Green Sinks-An Important Tool for Stormwater Management and Flood Mitigation

TEAM KENTUCKY

ENERGY AND ENVIRONMENT CABINET

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Licking River Basin Coordinator

Division of Water

UK UNIVERSITY OF KENTUCKY

FEMA

COMMONWEALTH OF KENTUCKY • DIVISION OF EMERGENCY MANAGEMENT • PREPARE

US Army Corps of Engineers

GATEWAY AREA DEVELOPMENT DISTRICT

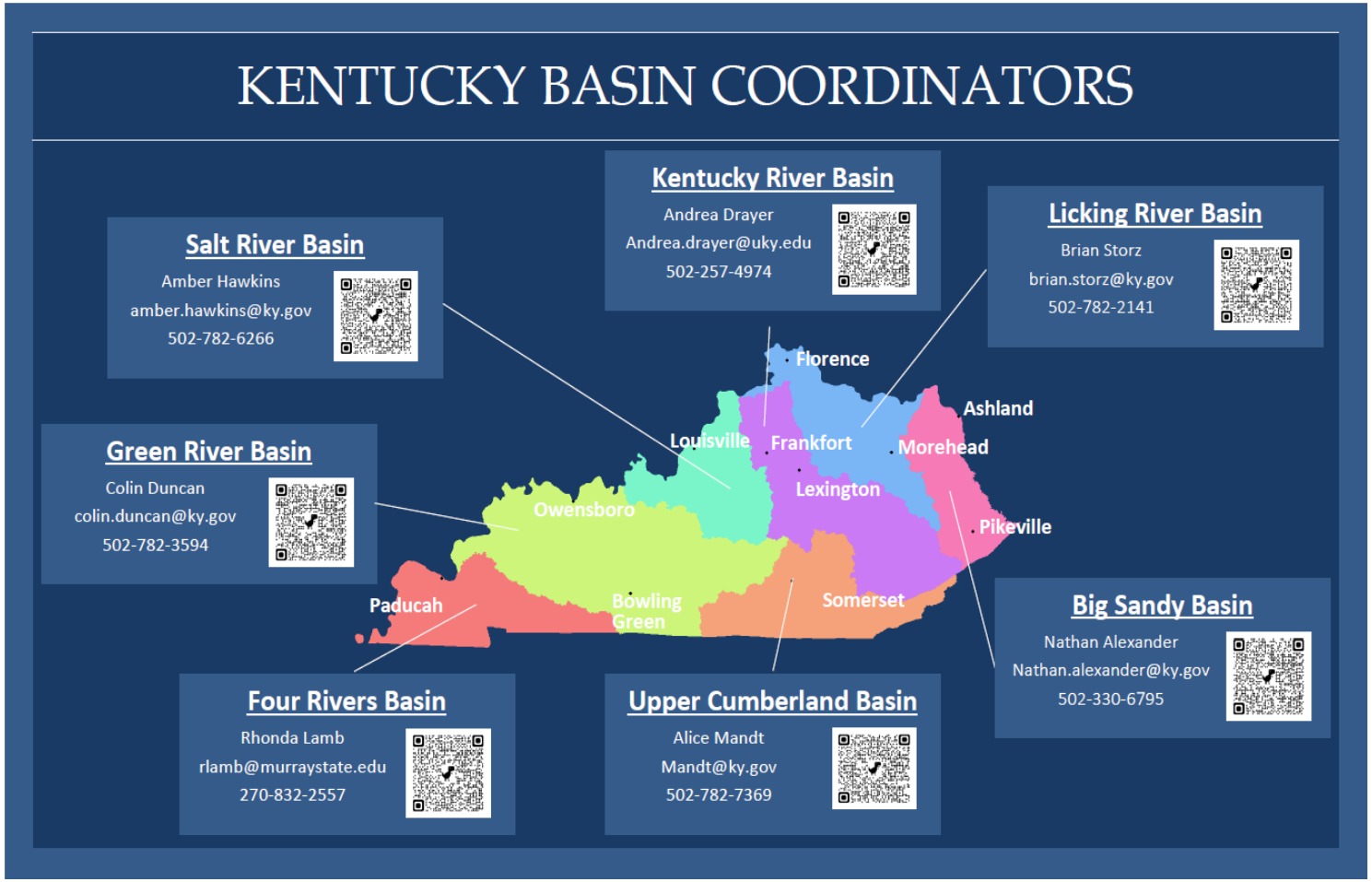
Presentation Outline

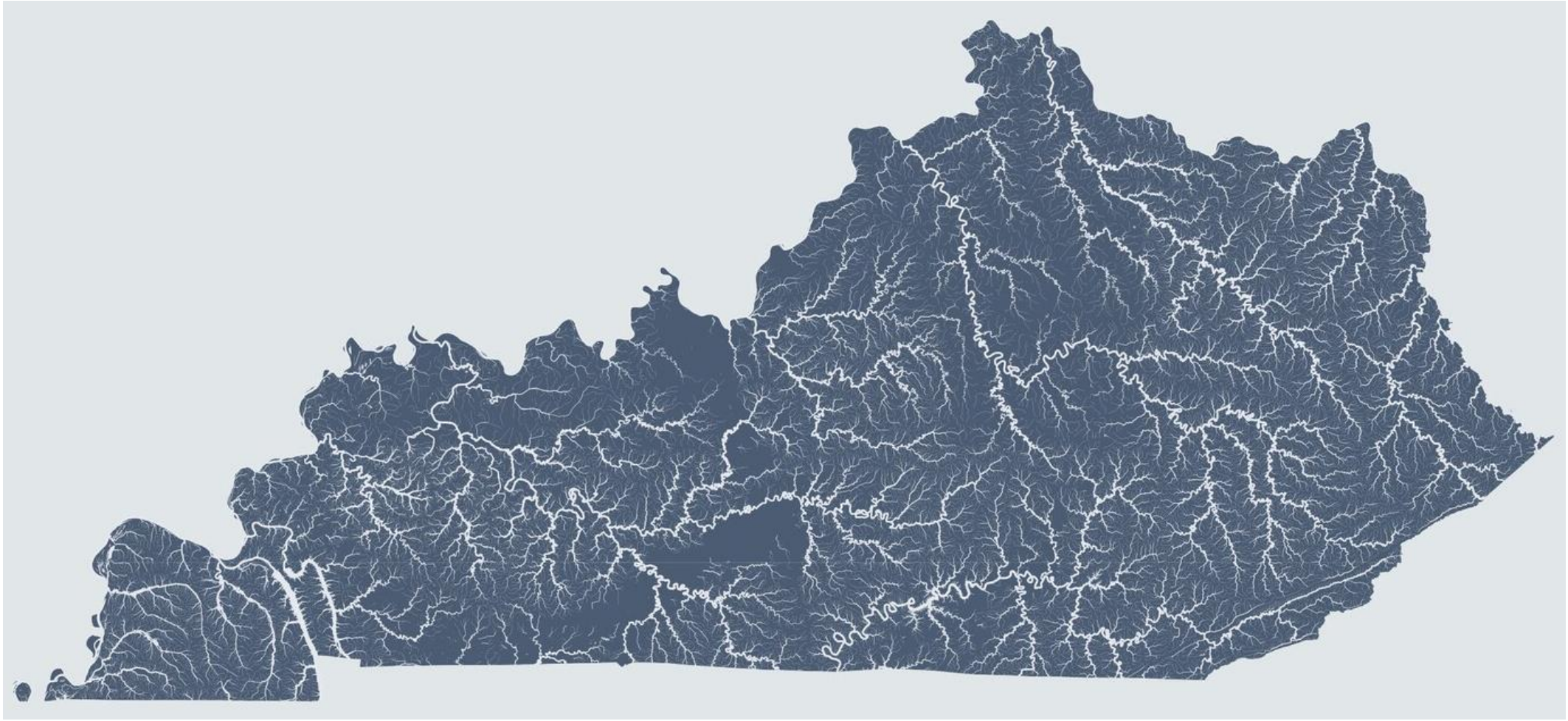
- Objective: Inform, answer questions, and generate interest in Green Sinks for stormwater and flood mitigation
