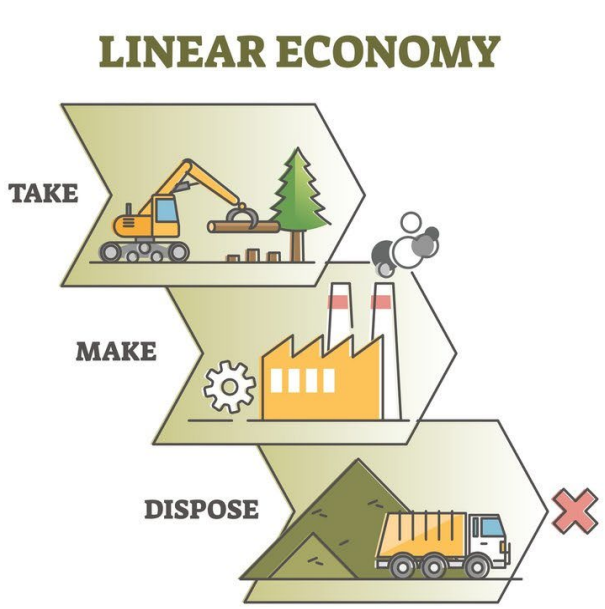
Watersheds & Rain Barrels

PENNSYLVANIA RESOURCES COUNCIL

Pennsylvania Resources Council

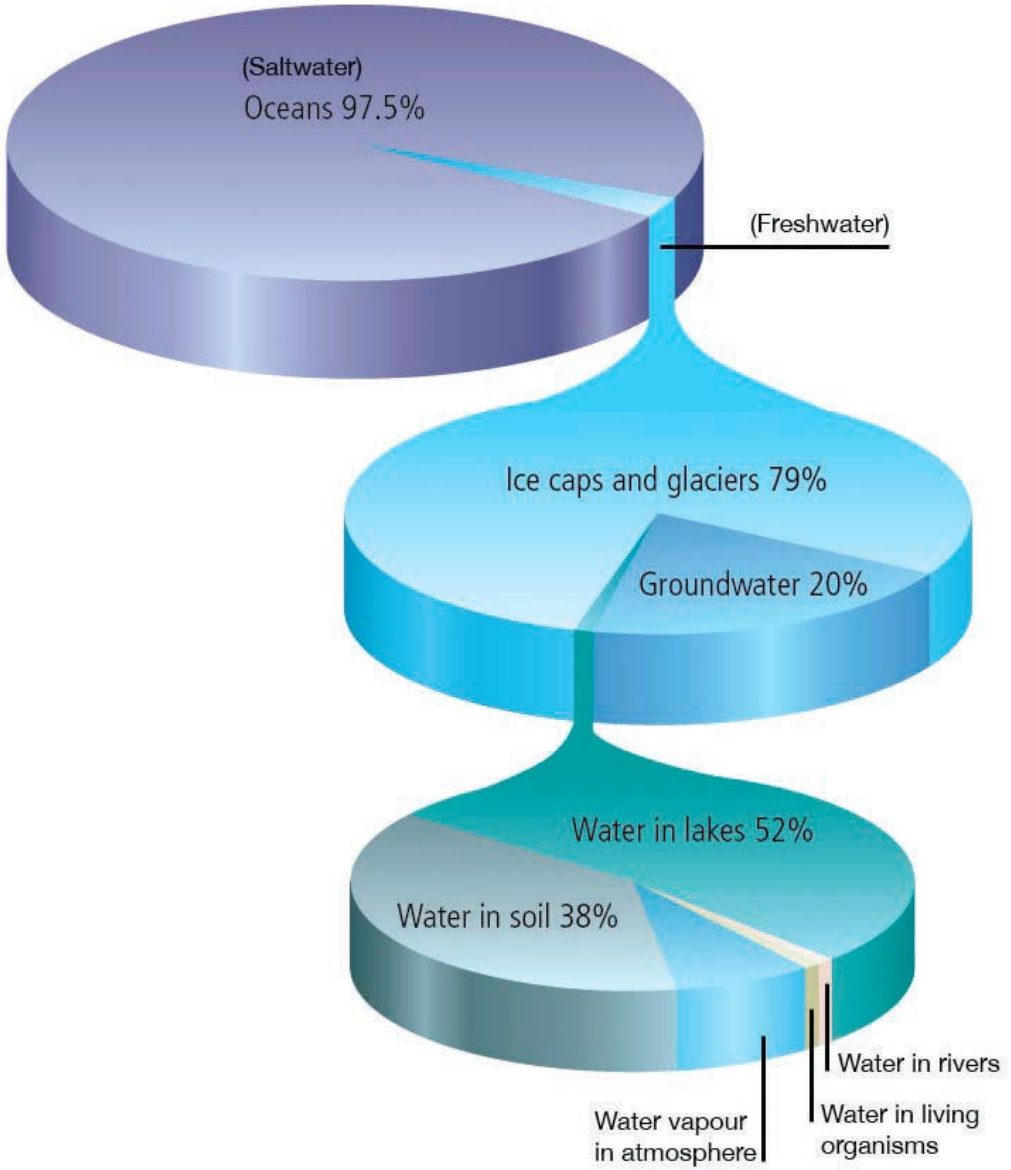
A Pennsylvania where nothing is wasted

- Founded in 1939 as PA Roadside Council
- Focus has shifted from roadside blight to littering to recycling to waste reduction
- Household waste collections, educational workshops, traveling glass bin, zero waste services and more!



In this presentation

- Water and watersheds
- How we impact watershed health
- How we can promote healthy waterways
- Rain barrel setup, maintenance, and use
- Other options for mitigating runoff



How much water is there?

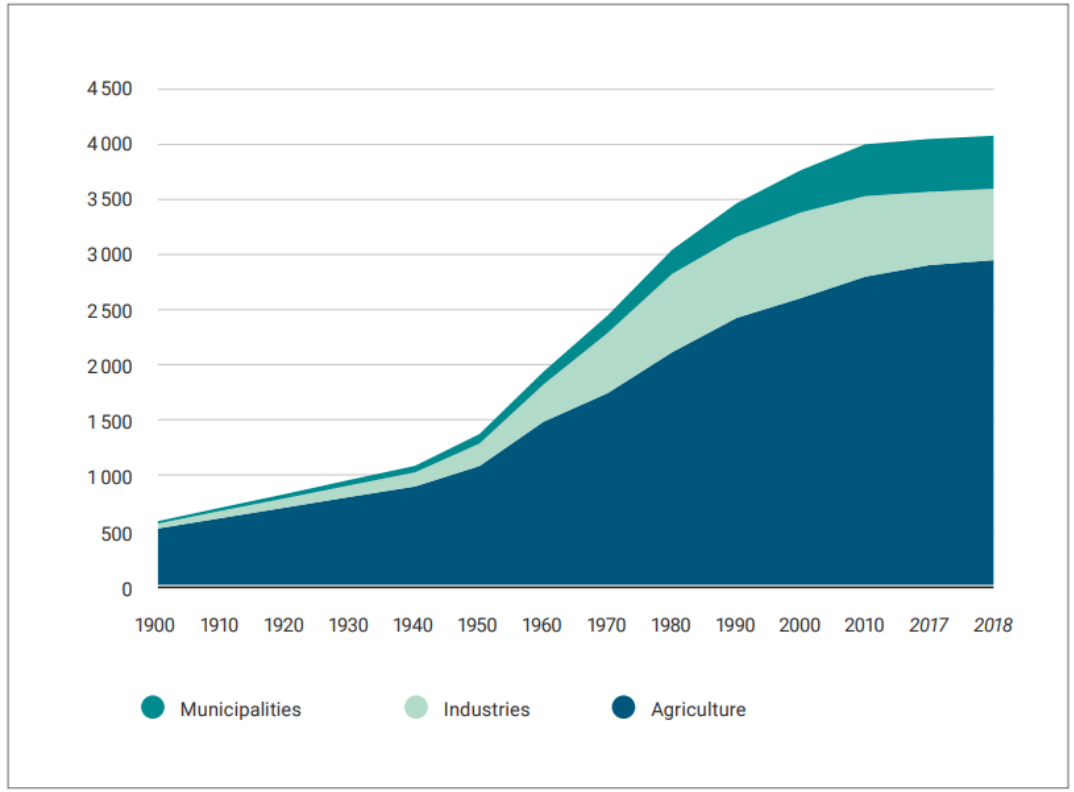
- Earth ≈ 70% water
- Fresh, accessible, clean water ≈ 1%
- How we use our fresh water
  - Irrigation = 70%
  - Industry = 22%
  - Domestic use = 8%

Quantity of Water?

