

Preparing for the Storm

Proactive Community Stormwater Mitigation with Nature Based Solutions

Samantha Vogeler
Manager

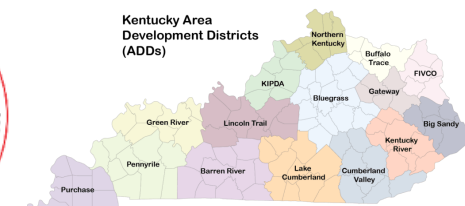
Watershed Management Branch
Kentucky Division of Water
Department for Environmental Protection
Energy and Environment Cabinet



FEMA



**US Army Corps
of Engineers®**

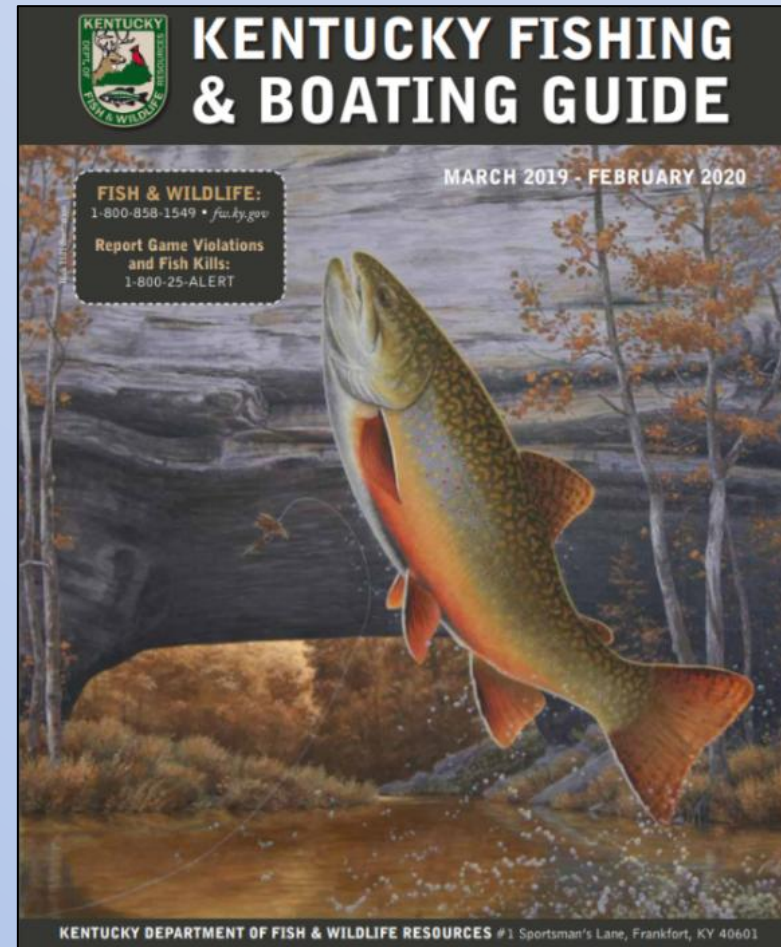


Presentation Outline

- Division of Water
- Natural Floodplains
- No Longer Dredge
- Nature-Based Solutions
- Building in the Floodplain
- Funding
- Questions



Division of Water – Protect and Manage Our Waters



Watershed Management Branch & Nonpoint Source Pollution

Non-regulatory

Watershed management approach to address nonpoint source pollution

Basin Coordination to facilitate projects, funding, and partnerships

Volunteer Lake and Stream Monitoring

319 (Nonpoint Source) Grant Program

- Watershed Planning
- NPS Education and Outreach
- NPS Demonstration Projects
- Watershed Plan Implementation



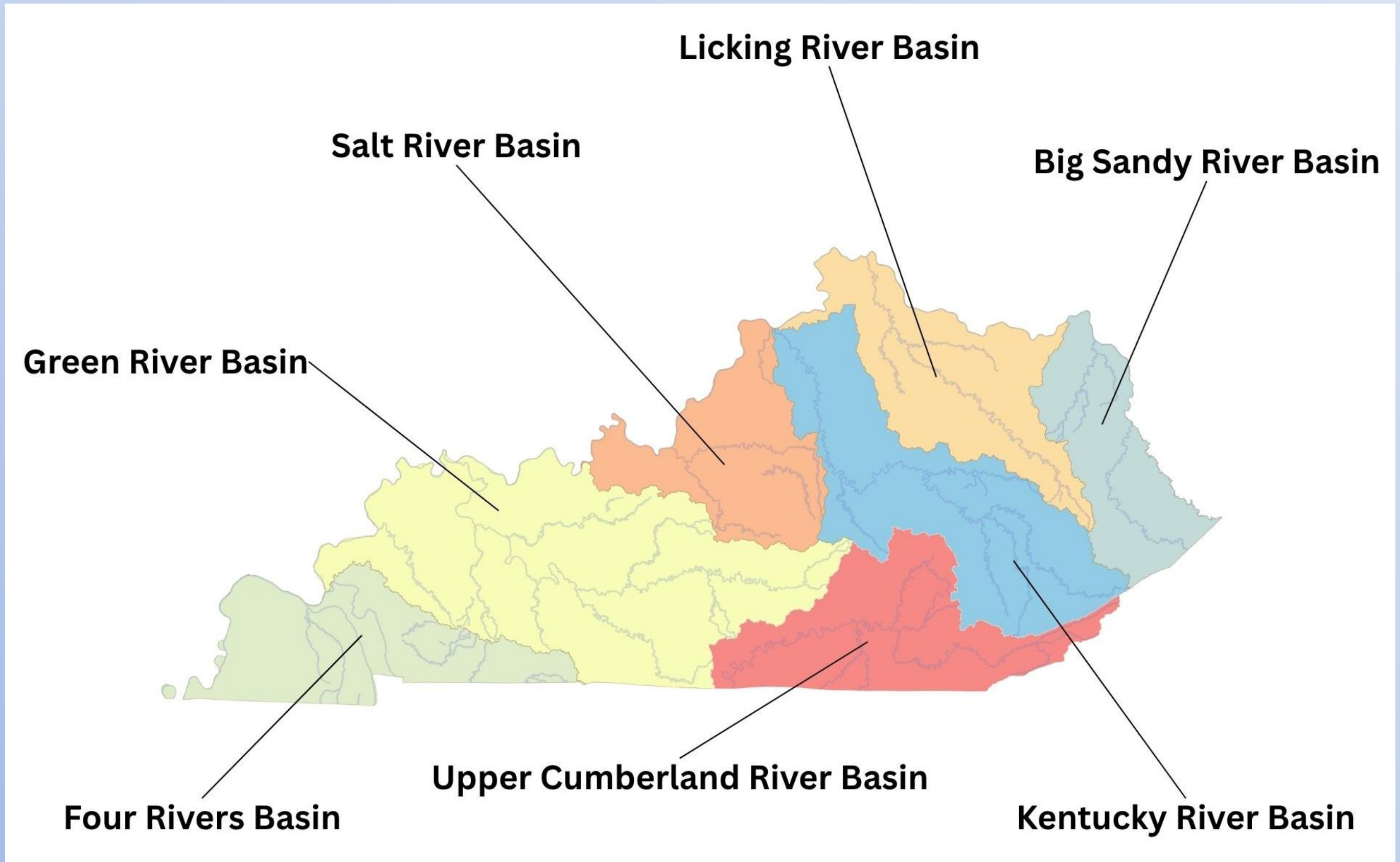
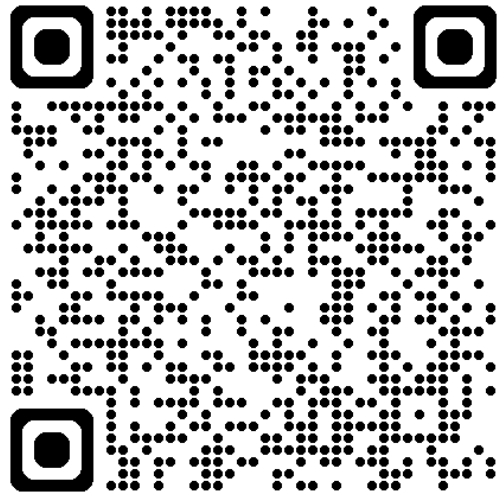
Nonpoint vs. Point Sources of Pollution