  - Basin Coordinator Role in Kentucky
  - Natural Flood Plains
  - Dredging
  - Green Sinks
  - Green Sink Updates

Basin Coordinators

- “Basin Coordinators serve as facilitators for agency activities and as a point of contact for local organizations interested in addressing clean water issues.” (KDOW)

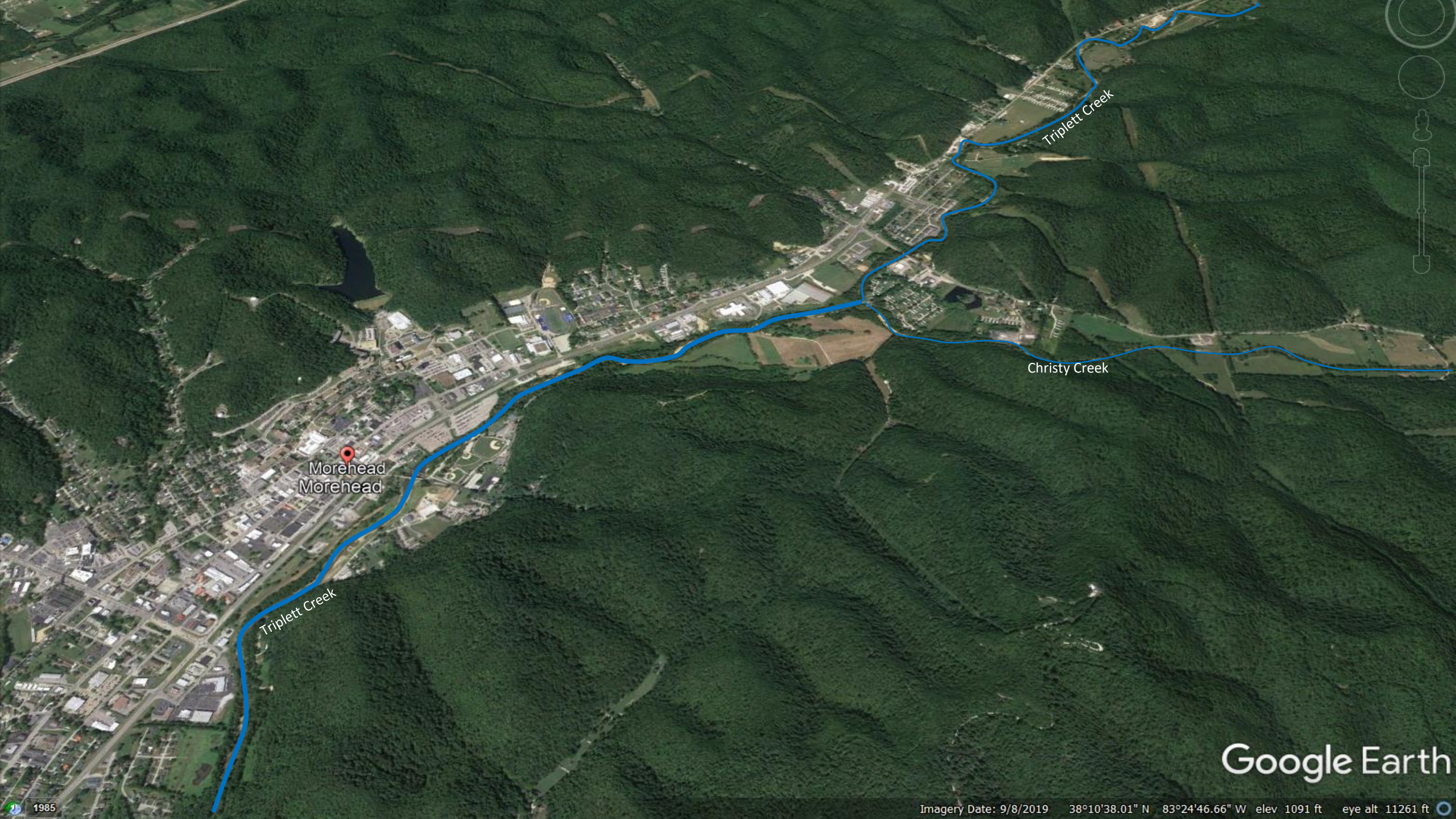
- Match local organizations with experts
  - Flood Mitigation
  - Outdoor Recreation
  - Water Quality
- Match local organizations with funding
- Education and outreach
- Assist with watershed planning
- Listen and learn





