



Fixing the Flashy Flint

An Integrated Approach

In collaboration with Clayton County and GEMA HMGP

Georgia Planning Association Conference | September 25th, 2026

wsp.com

Introductions



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Agenda



A story of a flashy urban stream -- and how we're fixing it

01

Project Vision and Approach

02

**Hazard Mitigation Planning
in Clayton County**

03

**Engineering Assessment
and Solutions**

04

**GIS, Data Collection,
and Visualization**

05

**Planning, Funding,
and Implementation**

06

**Lessons Learned and
Next Steps**

PART 01

Project Vision and Approach

The Upper Flint - one of Georgia's most critical (and flashy) urban streams

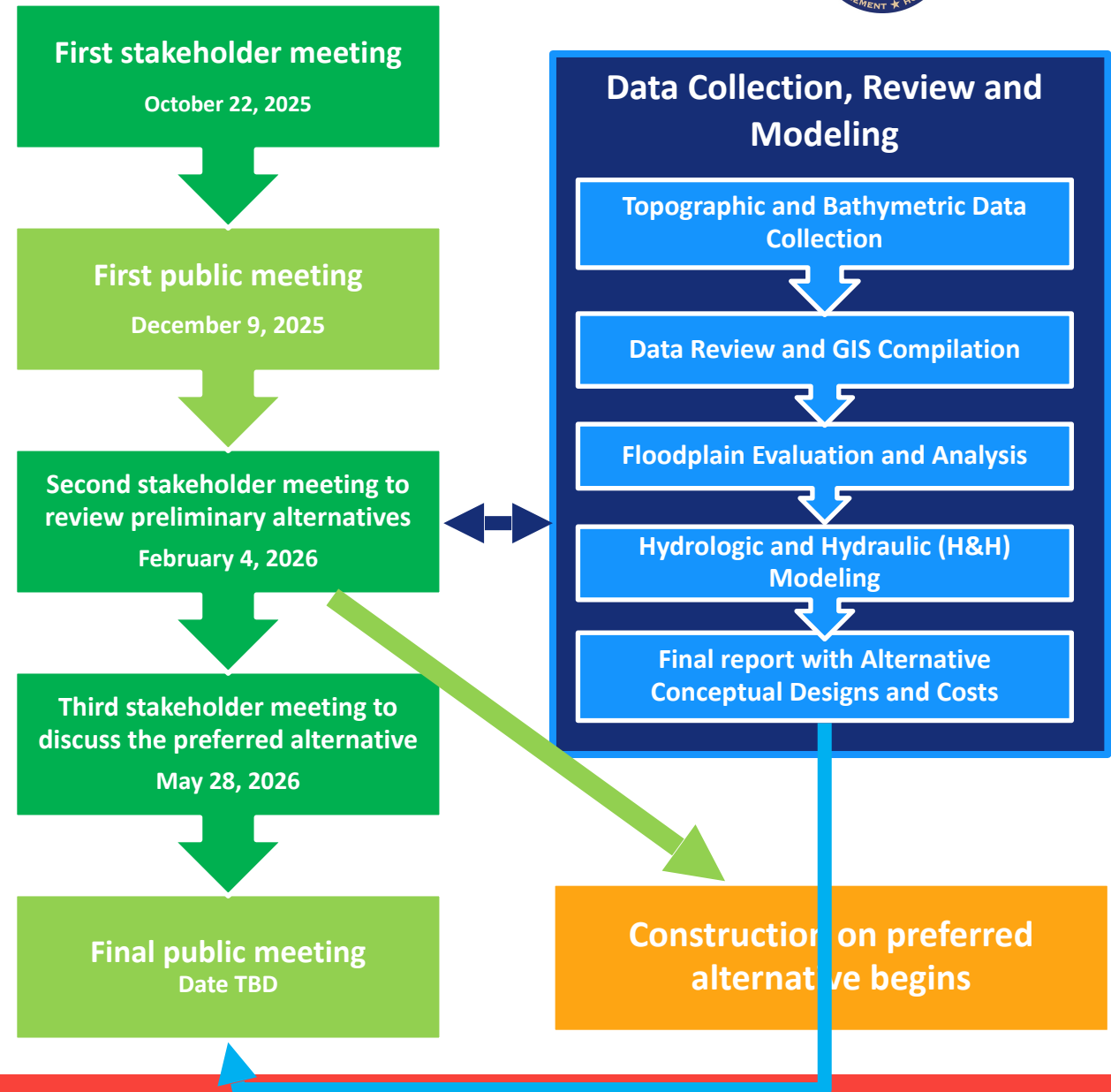
About the Project

WSP is supporting Clayton County in the restoration of the Flint River flood basin near the Southern Regional Medical Center in Riverdale, Georgia

Funded by the Hazard Mitigation Grant Program (HMGP), as approved by the Georgia Emergency Management Agency (GEMA)

Primary goal: To identify and design a preferred alternative to mitigate flooding in the project area

Community engagement and stakeholder input will play a key role in selecting the final design solution

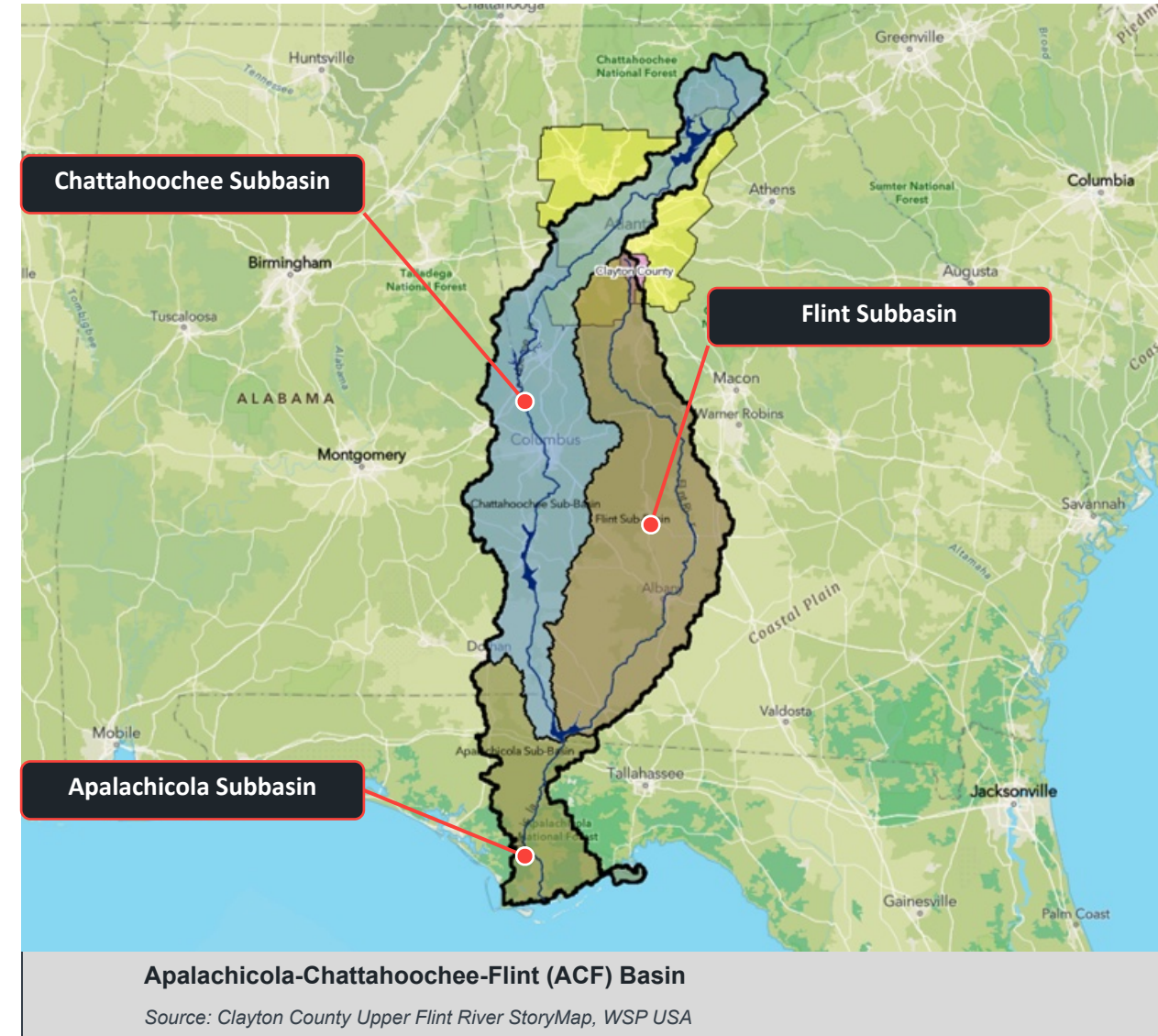


About the Flint River



From an airport runway to the Gulf of Mexico

- Headwaters extend from beneath Hartsfield-Jackson Atlanta International Airport -- the world's busiest.
- No dams for 150 miles from headwaters - one of the longest undammed reaches in the eastern U.S.
- Georgia's second largest river; joins the Chattahoochee to become the Apalachicola at the GA-FL border, draining to the Gulf of Mexico.
- Teeming with biodiversity - home to endangered and threatened species.
- Provides water for communities from Clayton County to the Florida state line.



PART 03

Hazard Mitigation Planning in Clayton County

Project & County Context



The Upper Flint in Clayton County: a community and infrastructure challenge

Clayton County Perspective

Immediate Concern: Flooding from the Flint significantly impacts a key medical facility – Southern Regional Medical Center (SRMC)

- Major Road Closures
- Limited access to SRMC
- Emergency Personnel Impacted

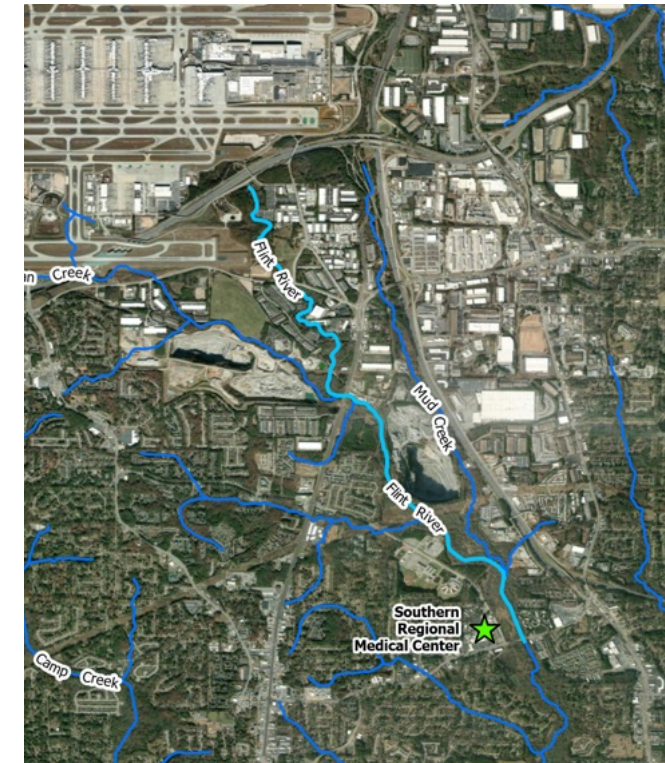
PROJECT GOAL

Identify and design a preferred alternative to mitigate flooding.