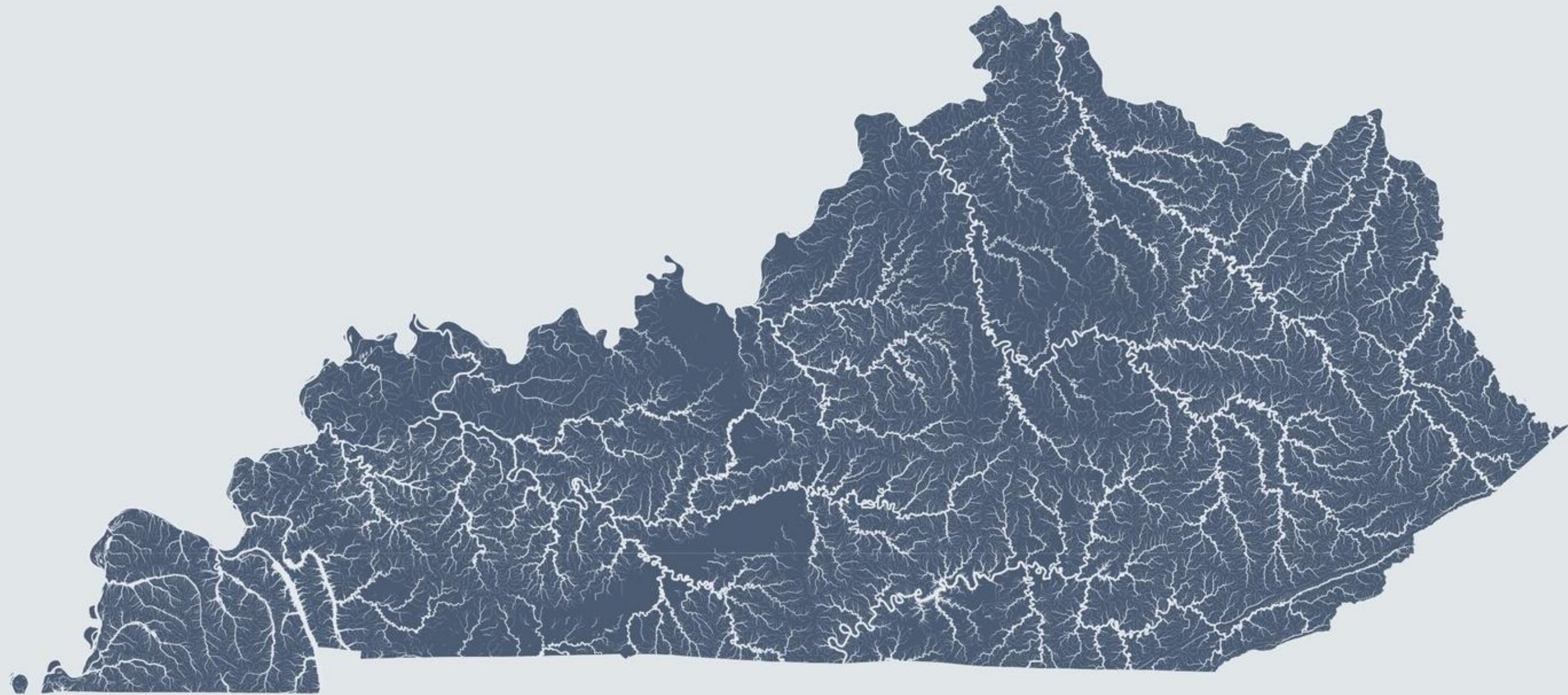
Nonpoint sources of pollution are diffuse; there's no easy way to identify exactly where they come from.

Point sources, however, are easily identified and can be regulated with permits and enforcement actions.



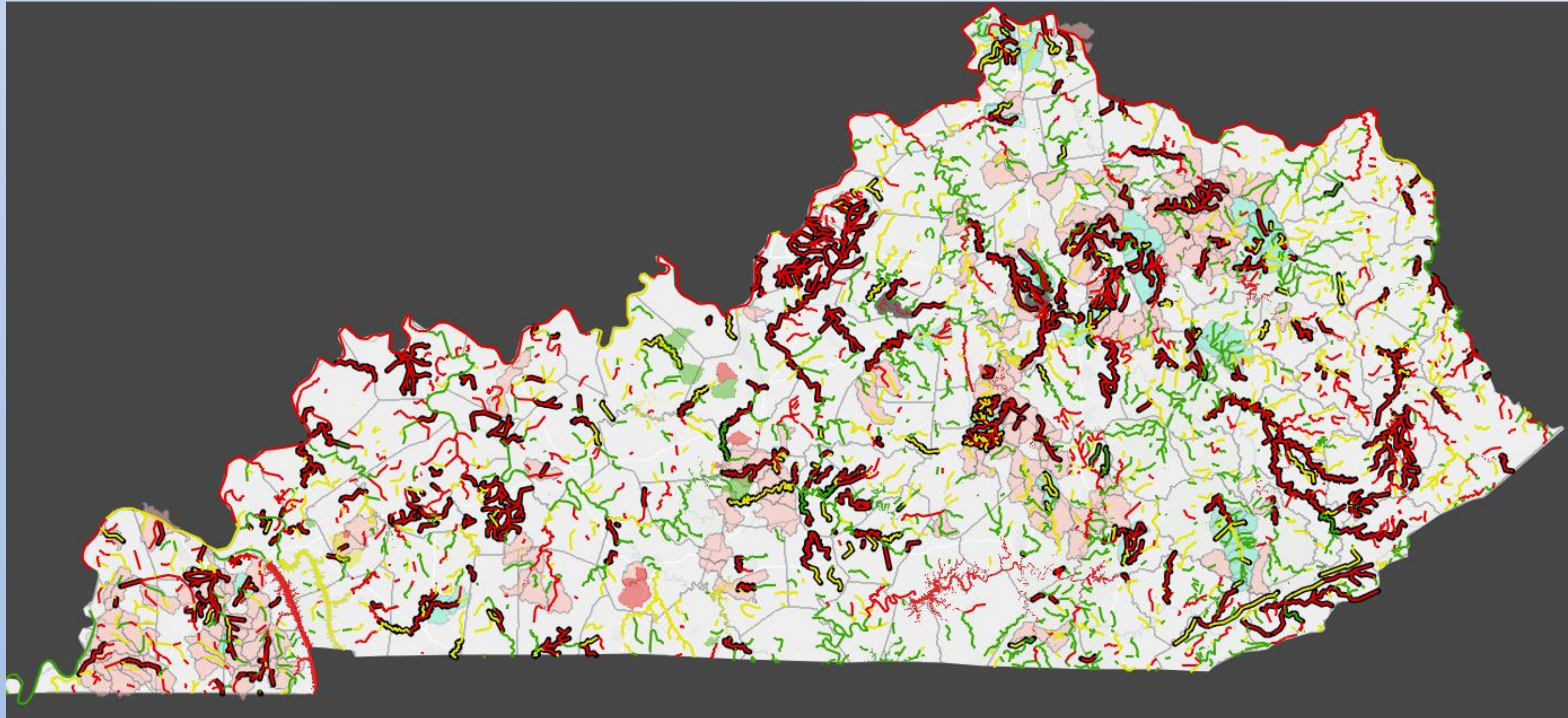
Basin Coordinators





92,000 Miles of Streams
86% Kentucky Communities in Floodplain

What is in the Stormwater?

