



Flood Study Coordination for City of Princeton

May 16, 2023



FEMA

Agenda

- ▶ **Project Overview**

- ▶ **Brush Creek Watershed Hydrologic Analysis**
 - FEMA – City of Princeton – Mercer County coordination on hydrologic features
 - Dam outflows

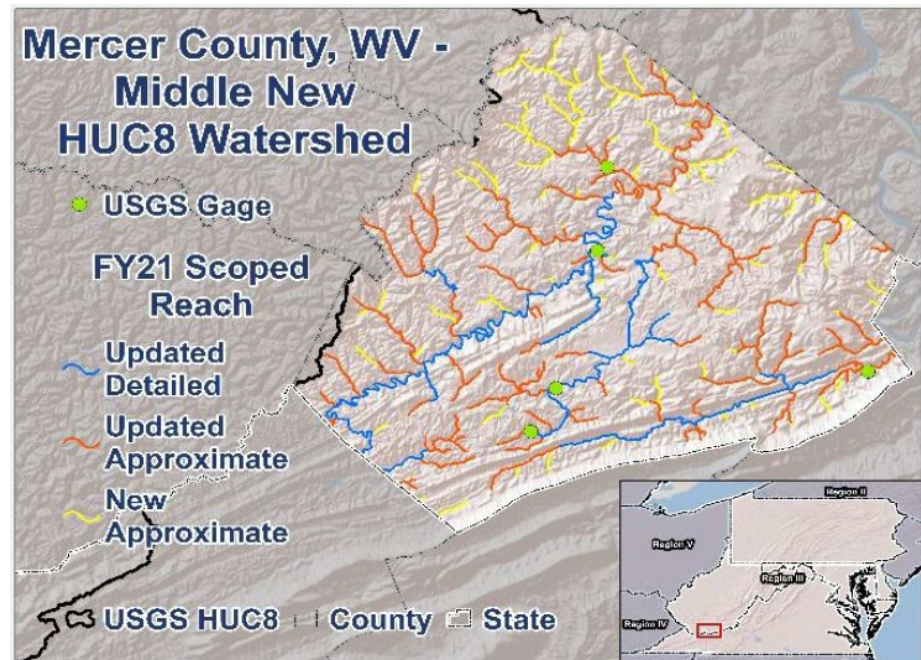
- ▶ **2D Hydraulic Analysis**
 - FEMA – City of Princeton – Mercer County coordination on hydraulic features
 - Mesh development
 - Flow routing through 2D terrain