PROJECT AREA

Upper Flint corridor
I-285 → Upper
Riverdale Rd.
Clayton County, GA

Key facilities:
Southern Regional
Medical Center
Upper Riverdale
Road bridge





Resilience & Hazard Mitigation Planning

From reactive response to proactive flood risk reduction

EMERGENCY MANAGEMENT LENS

1

Understand the hazard

Flooding, erosion, sediment, and infrastructure exposure

2

Quantify risk

Field data + stakeholder observations

3

Fund mitigation

HMGP provides a pathway to develop and advance a preferred alternative

4

Coordinate implementation

County departments + GEMA + technical and infrastructure partners

Current project: GEMA Hazard Mitigation Grant Program (HMGP)

REACTIVE

- Respond to flood events
- Repair damage / restore service
- Address immediate consequences

PROACTIVE

- Identify hazards before the next event
- Design mitigation based on modeled risk
- Reduce future disruption and exposure

Hazard Mitigation Grant Program (HMGP 4501)



Flood mitigation is about protecting people, access, infrastructure, and future investment

Provides funds to State agencies and local governments in the aftermath of a disasters for projects that reduce or eliminate long-term risk to human life and property from effects of natural hazards

Enables mitigation measures identified in local Hazard Mitigation Plan to be implemented during the recovery from a disaster.

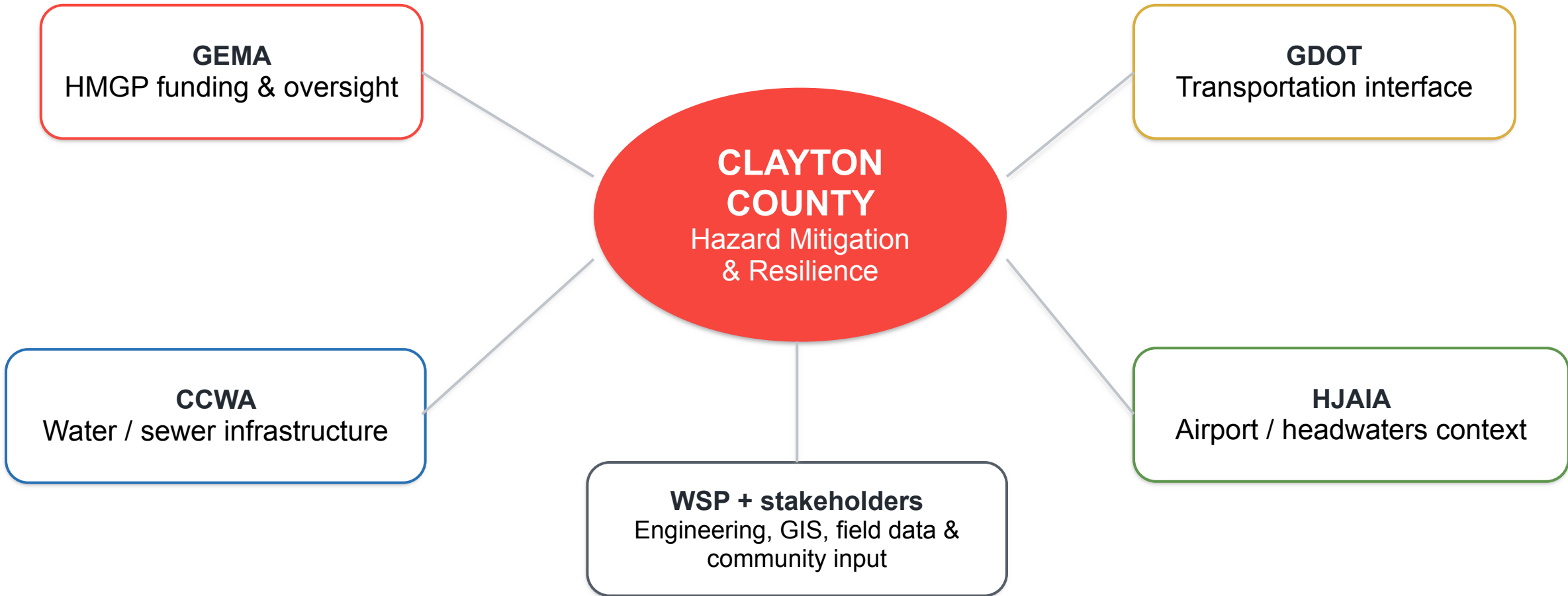
Administered by GEMA

The County perspective: Mitigation is an investment in continuity of critical services—not simply a response to the last flood.

County Coordination for Mitigation



Hazard mitigation works when technical analysis, county operations, and partners move together



The mitigation process connects the County's operational priorities to engineering alternatives and future implementation.

PART 03

Engineering Approach and Solutions

Why the Flint is flashy - and why conventional approaches fall short

Project Area



Upper Flint corridor from I-285 to Upper Riverdale Road, Clayton County, GA

1 Sullivan Creek

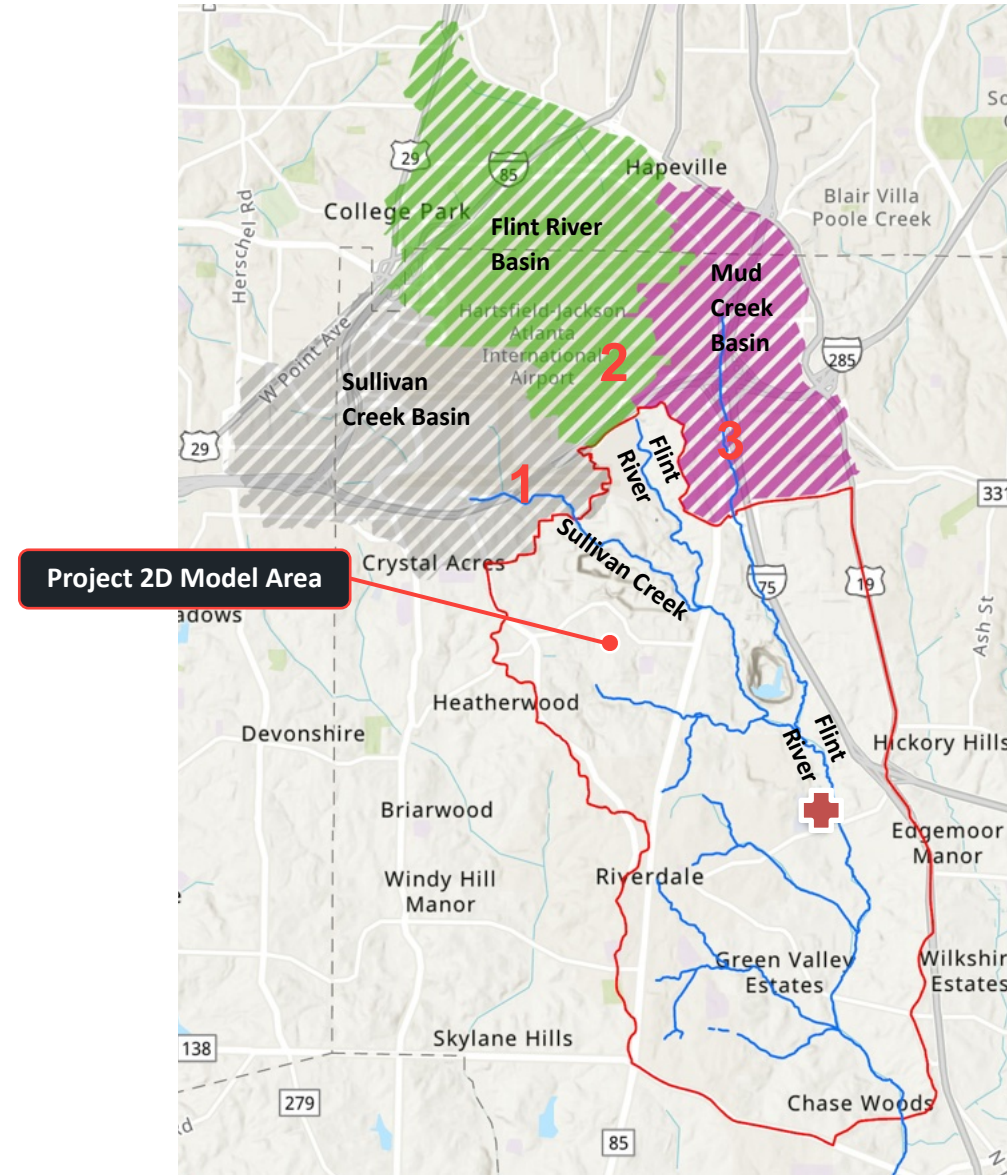
Draining the southwest portion of the study area, Sullivan Creek contributes ~3,012 acres (~36% of the contribution area) before joining the Flint River.

2 Flint River

The mainstem originates beneath Hartsfield-Jackson Atlanta International Airport and drains ~3345 acres (~40% of the contributing area) at the downstream end of the headwaters

3 Mud Creek

Draining the eastern portion of the study area, Mud creek adds ~2,042 acres (~24% of the contributing area) at the downstream end of the headwaters



A Flashy Urban Watershed



Rapid urbanization + impervious cover + highly responsive stormwater = a hyper-reactive stream



World's Busiest

Airport (Hartsfield-Jackson) -- sits directly on the headwaters (Source: *Finding the Flint*)



Hospital Lifeline

Southern Regional Medical Center access threatened by repeat flooding. (Source: OEM)