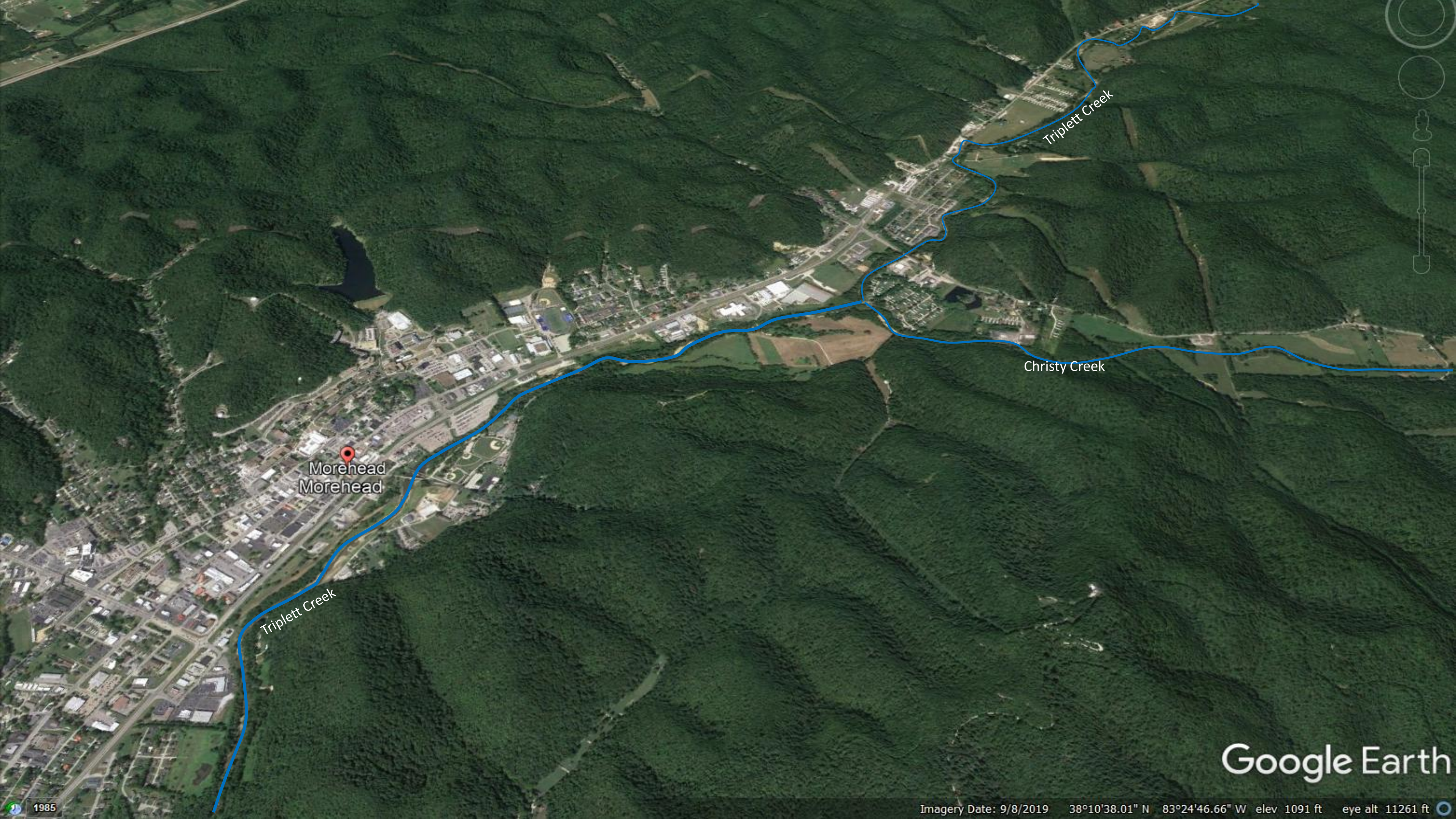


- Pathogens
- Excess Nutrients
- Sediment

Natural Floodplain Function



Salmon River, Northern Alaska (Arctic)
Used with permission from Roman Dial



Morehead
Morehead

Triplet Creek

Christy Creek

Triplet Creek

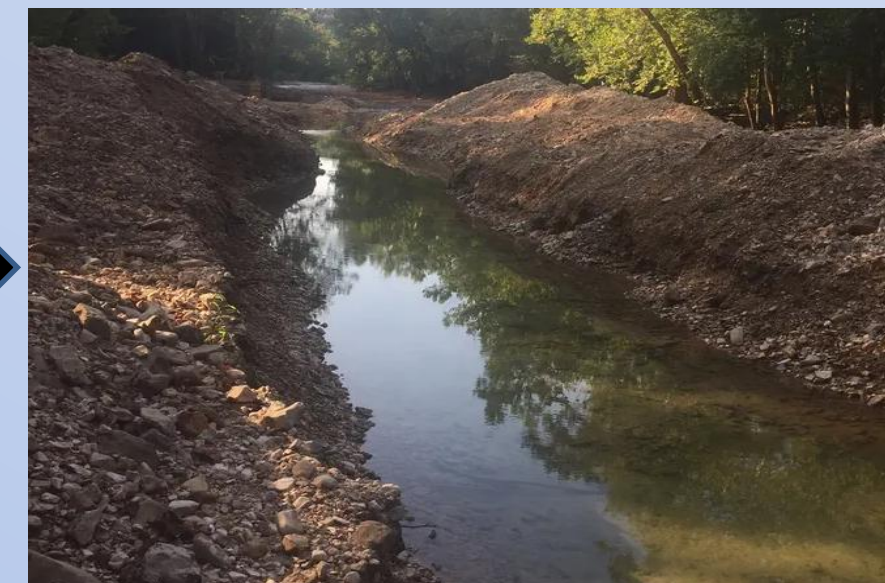
Google Earth

1985

Imagery Date: 9/8/2019 38°10'38.01" N 83°24'46.66" W elev 1091 ft eye alt 11261 ft

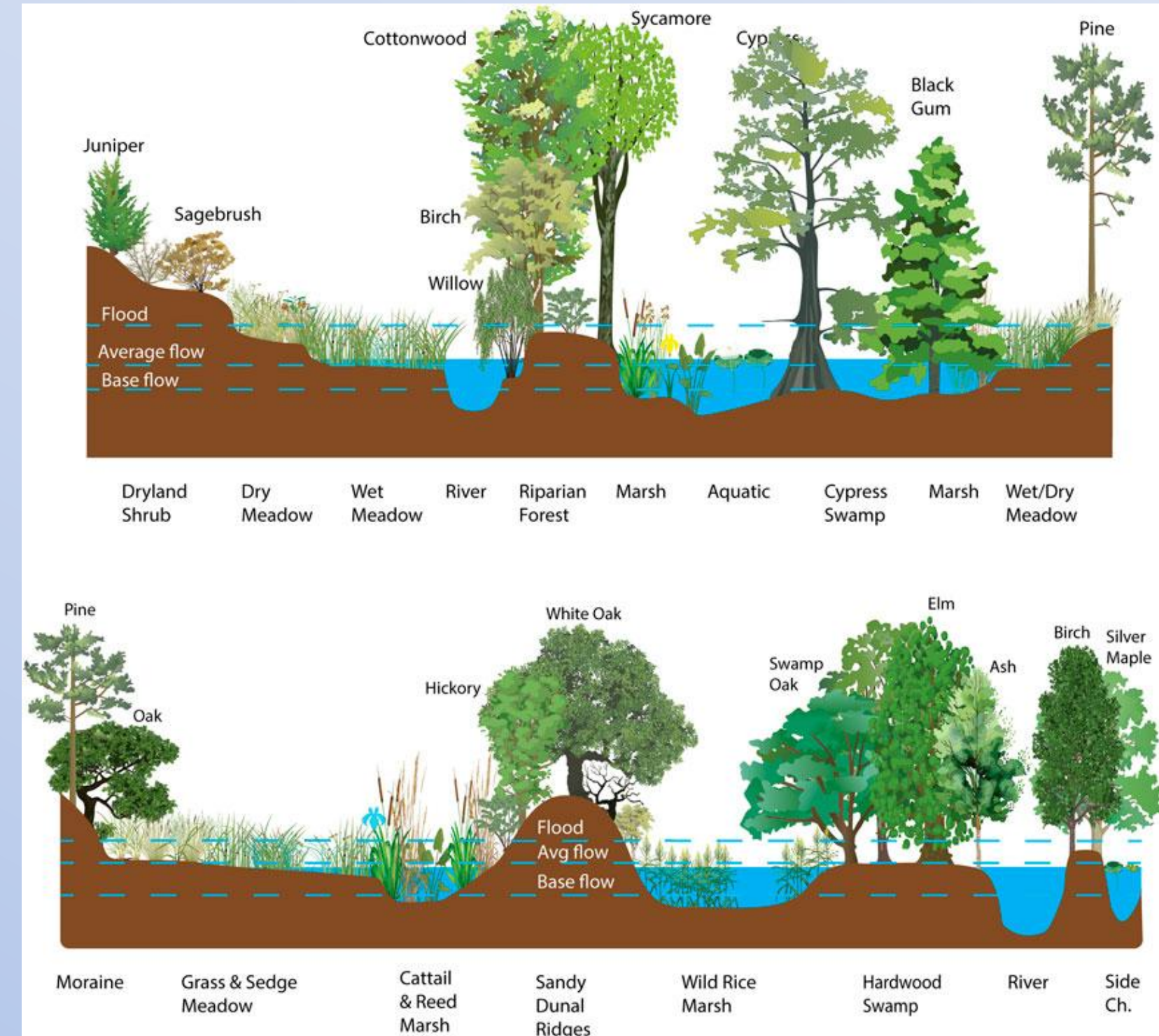
Why Not Dredge Our Way Out?

- Waterway navigation, not flood mitigation
- Massively expensive
- Destroys stream and bank habitat
- Increases erosion
- Dangerous to downstream communities

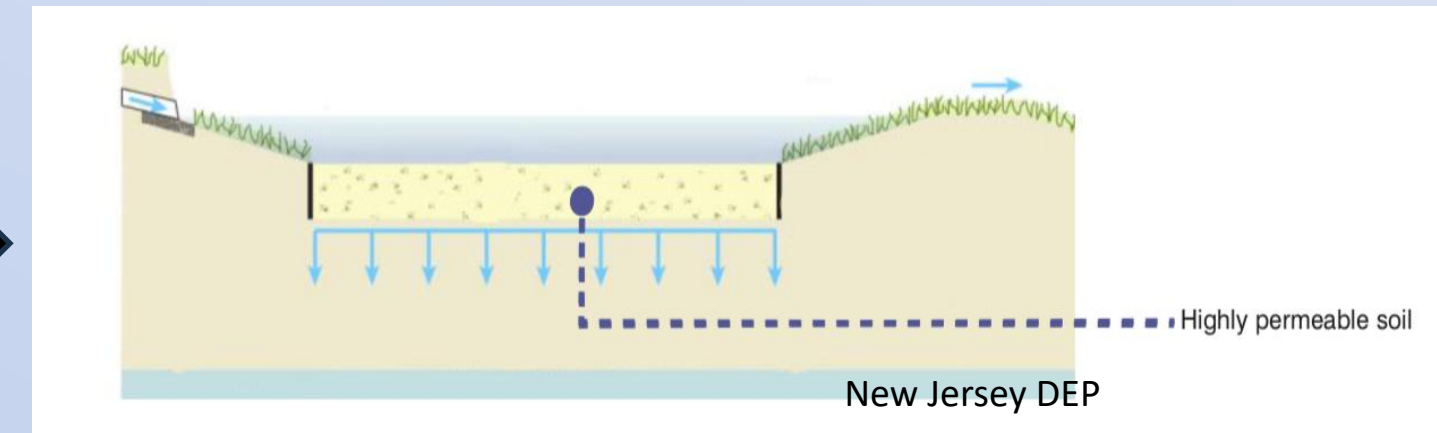


Nature-Based Solutions for Stormwater

- Floodplain Sinks
- High Flow Channels
- Stormwater Basins
- Wetlands
- Riparian Buffers
- Stream & Wetland Restoration