Project Overview

Mercer County, WV

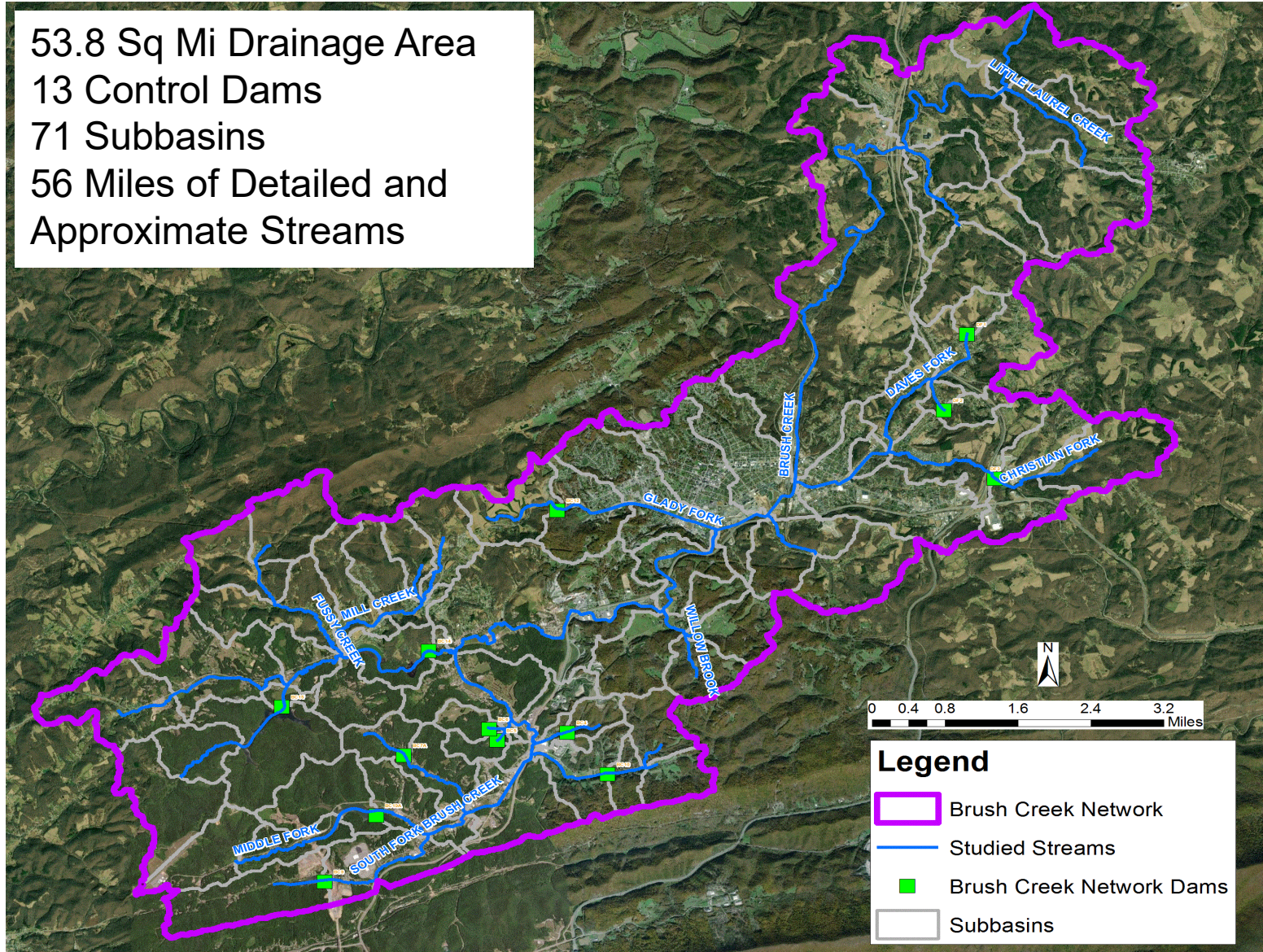
► Overall Study Scope

- 98 miles Zone AE
- 273 miles Zone A



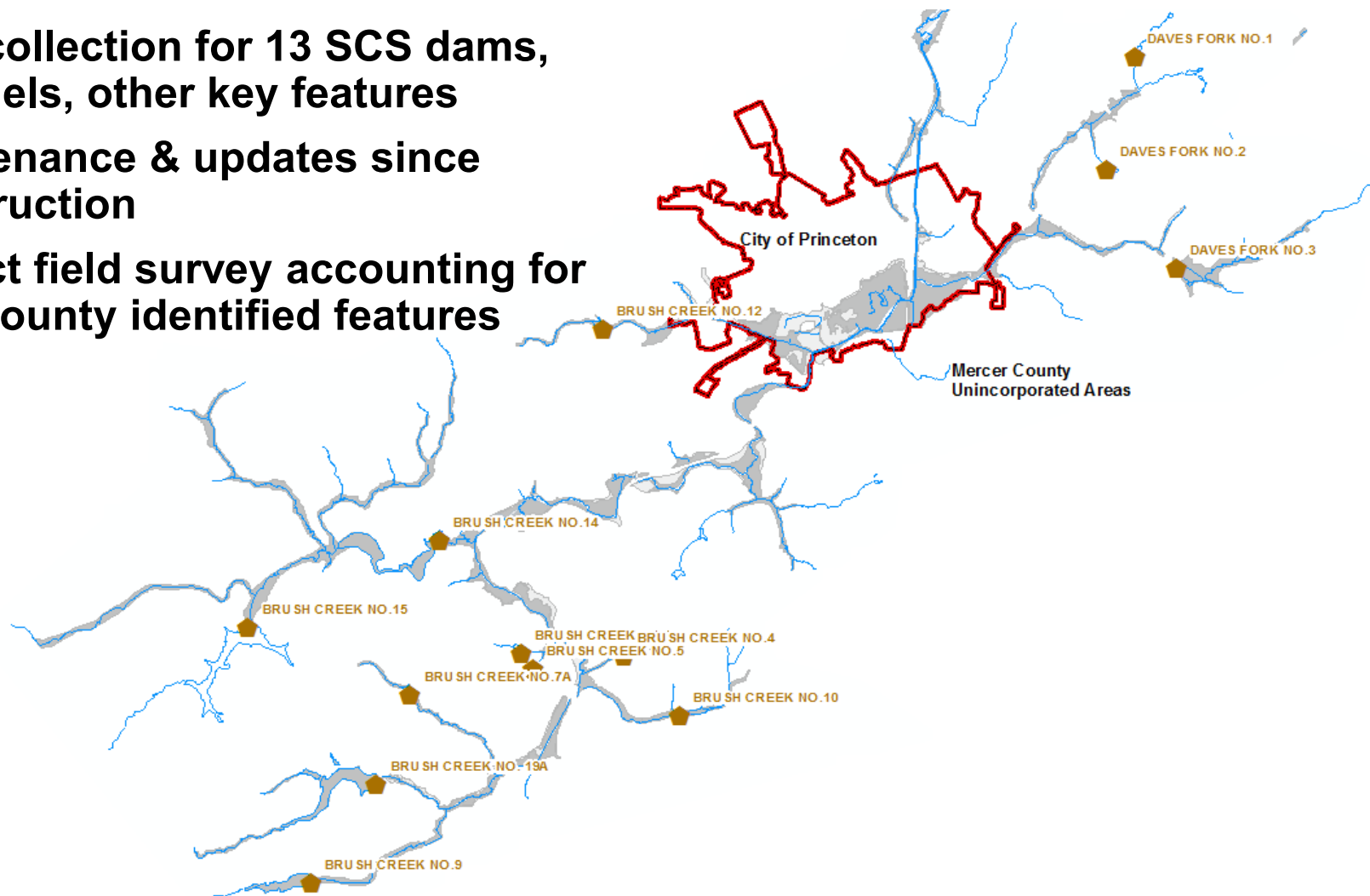
Brush Creek Watershed

53.8 Sq Mi Drainage Area
13 Control Dams
71 Subbasins
56 Miles of Detailed and
Approximate Streams



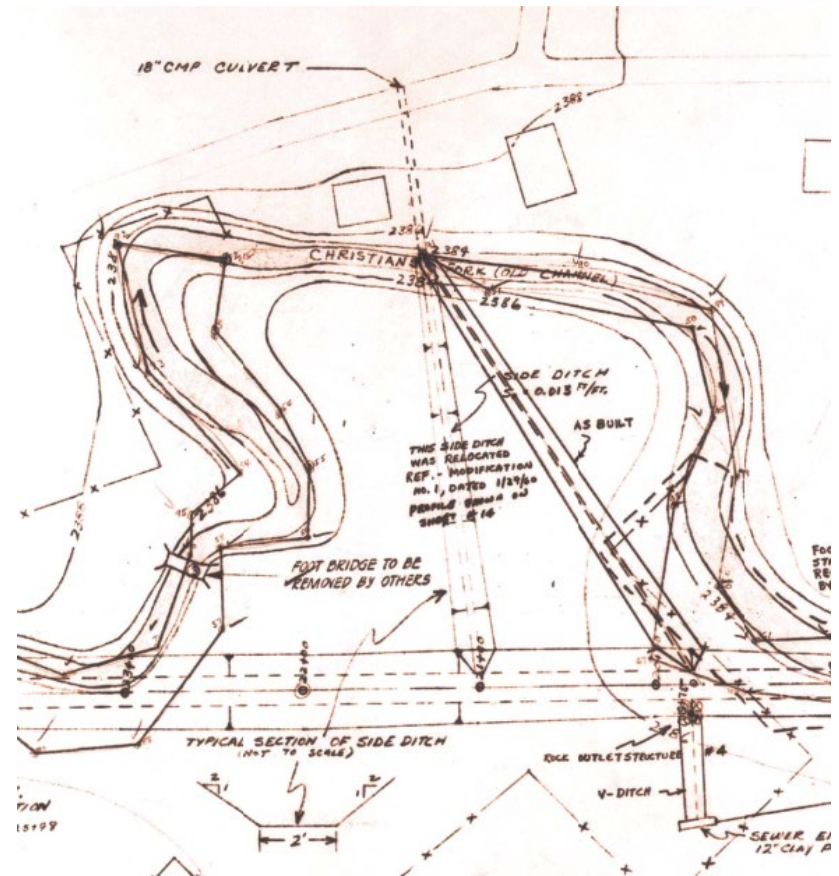
FEMA - City of Princeton – Mercer County Coordination

- ▶ **Data collection for 13 SCS dams, channels, other key features**
- ▶ **Maintenance & updates since construction**
- ▶ **Project field survey accounting for City/County identified features**



Continued Study Coordination

- ▶ **Initiation of study**
 - Detailed data coordination
 - Scope updates
- ▶ **Continued on monthly basis for**
 - Check-ins through hydrology
 - Coordination on updates to 2D



Data Used for Developing the Hydrologic Model

▶ Dams Data

- Data from City of Princeton – key for details of primary spillways
- 2022 field survey to capture any changes

