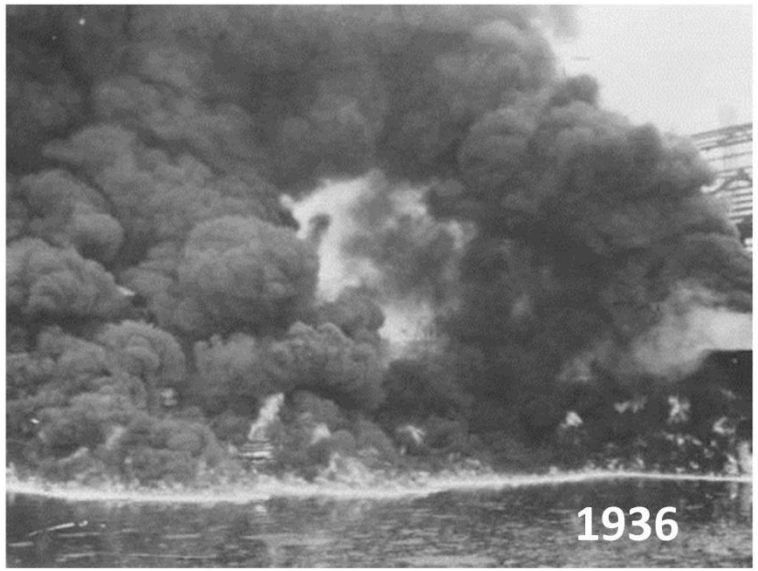
Dust Bowl of 1930's

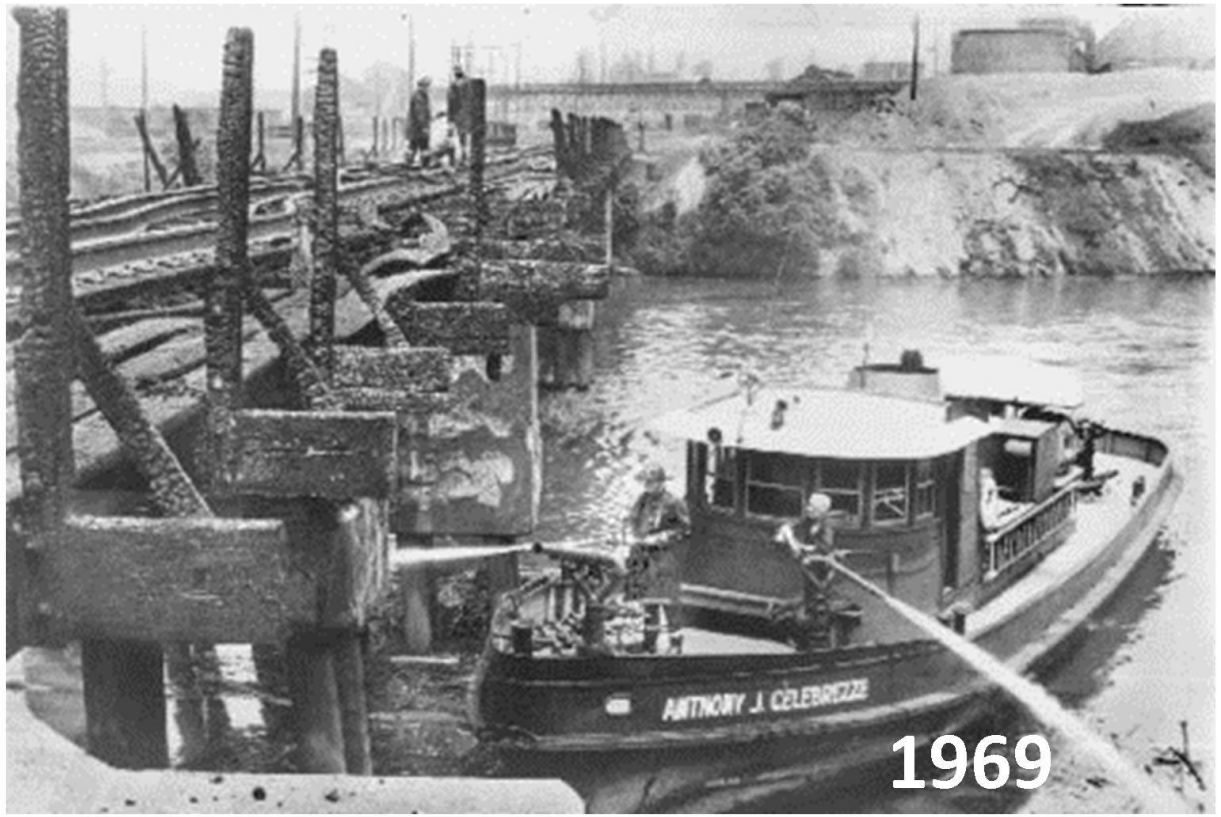


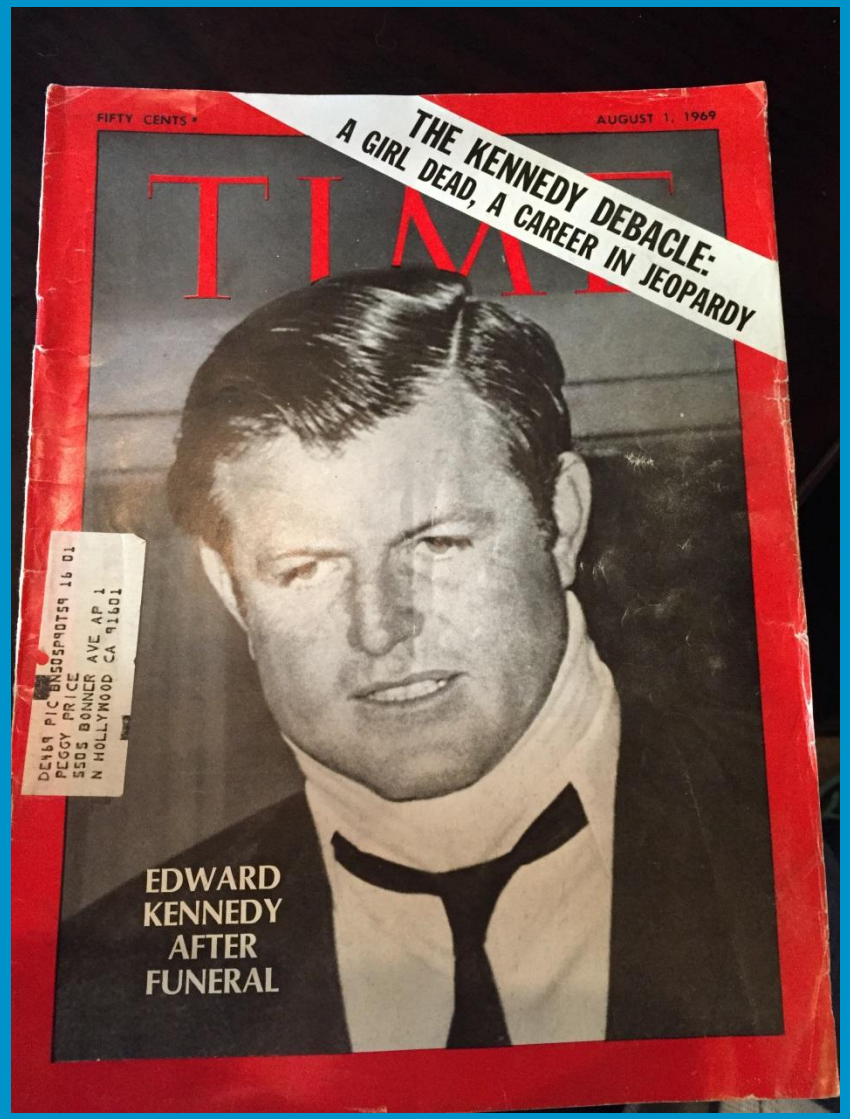
The Dust Bowl – a Film by Ken Burns
www.pbs.org/kenburns/dustbowl