92,000 miles of streams

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


Triplett Creek
Christy Creek
Morehead
Morehead
Triplett 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

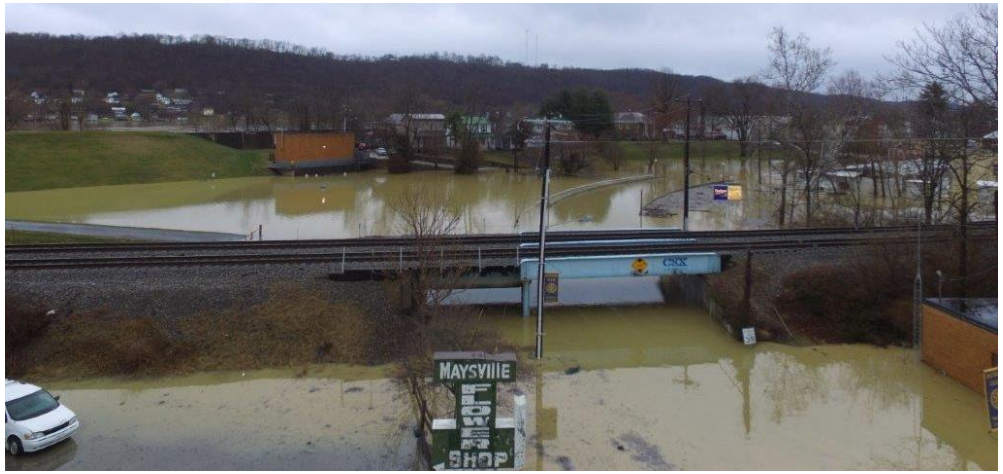
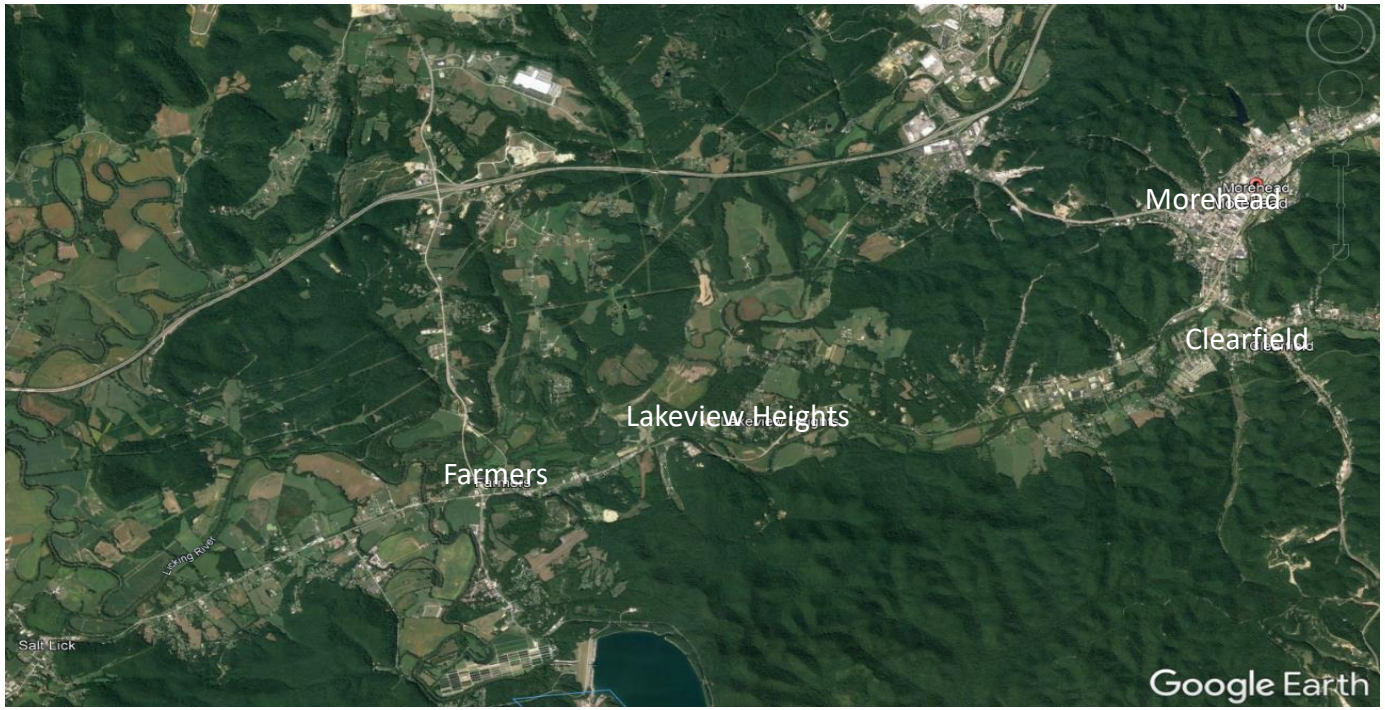



Photo source unknown.

Used with permission, Gabe Osborne

Why Not Dredge Our Way Out?