▶ Channelized reach field surveyed data

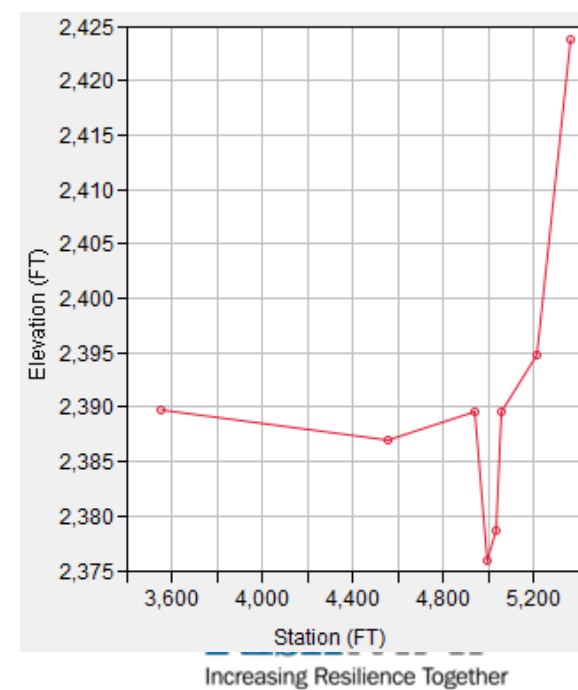
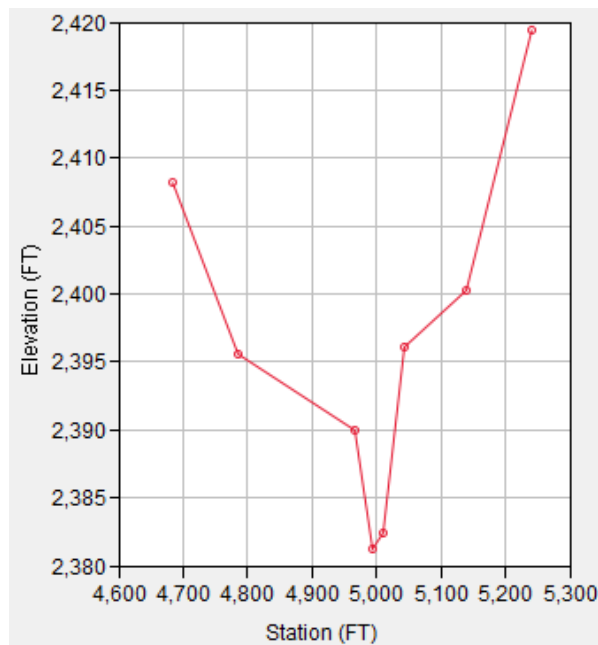
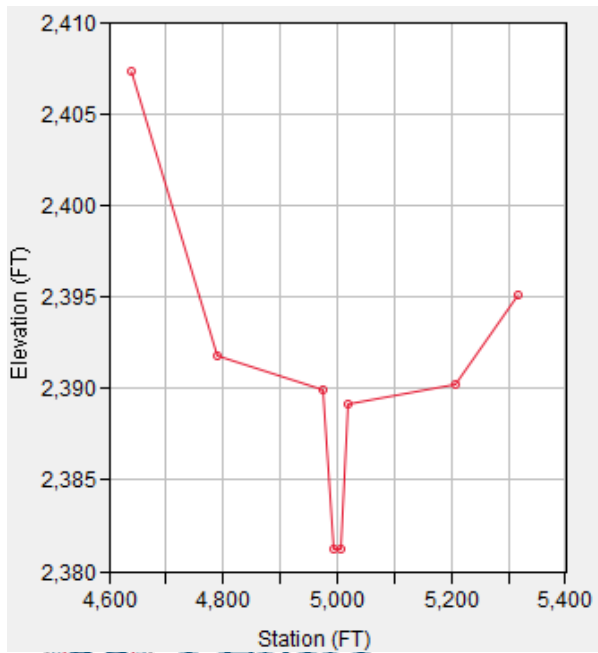
- Project data from City of Princeton coordination
- 2022 field survey