WILLIAMS
FULTON
LUCAS
OTTAWA
LAKE
ASHTABULA
GEAUGA
CUYAHOGA
TRUMBULL
DEFIANCE
HENRY
WOOD
SANDUSKY
ERIE
LORAIN
PORTAGE
PAULDING
PUTNAM
HANCOCK
SENECA
HURON
MEDINA
SUMMIT
MAHONING
VAN WERT
ALLEN
WYANDOT
CRAWFORD
RICHLAND
ASHLAND
WAYNE
STARK
COLUMBIANA
MERCER
AUGLAIZE
HARDIN
MARION
HOLMES
TUSCARAWAS
CARROLL
JEFFERSON
LOGAN
MORROW
KNOX
SHELBY
UNION
DELAWARE
COSHOCTON
HARRISON
DARKE
MIAMI
CHAMPAIGN
FRANKLIN
LICKING
MUSKINGUM
GUERNSEY
BELMONT
CLARK
PREBLE
MONTGOMERY
GREENE
MADISON
PICKAWAY
FAIRFIELD
PERRY
NOBLE
MONROE
MORGAN
FAYETTE
BUTLER
WARREN
CLINTON
HOCKING
WASHINGTON
ROSS
ATHENS
VINTON
HAMILTON
CLERMONT
HIGHLAND
PIKE
JACKSON
MEIGS
BROWN
ADAMS
SCIOTO
GALLIA
LAWRENCE

Cuyahoga River
The River that Burned







Some river! Chocolate-brown, oily, bubbling with subsurface gases, it oozes rather than flows. "Anyone who falls into the Cuyahoga does not drown," Cleveland's citizens joke grimly. "He decays."

Time Magazine, August 1969

“The lower Cuyahoga has no visible life, not even low forms such as leeches and sludge worms that usually thrive on wastes."

The Federal Water Pollution Control Administration

"The Cuyahoga will live in infamy as the only river that was ever declared a fire hazard."

Congressman Louis Stokes

"I will never forget a photograph of flames, fire, shooting right out of the water in downtown Cleveland. It was the summer of 1969 and the Cuyahoga River was burning."

EPA Administrator Carol Browner

"What a terrible reflection on our city"

Cleveland Mayor Carl Stokes

GREAT LAKES
BREWING CO.

Burning River

A Handcrafted Pale Ale

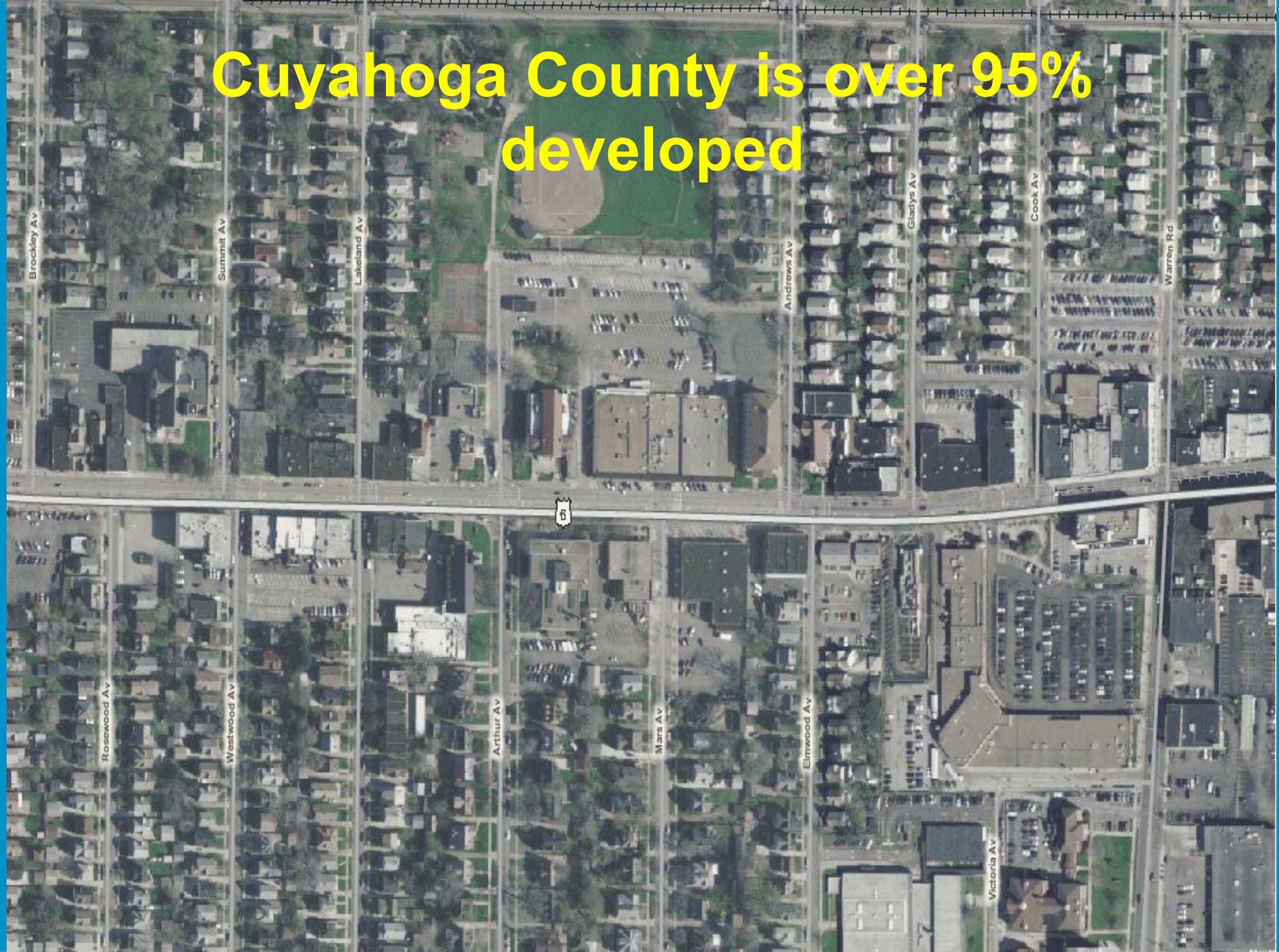
Cleveland, Ohio


VISIT CLEVELAND.
NO, THIS DOESN'T HAPPEN ANYMORE.
I ♥ CLE @neorsd

Urbanization

- Urbanization (and suburbanization) means increased impervious (hard) surfaces, such as streets, rooftops, parking lots, and even lawns (green concrete)
- All these hard surfaces disrupt the natural flow and cycling of water through the environment
- Affects both water quality and water quantity