- Global Withdrawls increased then flatlining or declining WHY?
  - Increase in Water productivity (Growing populations need more water)
  - Water Efficiency
  - Prevalence of water scarcity due arid conditions

Figure P.1

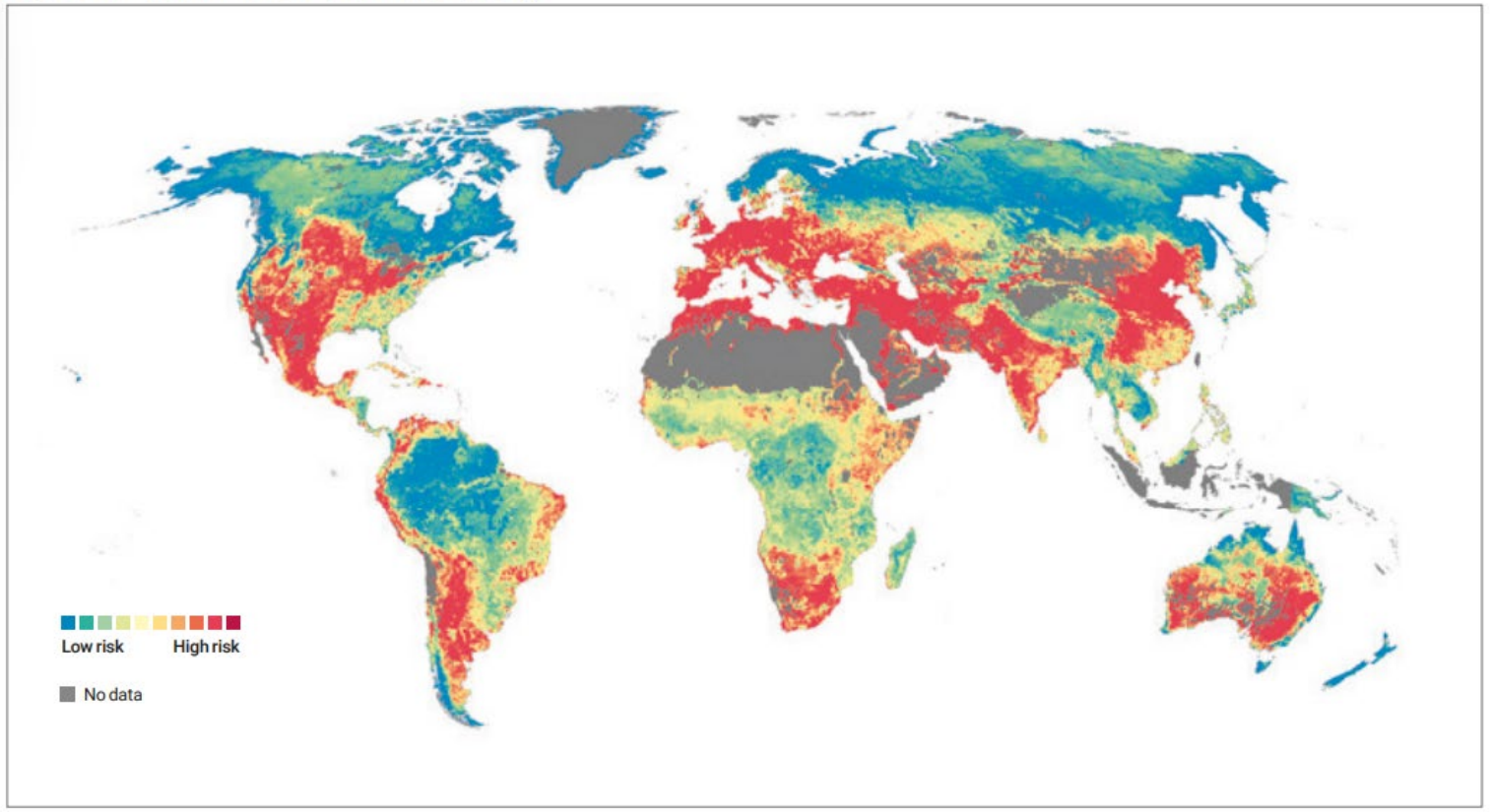
Evolution of global water withdrawals, 1900–2018 (km³/year)



Source: FAO (2022, fig. 1.23, p. 71, based on AQUASTAT).

UN Water Report 2023

Figure P.6 Global risks of poor water quality



Note: This map shows a water quality index summarizing global prediction for biological oxygen demand, electrical conductivity and nitrogen. Each value is scaled to a common support for comparability and then summed together. Average values for 2000–2010 are displayed. Grey areas have no data for one or more parameters. Details on the construction of the index are presented in the World Bank report's appendix, available at www.worldbank.org/qualityunknown.

Source: Damania et al. (2019, map 1.2, p. 7).

UN Water Report 2023

Quality of Water?

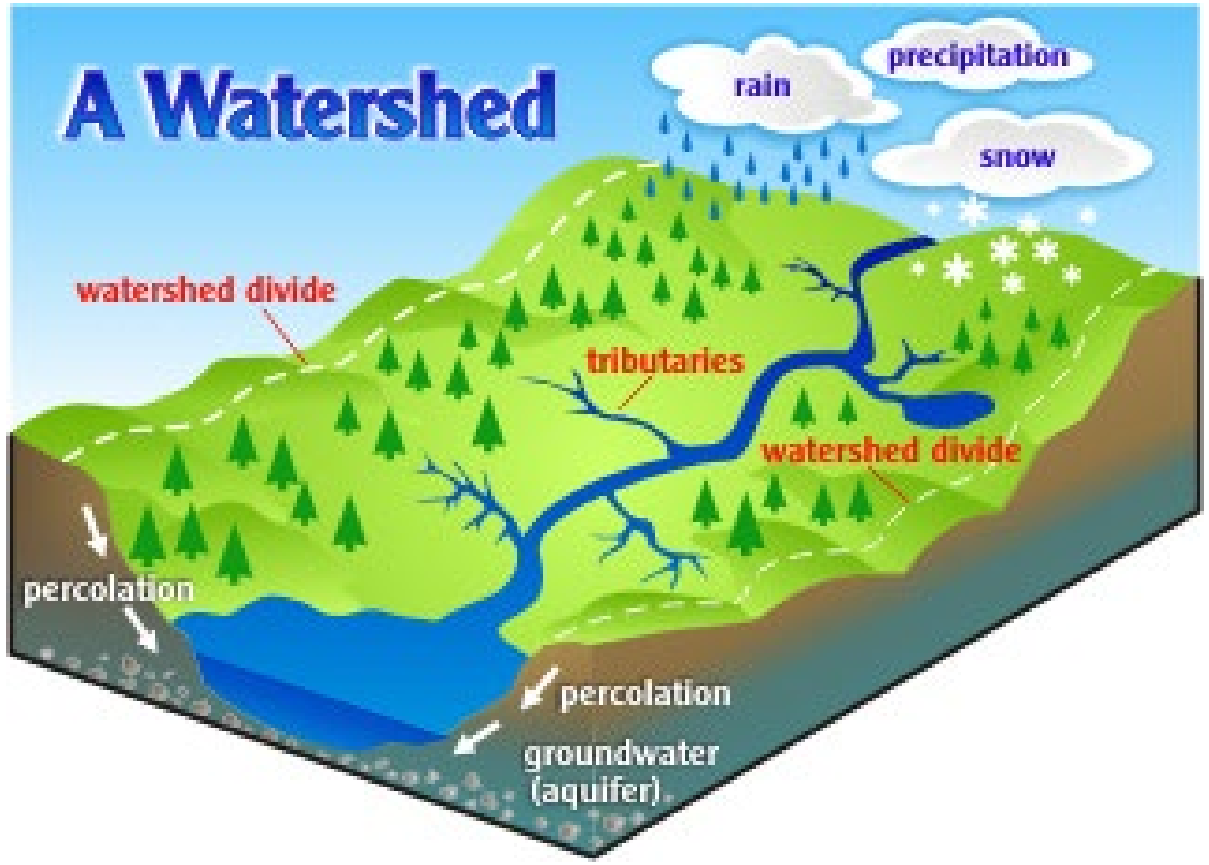
WATER QUALITY INDEX BASED ON BIOLOGICAL OXYGEN DEMAND, CONDUCTIVITY AND NITROGEN