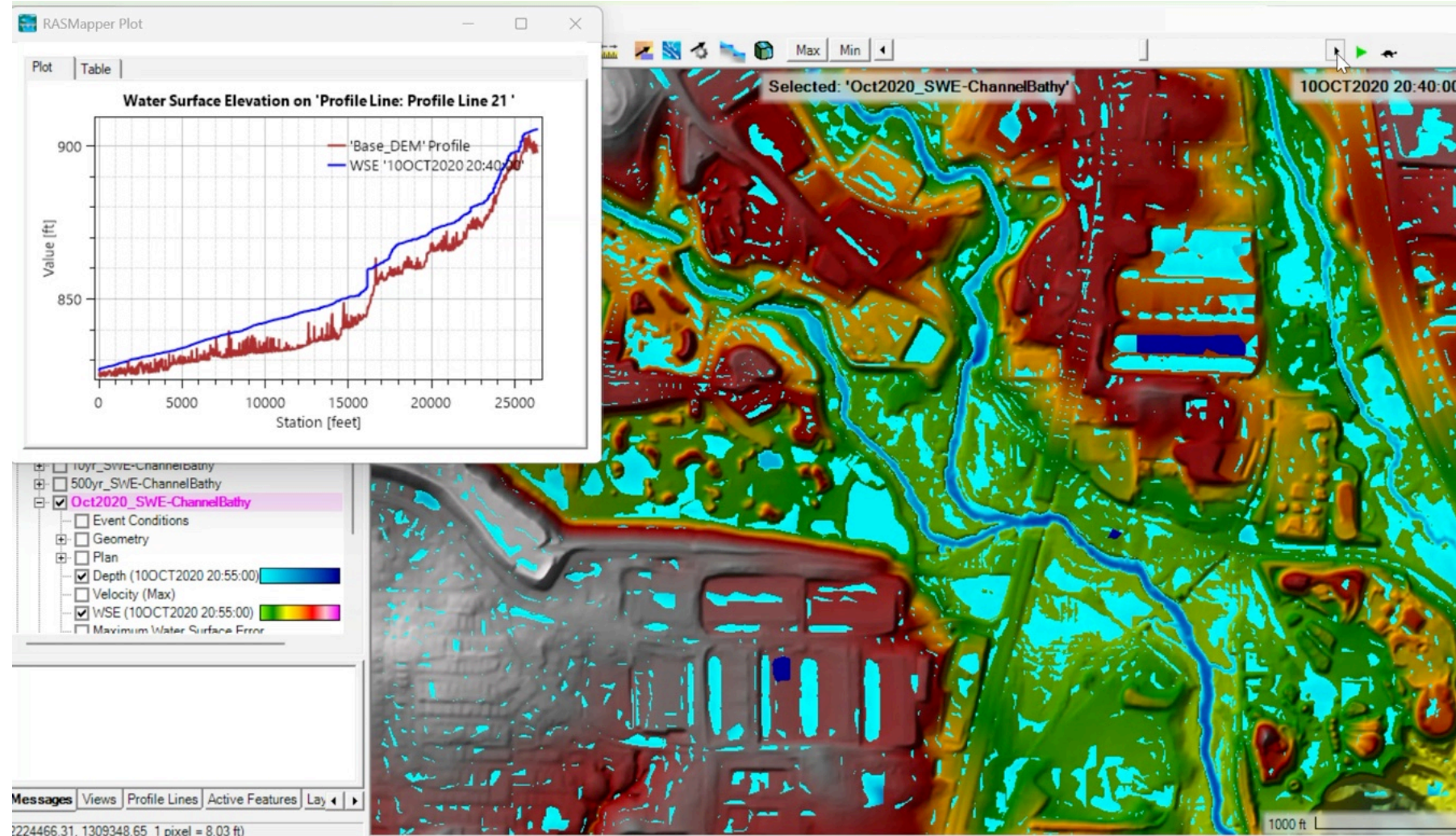
Major Roadway

Upper Riverdale Rd bridge inundated on March 6th 2024 (Source: OEM)

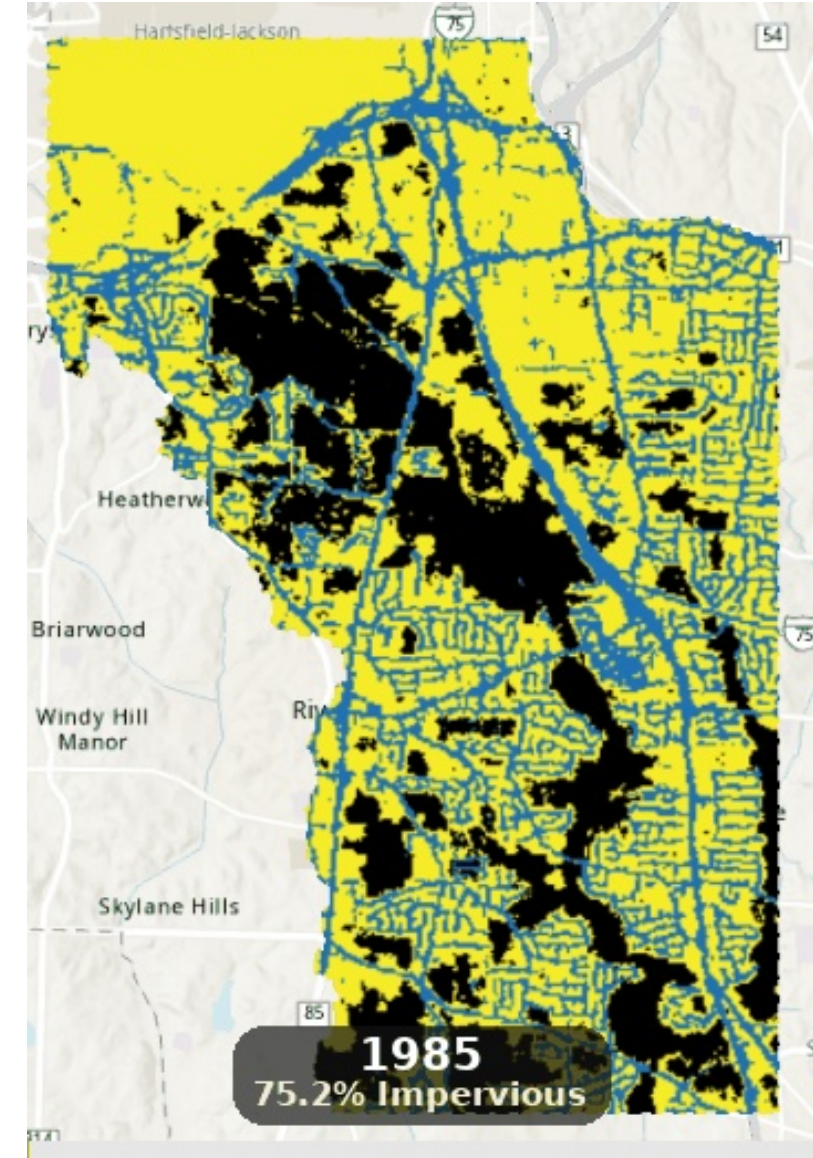
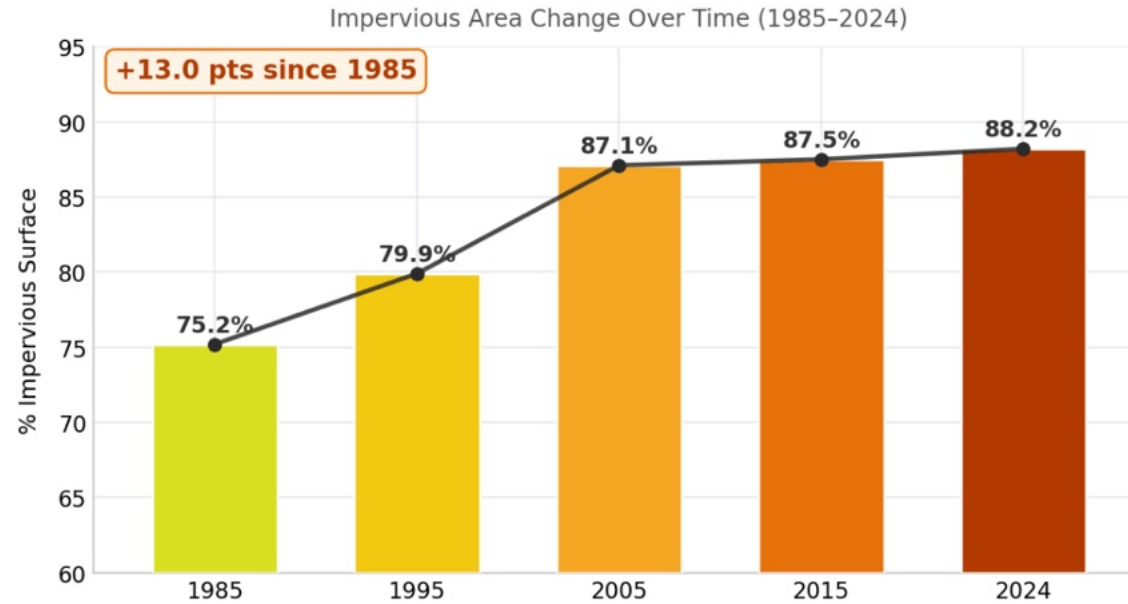
A Flashy Urban Watershed



- Highly urbanized/impervious headwaters generate rapid, high-volume runoff.
- The corridor 'flashes' from baseflow to bankfull in minutes - not hours.
- Peaks arrive faster and higher than the channel can accommodate.
- Result: over-widened, incised banks; disconnected floodplain; degraded wetlands.



% Impervious



Land Cover Classification



- Esri Deep Learning models were used to generate high-quality land cover outputs for flooding scenario models in ArcGIS Pro

Traditional land cover inputs such as from the National Land Cover Database have low resolution

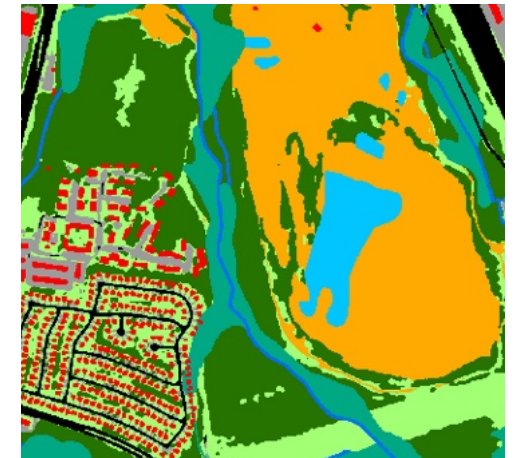
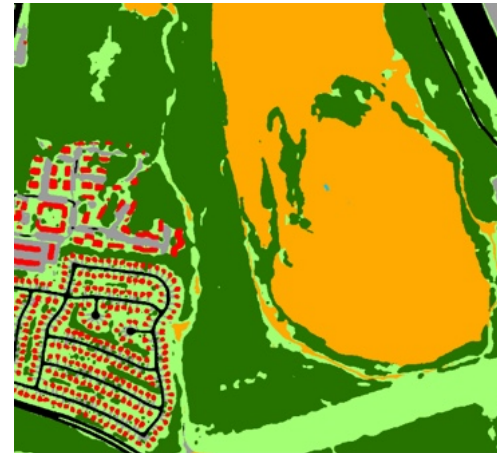
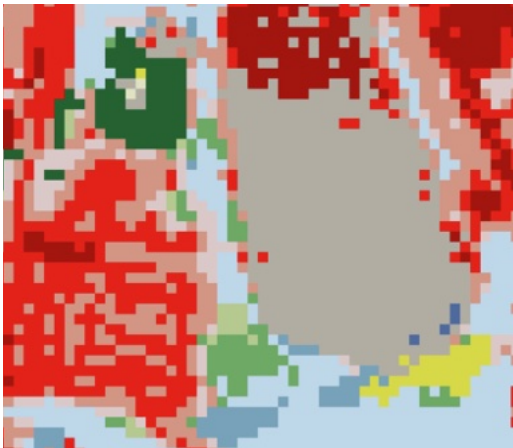
Obtain imagery from National Agriculture Imagery Program (NAIP)