Cuyahoga County is over 95% developed

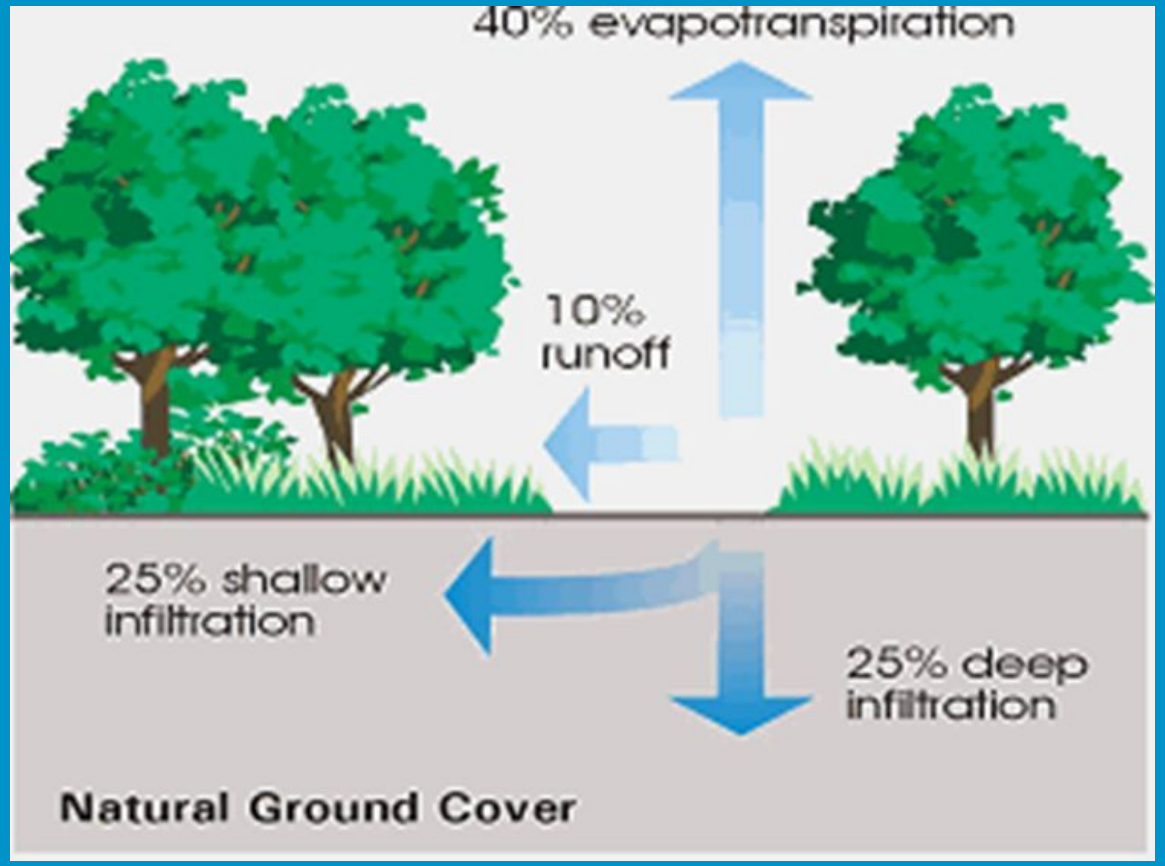


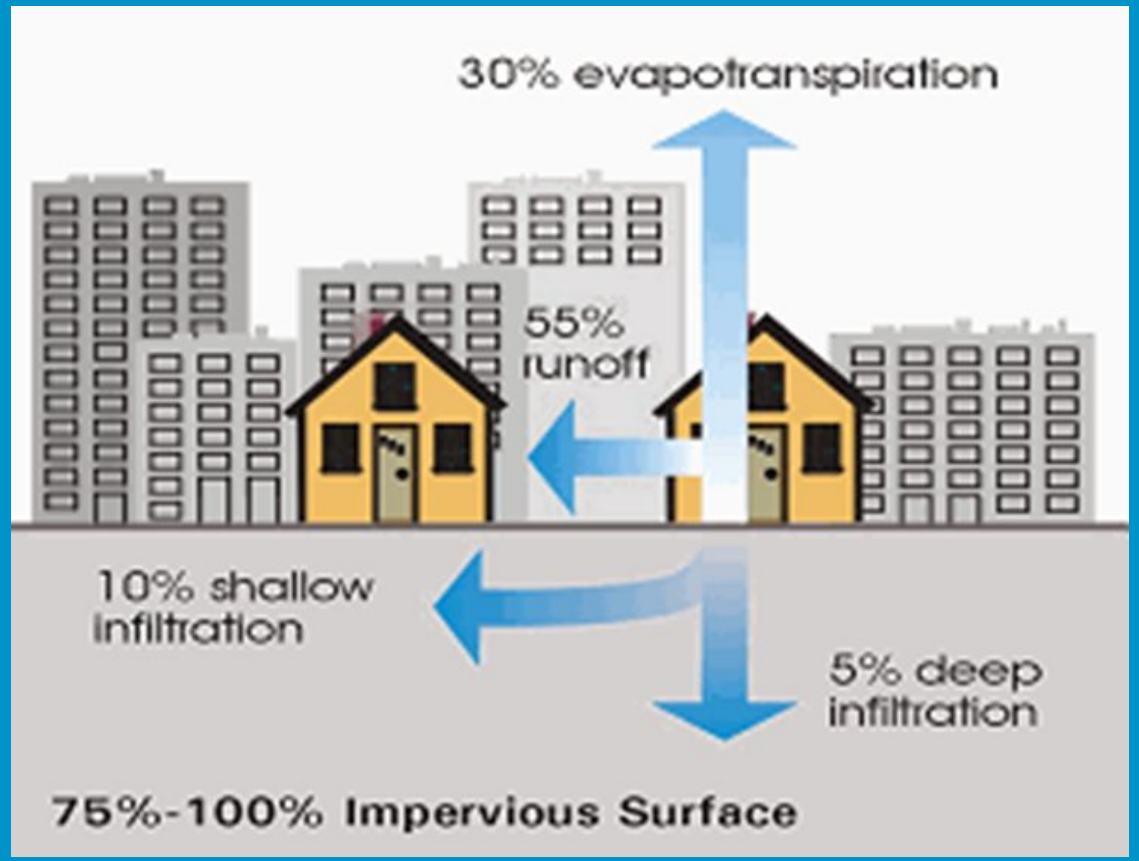
% Imperviousness	Impact
2%	No detrimental effect, riparian
7-8%	Buffer remains sound
10%	Stream begins to erode
18%	Aquatic diversity declines
40%	Active stream widening
60%	Massive erosion, natural channel cannot be maintained

SOURCE: Watershed Protection Techniques, Vol. No 3, Fall 1994. The Importance of Imperviousness

Watershed	Impervious Cover (1994)
Euclid Creek	32.6%
Cuyahoga River	31.2%
Rocky River	25.6%
Chagrin River	21.1%
Black River	9.6%
Ashtabula River	8.0 %
Grand River	4.1%

SOURCE: Ohio Nonpoint Pollution Control Program Plan


40% evapotranspiration
10% runoff
25% shallow infiltration
25% deep infiltration
Natural Ground Cover