- Used to improve waterway navigation, not flood regulation
- Massively expensive
- Destroys stream and bank habitat
- Bridge and culvert foundations are undermined
- Creates continuous erosion, property loss, and habitat destruction
- Faster, more powerful streams are even more dangerous to downstream communities



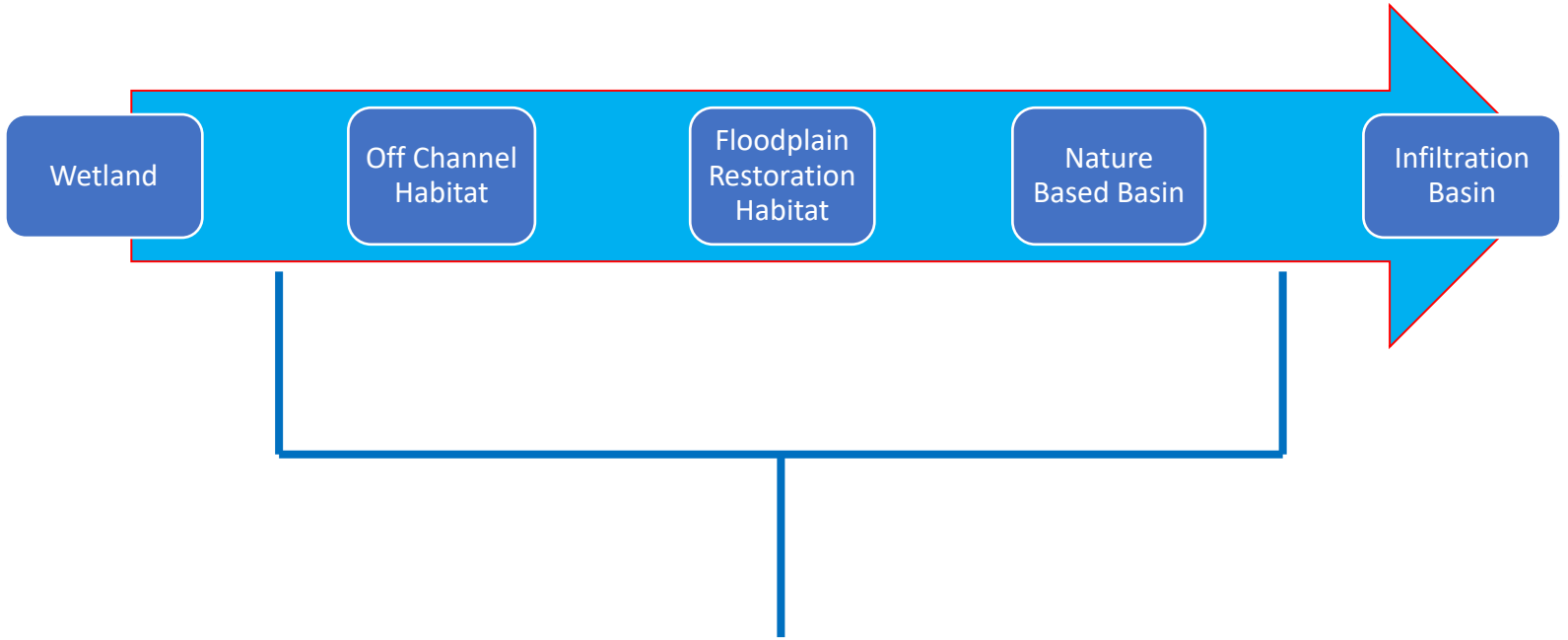
Used with permission, Loring Bullard

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

We Go Deep

Off-Channel Basins for Flood Mitigation

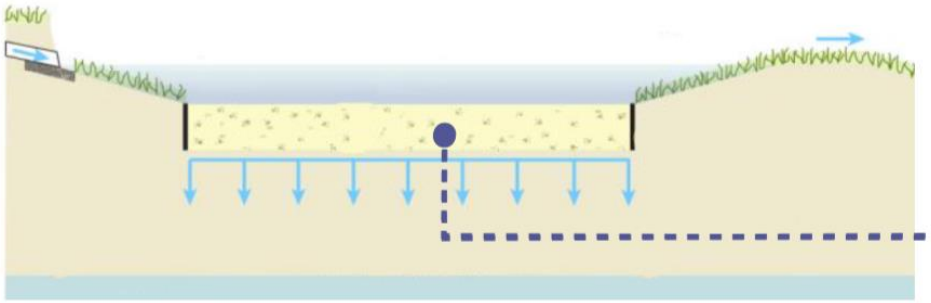
Permanent Pool



Dry: 24-48 hrs

Green Sinks

Green Sinks



New Jersey DEP

Bob Hawley, Sustainable Streams, LLC

Benefits of Green Sinks

- Reduces power and volume of floods
- Reduce stream erosion
- Improves water quality
- Recharge ground water
- Cost effective
- Design flexibility
- Public green space

US ARMY CORPS OF ENGINEERS
NASHVILLE DISTRICT

Morehead, Kentucky
Planning Assistance to States Study
Flood Risk Reduction on Triplett Creek

Performed by Nashville District, U.S. Army Corps of Engineers
For Louisville District, U.S. Army Corps of Engineers
February 2018