Floodplain Sinks

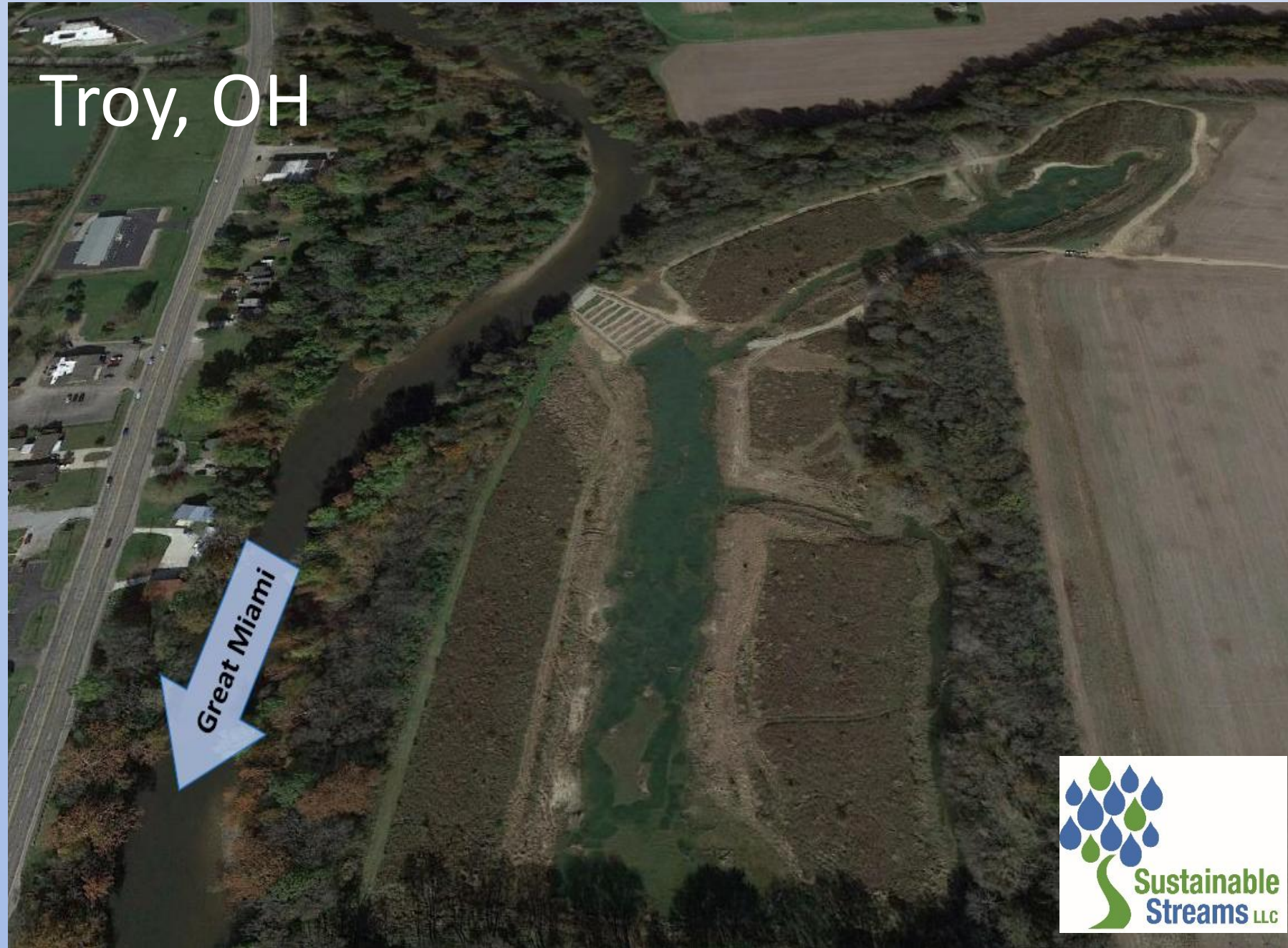


If we can't let the water spread out or dredge our way out, where do we go?