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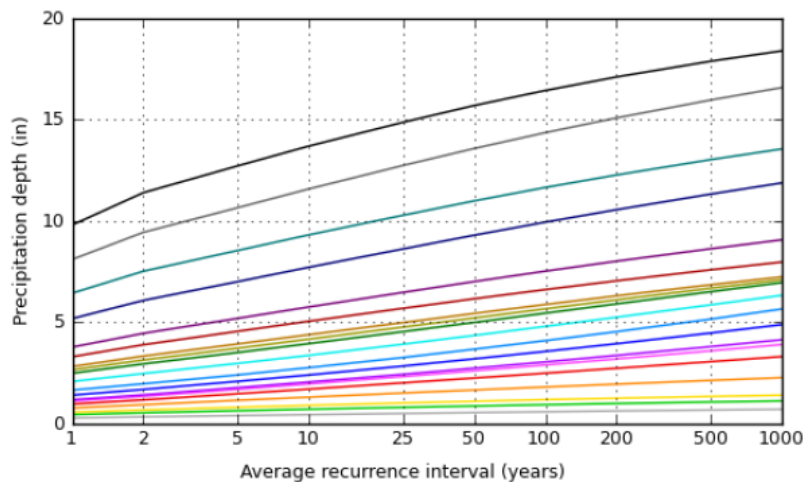
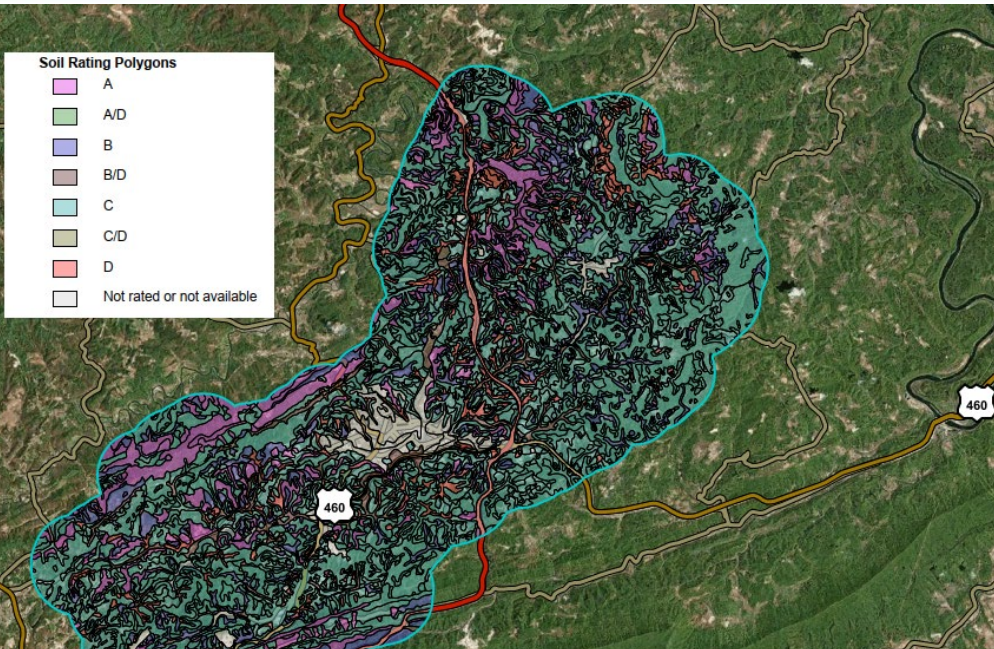
Routing with field surveyed data

- ▶ **Field survey locations at channelized reaches and key features identified in coordination with City of Princeton.**
- ▶ **Accounts for stream improvement and channelization projects**