In ArcGIS Pro, use the "Classify Pixels Using Deep Learning" tool



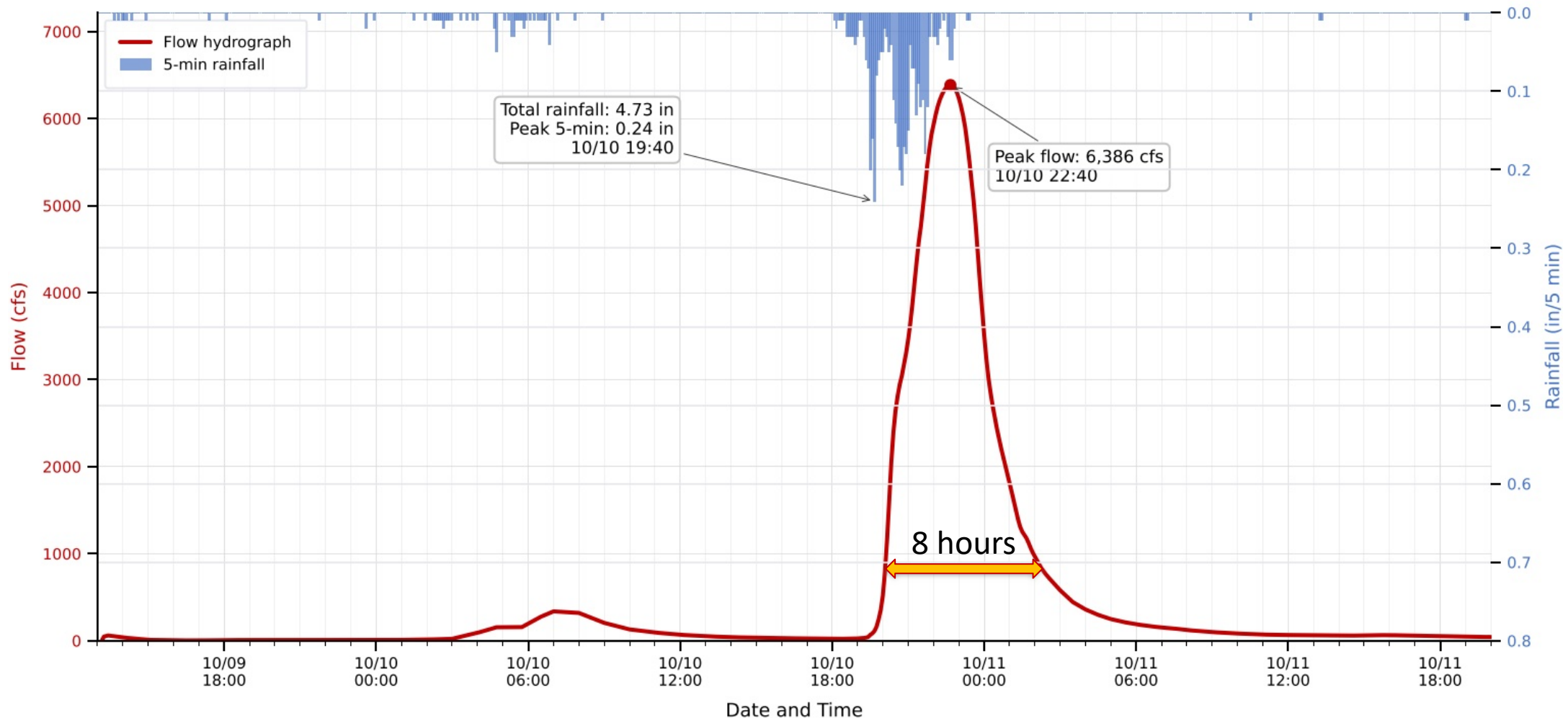
"Stamp" additional layers (wetlands, buildings, roads, etc.) into the new raster



Rainfall/Runoff Response



Flint River Flow Hydrograph and Hyetograph - October 9-11, 2020



Rainfall aggregated from 1-minute data to 5-minute totals for display; right rainfall axis expanded to 0.80 in/5 min.

Recent Flooding Conditions



Recent Flooding Conditions



Recent Flooding Conditions



Sanitary Sewer Pipe Crossing – Debris Analysis

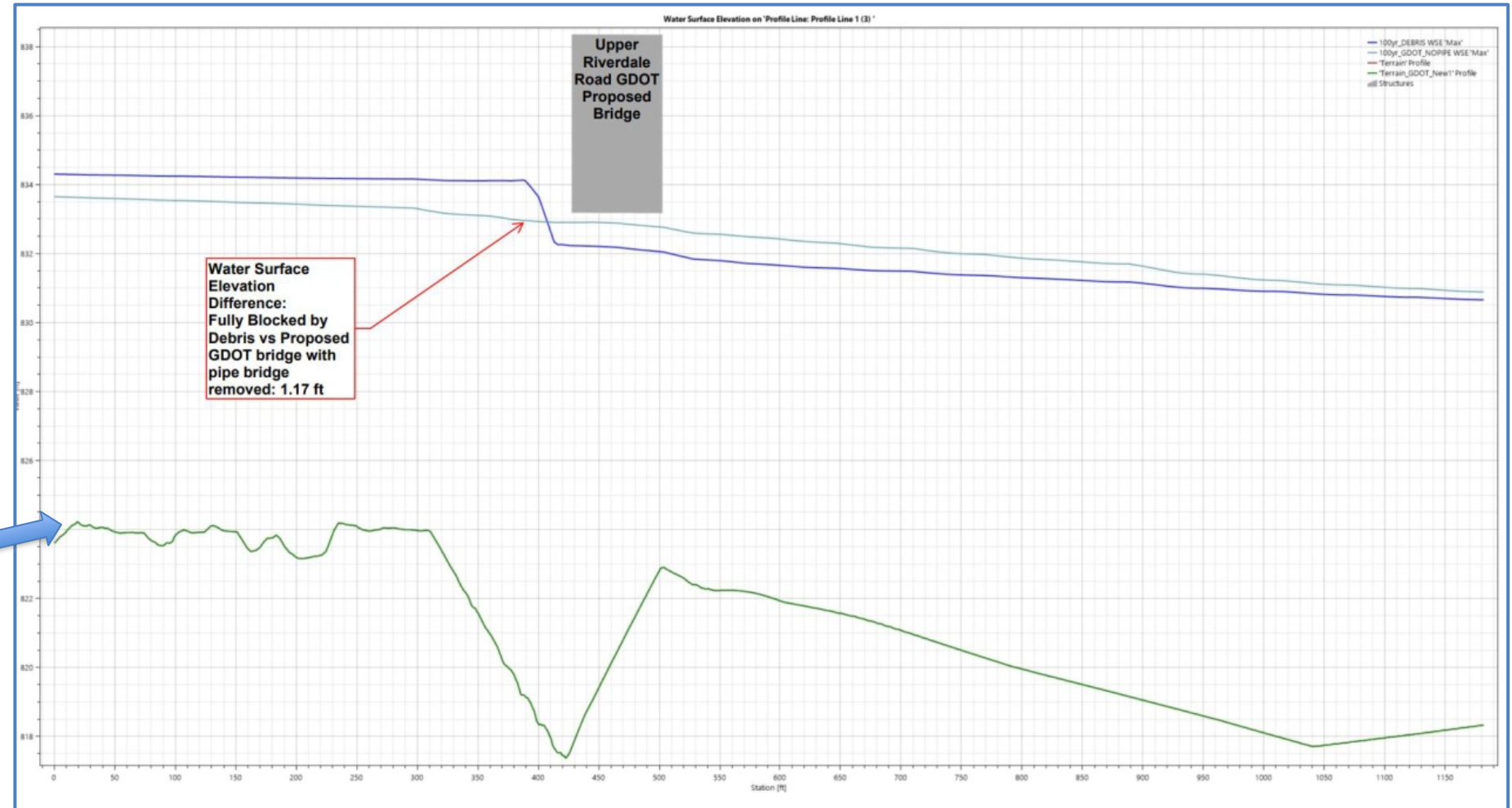
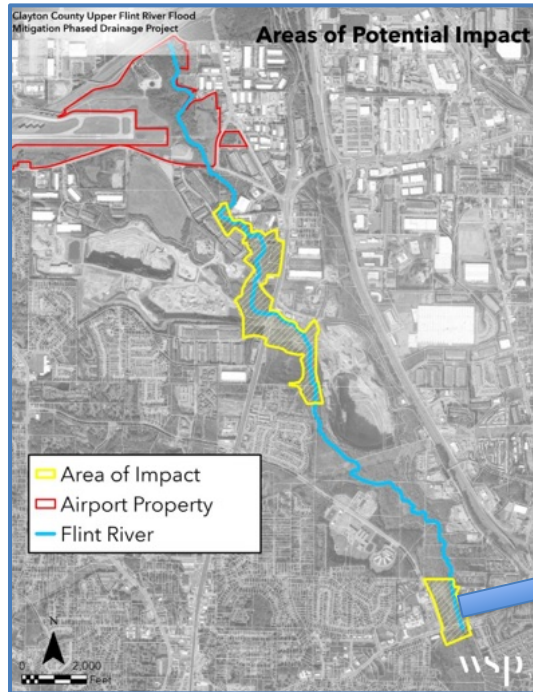


February 4th, 2026



May 14th, 2026

Debris Analysis



Degraded Banks (Aggradation & Degradation)



Field Data Collection



- Imagery integrated with Google Street View -- anyone can 'walk' the Flint online.
- Powers our engineering BANCS assessment AND public engagement



BANCS / BEHI Results



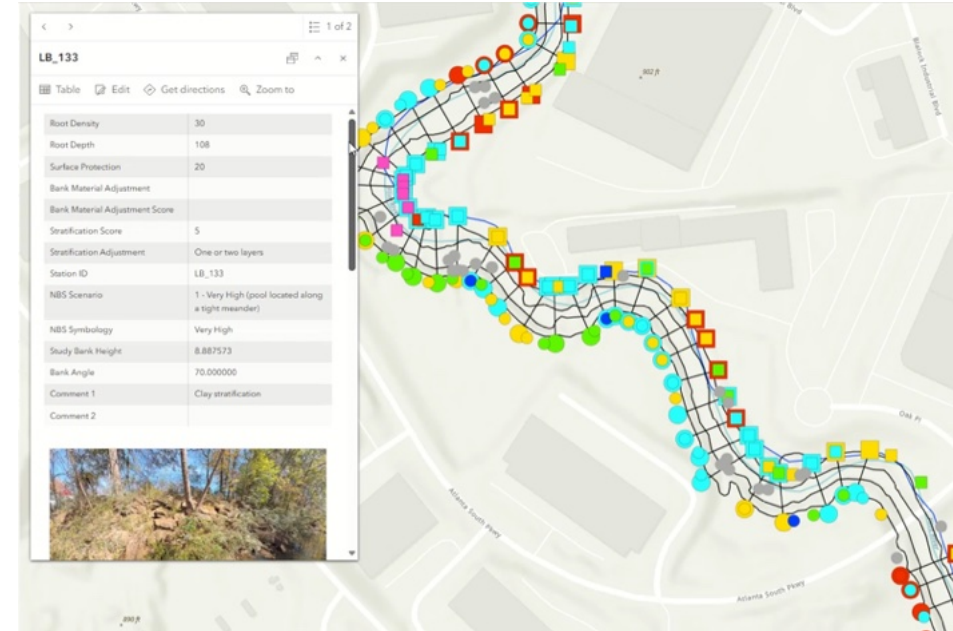
Where the banks are failing - and how badly

- Bank Erosion Hazard Index (BEHI)
- Near Bank Stress (NBS)
- Largest lateral recession: 9.7 ft/yr (The average erosion rates for the left and right banks are 0.46 ft/yr and 0.42 ft/yr, respectively)
- Sum of erosion subtotals for the left bank: 3,968.42 (tons/yr)



797.46 (tons/yr)

Highest Risk Bank (Extreme BEHI & NBS).