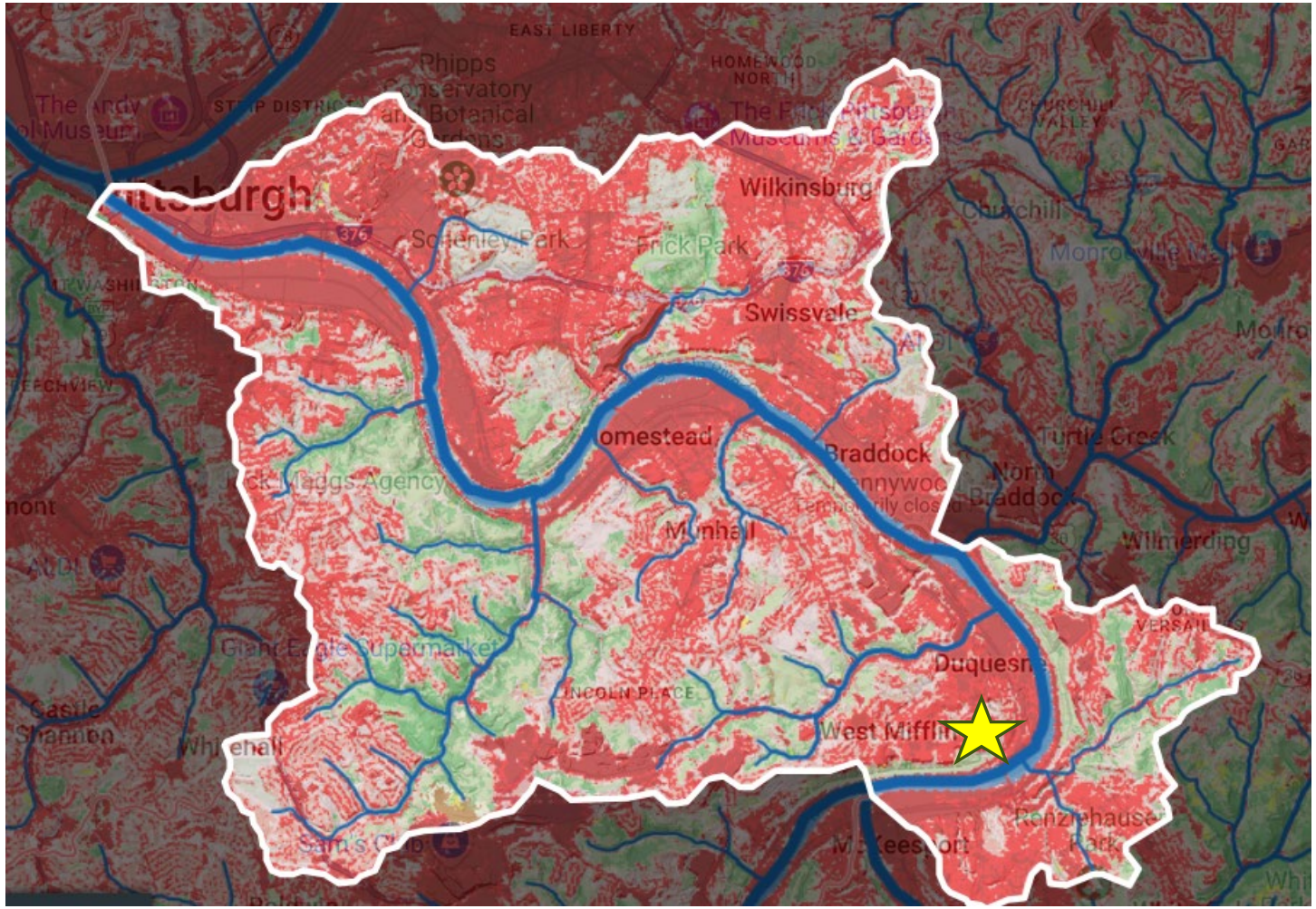
Clean water is a key factor for economic growth. Deteriorating water quality is stalling economic growth, worsening health conditions, reducing food production, and exacerbating poverty in many countries.

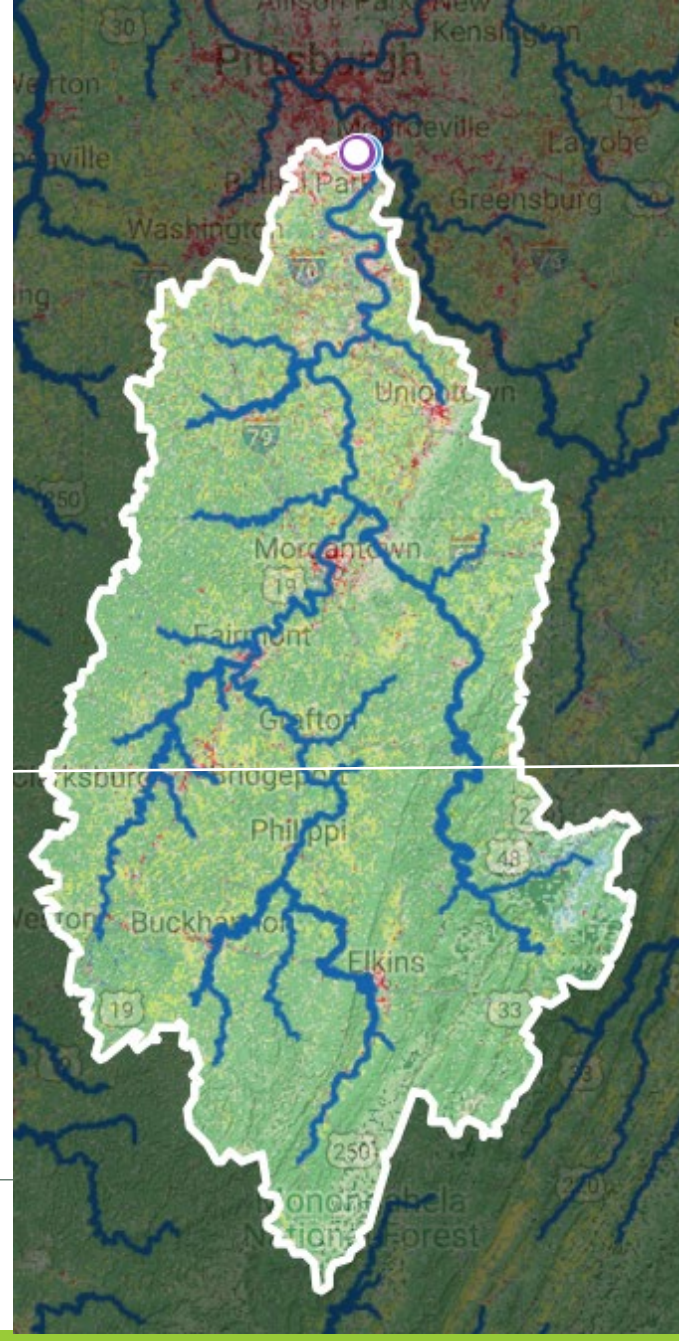
-World Bank Group President David Malpass.

What's a watershed?

- Area of land that drains into the same body of water
- Divided by elevation
- Nested into one another







What Watershed am I in?