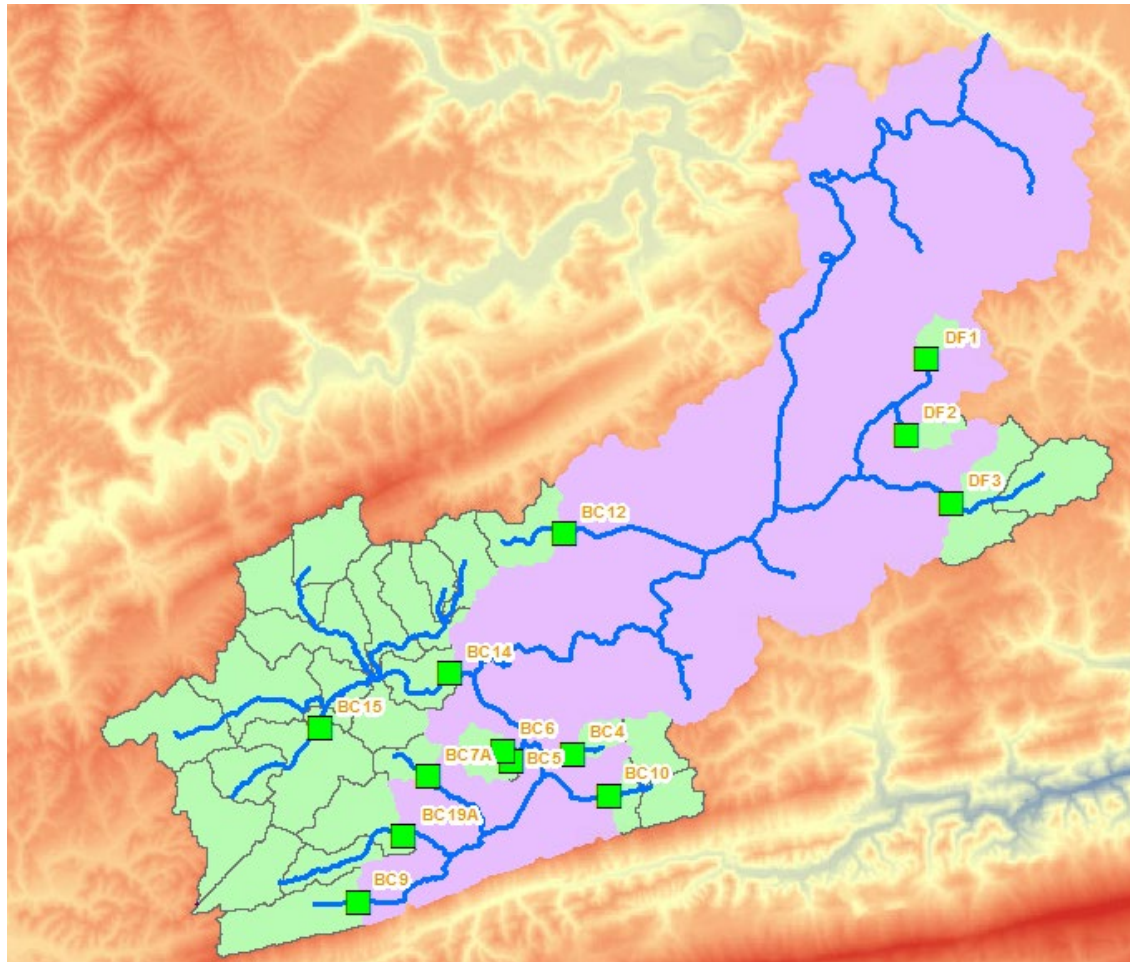


Data Used for Developing the Hydrologic Model

- ▶ Precipitation Data
- ▶ Soil Data
- ▶ Land Cover Data



Updated 2D flow routing approach



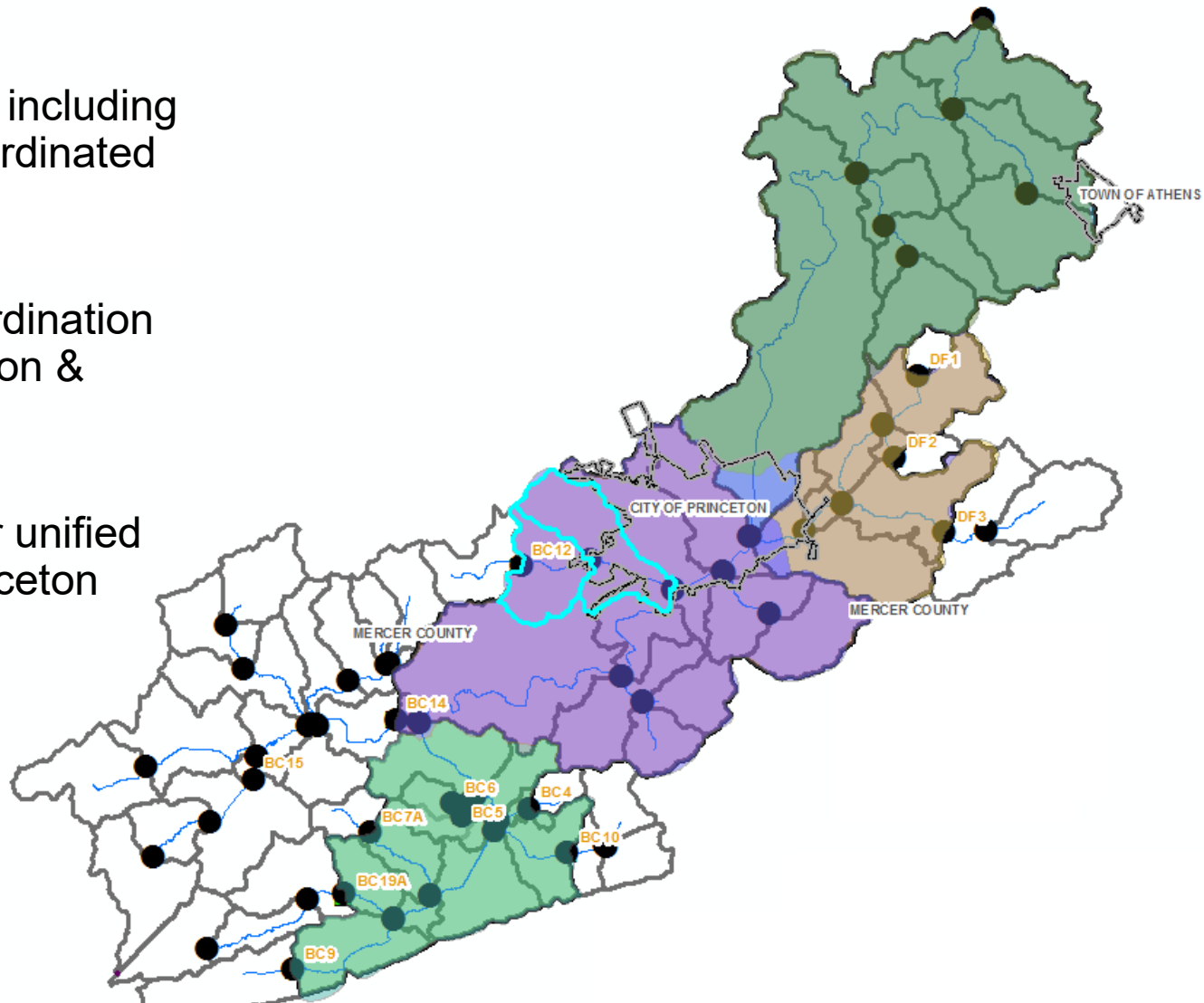
- The portion of the drainage area regulated by dams is ~19 sq mi, about 35% of total network
- Leverage the completed reduced dam outflows from hydrologic analysis
- Better reflection of flow timing from detailed flood mitigation project information from City of Princeton