An average adult African elephant weighs about 6 tons

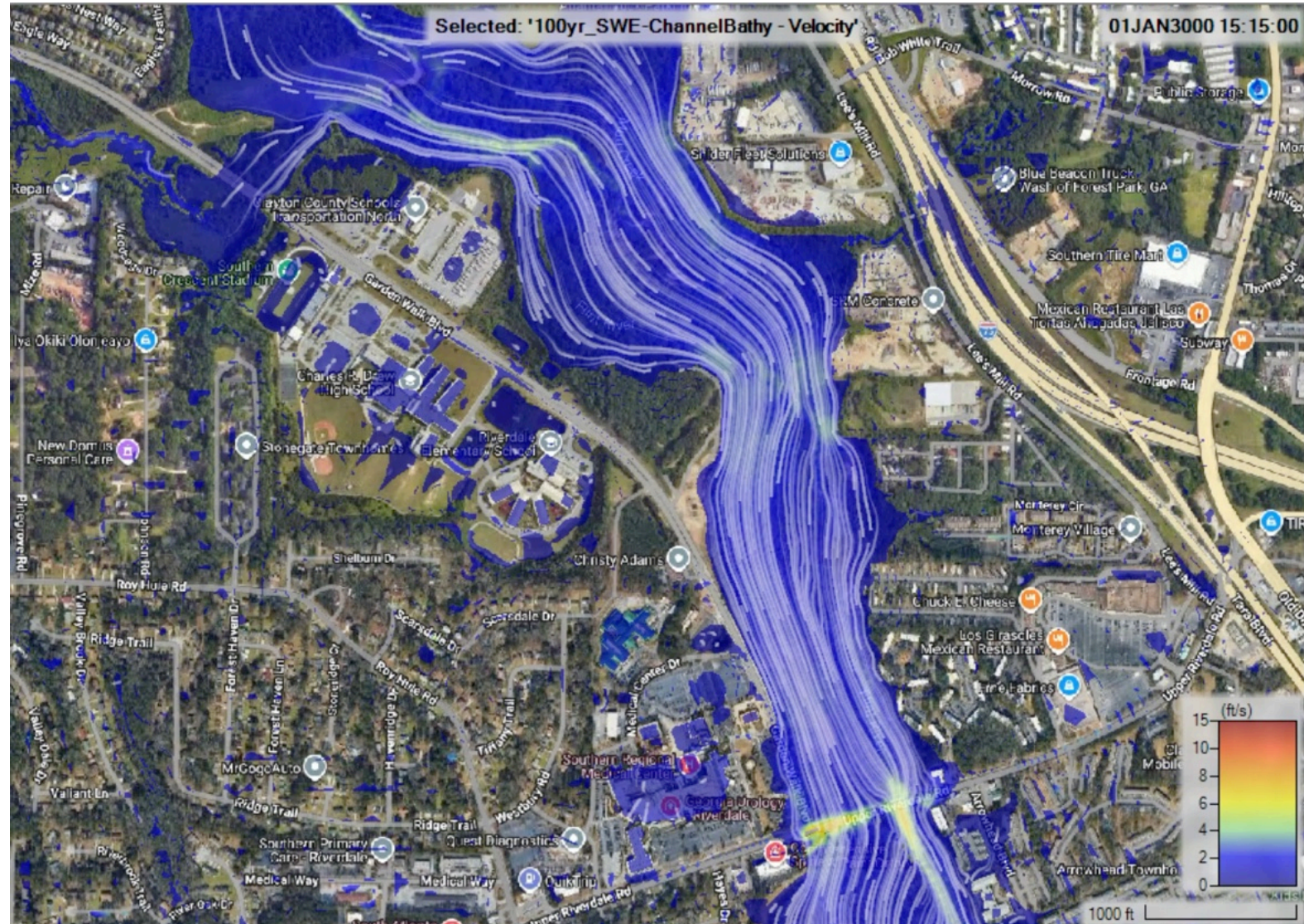


High-Resolution 2D Hydraulic Modeling



Rain-on-mesh simulations across the study area

- Multifrequency Analysis – 1yr, 2yr, 5yr, 10yr, 25yr, 50yr, 100yr, 500yr
- Depth, velocity, water-surface elevation, shear stress, stream power at every cell.
- Captures overbank flow, floodplain storage, and hospital-access impacts.
- Model calibrated with gage data and stakeholder-submitted flood photos.

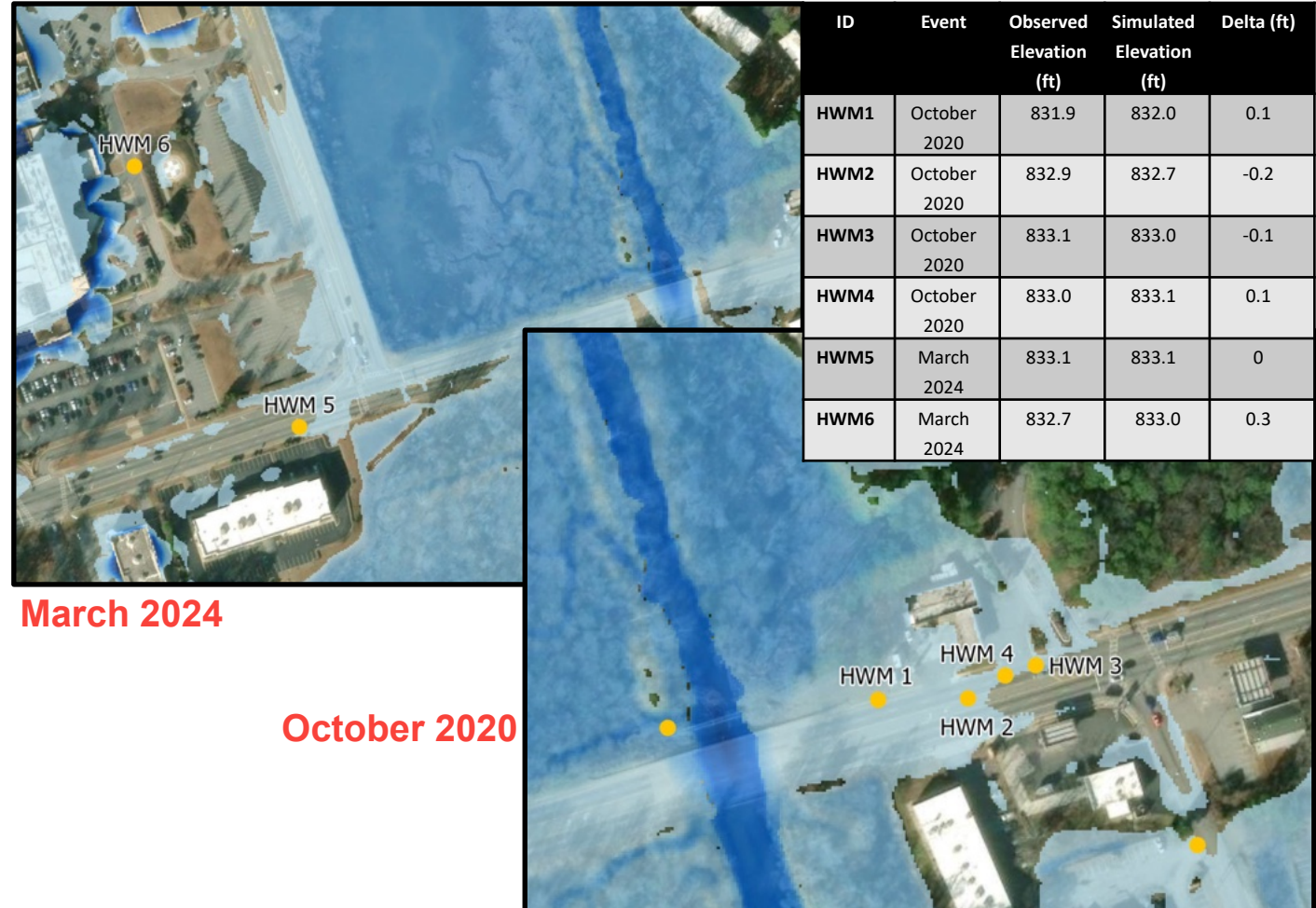


Calibration and Validation



Rain-on-mesh simulations across the study area

- **Calibration Events:** December 2018, January 2021, December 2023, March 2024
- 2 high flow events, and 2 low flow events calibration
- **Validation Event:** October 2020
- Model calibrated with gage data and stakeholder-submitted flood photos.
- Flood Photos were georeferenced to estimate high water marks for calibration of various storms
- Low flow events were calibrated to confirm model robustness and support sediment transport modeling



Validation Event Photographs



Rain-on-mesh simulations across the study area



ID	Event	Observed Elevation (ft)	Simulated Elevation (ft)	Delta (ft)
HWM1	October 2020	831.9	832.0	0.1
HWM2	October 2020	832.9	832.7	-0.2
HWM3	October 2020	833.1	833.0	-0.1
HWM4	October 2020	833.0	833.1	0.1

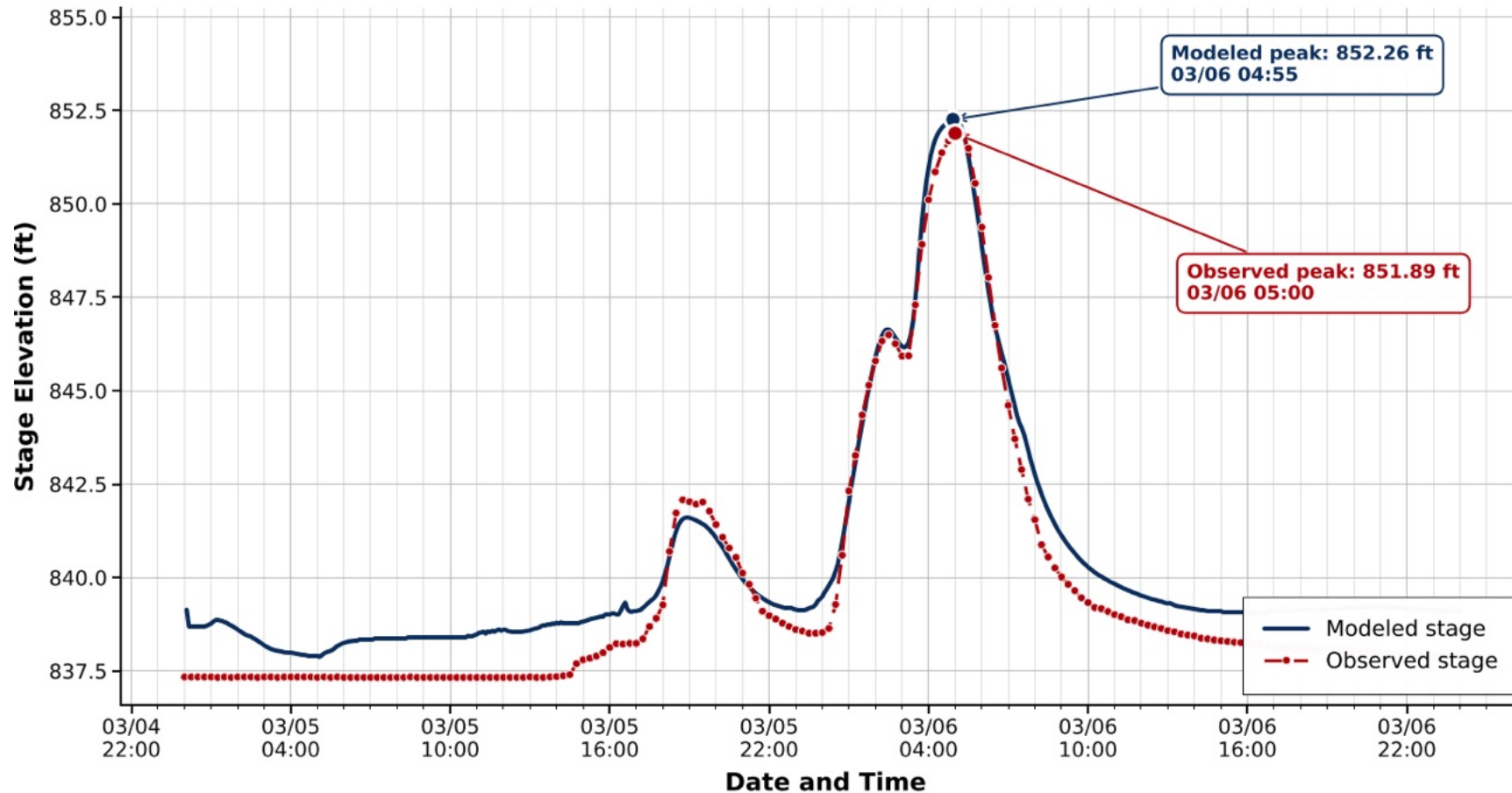


Calibration Event – March 2024 (High Flow)