MAP FROM STROUD RESEARCH CENTER'S *MODEL MY WATERSHED*

What Happens in a Storm?

Streets Run-Monongahela River HUC 12 0502000508088 :

- **323,821.56 lbs.** [146, 882.99 kg] Total Suspended Solids (TSS)
- **857.24 lbs.** [388.838 kg] Total Phosphorous (TP)

Total loads delivered in a 24-hour hypothetical storm event

Simulated by EPA's STEP-L model algorithms

Quality Measure	Load (kg)	Loading Rate (kg/ha)	Average Concentration (mg/L)
Total Suspended Solids	146,882.990	10.436	122.6
Total Nitrogen	3,469.124	0.246	2.9
Total Phosphorus	388.838	0.028	0.3

DATA FROM STROUD RESEARCH CENTER'S

MODEL MY WATERSHED

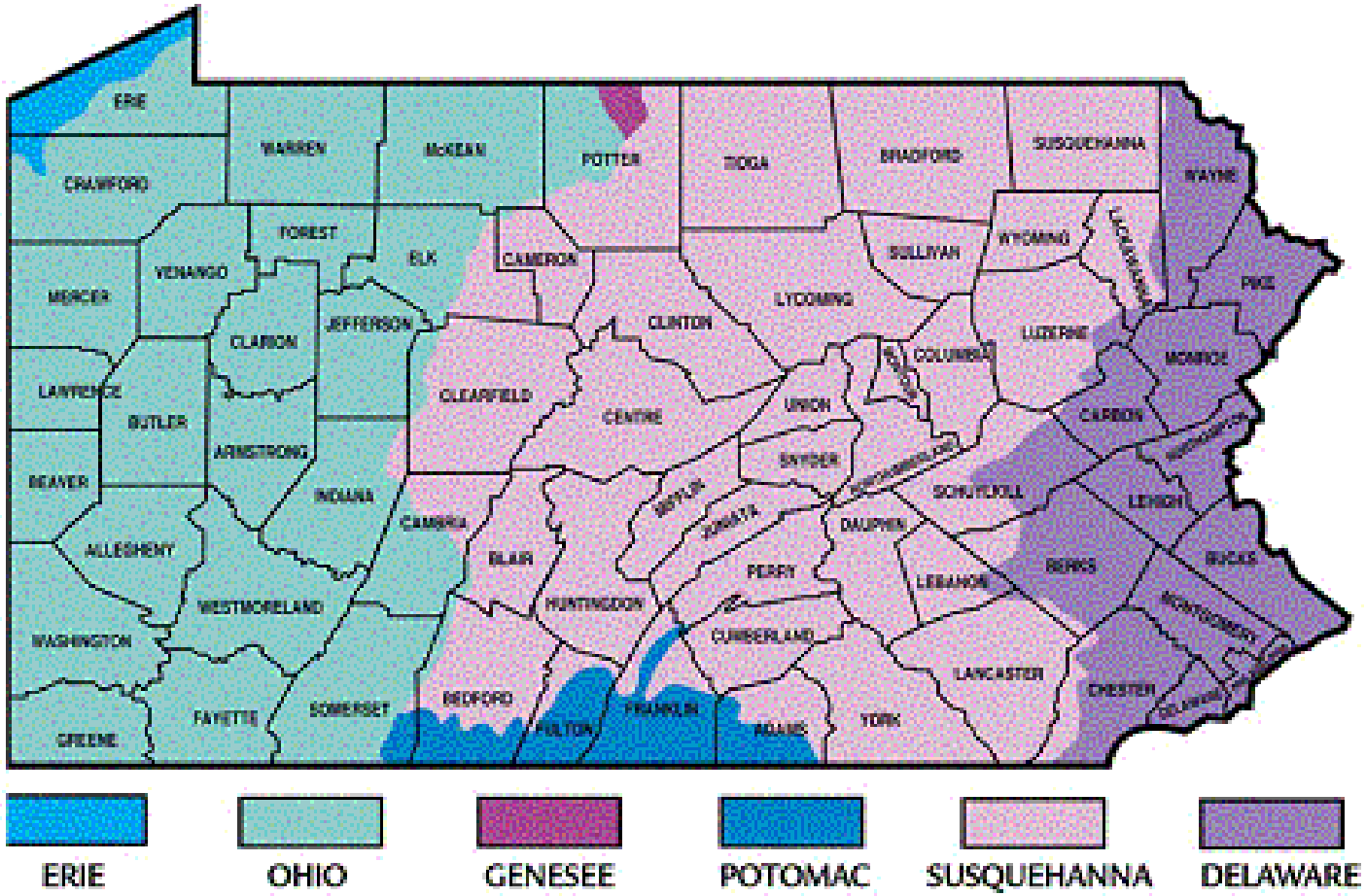
Graphic: https://www.thedirtcorps.com/community-gsi/

How can we help?

West Mifflin MS4 Pollution Reduction Targets:

67,544 lbs./yr. TSS

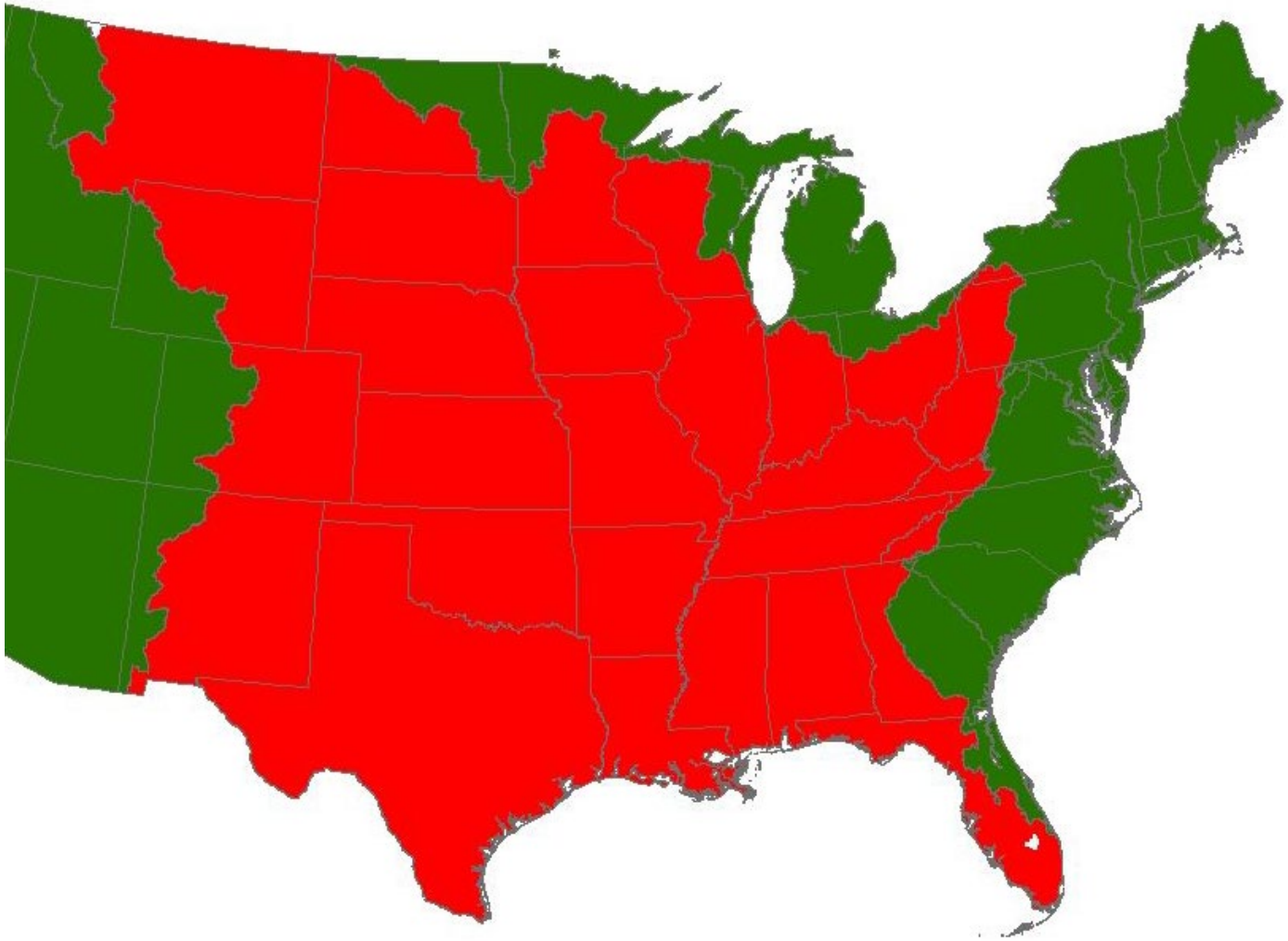
102 lbs./yr. TP



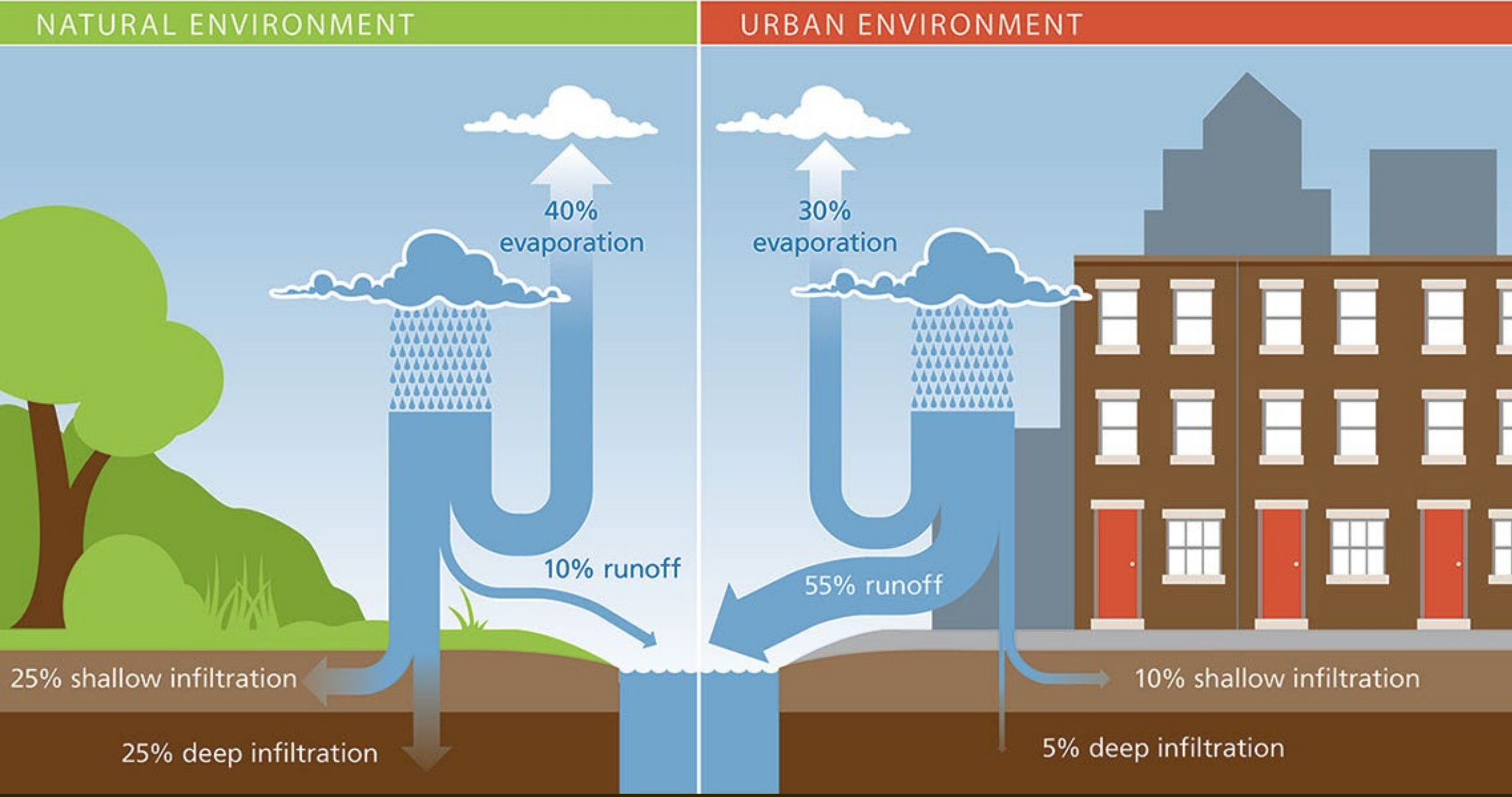
Six major watersheds of PA

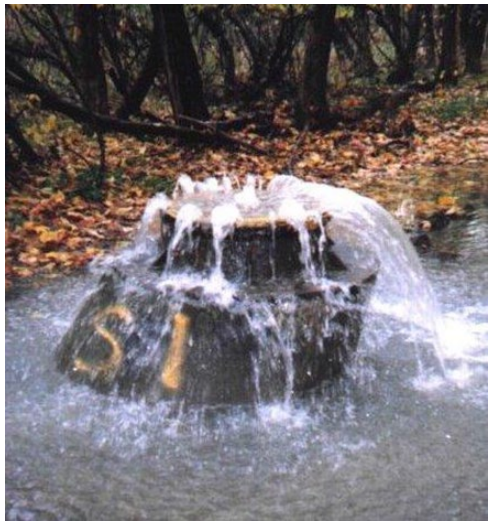
Ohio River Watershed

Mississippi River Watershed



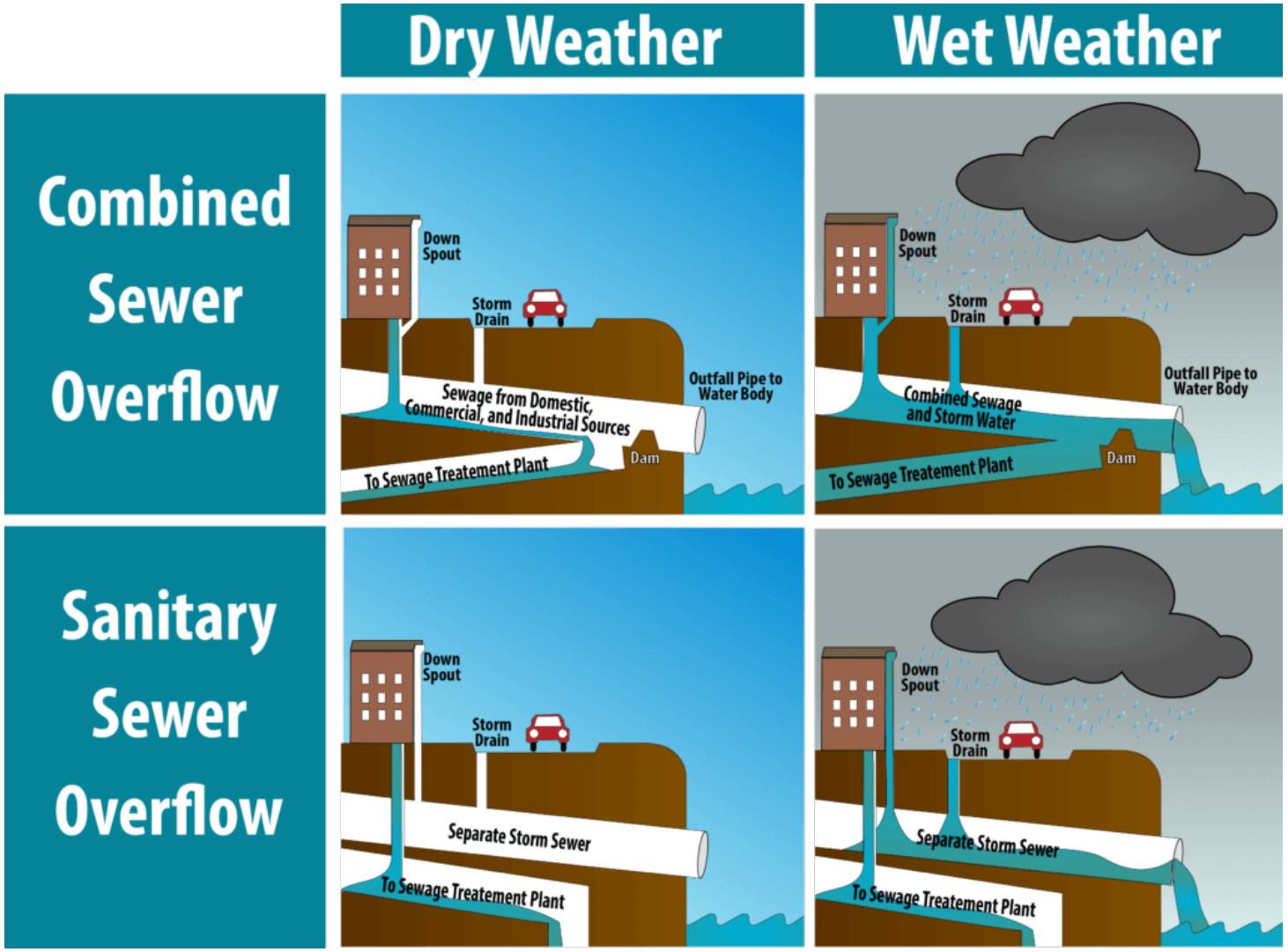
Gulf of Mexico Watershed


NATURAL ENVIRONMENT
URBAN ENVIRONMENT
40% evaporation
30% evaporation
10% runoff
55% runoff
25% shallow infiltration
10% shallow infiltration
25% deep infiltration
5% deep infiltration



Runoff and urbanization

- Impervious surfaces reduce absorption
- Combined sewer overflow
  - Only takes 1/10” of rain

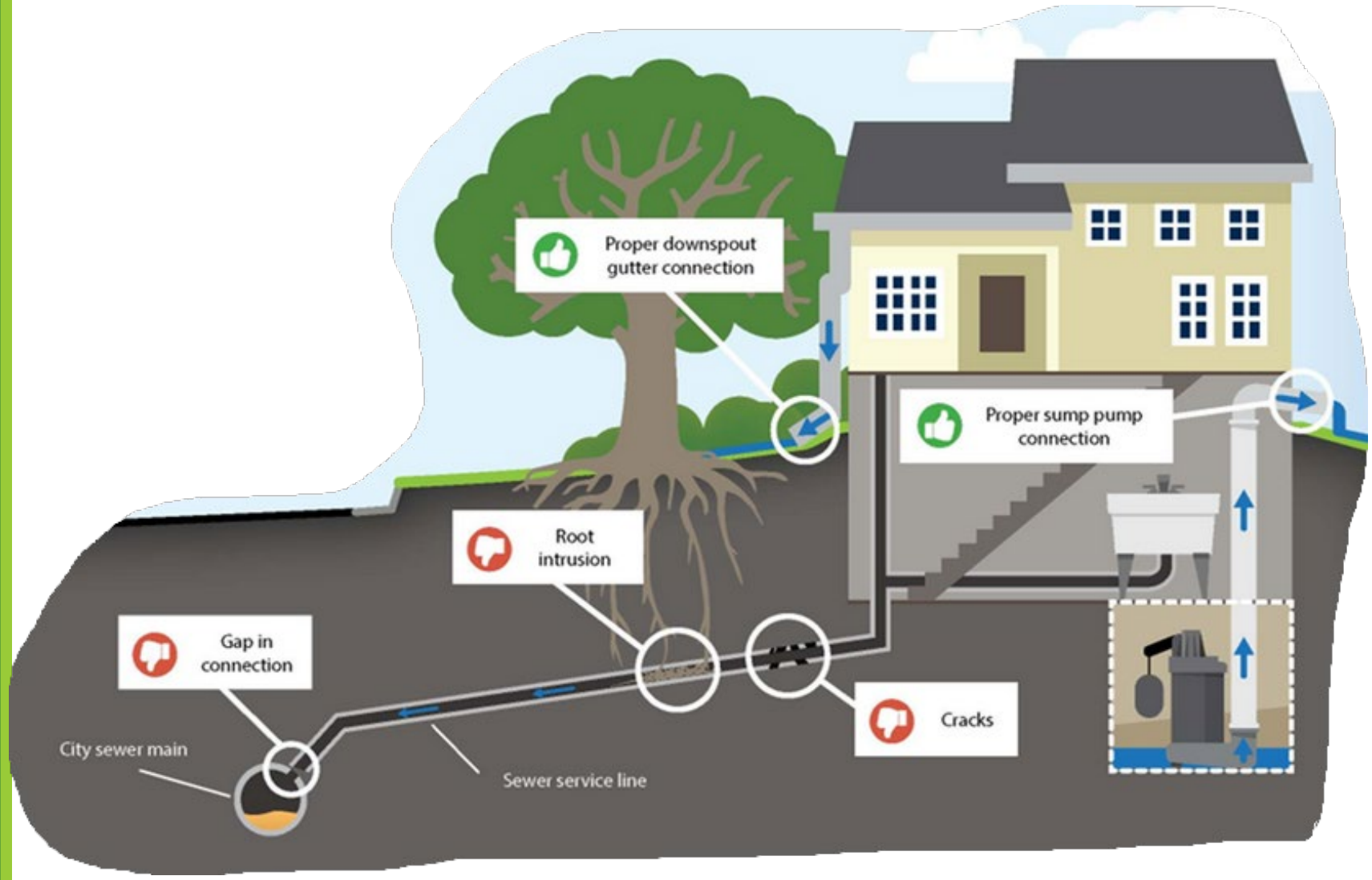


Quantity

- Wet weather can cause CSOs into rivers
- Wet weather can cause issues in downstream sewer pipes and wastewater plants
- Disconnect rain and groundwater inputs from the pipes!

Quantity-Inflow and Infiltration

- Disconnect sump pumps
- Disconnect downspouts
- Have plumber inspect service line for root intrusion and cracks
- Make repairs to service lines