We Go Deep

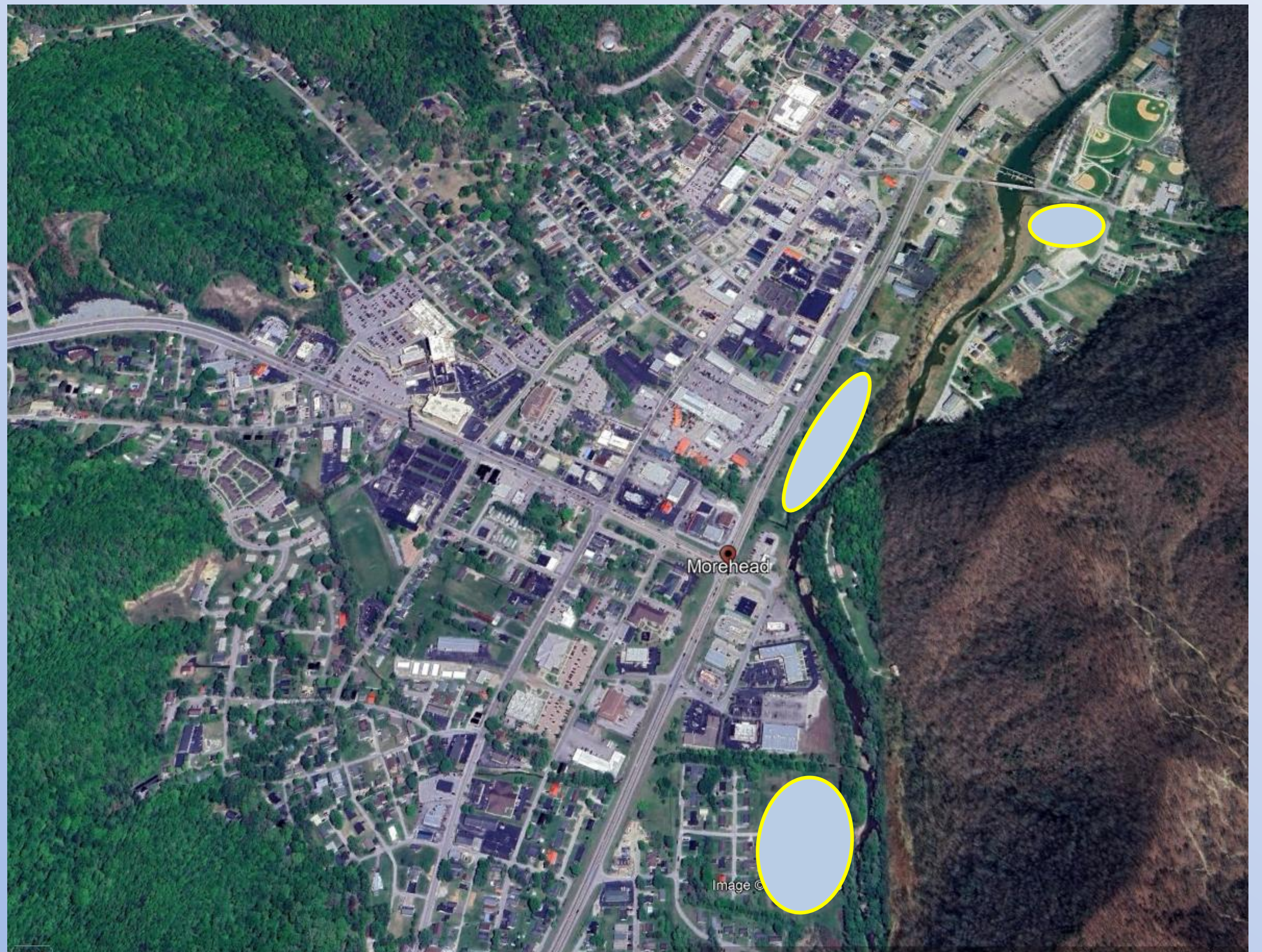
Floodplain Sinks

Troy, OH



Kenton County, KY



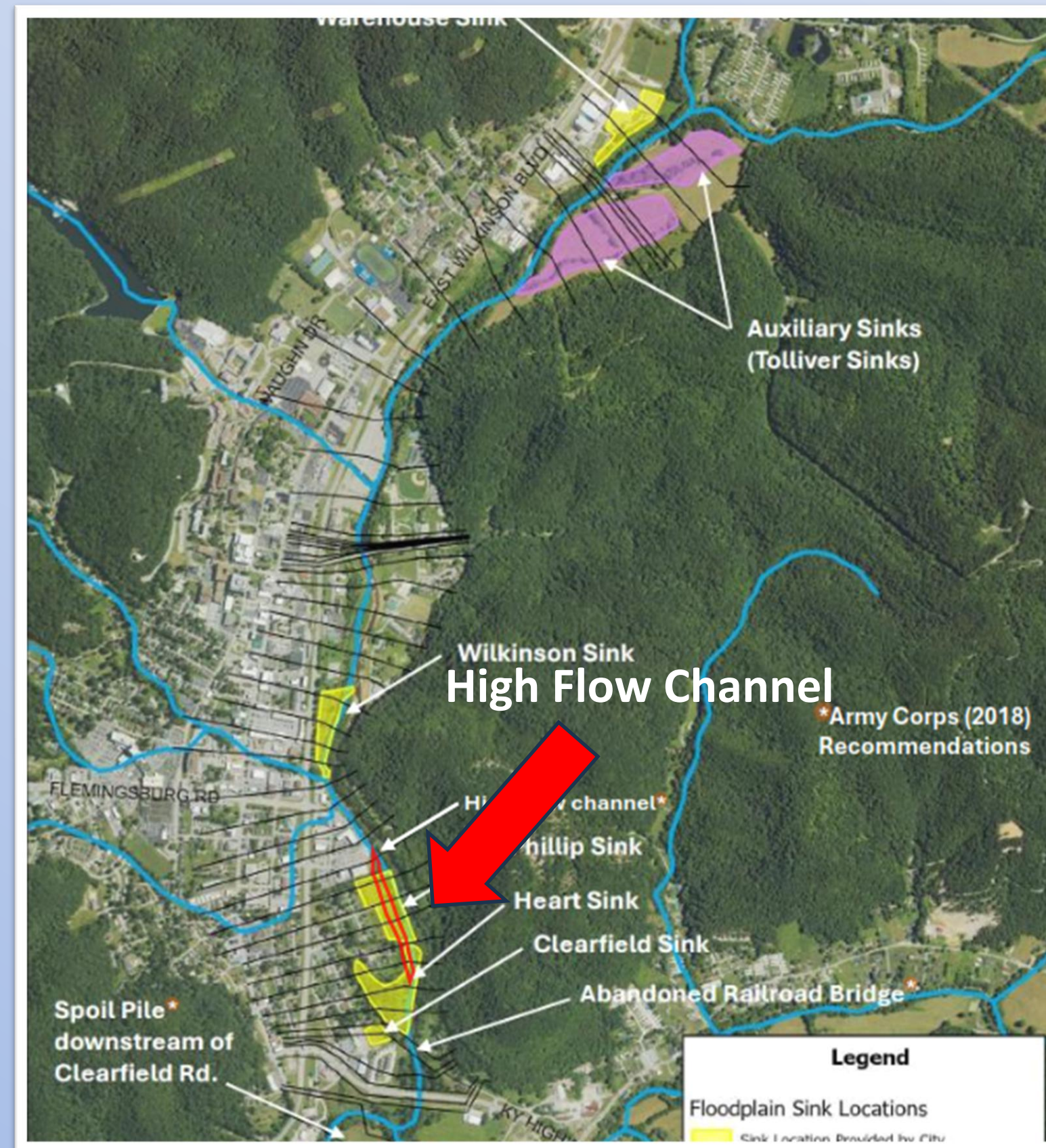


High Flow Channels

High-Flow Channels



Floodplain Sinks + High Flow Channel



Stormwater Basins



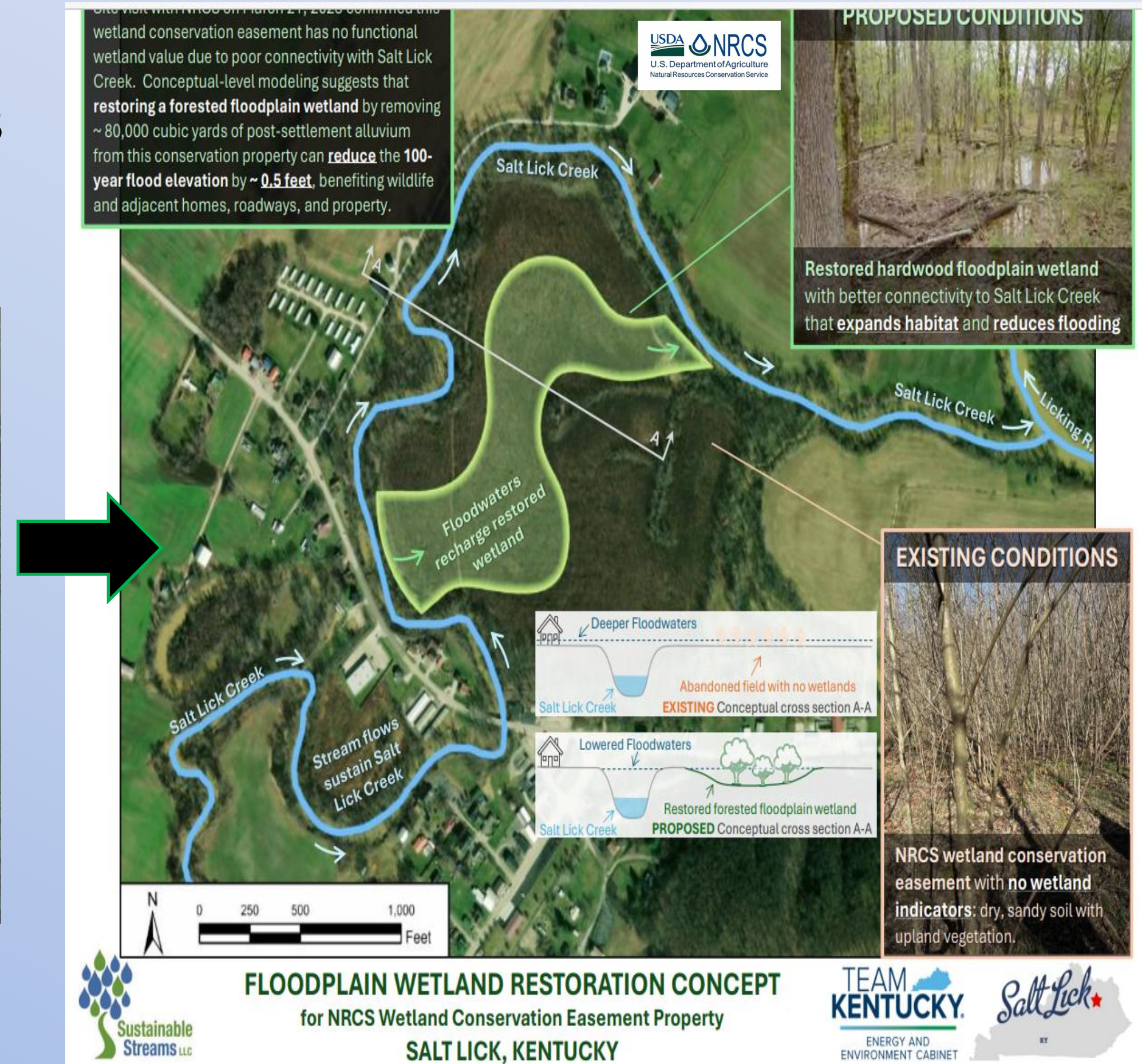
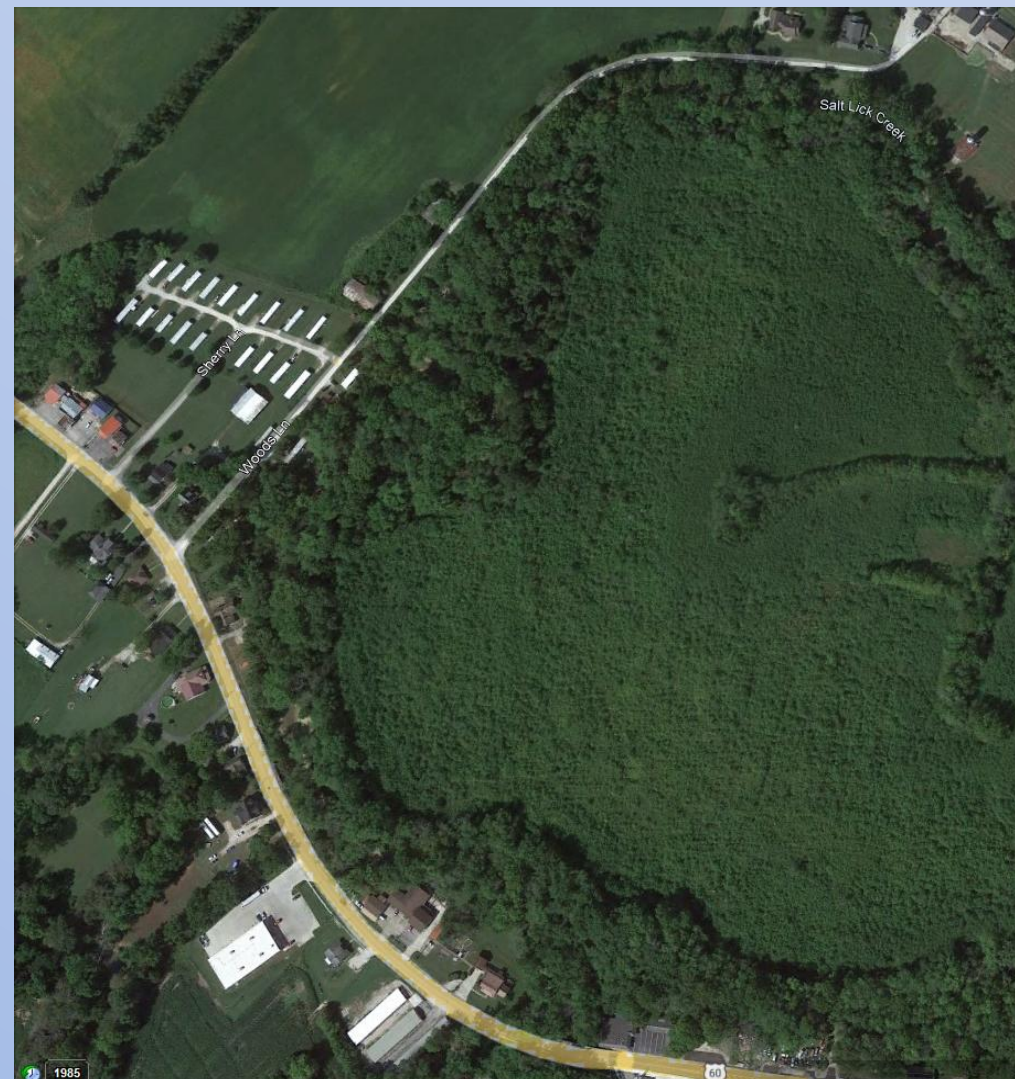
Wetlands