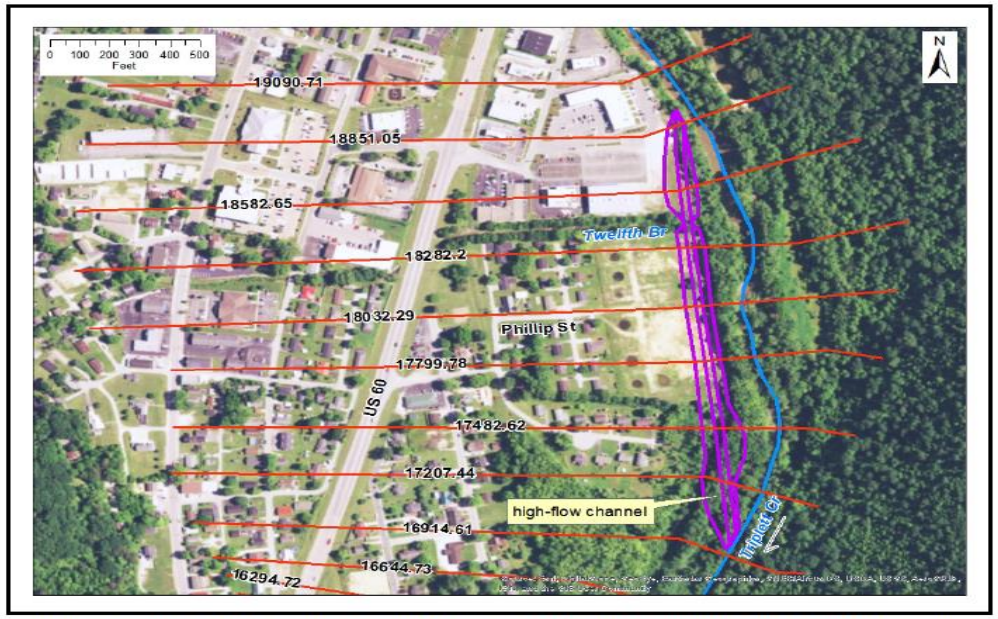
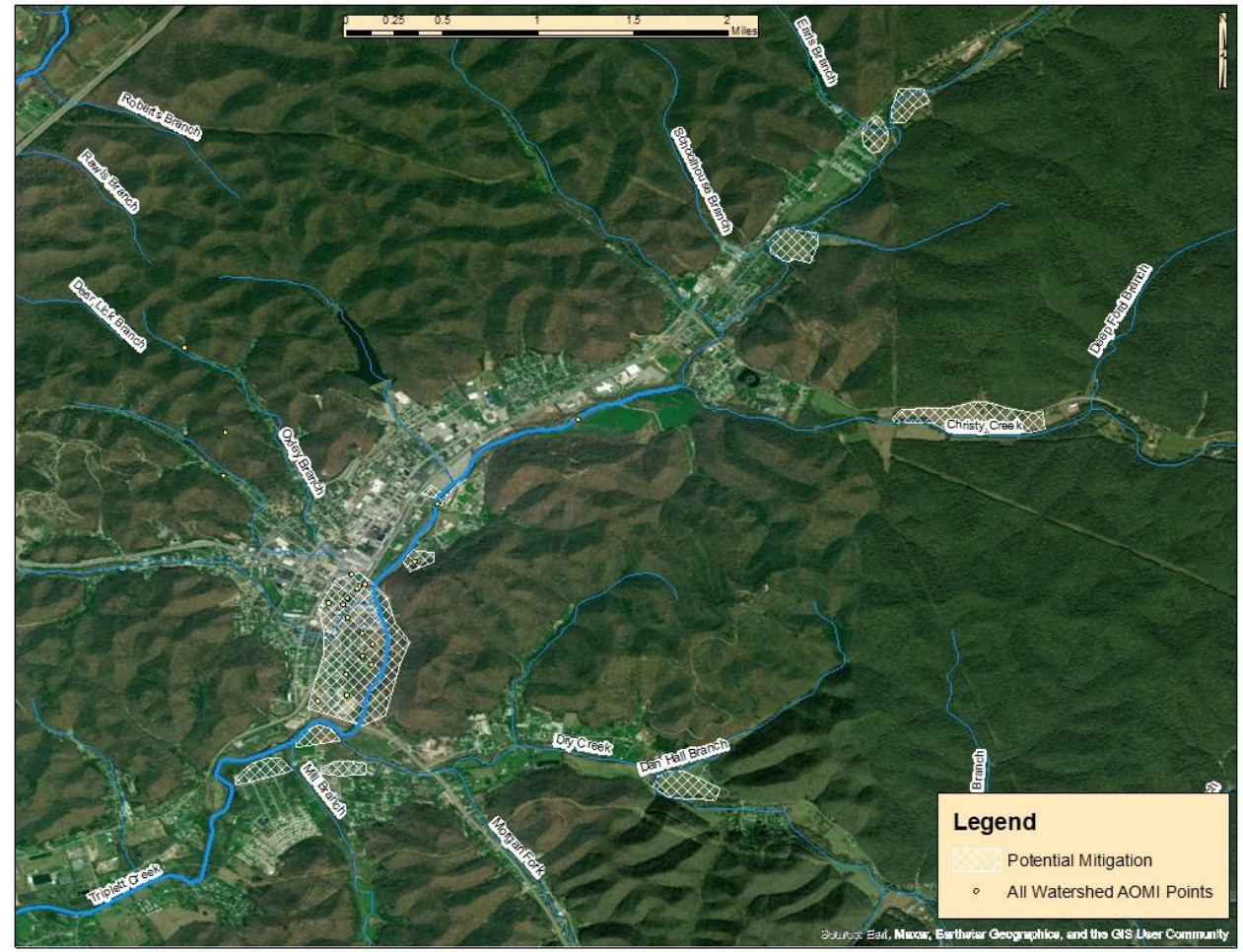
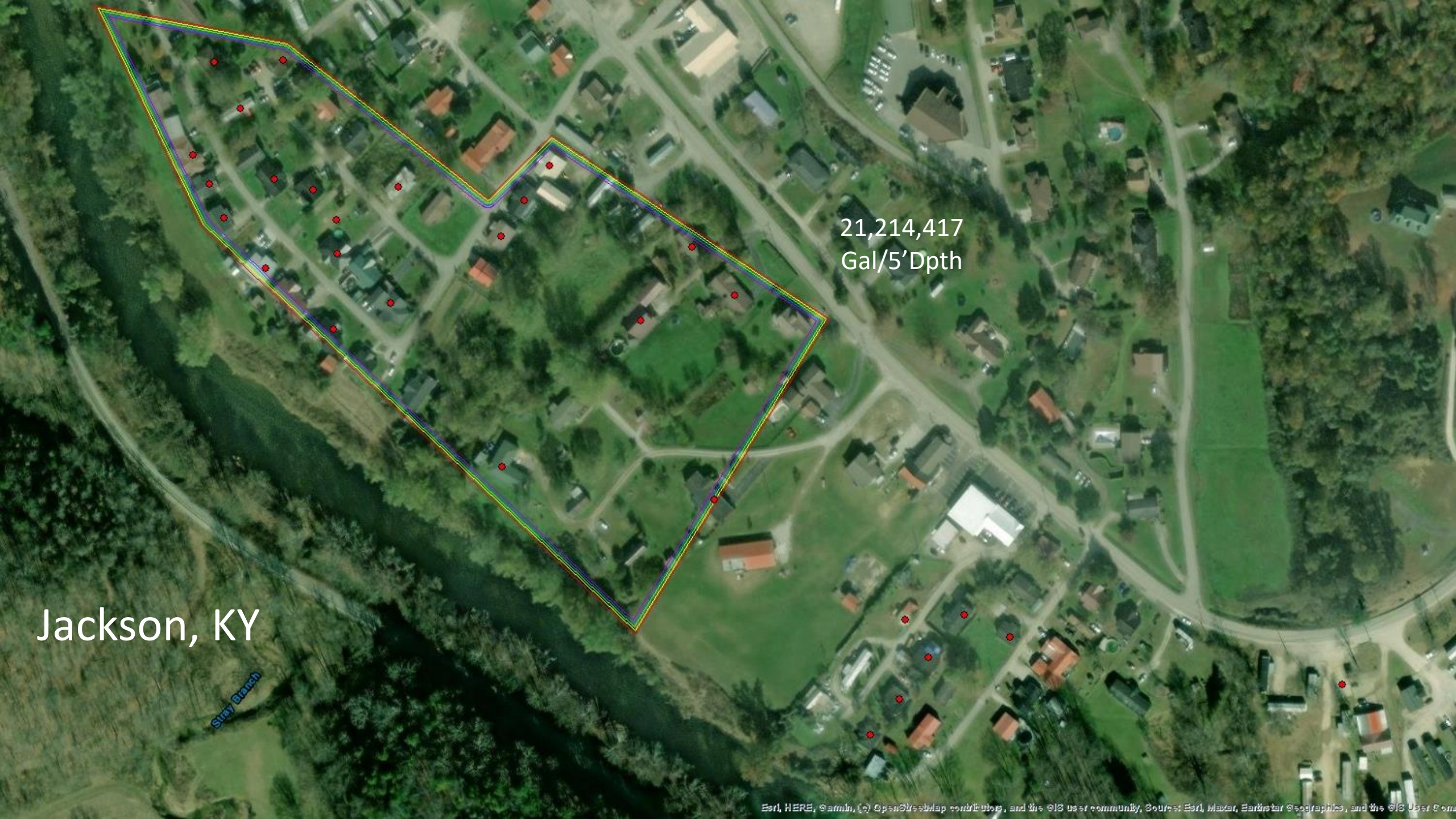