Graphic from De Pere Wisconsin

Green infrastructure

- Permeable pavement
- Bioswales
- Planter boxes
- Downspout disconnection
- Rain gardens

Quality-What is runoff carrying?

Point source pollution:
Contaminants can be traced to a single origin

Nonpoint source pollution:
Contaminants have no single origin

Keeping water clean

At home

In the yard and garden

Out and about

At home

Be wary of chemical-laden products

- Chemical cleaners
- Personal care products
- Workout clothing

Filter synthetic fibers in the wash

Prioritize local, organic foods

Don’t pour fats, oils, grease or “flushable” wipes down the drain

In the yard and garden

- Test before you treat
- Fertilize organically and only as needed
- Aerate in spring and fall
- Water longer and less often
- Dispose of yard waste responsibly
- Mow high and leave grass clippings
- Reduce runoff

Out and about

- Clean up after your pet
- Keep up on car maintenance
- Dispose of hazardous waste responsibly
- Don’t litter!

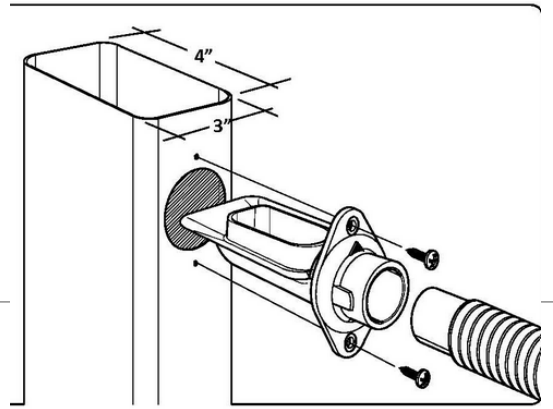
How do rain barrels help?