A wetland gives stormwater a place to go and time to slow down.

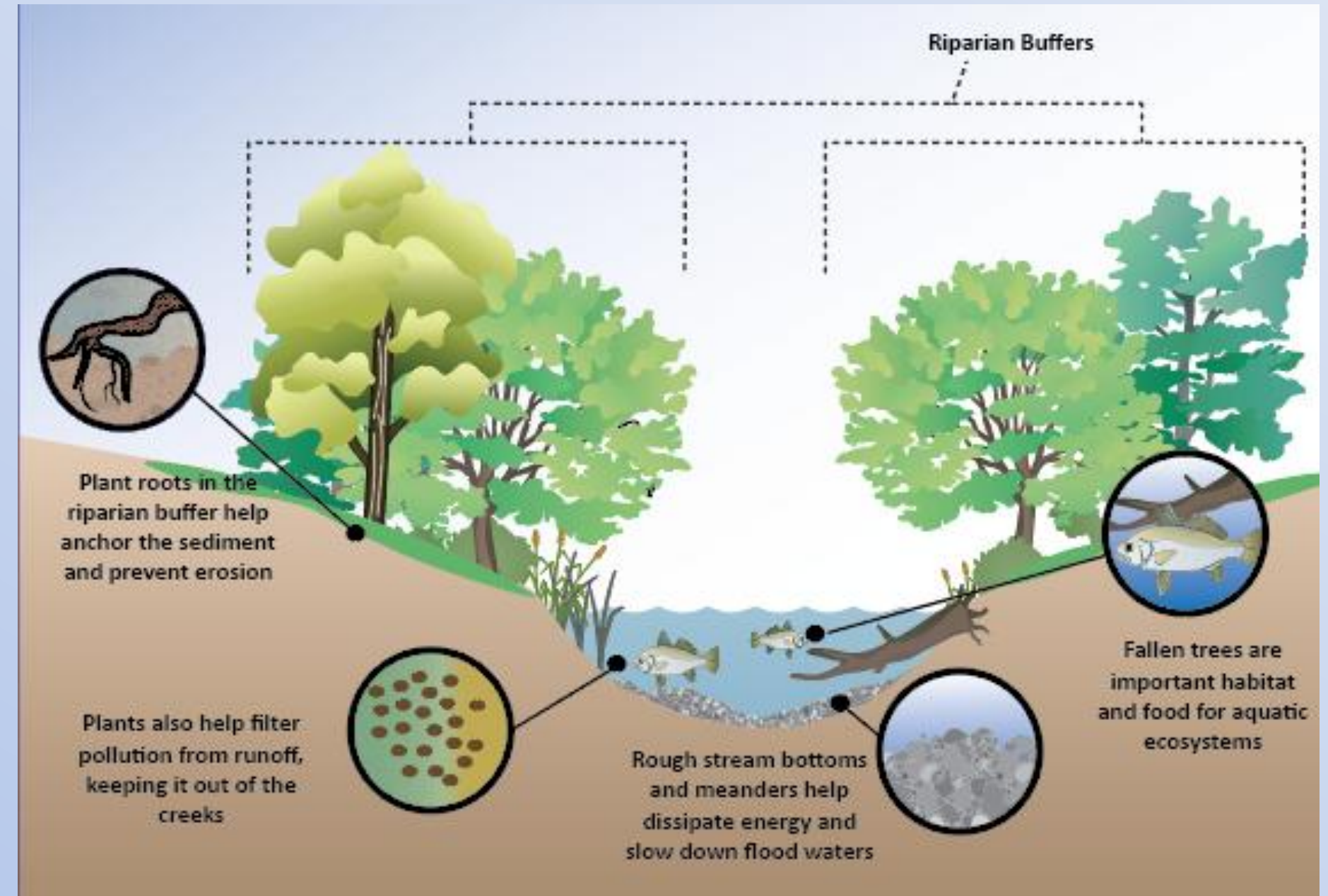
Wetlands & High Flow Channels

Wetland that functions as a high flow channel



Riparian Buffers

A riparian buffer is basically the stream's first line of defense from everything running off the surrounding land.