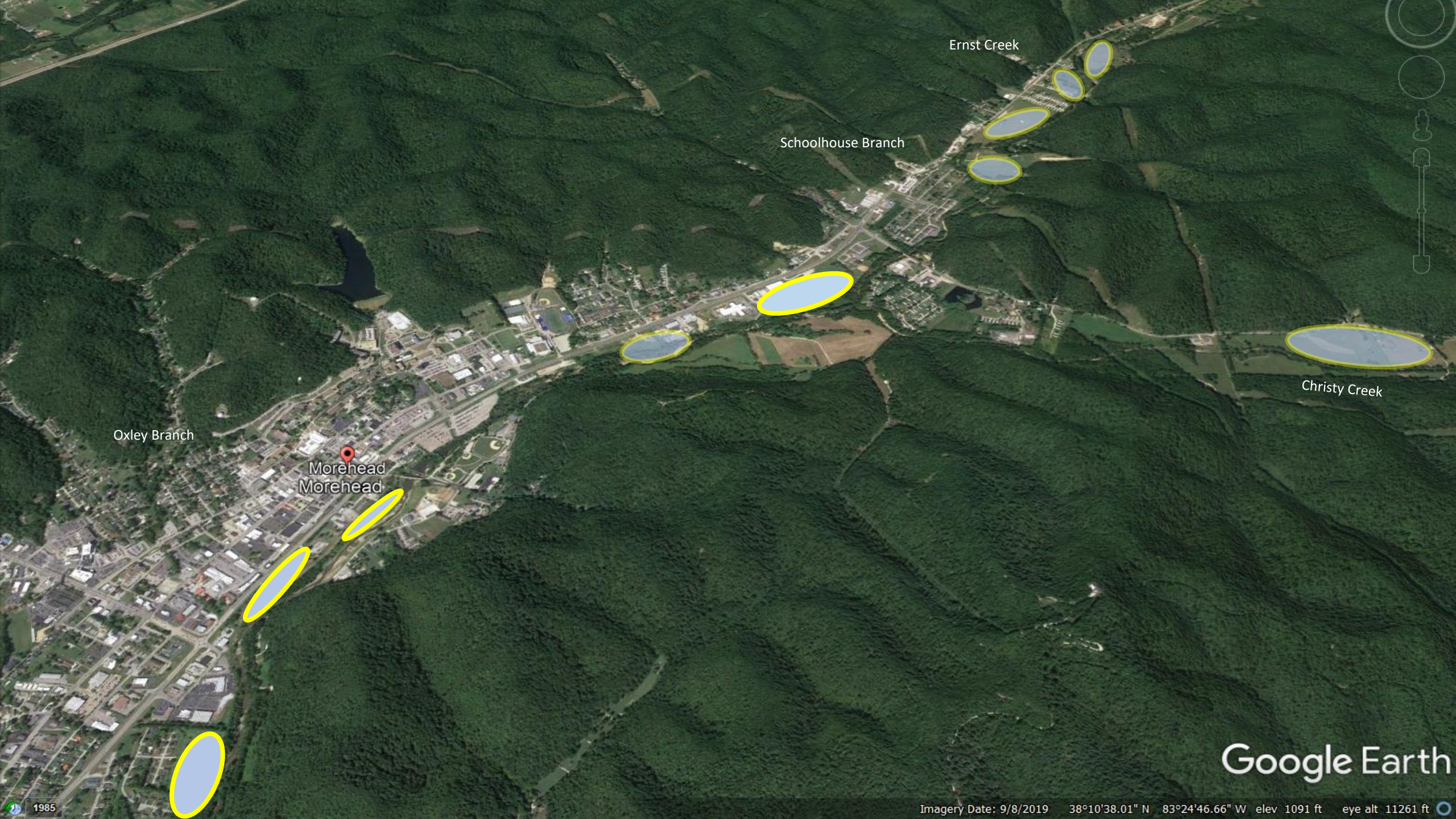
Figure 46. Map of Alternative 3c, high-flow channel between Railroad and Oxley Branch.