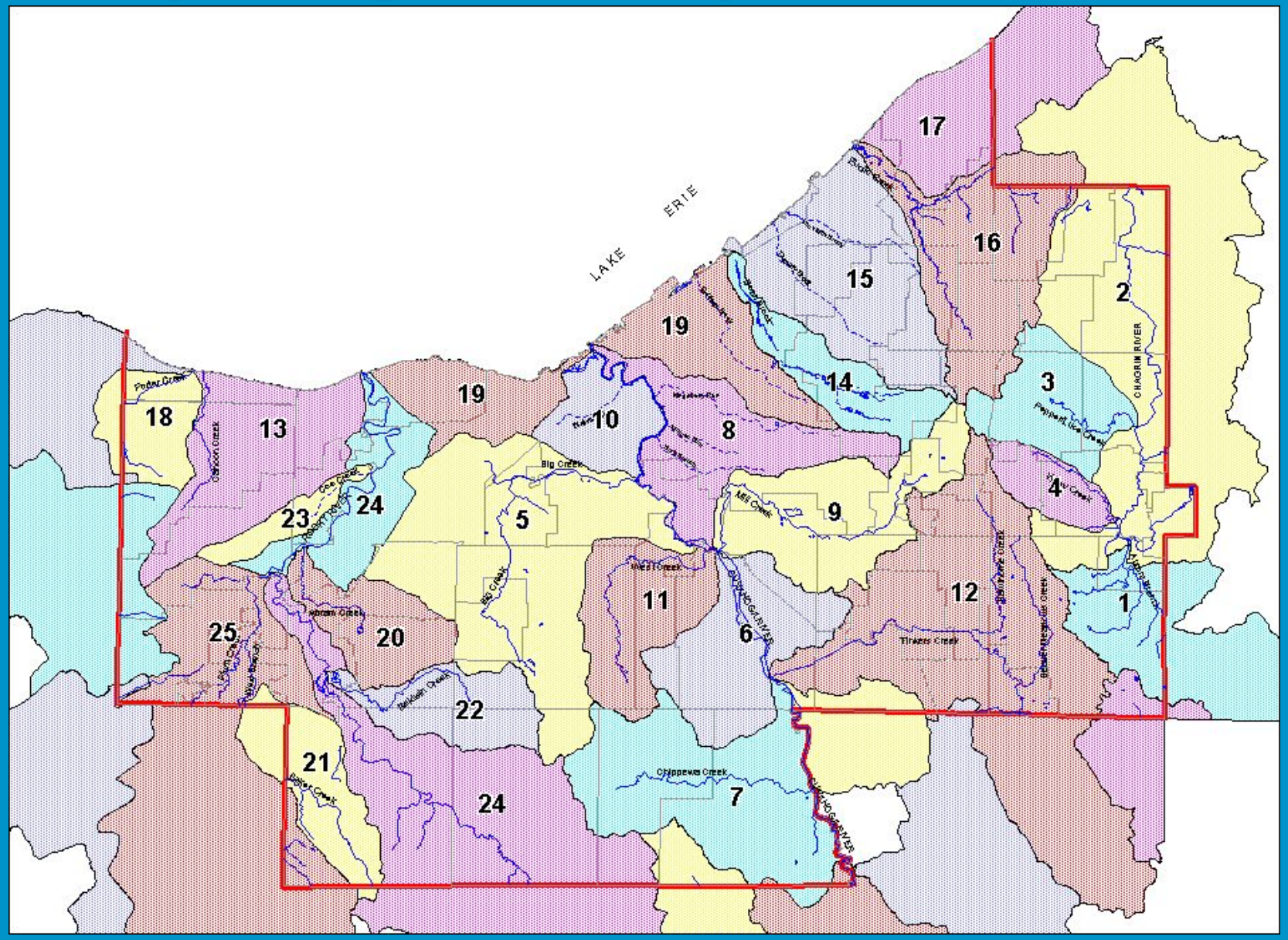

30% evapotranspiration
55% runoff
10% shallow infiltration
5% deep infiltration
75%-100% Impervious Surface

What is a watershed ?

What is a watershed?

The land that water flows across or under on its way to a stream, river, or lake.

Cuyahoga County Watersheds



Chagrin River
1. Aurora Branch
2. Main Branch
3. Pepper/Luce Creek
4. Wiley Creek

Cuyahoga River
5. Big Creek
6. Central County Tributaries
7. Chippewa Creek
8. Kingsbury, Burk, Morgan
9. Mill Creek
10. Walworth Run
11. West Creek
12. Tinkers Creek

Lake Erie Direct Tributaries
13. Cahoon Creek
14. Doan Brook
15. Dugway, Nine Mile, Green
16. Euclid Creek
17. Euclid City/Lake County
18. Porter Creek
19. Cleveland, Lakewood tributaries

Rocky River
20. Abrams Creek
21. Baker Creek
22. Baldwin Creek
23. Coe Creek
24. Main Branch
25. West Branch/Plum Creek


Entering
CHESAPEAKE BAY
WATERSHED
Be a friend to the Chesapeake
The Chesapeake Bay Commission

Clean Water Act

1972 - permit system for regulating point sources of pollution

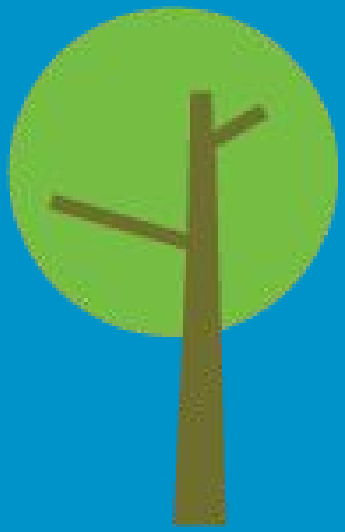
Clean Water Act

- **Non-point source** pollution
- Stormwater
- Death by 1,000 cuts

Clean Water Act

Minimum control measures:

1. **Public Education**
2. **Public Involvement**
3. Illicit discharge detection and elimination
4. **Construction site storm water runoff control**
5. **Post construction storm water management**
6. Pollution prevention/Good Housekeeping for municipal operations



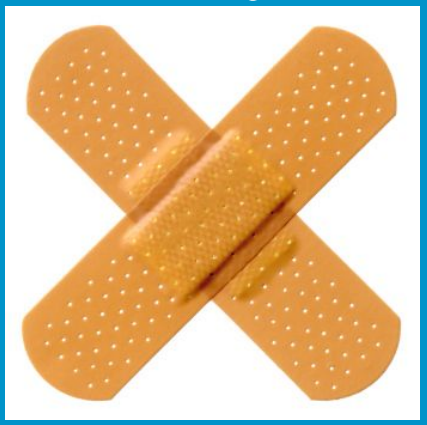
Clean Water Act remains one of the most successful pieces of environmental legislation in the history of the U.S.

Stormwater Pollutants

Death by 1,000 Cuts

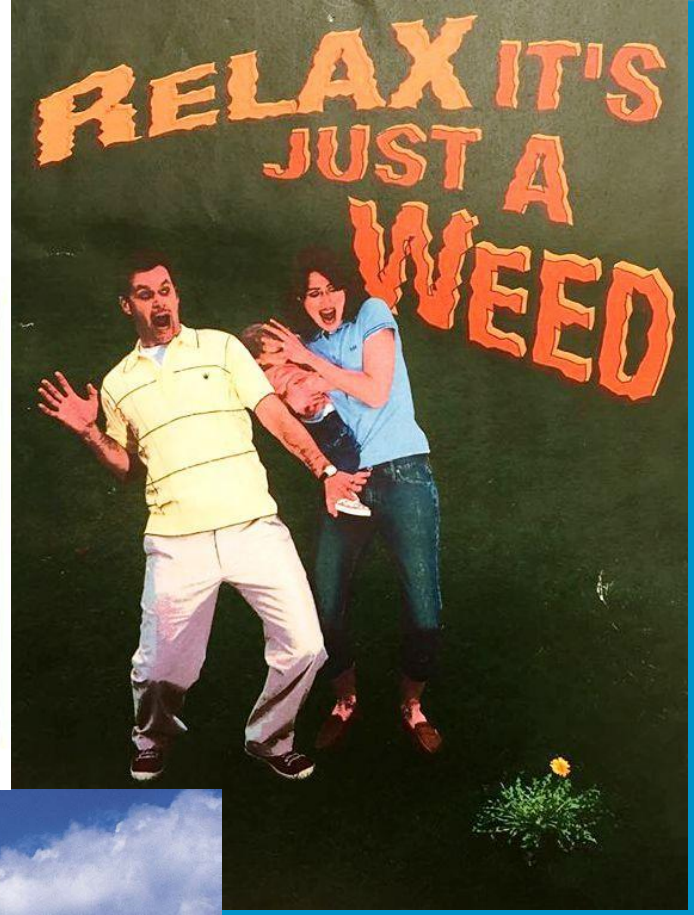
- Fertilizers and Pesticides
- Oil and Gas
- Litter
- Sediment
- Pet Waste

What can you do?



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.



Fertilizers and Pesticides

OHIO STATE UNIVERSITY EXTENSION

THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES

extension.osu.edu
agnr.osu.edu

SOIL TESTING FOR OHIO LAWNS, LANDSCAPES, FRUIT CROPS, AND VEGETABLE GARDENS

HYG-1132
Last Updated: 07/08/2016

Joe Boggs, Assistant Professor and Extension Educator, Agriculture and Natural Resources, Hamilton County
Cindy Meyer, Extension Educator, Agriculture and Natural Resources, Butler County
Gary Gao, Associate Professor, Department of Horticulture and Crop Sciences, South Centers
Jim Chatfield, Associate Professor and Extension Specialist, Department of Plant Pathology, Department of Horticulture and Crop Science

Soil tests provide more helpful information on soils than any other resource. It is an inexpensive way to maintain good plant health in lawns and landscapes, and to maximize productivity of vegetable gardens and fruit crops. Soil test results pinpoint plant nutrient needs and soil test lab recommendations guide fertilizer applications so just the right amount is used. Test results also provide information for making plant selection decisions based on "right plant—right place." If good plants go bad, a soil test can help diagnose what went wrong.

Soil samples are sent to an accredited soil testing lab (see list at end). Results will be sent along with recommendations for taking corrective actions if needed. This includes the amount of fertilizers and other additives needed to support healthy plants. With an accurate soil sample and test, reliable fertilizer recommendations can help horticulture professionals and gardening enthusiasts improve plant quality and productivity, reduce nutrient runoff, and save money.