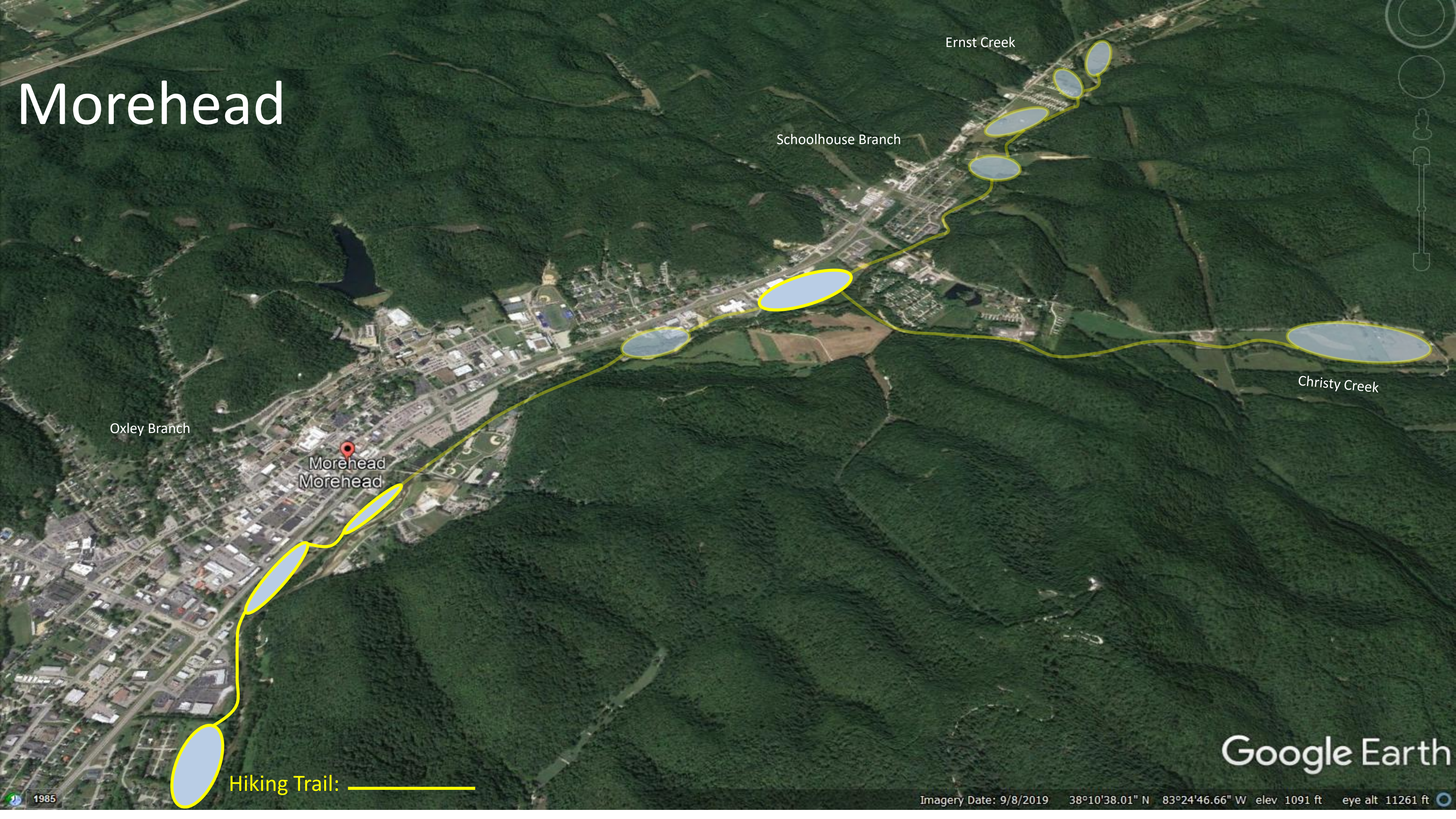
Stream and Wetland Restoration





Future Maysville

Morehead



Oxley Branch

Morehead
Morehead

Schoolhouse Branch

Ernst Creek

Christy Creek

Hiking Trail: _____

Google Earth

Imagery Date: 9/8/2019 38°10'38.01" N 83°24'46.66" W elev 1091 ft eye alt 11261 ft

1985

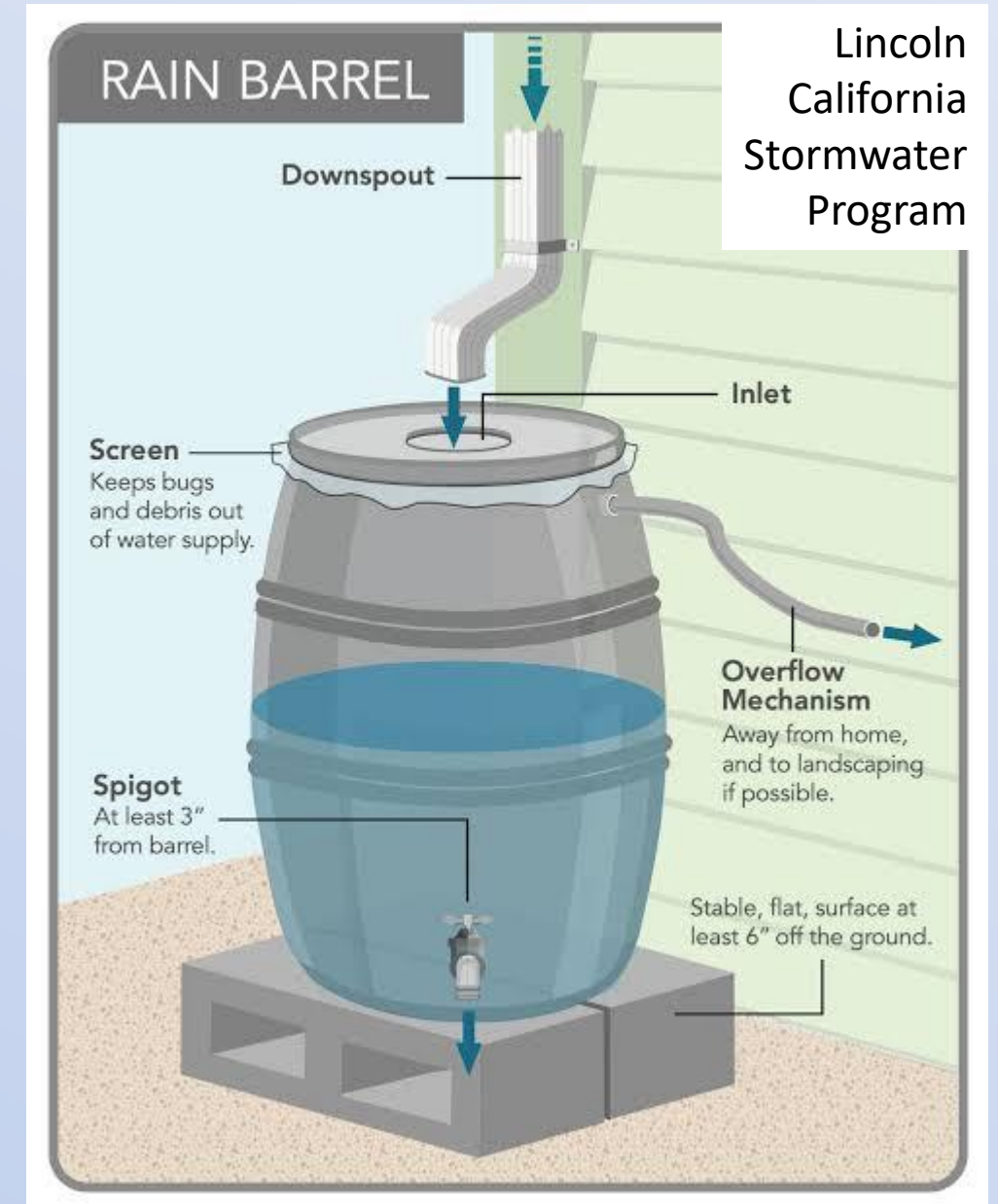


Watershed Approach

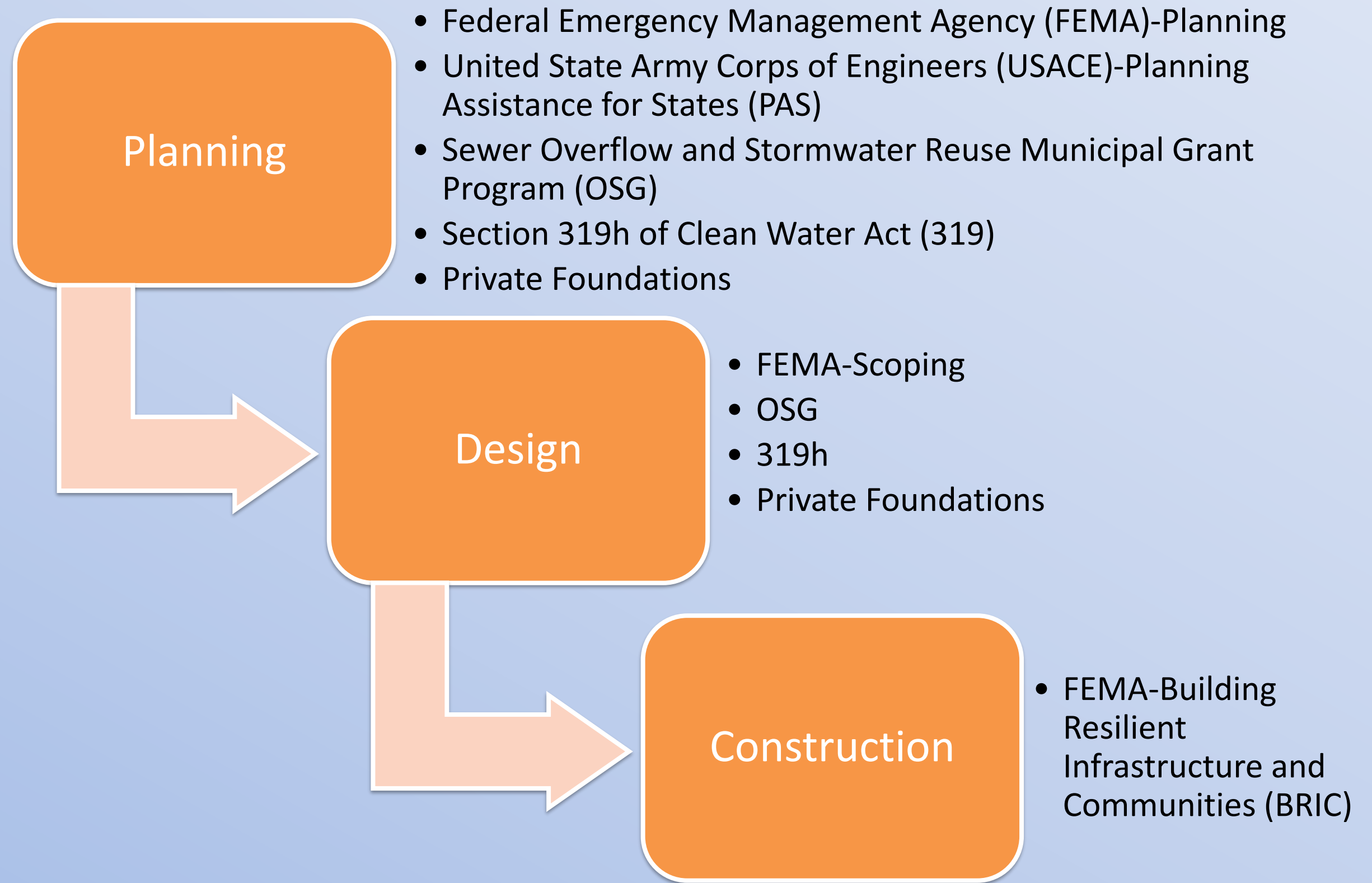
Consider your entire watershed and decrease runoff in the headwaters when possible.