- Get rainwater into the ground at a time it can be absorbed
- Reduce pollution being spread through runoff
- Reduce flooding during rainstorms
- Save on your water bill
- Reduce your household impact on the ecosystem

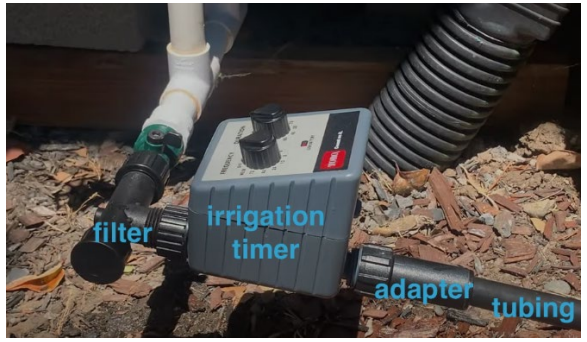
Safety first!

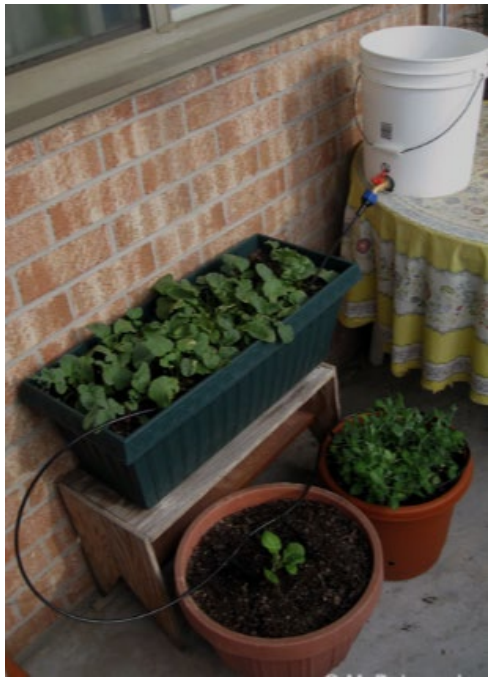
- Always cover your barrel
- Wear safety gear during installation
- Beware of electrical dangers, especially during setup
- Keep on a solid surface
- Don’t drink the water!

Setup



1. Find a convenient location
   - Under a downspout
   - Near where you'll be using the water
2. Flatten and elevate the area at least 15"
3. Cut your downspout ~2" above where the lid of the barrel will sit
   - Cut slightly higher for downspout elbow
4. Assemble barrel below
5. Open one side of top for overflow





Optional accessories

- Utility pumps/Elevation
- Rain diverters
- Additional hosing
- Timer
- Low pressure drip hose

Calculating rainwater harvest

Footprint of the house (ft^2) x **0.62** x **rainfall** (in)
= Gallons of rainwater collected

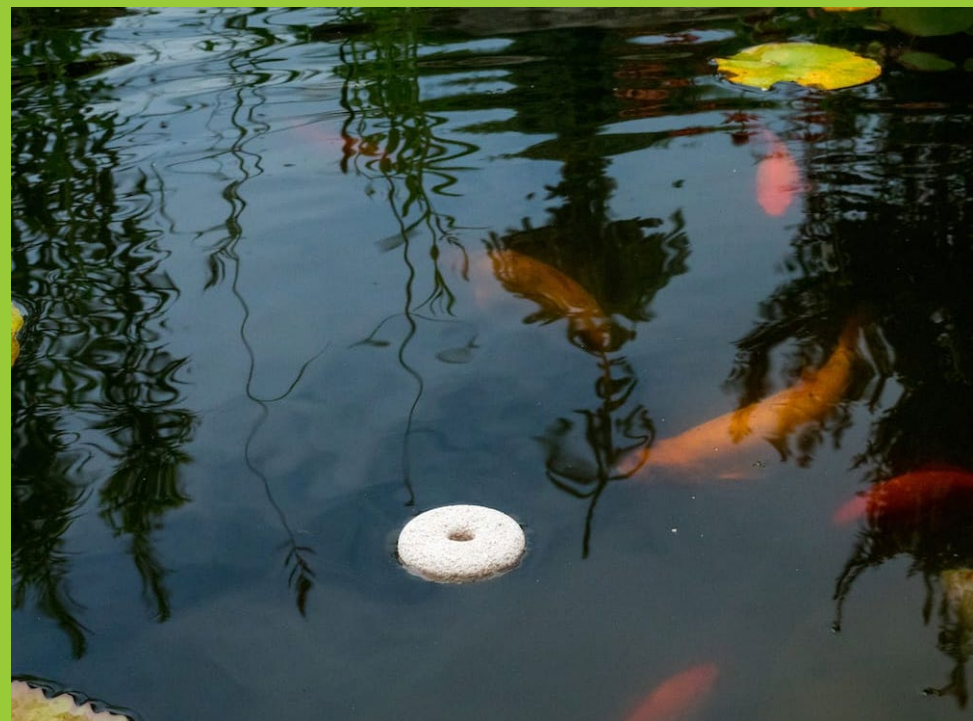
Ex. 1000 ft^2 house x 0.6 x 0.25” rainfall = 150 gallons of water

When *not* to harvest rainwater

- If your roof has…
  - Chemically treated wooden shingles
  - Asphalt shingles with copper or zinc embedded
  - Zinc anti-moss strips
  - Copper gutters

Water treatment

- Helps control bacteria, mosquitos, algae
- Add 1 oz of bleach to a full 55-gallon barrel
- Let sit for 24 hours before using
- Repeat monthly
- Optional add: Mosquito dunks!



Seasonal maintenance

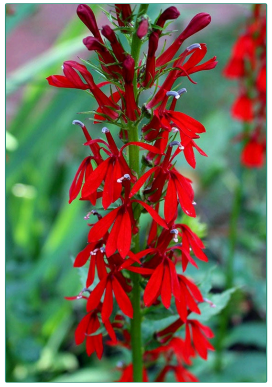
- Clean barrel seasonally
  - 3% bleach or hydrogen peroxide solution
- Empty and store over winter

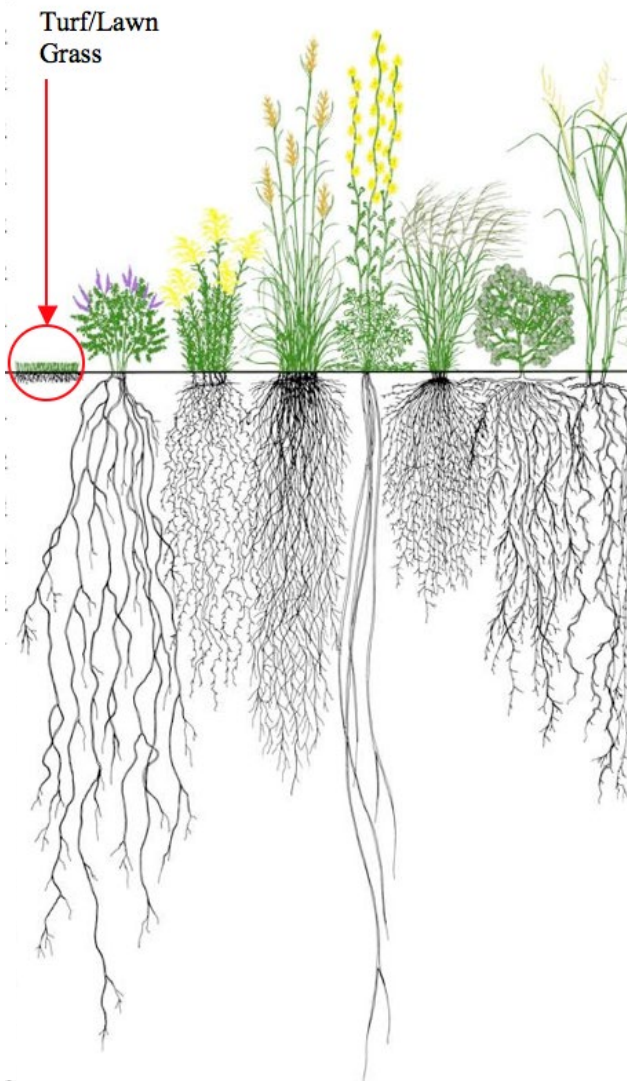
Using collected rainwater in the garden

- Water the soil, not the plant
- Water early in the day
- Don’t harvest immediately after watering

Bonus:
The rain garden

- Collects and absorbs runoff
- Recaptures nutrients and filters sediments
- Usually dry except after rain
- 20% the size of the area draining into it
- Best with native plants





Spotlight: Native plants

- Adapted to the area's climate and conditions
- Low-maintenance care
- Promote biodiversity
- Long roots absorb water, anchor plants, nourish soil

☐ § 90-2 **Responsibility for trimming or removal.**

The owner or occupant of any land within the rights-of-way of any streets, highways, alleys or thoroughfares located within the Borough of West Mifflin, or within five feet of any berm or roadbed of any street, highway, alley or thoroughfare, shall trim, cut, dismantle or remove or cause to be trimmed, cut, dismantled or removed all hedges, shrubs, vegetation or obstructions growing upon or remaining upon such right-of-way or within five feet of the berm or roadbed.