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Considerations for 2D Model Boundaries

- Channel networks, including scope updates coordinated with City/County
- Features from coordination with City of Princeton & Mercer County
- Corporate limits for unified area in City of Princeton



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Model Mesh

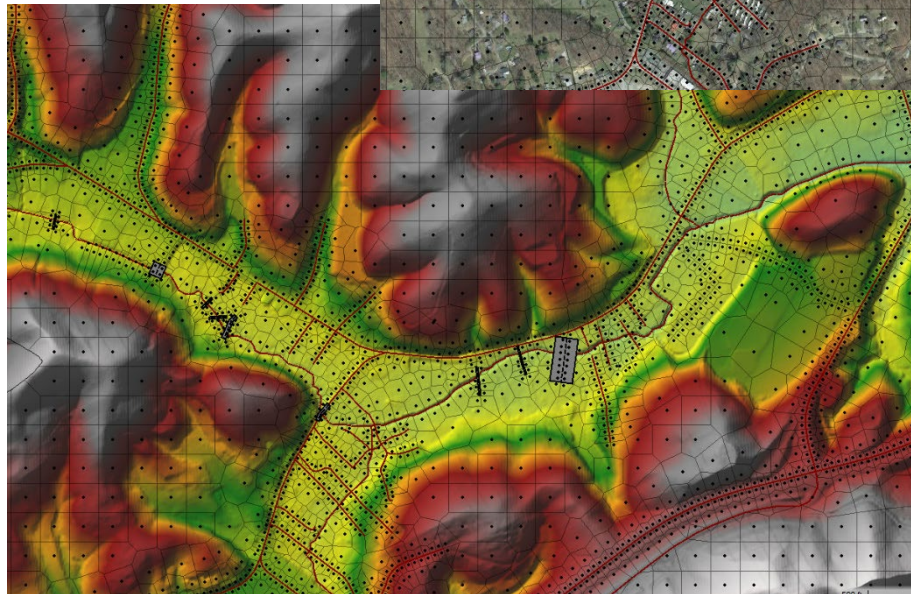
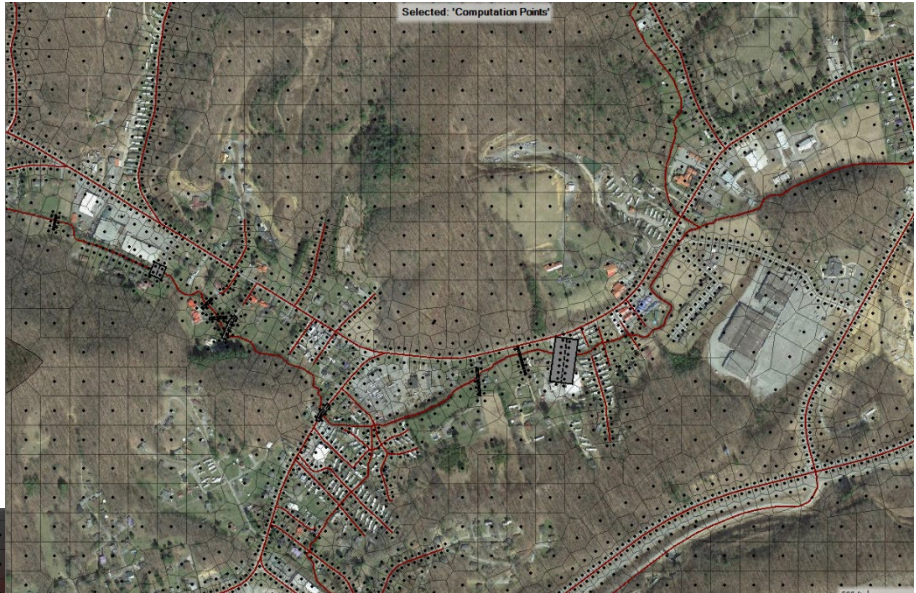
▶ Core of 2D model

