FEMA Region 3

Flood Risk Review Meeting

Cabell County

June 5, 2025

FEMA

Agenda

1. Welcome and Introductions
2. Where We Are - Draft Maps
3. Flood Study Update
4. Using Flood Risk Data to Reduce Risk
5. Floodplain Management
6. Discussion

FEMA

Introductions

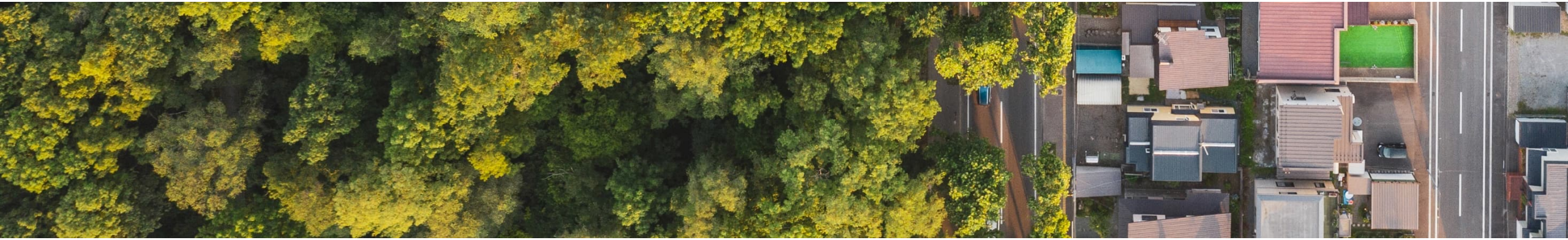
Please Introduce Yourself

- Name
- Position
- Organization

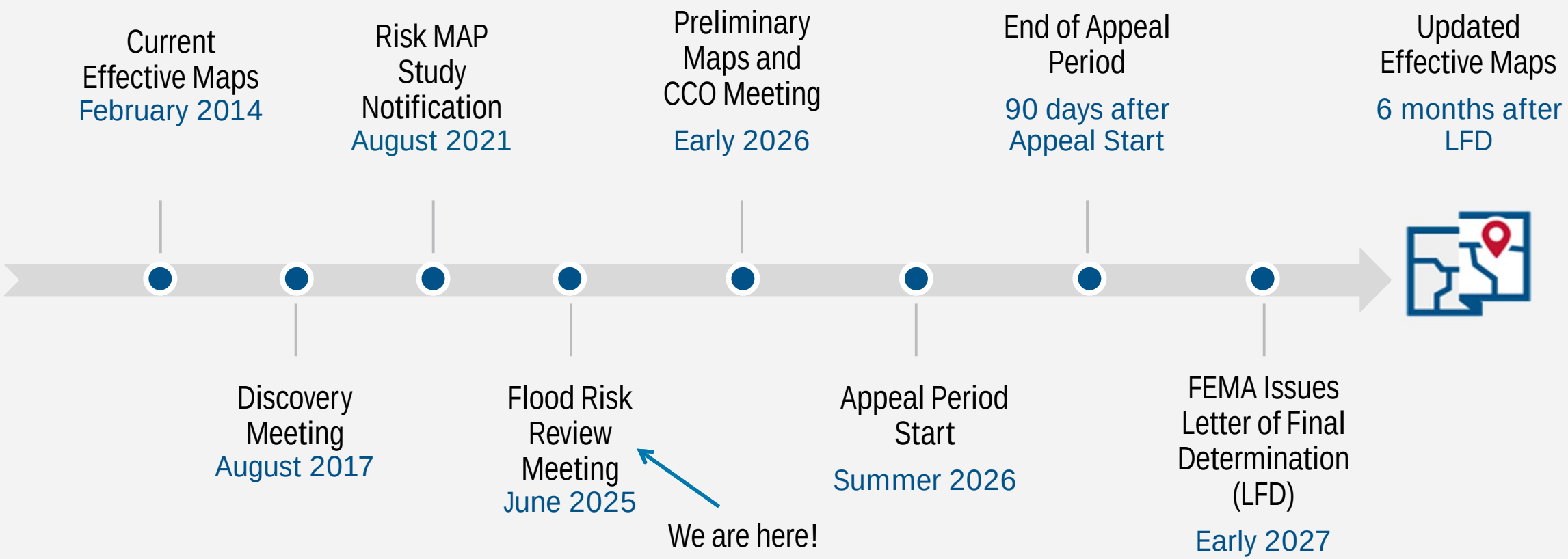
Where We Are – Draft Maps

3 Reasons We Are Here Today

- To preview and discuss the draft floodplain mapping that will update the Flood Insurance Study (FIS) report and Flood Insurance Rate Map (FIRM) for **Cabell County, West Virginia**
- To examine the new study areas, discuss how the analysis and mapping have changed since the previous FIRM, and discuss current and future implications for these changes
- To present a timeline of next steps