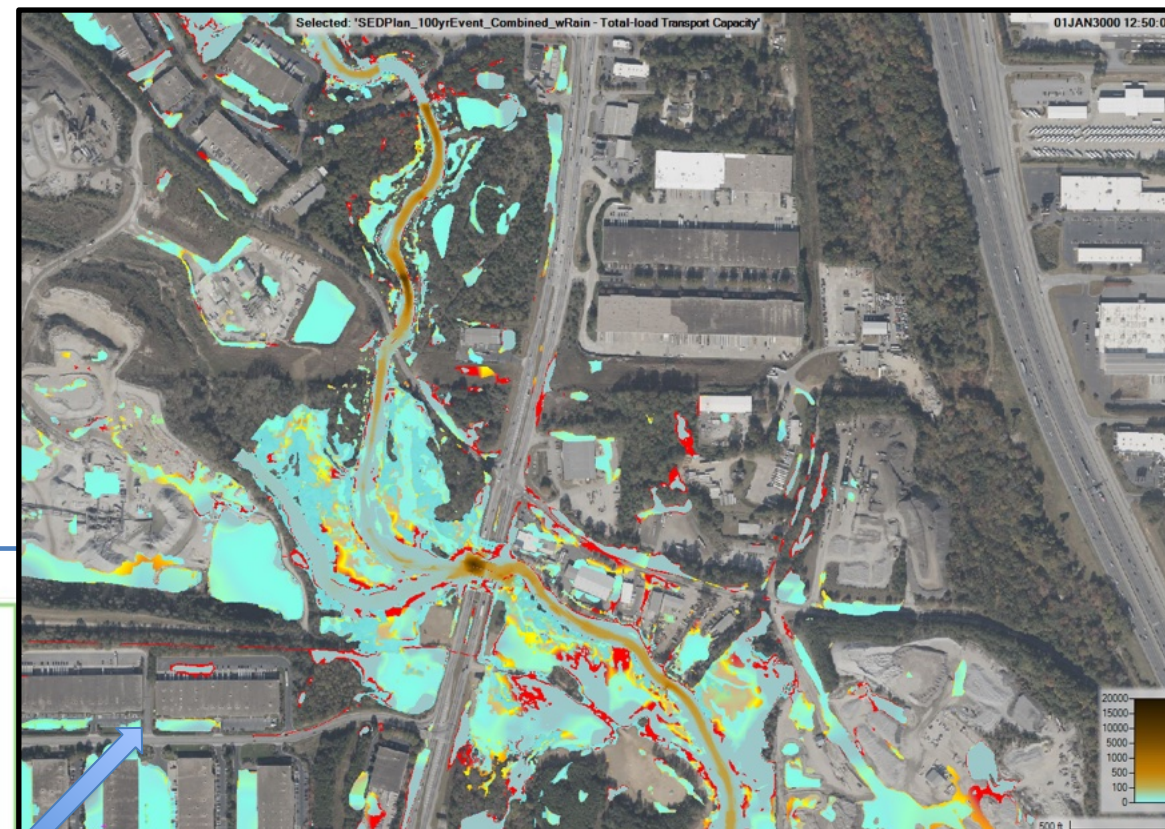
Model run stage hydrograph compared to USGS gage data demonstrates model robustness

Flint River March 2024 Calibration — Modeled vs. Observed Stage



Linking failing banks to channel instability and flood risk

-



The Conventional Approach Falls Short



Erosion, sediment, and flooding are typically evaluated in silos

Erosion

Bank assessment done in isolation,
without hydraulic drivers.

Sediment

Sediment transport rarely
linked to actual failing bank
sources.

Flooding

1D hydraulics miss floodplain
dynamics; ignore sediment
feedback.

Result: fragmented analysis → mitigation that is short-lived, misdirected, or both.

PART 04

GIS, Data Collection, and Visualization

Using GIS to collect data, analyze, and communicate

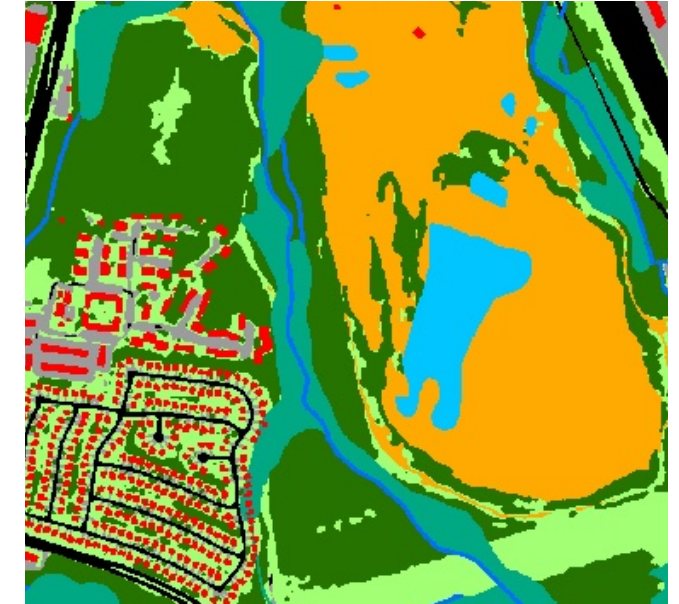
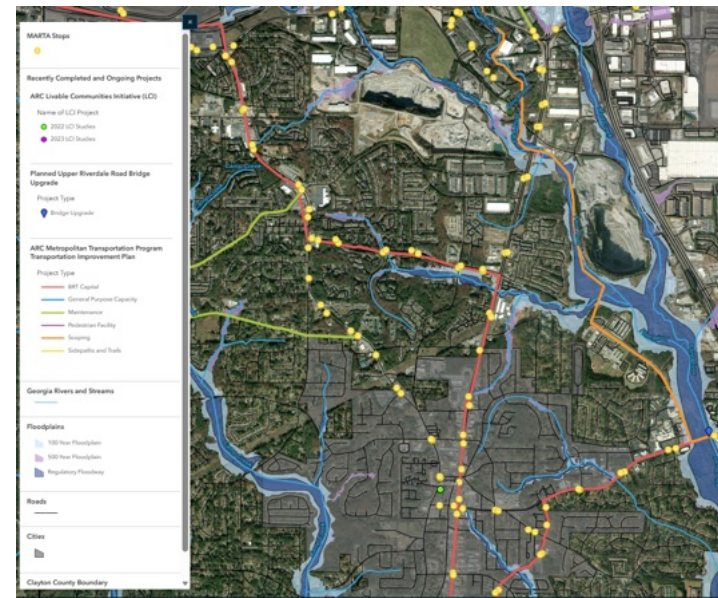
GIS Framework



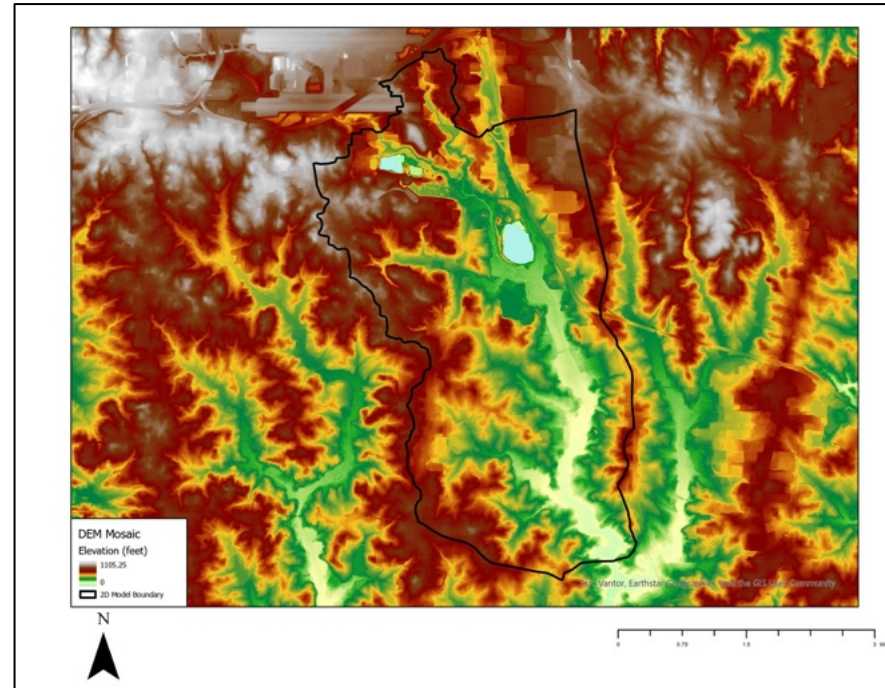
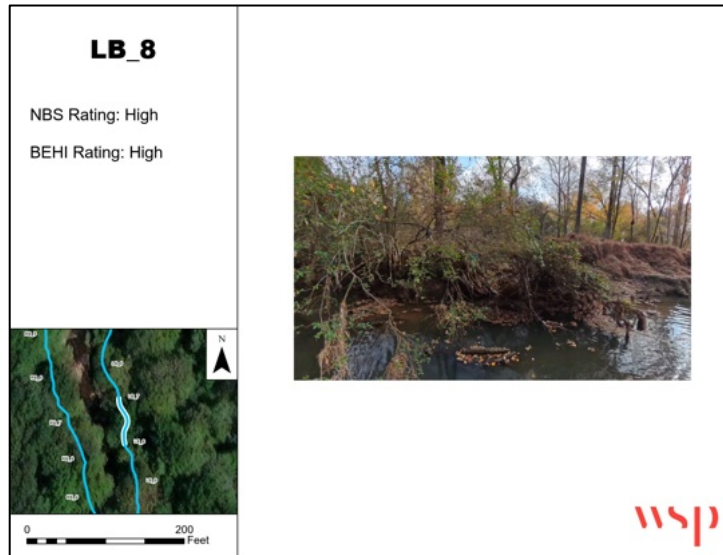
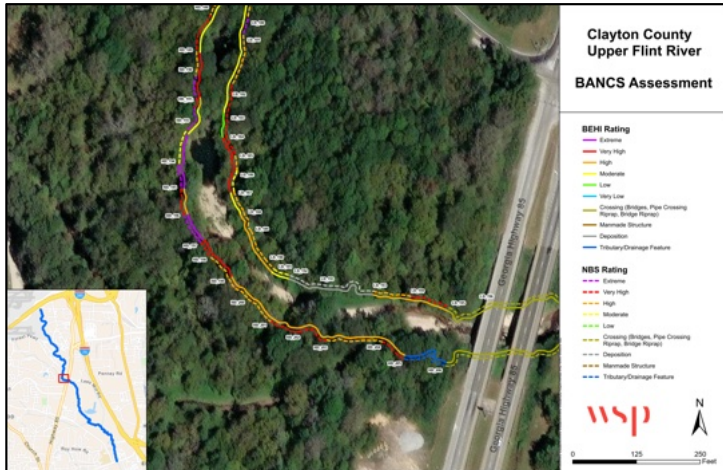
Integration of environmental, engineering, infrastructure, parcel, and hydrologic datasets