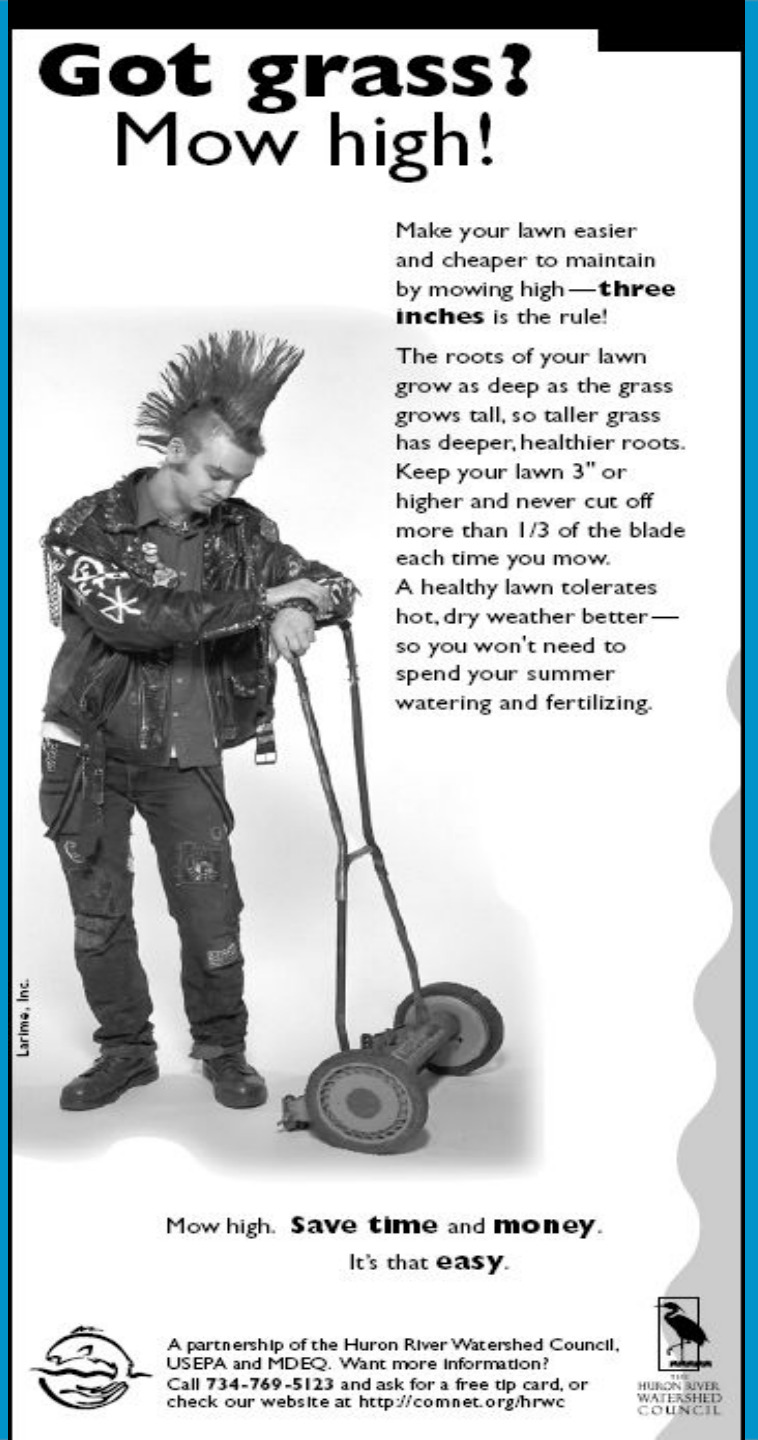
A standard soil test provides information on chemical properties of the soil that represents soil fertility. This includes the amount of positively charged plant nutrients (cations) found in the soil including phosphorous (P^{+}), potassium (K^{+}), calcium (Ca^{++}), and magnesium (Mg^{++}). These chemical elements are called "macronutrients" based on the amount needed and used by plants to maintain healthy growth and development. The test will also reveal the cation exchange capacity (CEC) of the soil, which is a measure of how well the soil holds onto these chemical elements. The higher the CEC, the better the soil holds onto cations against water leaching.

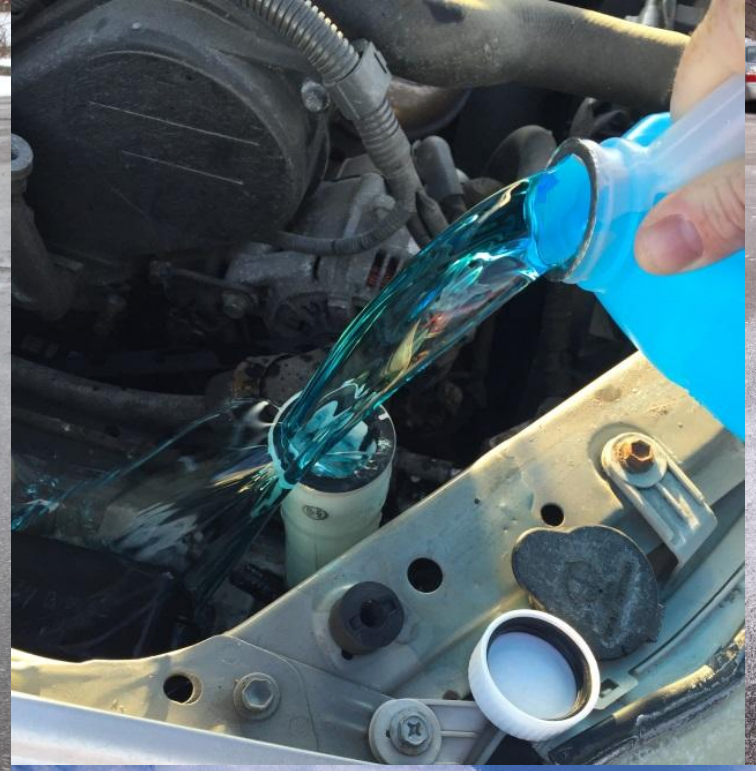
One of the most important chemical properties is soil pH. Figure 1 shows how soil pH influences the availability of important chemical elements to plants. The same amount of the nutrient is in the soil regardless of the width of the band; however, where the bands are wide, the element is in a water-soluble form to be taken up by plant roots. Where the bands are narrow, elements are chemically bound into a non-soluble form that places them out of the reach of plant roots.

For additional fees, soil testing labs will provide information on other chemical properties of the soil such as

Mow High and Let it Lie

- Mow your grass no shorter than 3” tall
- Leave your grass clippings – this is great fertilizer for your lawn!!!
- Following these tips will reduce the need to water and fertilize your lawn





Cars

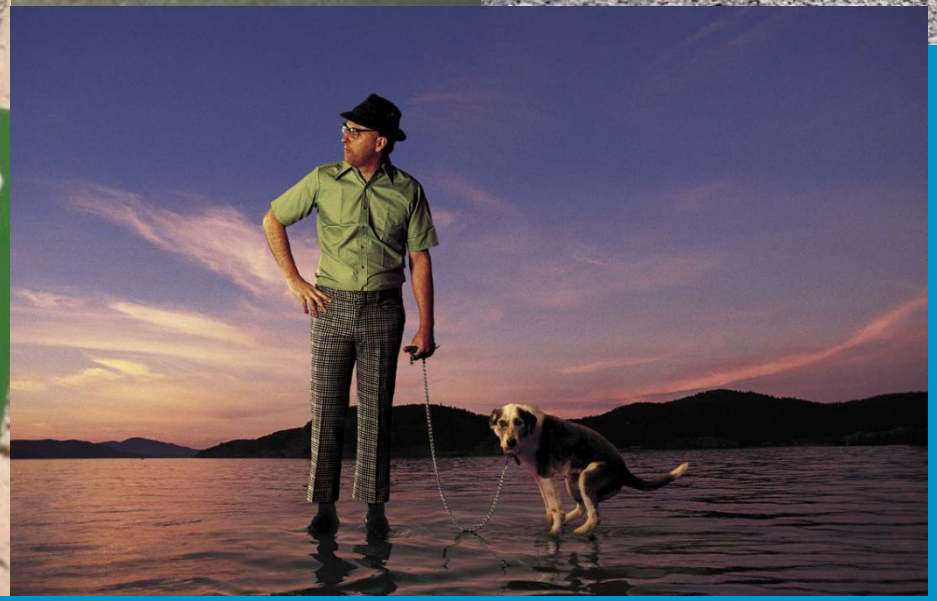
Poisoned Waters

"Based on actual sampling in the Puget Sound basin, we have estimated that the volume of oil that is carried into Puget Sound by stormwater run off is equal to the oil spill in Prince William Sound that the Exxon Valdez spilled. Every two years, the storm water in Puget Sound carries that volume of oil into Puget Sound."