- Can be leveraged for future needs

▶ Breaklines – *key for hydraulic features from City coordination*

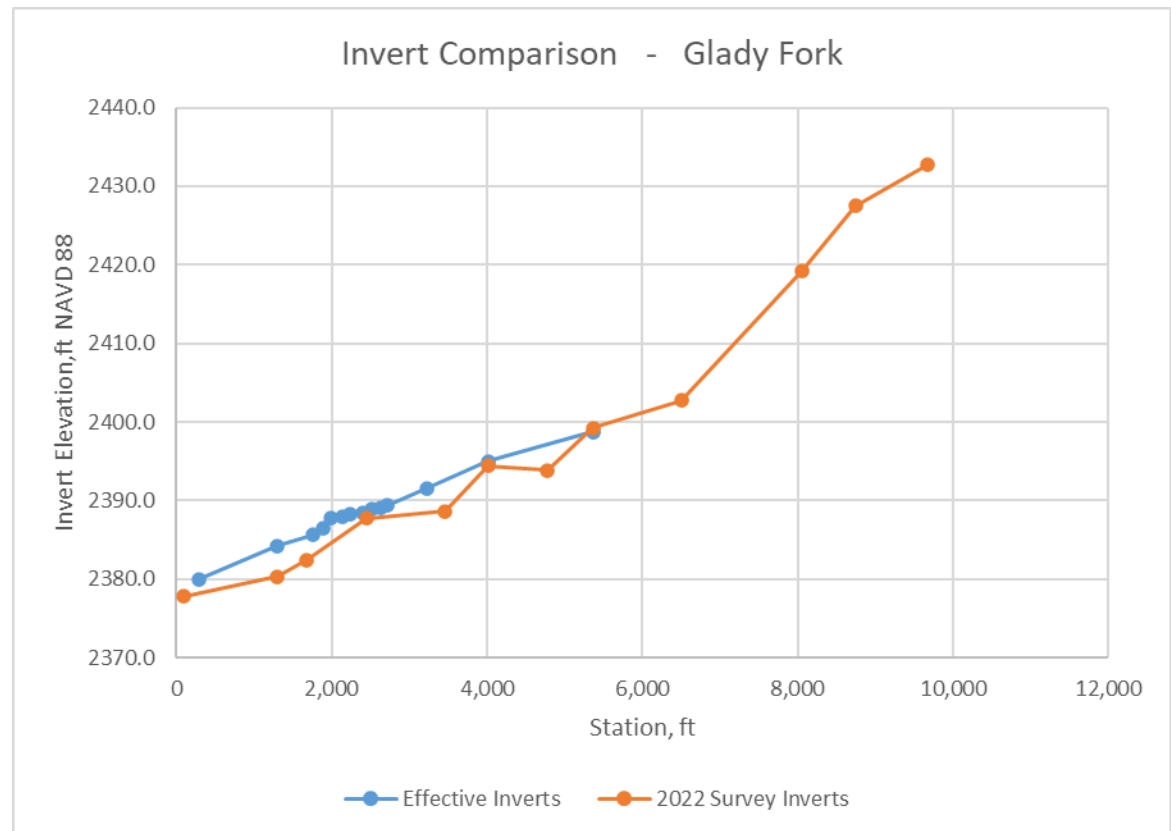
- Channels
- Roads
- Embankments
- High variability areas

▶ Mesh with variable cell size



Invert Comparison for Channel Routing

- ▶ **City identified dredging & other channel flood mitigation project work for some reaches**



Glady Fork Sub-watershed Run

- ▶ Initial modeling with 2D better capture of detailed channelization
- ▶ Routing/timing of flows moving down the channels
- ▶ Average flow reduction of 20-30%

RAS 2D Location	HEC HMS Location	DA	Peak Flow_HMS	Peak Flow_RAS	Diff	Volume_HMS	Volume_RAS	Diff
Outfall	Junction -23	6.8	3093	2145	-31%	743	542	-27%
Reference line 1	Junction -22	5.3	2282	1475	-35%	495	314	-37%
Reference line 2	Junction -21	2.1	1596	990	-38%	264	179.2	-32%
Reference line 3	Junction -18	3.1	903	730	-19%	208	133.45	-36%
GF DS	Junction -29	2.7	1585	1023	-35%	278	246	-12%
GF US	Junction -28	1.5	644	541	-16%	102	101	-1%

Contact Information

▶ **Mike Seering**

Compass/AECOM, Project Manager

240-520-8881

mike.seering@aecom.com