Data sources include:

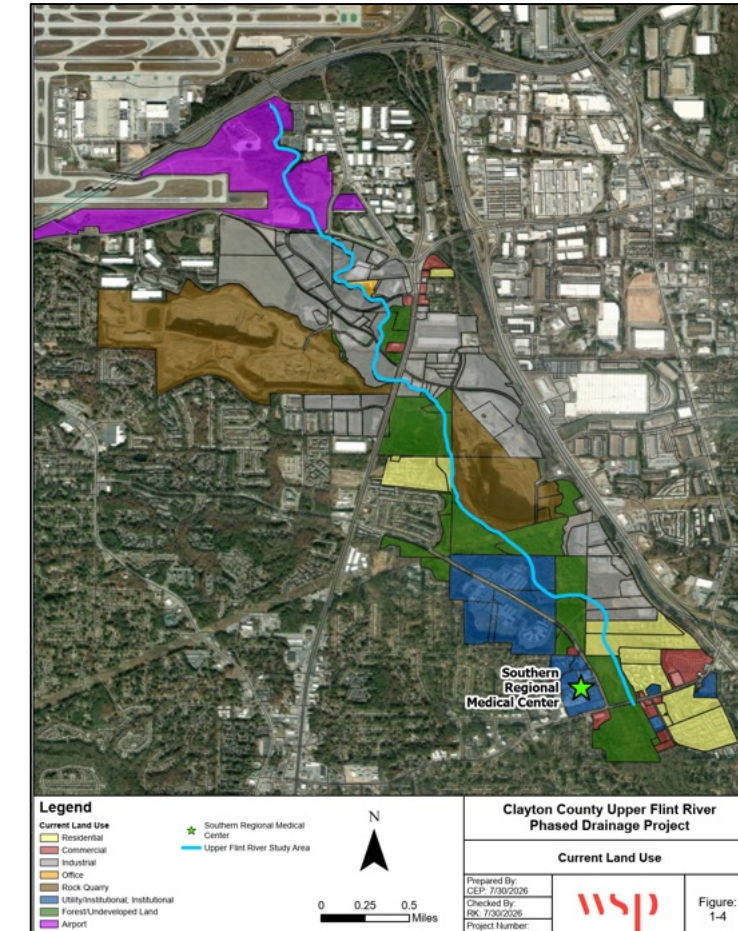
- Clayton County Office of Resilience
- Clayton County Water Authority
- National Wetlands Inventory
- National Agriculture Imagery Program
- Atlanta Regional Commission
- MARTA
- FEMA



Mapping and Analysis



These are just some of the maps and datasets that provided an understanding of watershed conditions and created a foundation for guiding future flood mitigation efforts



Mobile GIS and Field Data Collection



Custom GIS-Based Data Collection

- 360 imagery was used to make initial assessment of river conditions which was turned into point data in **ArcGIS Field Maps**
- The field team could see the original assessment of a bank cross section and add additional data
- Real-time QA/QC, offline sync, and auto-generated georeferenced photos, notes, and measurements.



Field map **before** fieldwork



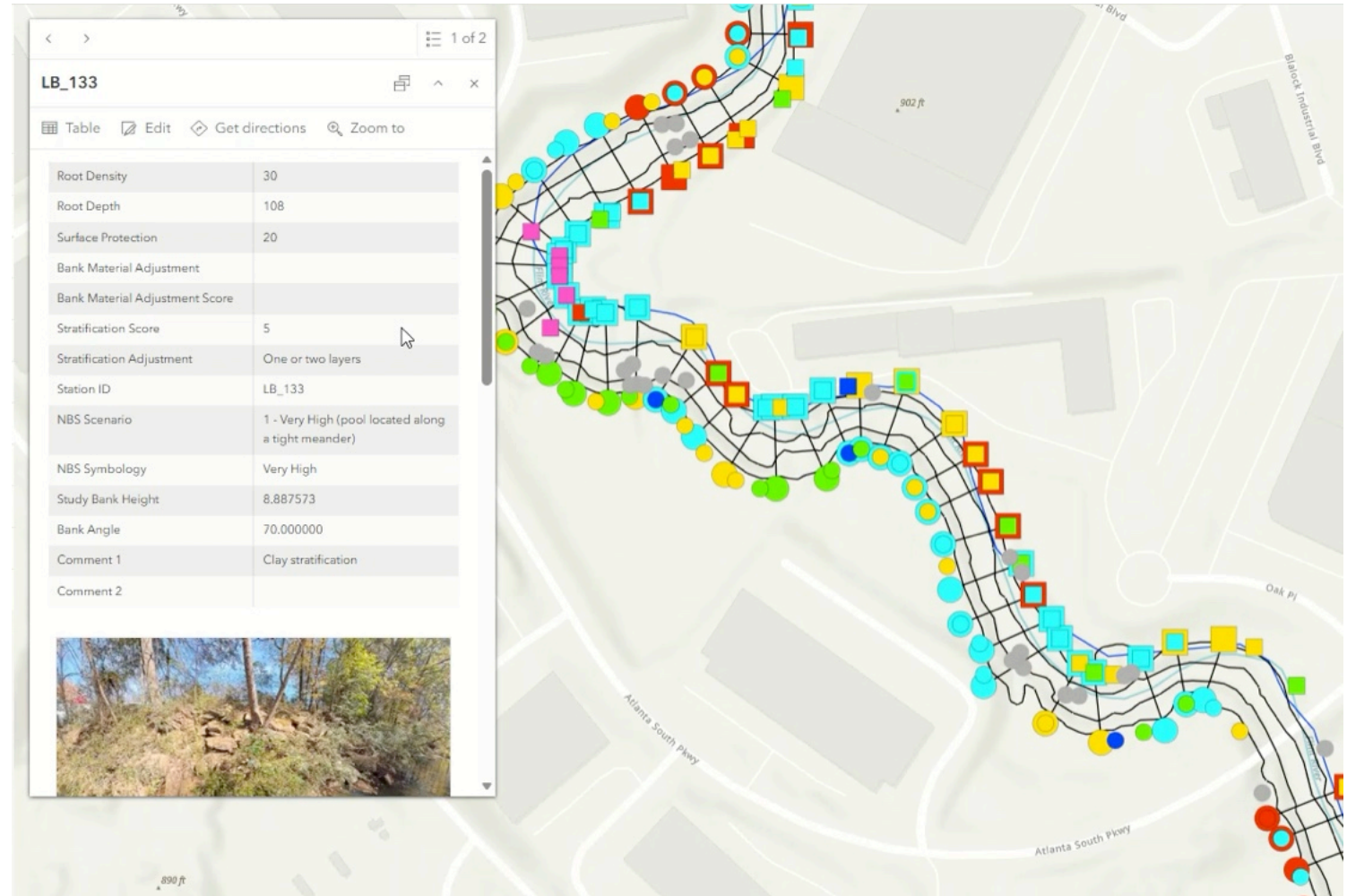
Field map **after** fieldwork

Field-view of the data collection tool

Mobile GIS and Field Data Collection



Real time georeferenced data capture!



Interactive Dashboard



The Bank Assessment for Non-point source Consequences of Sediment (BANCS) is a field-based approach to understand and predict streambank erosion rates and deposition. The following characteristics were measured or calculated for each segment of the streambank along the approximately 5 miles of the Upper Flint River. Erosion calculations use BEHI and NBS indices. Bank Erosion Hazard Index (BEHI) show how likely the bank is to erode based on its condition. Near-Bank Stress (NBS) is how strongly the water pushes against the bank.

Use the map to explore the streambank measurements along the Flint River and click on segments to examine the data in the table below the map.

Scroll to view definitions.

Bank and Soil Measurements Used for BEHI and Erosion Calculations

Study Bank Height (feet) - How tall the riverbank is, measured from the toe of the bank to the top
Root Depth (feet) - How deep plant roots go into the bank. Deep roots help hold dirt together and prevent it from washing away.

Root Density (%) - How root-filled the soil is along the stream bank.

Bank Angle (degree) - The steepness of the riverbank

Surface Protection (%) - The percentage of the bank that is covered by grass, rocks, or plants. Banks covered with these materials are more protected from the flow of water.

Length of Bank (feet) - How long this riverbank section is from upstream to downstream

Bankfull Height (feet) - The height of the water relative to its banks during a big but common

Near Bank Stress (NBS) Rating

- Extreme
- Very High
- High
- Moderate
- Low
- Crossing (Bridges, Pipes, etc.)
- Deposition
- Manmade Structure
- Tributary/Drainage Feature

Bank Erosion Hazard Index (BEHI) Rating

- Extreme
- Very High
- High
- Moderate
- Low
- Very Low
- Crossing (Bridges, Pipes, etc.)
- Deposition

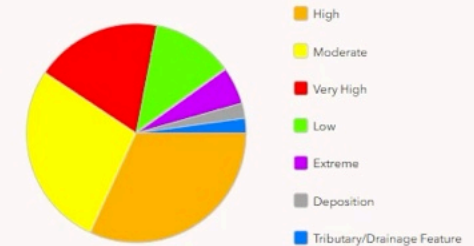


Location: RB_186

Bank and Soil Measurements

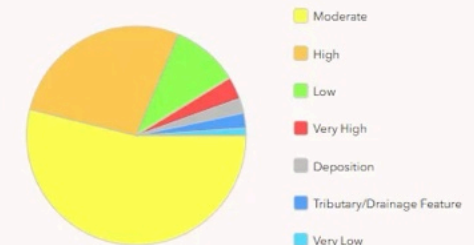
Study Bank Height (ft)	14.0
Root Depth (ft)	3.5
Bank Angle	

How high is the stress on the streambanks you're viewing?



The Near Bank Stress Index (NBS) rating shows how intensely the water hits the stream bank. This pie-chart shows how much stress is impacting the streambanks you're looking at in the map. Purple and red colors mean banks are experiencing stronger forces from flowing water which can increase erosion risk.

How unstable are the streambanks you're viewing?

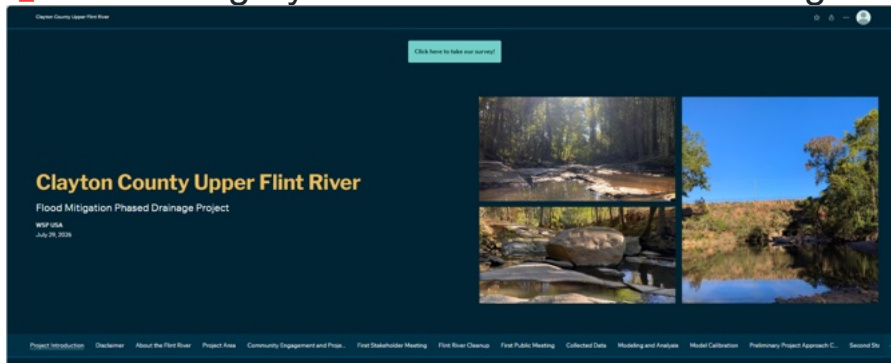


The Bank Erosion Hazard Index (BEHI) rating shows how likely a bank is to erode. This pie-chart shows how many streambank sections fall into each stability group. Purple and red colors mean weaker banks while blue and green show stronger banks that are less likely to erode.