JAY MANNING, *Director, Wash. Dept. of Ecology*

=

Cuyahoga County = 90,000 registered dogs
Dog poop 2x/day = 45 TONS of doggie droppings a day



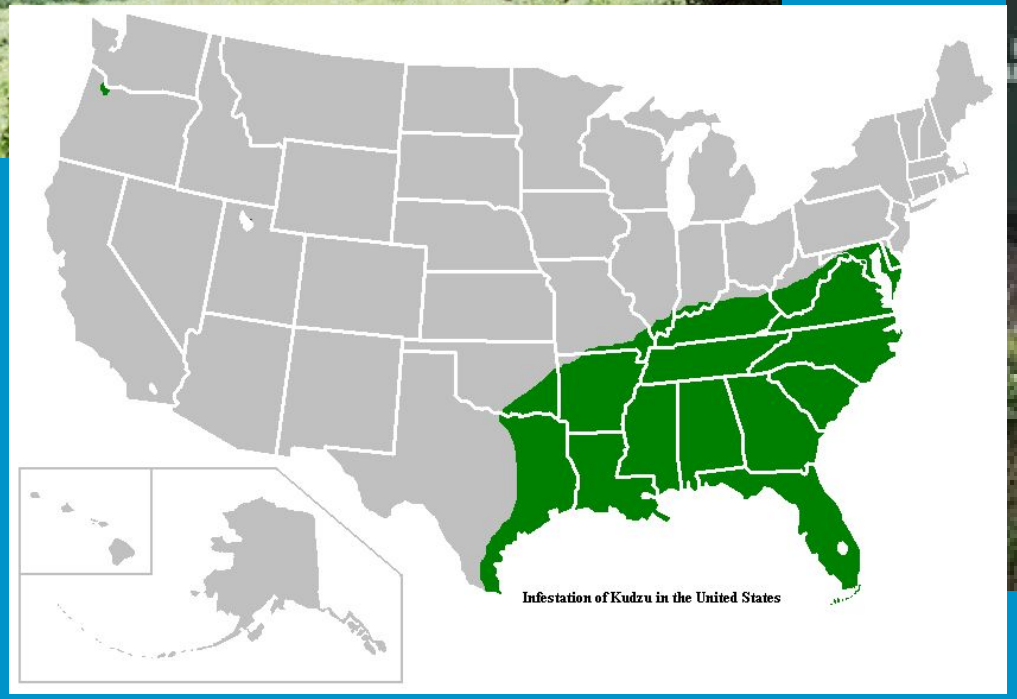
Pet Waste Management


2014

Landscaping with Native Plants

- Native plants are adapted to local soil and climate conditions
- Healthier with less water and fertilizer than exotic varieties
- Prevent the spread of exotic invasive species
- Encourages local wildlife (butterflies, bees, etc.)

On purpose!!
Kudzu
Erosion protection – 1930's



Invasive Plants

Rain Gardens

- Rain gardens are beautiful natural landscape features requiring less maintenance and fewer chemicals than traditional lawns
- Rain gardens capture runoff from impervious areas such as roofs and driveways (and lawns) and allow it to seep slowly into the ground

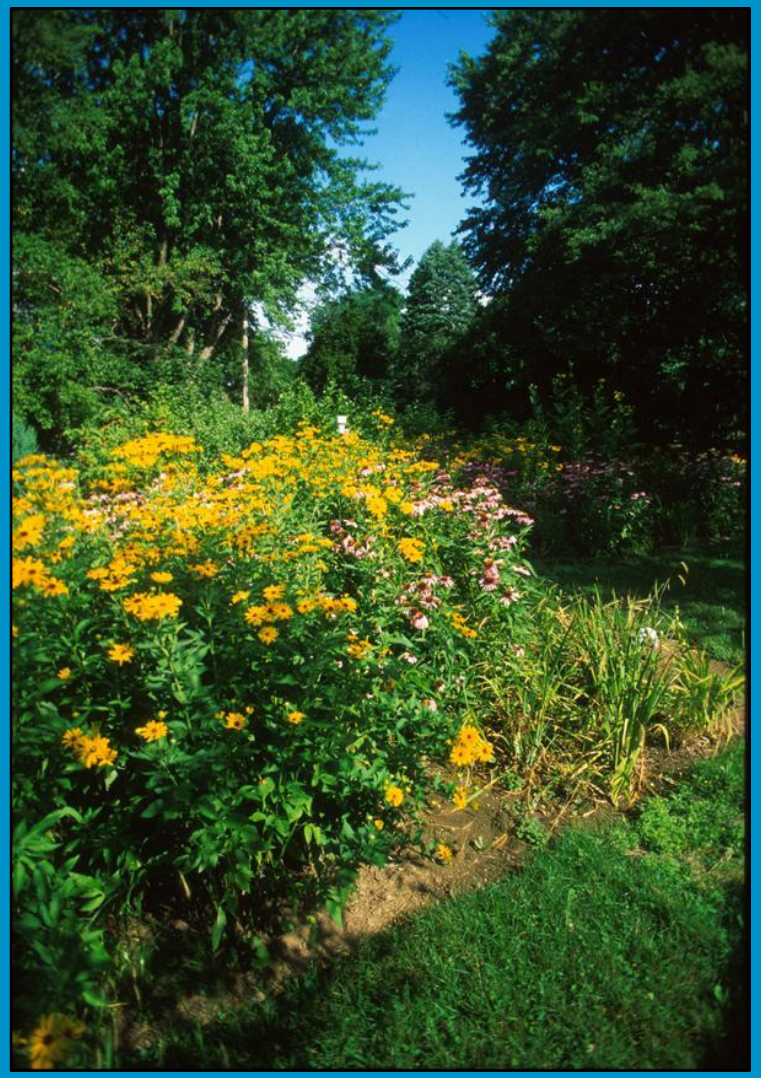
Why are Rain Gardens important?

70% of the pollution in our waterways is carried there by stormwater runoff from our own yards

Increased impervious areas with urbanization/ suburbanization

Resulting problems:

- Flooding
- Compacted soils
- Polluted waterways
- High cost of fixing problems



FAQs of Rain Gardens

- Does the rain garden form a pond?
  No. Rain gardens are saucer shaped, not bowl shaped. If designed properly, rainwater will soak into the ground so that the rain garden is dry between rainfalls.
- Will they attract mosquitoes?
  No. Mosquitoes need 7-12 days to lay and hatch eggs and standing water in the rain garden should drain in a few hours after rain events. Mosquitoes are more likely to breed in bird baths, old tires, catch basins.
- How much maintenance is entailed?
  After rain gardens are established, they can be maintained with minimal effort after plants are established. Weeding and watering are the basic maintenance chores.