DOW-Morehead Greensinks
Phillips Drive
12/15/23, 12:00 AM
2D
Timeline
Cloud
Mesh
Mesh Offset (ft)
0
Save
Measurements
No measurements. Use the toolbar on the map to add measurements.

1	Morehead						
2		Mosquito Ponds				Square Foot X Depth	Cubic foot X 7.48
3			Polygon	Area (sqft)	Depth	Volume (CubicFt)	Capacity (Gal)
4			0-1	208850	1'	194325	1453551
5				198449	2'	185334	1386298.32
6				188048	3'	176517	1320347.16
7				177647	4'	167841	1255450.68
8				167246	5'	159295	1191526.6
9		Totals		940240		883312	6607173.76


21,214,417
Gal/5’Dpth
Jackson, KY
Stray Branch
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Com


Ernst Creek
Schoolhouse Branch
Christy Creek
Oxley Branch
Morehead
Morehead
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

Connecting the Basins

Morehead

Ernst Creek

Schoolhouse Branch

Christy Creek

Oxley Branch

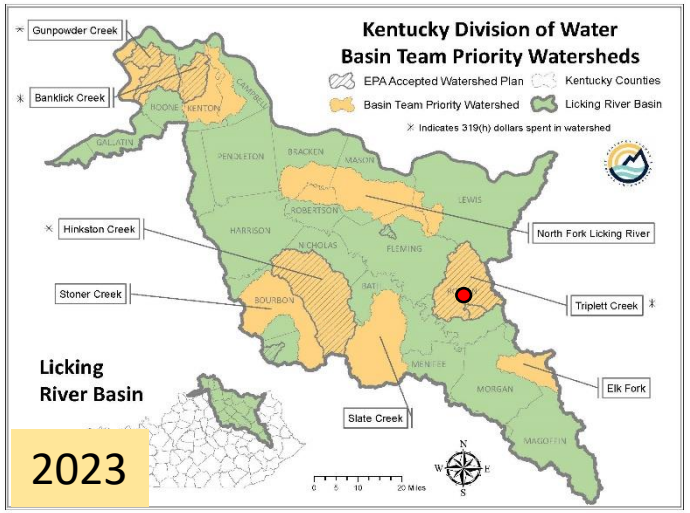
Morehead
Morehead

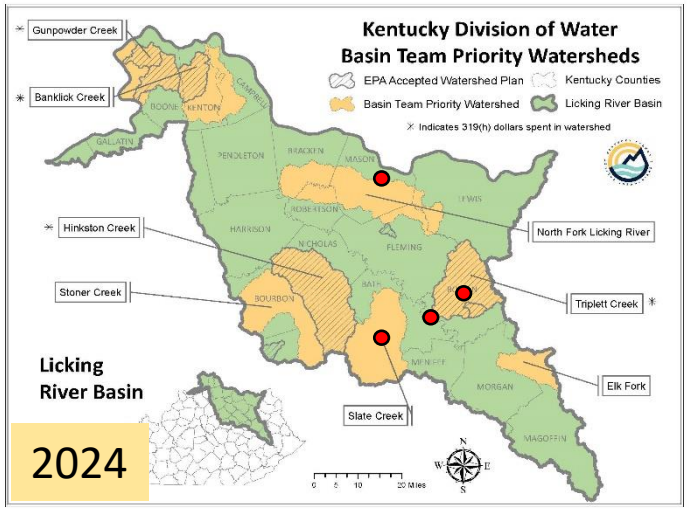
Hiking Trail: _____

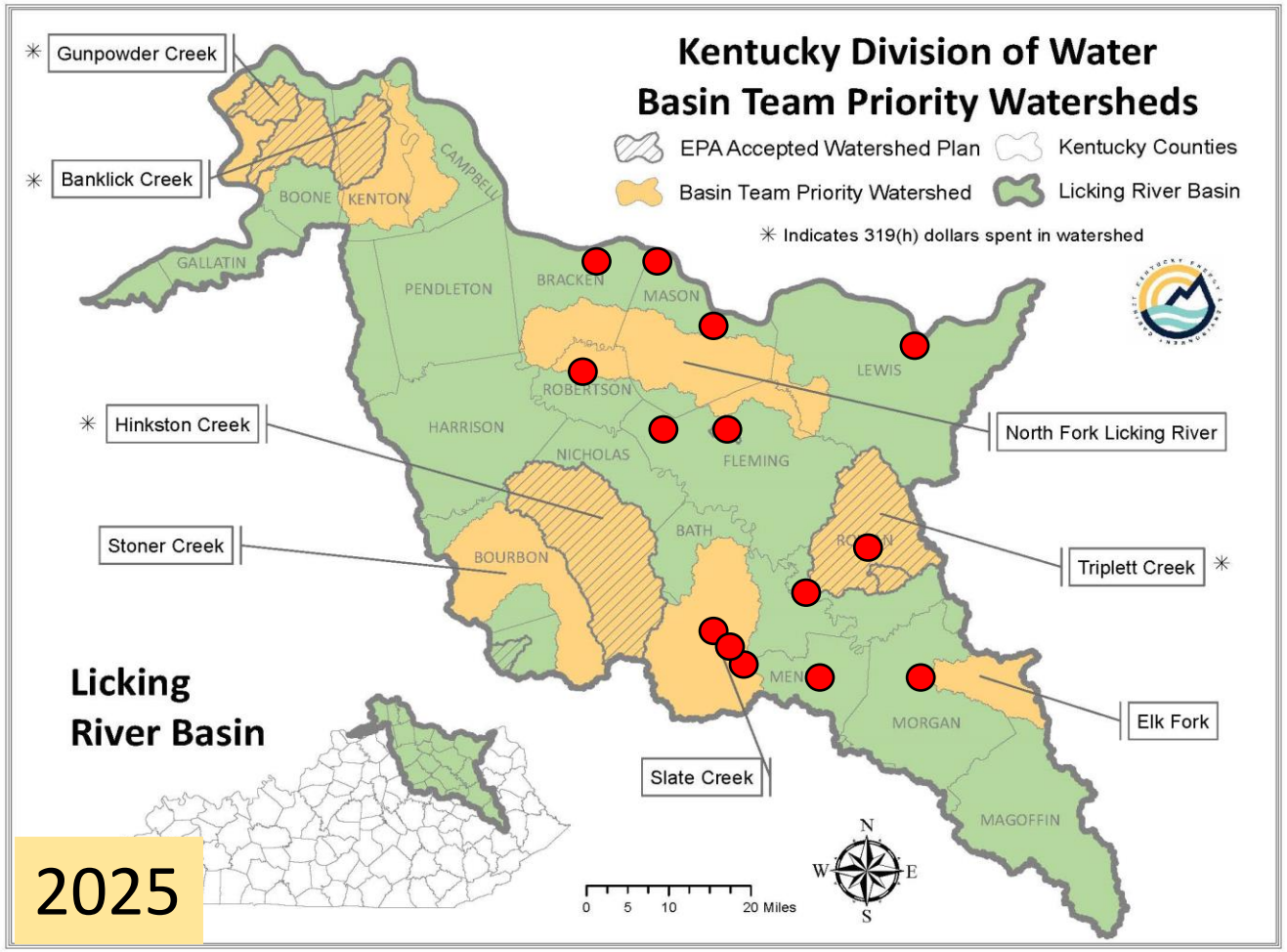
1985

/8/

Green Sinks Flood Mitigation Growth







Maysville


Basin 1
Basin 2
Basin 3
Basin 4
Limestone Creek
Hiking Trail:
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Google Earth

Department of Landscape Architecture

Martin-Gatton College of Agriculture, Food and Environment

KDOW Green Sinks Flood Mitigation Program