ArcGIS StoryMap



- ArcGIS StoryMap serves as living, **interactive** public engagement hub - data, maps, videos, surveys
- Presentations from previous stakeholder/public meetings
- For modeling calibration, stakeholders can provide pictures, location, and any other historical documentation of flooding
- 360° imagery + BANCS results + modeling all embedded

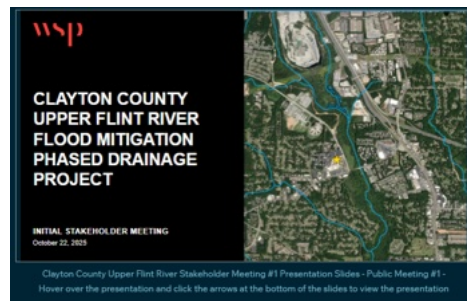
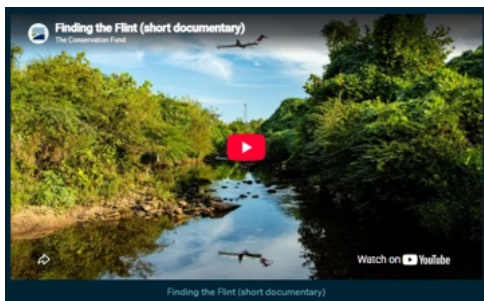


Upper Flint River Flooding Incidents

Use this form to describe the location and approximate water depth of flooding incidents that have occurred near Upper Riverdale Road. Please also attach any images you have of the event.

Flood Event Date
7/29/2026

Flood Event Severity
☐ Low ☐ Medium ☐ High
☐ Other



EXPLORE THE STORYMAP

Clayton County Upper Flint River StoryMap



Integrating Engineering and GIS



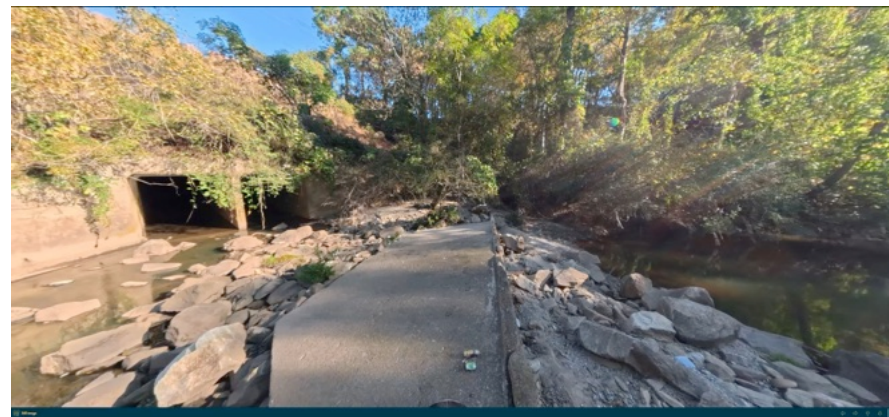
ArcGIS StoryMap

Transformed technical datasets into an interactive tool for identifying possible project areas

Supporting communication with:

- County Staff
- Elected officials
- Stakeholders from a variety of organizations (ARC, GEMA, GDOT, etc.)
- Community members

Engineering identified the causes of watershed challenges, **field work** documented actual conditions, and **GIS** brought everything together into a framework for **prioritizing** possible projects, **evaluating** alternatives, and **communicating** solutions.



Unprecedented Data Resolution



Field automation at rates far exceeding conventional standards

100%

of the corridor covered by 360° imagery
and BANCS-ready data

5×

faster field data collection vs. conventional
Methods

5×

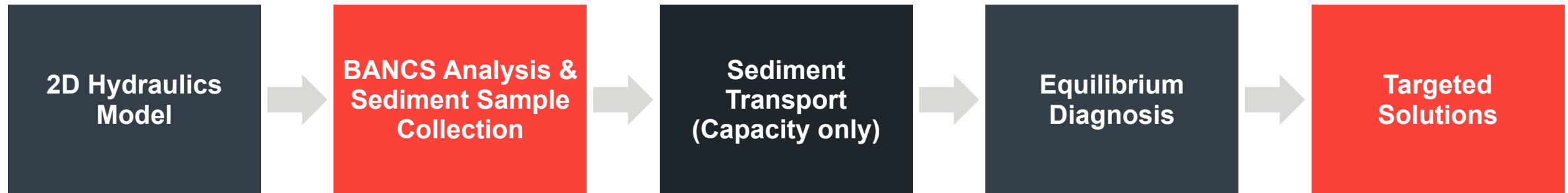
BANCS digital data post processing vs.
paper method

A dataset of unprecedented resolution for a watershed of this scale.

The Sediment Balance Approach



A workflow that links field, model, and mitigation decisions



Where does the system release sediment? Where does it accumulate? Where is it out of equilibrium?

→ **Answer these questions together, and mitigation becomes process-based, not symptom-based.**

Preliminary Project Concept

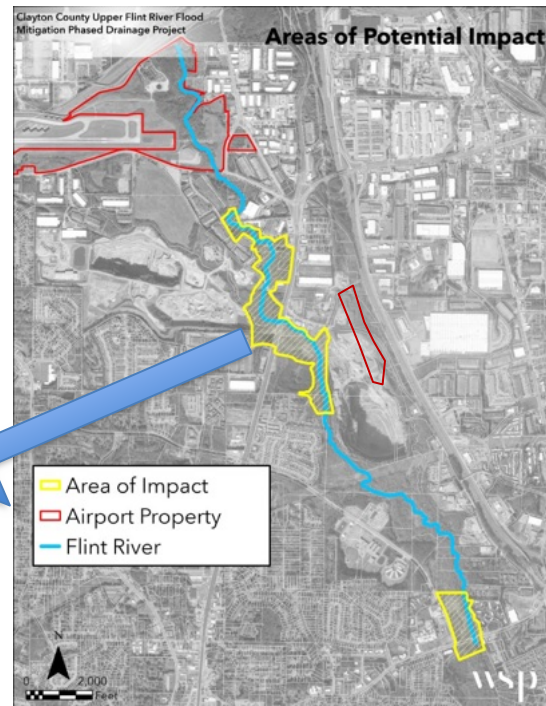
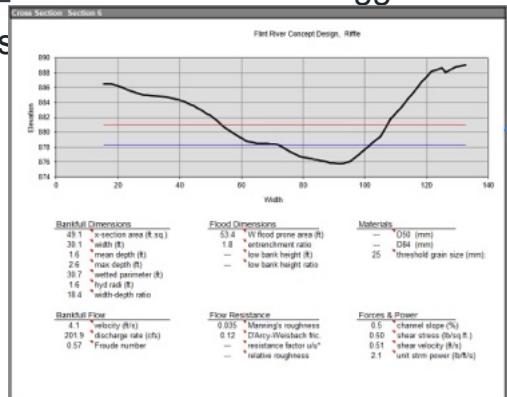


Two reaches, two strategies — one sediment balance

NORTHERN REACH | Forest Parkway → West of Quarry Streambank Restoration Focus

Highest bank instability; largest sediment source

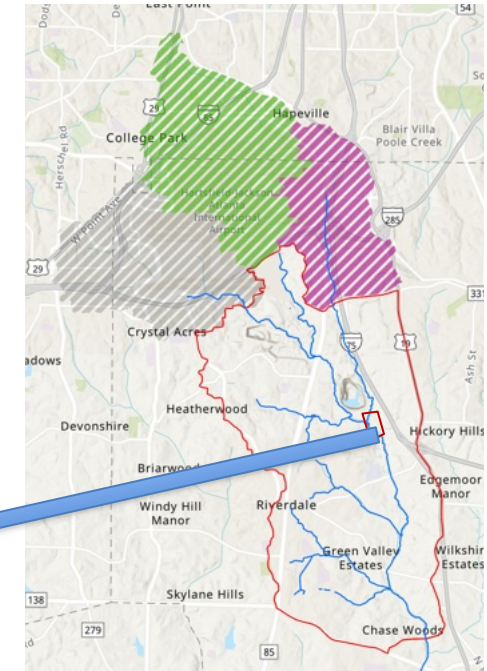
- Nature-based bank stabilization
- Reconnect narrow floodplain benches
- Reduce near-bank stress via geometry
- Prioritize BANCS-flagged



SOUTHERN REACH | Upper Riverdale Rd Flood Detention Enhancement Focus

Deposition + conveyance loss driving flooding

- Floodplain reactivation & storage
- Nature-based detention features
- Protect hospital access + roadway
- Address flood risk



PART 05

Planning, Funding, and Implementation

Planning, Funding, and Implementation



Clayton County partners with WSP on Hazard Mitigation Plan & Hazard Mitigation Grant Program

Planning:

Clayton County relied on the hazard mitigation plan to identify county-wide hazards – specifically flooding concerns along the Flint

Funding:

HMGP 4501 –Phase 1
allocated to Clayton County

HMGP

Implementation:

Strategic Pre-Planning with Stakeholders

Data Collection

Internal/External Collaboration

PART 06

Lessons Learned and Next Steps

Early and Often Stakeholder Engagement



Turning technical work into a public asset

- Three formal stakeholder meetings + one public meeting + multiple additional meetings
- Stakeholders: American Rivers, Finding the Flint, Flint Riverkeeper, ARC, GEMA, GDOT, HJAIA, CCWA, The Conservation Fund, MARTA, USACE, NOAA, SRMC, CCFD, etc.



First Stakeholder Meeting

October 22, 2025

Flint River Cleanup

October 31, 2025

First Public Meeting

December 9, 2025

Second Stakeholder Meeting

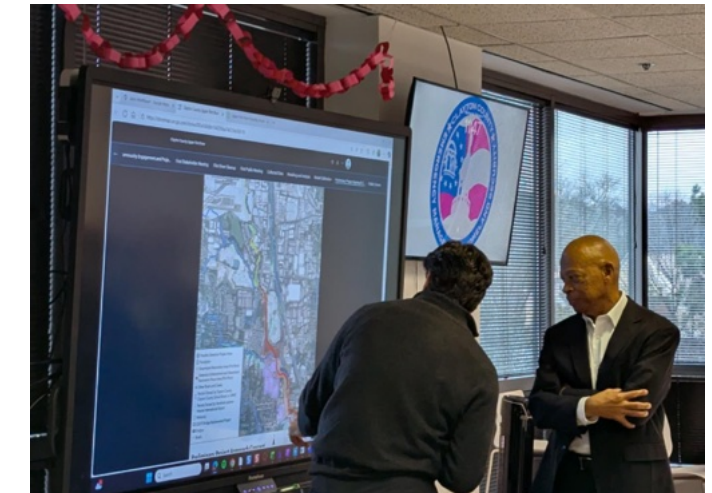
February 4, 2026

Third Stakeholder Meeting

May 28, 2026

Final Public Meeting

TBD



Key Lessons for Planners



What makes this approach different — and transferable

01 Rehal

Watershed-wide thinking is critical

02 Claire

GIS supports data-driven planning and decision-making

StoryMaps are useful tools for communication and collaboration with stakeholders

03 Kennedy

County resilience and mitigation planning

Holistic approach

Pre-planning/stakeholder engagement

04 Lee

Multi-agency engagement is critical for complex projects

Collaboration of planning, emergency management, environmental, and engineering

What's Next



- 1 Continued stakeholder engagement
- 2 Final public meeting
- 3 Finalize design
- 4 Finalize permitting
- 5 Construction phase
- 6 Additional projects and long-term monitoring





Thank you.

Questions?

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