- Rain Barrels
- Rain Gardens
- Bioswales
- Pervious Pavers
- Basin Retrofits

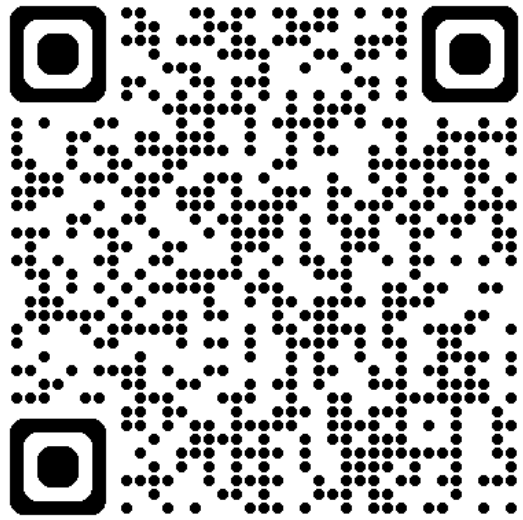
Community buy-in.



Funding Sources



Floodplain Development Risks



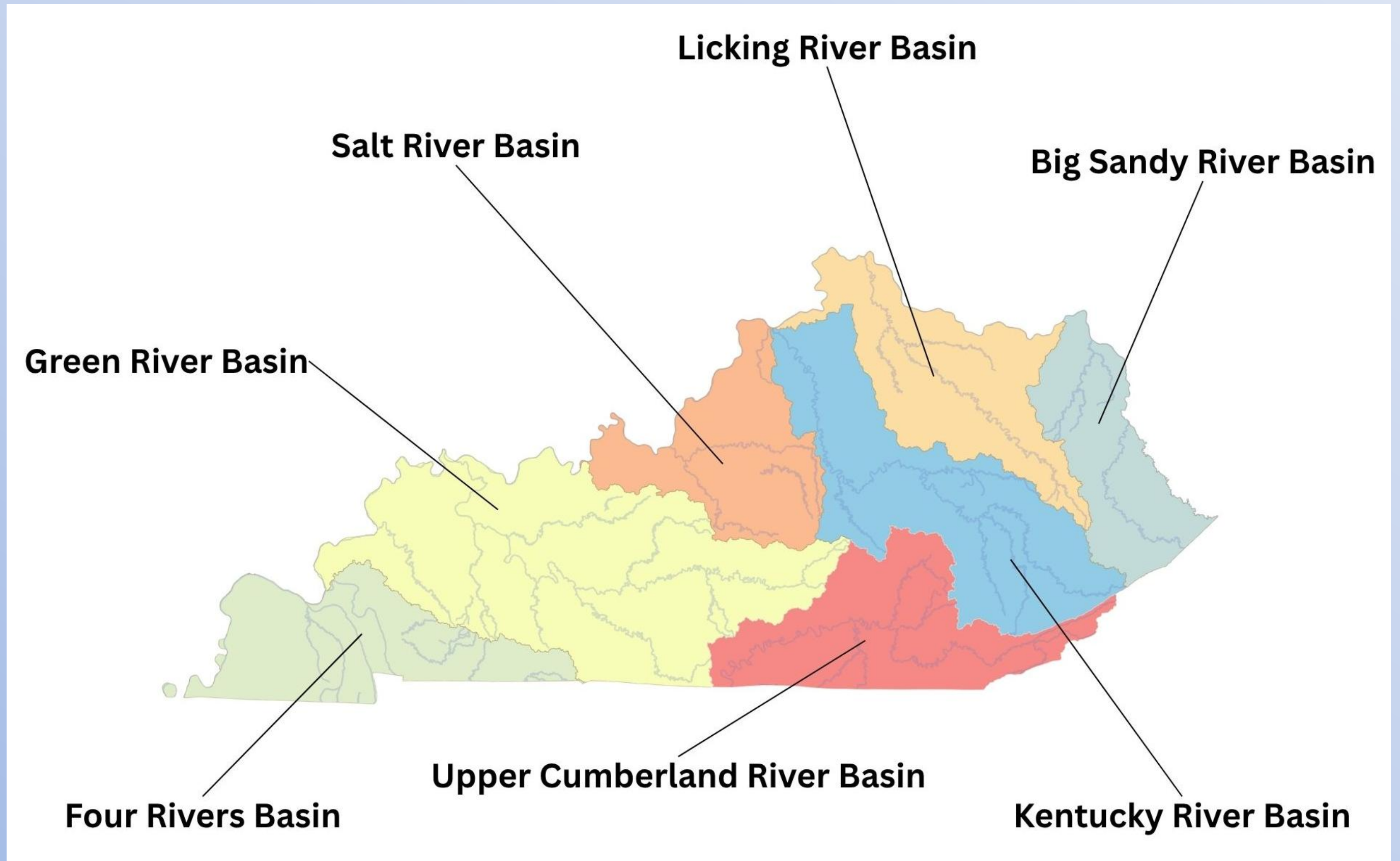
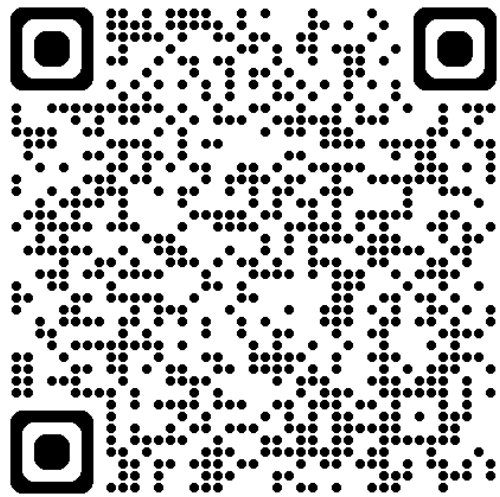


United States Geological Survey (USGS) Low-Cost Alert System (LoCAS)

- Flood Water Alert
 - Emergency Personnel and Community
- \$12,700 to \$20,000 Initial Installation
- \$2500/year Maintenance Cost



Basin Coordinators



Stormwater Mitigation Initiative

Acknowledgements

Sustainable Streams, LLC

Tetra Tech

Sanitation District 1

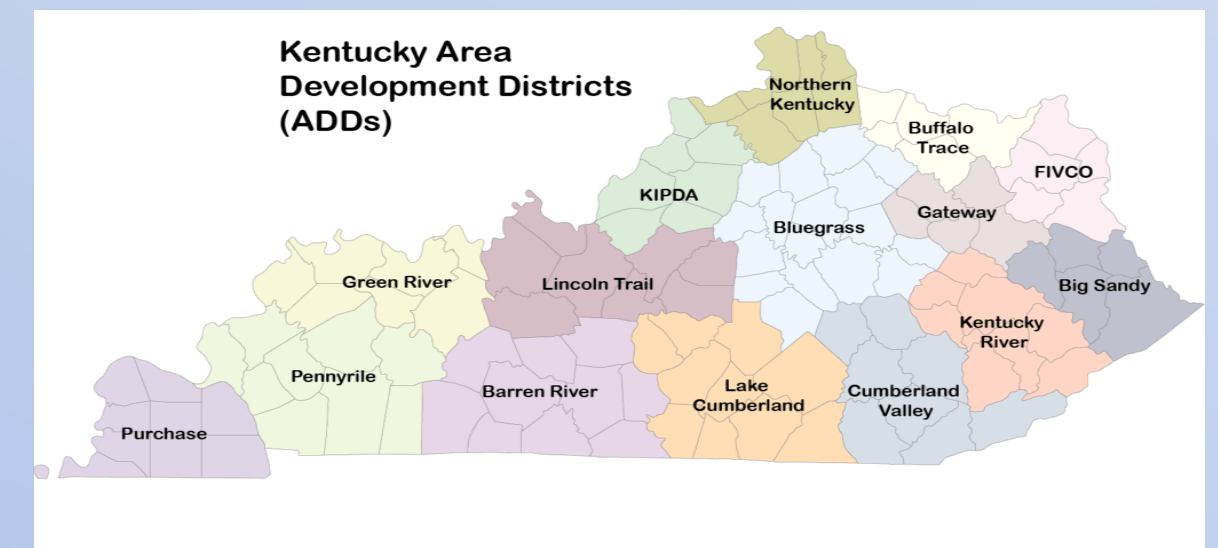
Lexington-Fayette Urban County Government

City of Morehead

Pendleton County

Kenton County Conservation District

Banklick Watershed Council



Questions

Thank you!

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