Acknowledgements

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- Katie Cartwright-GWADD
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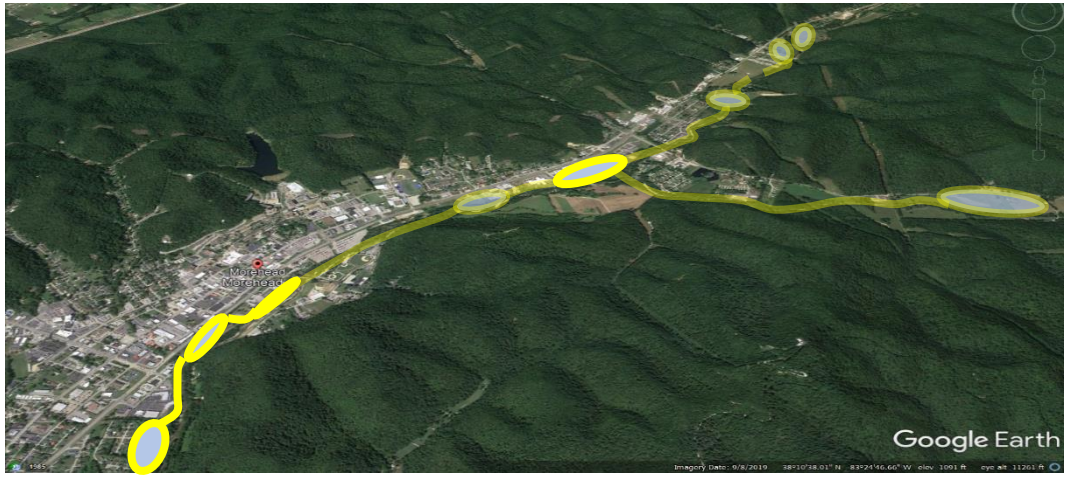
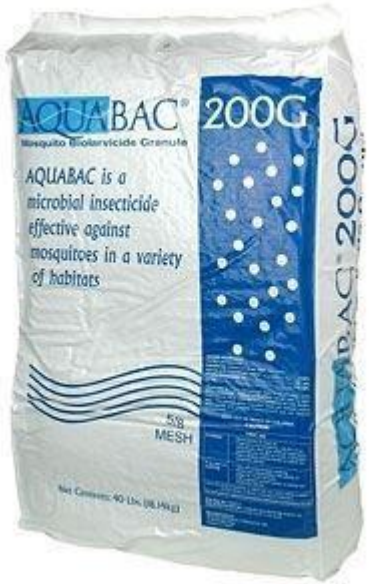
- Tammy Markert-USACE-Louisville

Questions?



Mosquito Control



Bti

- Naturally occurring bacteria found in soils
- Contains spores that produce toxins that specifically target mosquito larvae
- EPA approved

Maintenance

Table 1. Typical maintenance activities for infiltration basins

Activity	Schedule
▪ Replace pea gravel or topsoil (when clogged)	As needed
▪ Ensure inlets are clear of debris, including sediment and oil/grease ▪ Stabilize the surrounding area ▪ Mow grass and remove grass clippings of filter strip areas, if applicable ▪ Repair undercut and eroded areas at inflow/outflow structures	Monthly
▪ Inspect pretreatment devices and diversion structures for debris accumulation and structural integrity; take corrective action as needed	Semiannually
▪ Aerate the pretreatment basin bottom or de-thatch it, if applicable	Annually
▪ Scrape the pretreatment bottom to remove accumulated sediment and re-seed ground cover, if applicable	Every 5 years
▪ Perform total rehabilitation of the basin and restore design storage capacity Excavate the basin bottom to expose clean soil	Upon failure

Source: MPCA, 2016