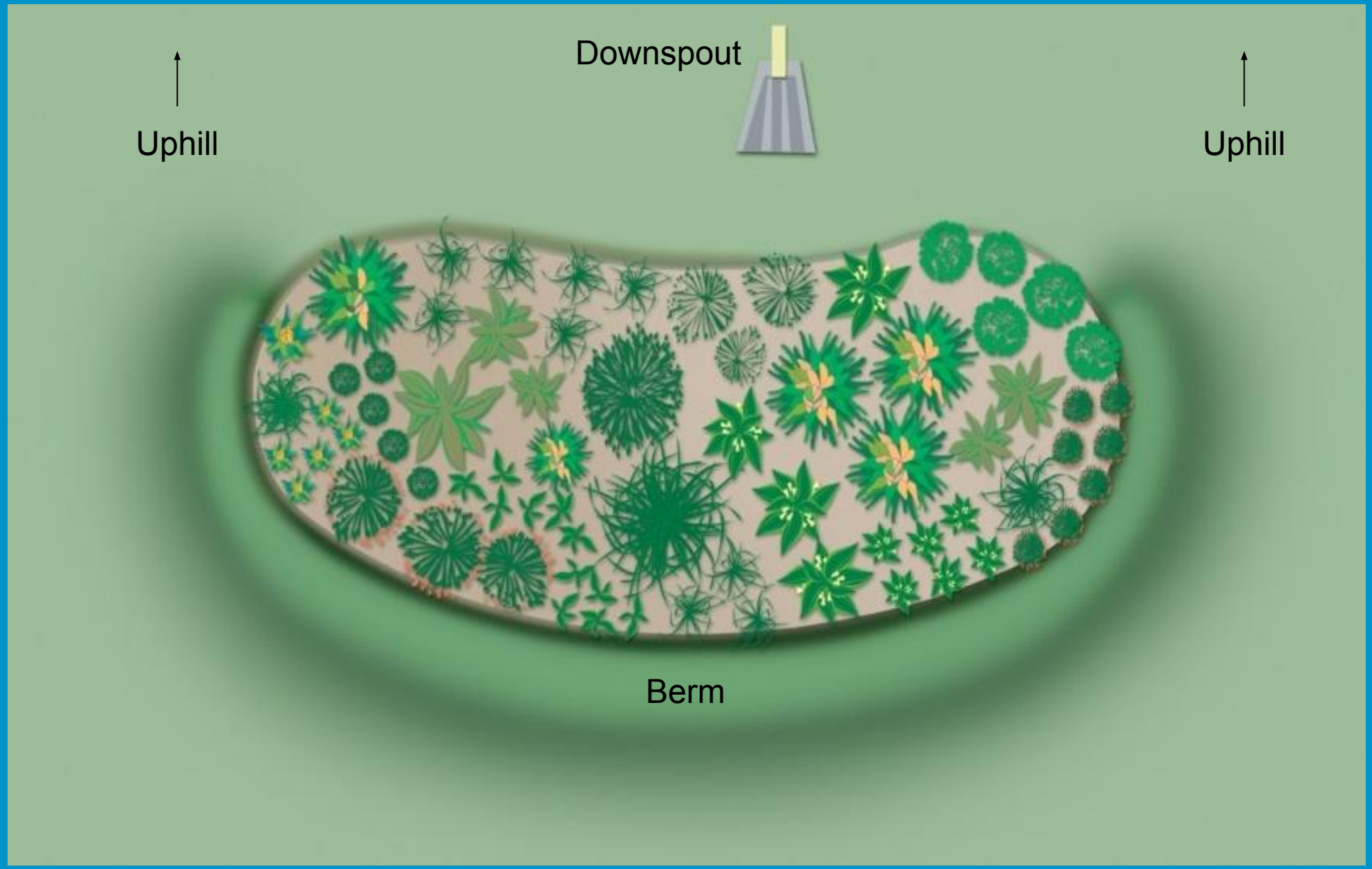
FAQs of Rain Gardens

- Is a rain garden expensive?
  It doesn't have to be. Seek out help (labor) from friends and family. Costs may also be minimized by obtaining divided plants from friends, family, colleagues and neighbors.

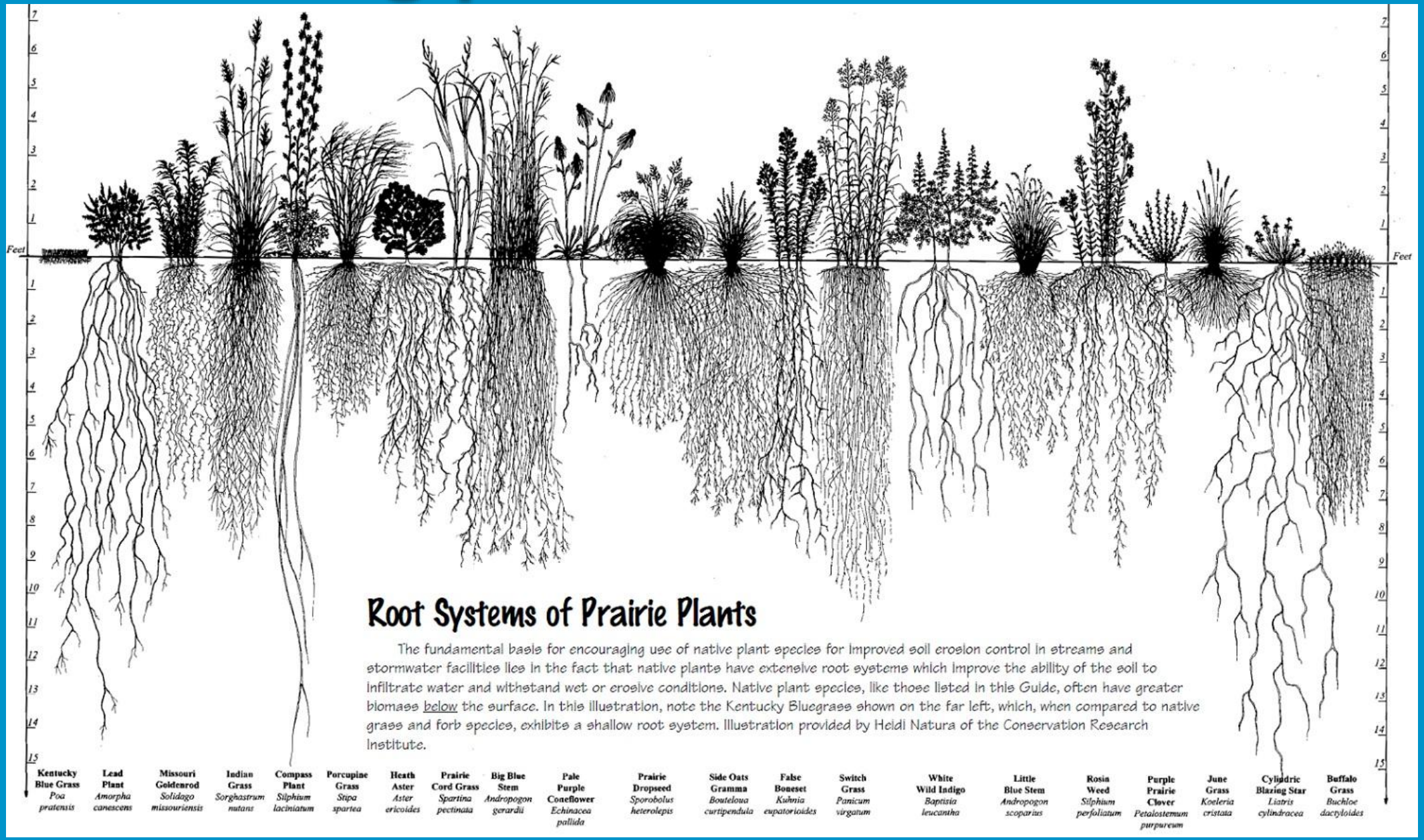
- Can I build a rain garden in my community?
  Check local ordinances may prohibit or regulate disconnecting downspouts, etc.