☐ § 90-3 **Height restrictions.**

Any hedge, shrub, vegetation or obstruction situate parallel to the right-of-way of a street, highway, alley or thoroughfare within the Borough of West Mifflin and situate five feet to eight feet from any berm or roadbed must not exceed 48 inches in height; provided, however, if such hedges, shrubs, vegetation or obstructions prevent a free and unobstructed view at or near the intersection of any two streets, highways, alleys or thoroughfares or on any curve on any street, highway, alley or thoroughfare or impede the safe travel of pedestrians along said street, highway, alley or thoroughfare, they shall not be allowed, regardless of compliance with the height restrictions heretofore set forth.

Check local ordinances regarding “weed” laws and set-backs

More runoff prevention

Flow-through planters

Dry wells

Trees

Even container plants!

UNITED STEELWORKERS

LOCAL 2227 - DISTRICT 10

West Mifflin Sanitary Sewer & Stormwater Authority

Pennsylvania Resources Council

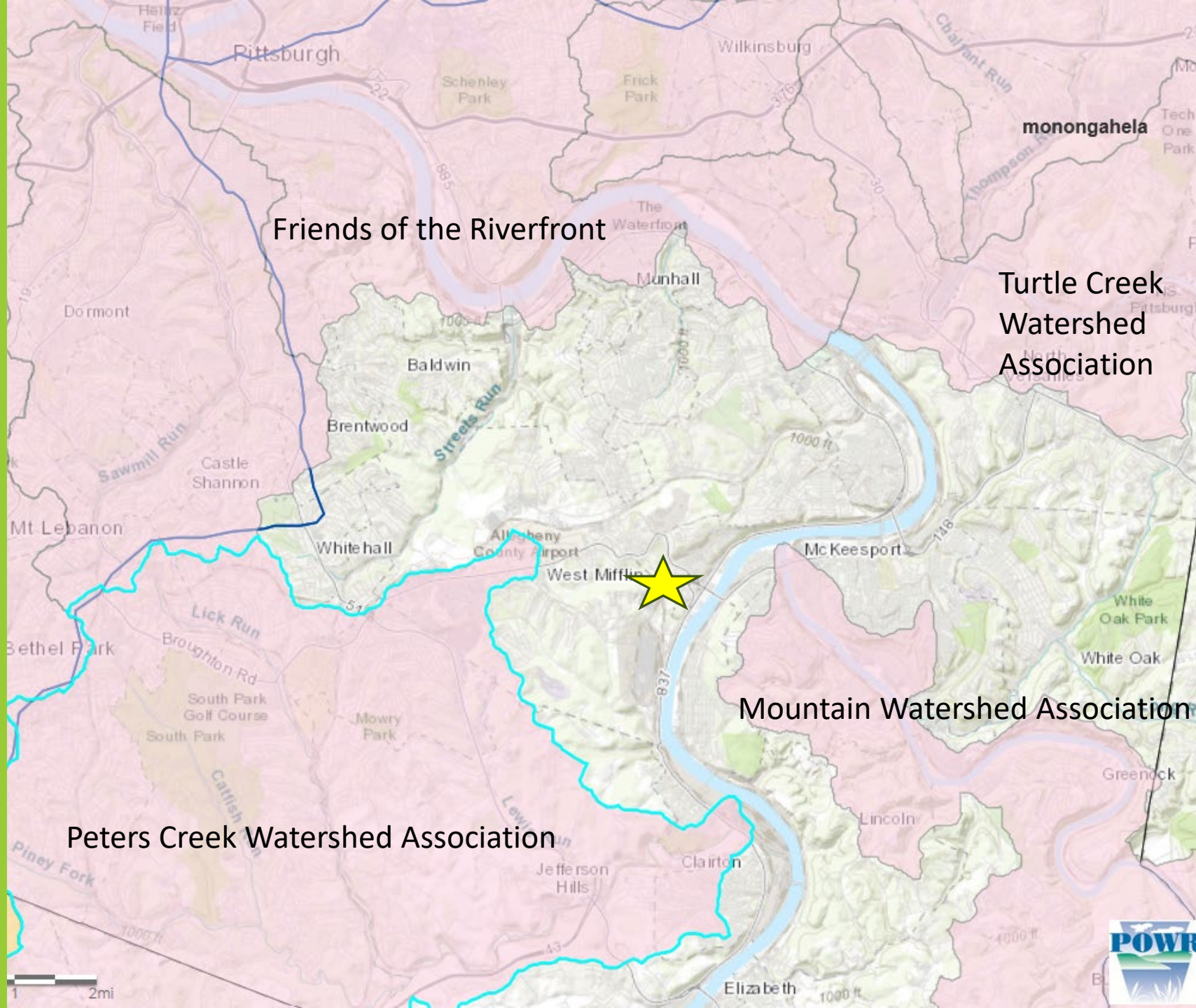
A Pennsylvania where nothing is wasted

PENNSYLVANIA AMERICAN WATER

Brought to You By. . .

Community Connections

- West Mifflin Sanitary Sewer and Stormwater Authority https://wmssma.org/
- Penn State Master Watershed Stewards https://extension.psu.edu/programs/watershed-stewards
- 3 Rivers Quest WVU https://3riversquest.wvu.edu/monongahela-river
- Allegheny County Conservation District https://www.accdpa.org/



Watersheds & Rain Barrels

In-person Workshop

FREE! Limited to union members and residents of West Mifflin only
Tuesday, March 4 | 1:00 pm
Local 2227 Steelworkers Union Hall

DETAILS & REGISTRATION

In-person Workshop

FREE! Limited to residents of McKeesport
Wed, March 26 | 6:00 pm
Carnegie Library of McKeesport

DETAILS & REGISTRATION

In-person Workshop

$20-$80
Monday, May 12 | 5:30 pm
Phipps Garden Center

DETAILS & REGISTRATION

In-person Workshop

FREE! Limited to residents of Connellsville only
Saturday, May 17 | 11:00 am
Connellsville Canteen

DETAILS & REGISTRATION

In-person Workshop

$20-$80
Wednesday, May 21 | 6:30 pm
Green Tree Public Library

DETAILS & REGISTRATION

Backyard Composting

In-person Workshop

$0-$50 Limited to residents of Forest Hills Borough
Sat. February 8th | 1:00 pm
Forest Hills Borough

DETAILS AND REGISTRATION

In-person Workshop

$20-70
Wed. April 2nd | 6:00 pm
Penn State Extension – Kittanning

DETAILS AND REGISTRATION

In-person Workshop

$0-$50
Wed. April 23rd | 6:00 pm
Borough of Churchill

DETAILS AND REGISTRATION

In-person Workshop

FREE Limited to residents of McKeesport
Wed. May 7| 6:00 pm
Carnegie Library of McKeesport

DETAILS AND REGISTRATION

In-person Workshop

$20-70
Fri. May 30th| 5:30 pm
Phipps Garden Center

DETAILS AND REGISTRATION

Image from https://www.nationalgeographic.com/animals/amphibians/facts/axolotl

Survey and Q&A

laurab@prc.org

Pennsylvania Resources Council

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