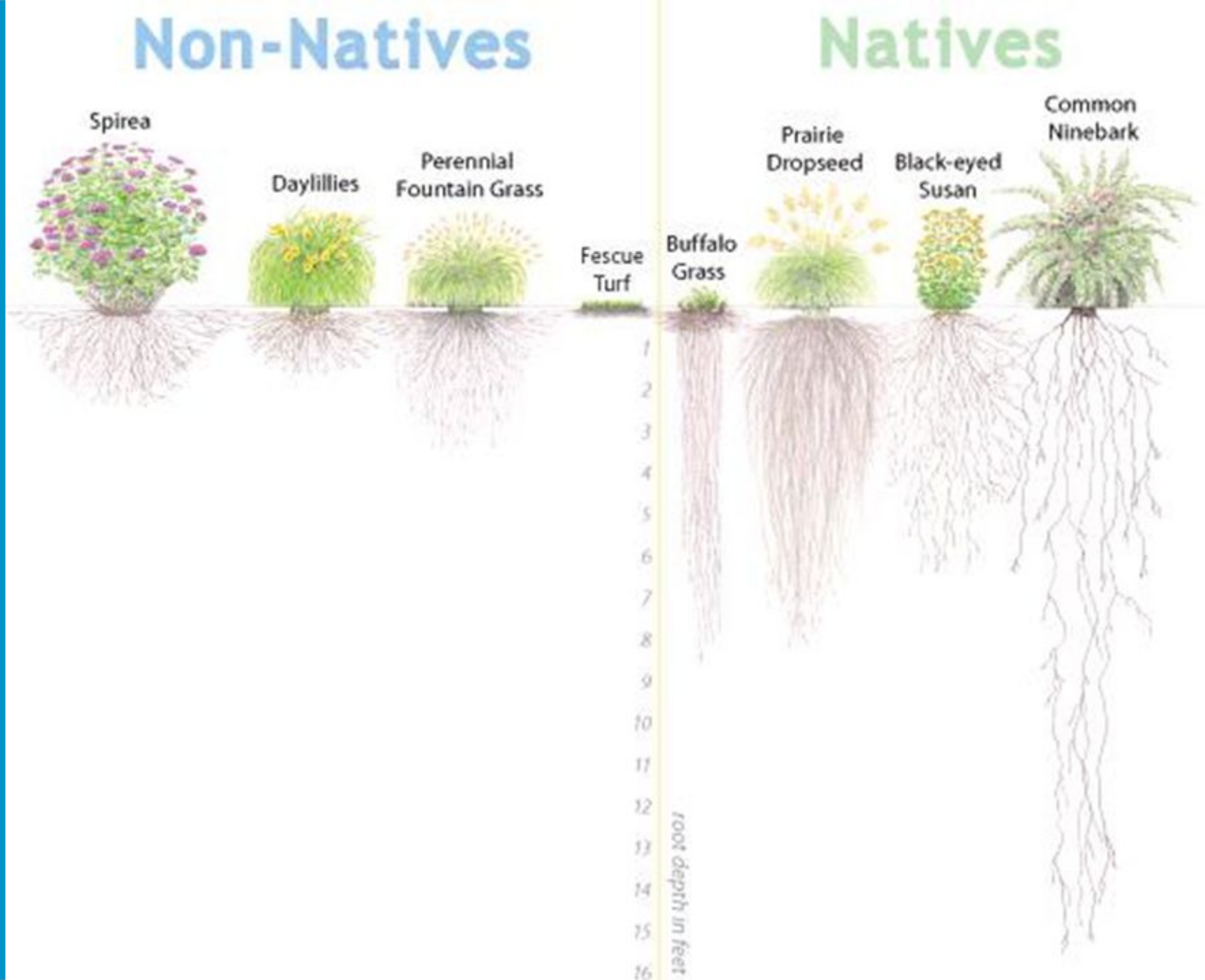
How do Rain Gardens work?

- Receives runoff water from roofs or other impervious (hard) surfaces such as driveways
- Designed with a shallow depression so that the water can be taken in by plants and soak into the ground instead of running off.
- Plants, mulch and soil in rain gardens combine natural physical, biological and chemical processes to remove pollutants from runoff


Downspout
Uphill
Uphill
Berm

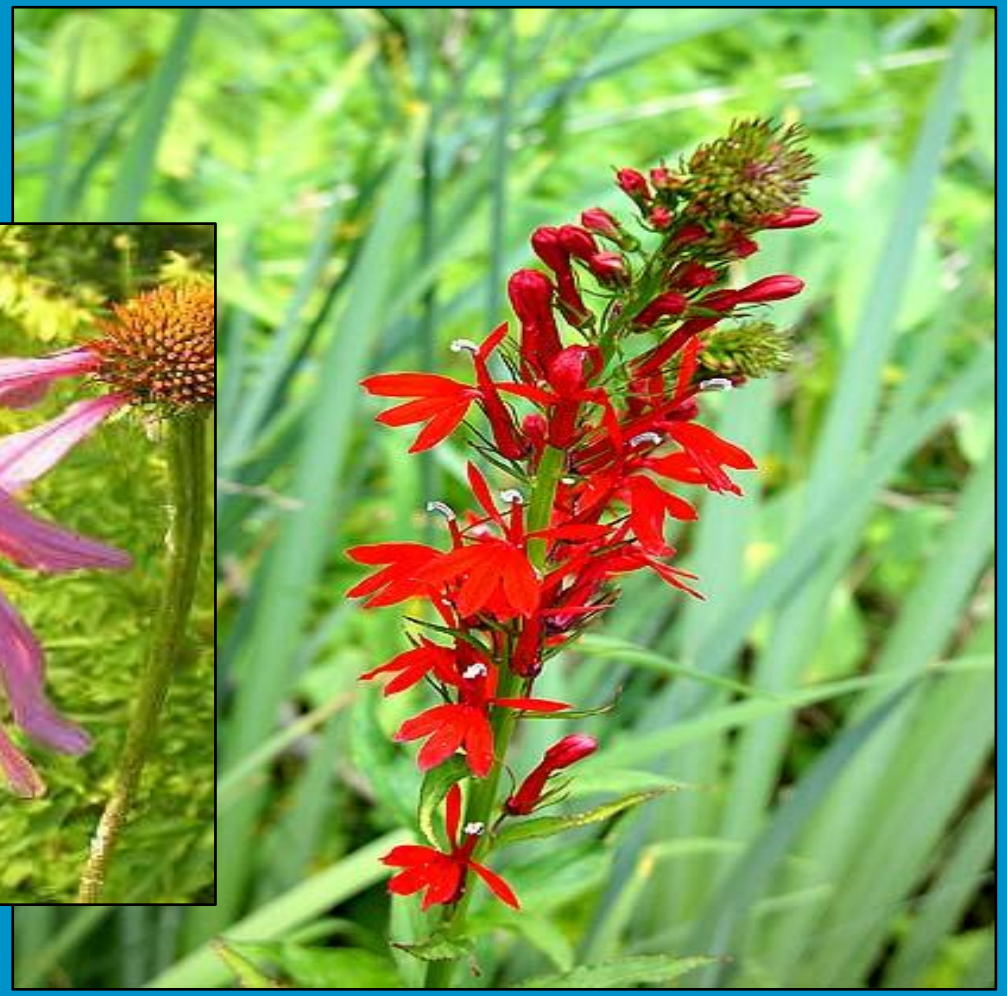
Choosing plants for Rain Gardens




Non-Natives
Natives
Spirea
Daylillies
Perennial Fountain Grass
Fescue Turf
Buffalo Grass
Prairie Dropseed
Black-eyed Susan
Common Ninebark
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
root depth in feet

Lobelia

Coneflower



Cardinal flower

Grasses

Building the Garden

Many hands make light work!

Avoid compaction of the soil with heavy equipment

You may need to amend your soil if it is too clayey and doesn't absorb water at the rate you desire

Maintenance

- Remove weeds on a regular basis as the plants grow
- Replenish mulch and organic matter as needed
- Low maintenance if the correct plants are chosen.
- Water plants for at least two years to get them established.

Great School or Community Project!

Rain Barrels

- **Water Conservation**
  60% of municipal water supply goes to watering our lawns
- **Protection of Local Watersheds**
  70 million lbs of fertilizer are applied to lawns each year
- **Natural Gardening**
  Free of chlorine, fluoride, and other chemicals. Beneficial microbes thrive with rainwater.

Rain Barrels

You can collect an average of 2,100 gallons of rain per month during the spring and summer.

QUESTIONS?

Amy Roskilly, Conservation Education Specialist
Cuyahoga Soil & Water Conservation District
aroskilly@cuyahogaswcd.org
www.cuyahogaswcd.org