Timeline

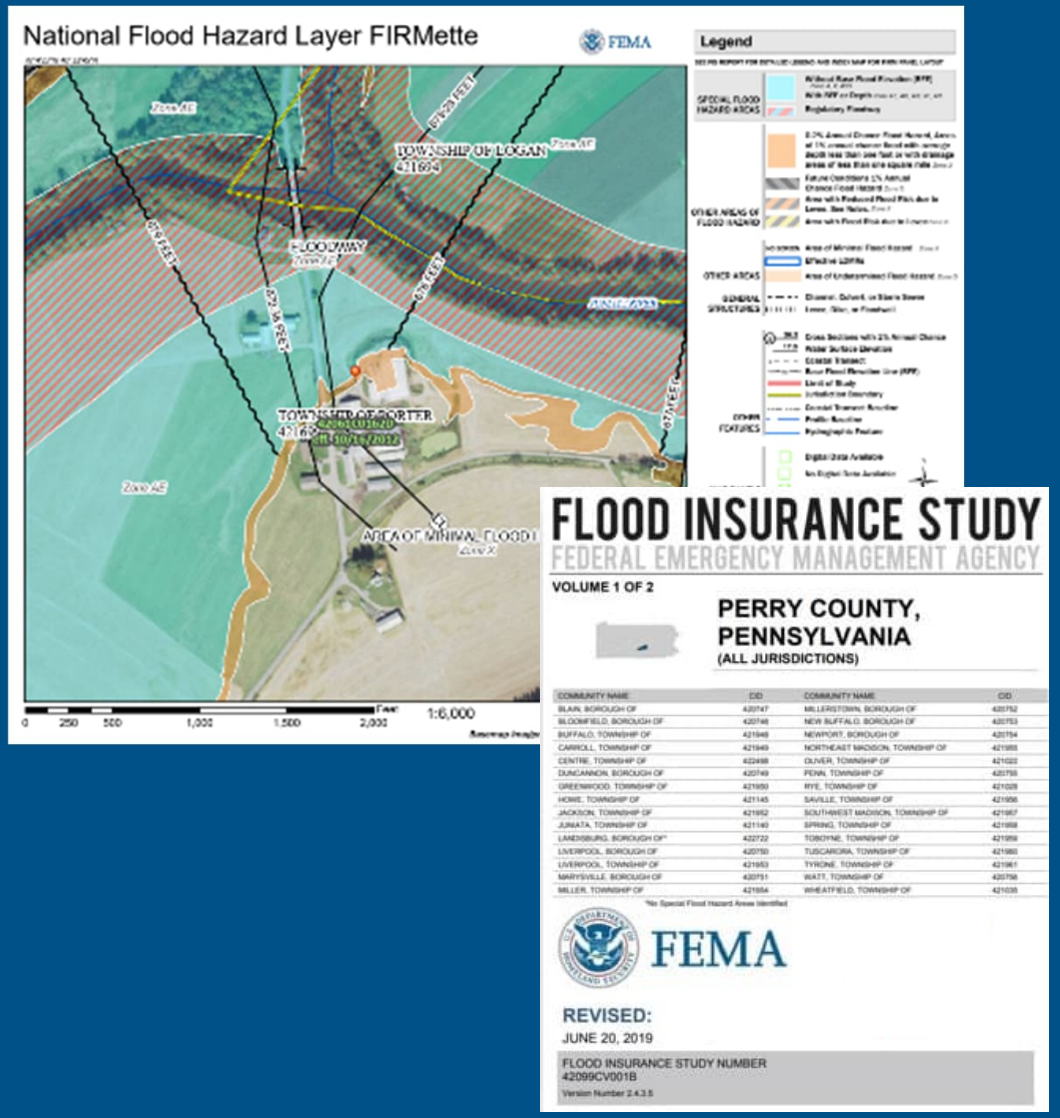

Current Effective Maps
February 2014
Risk MAP Study Notification
August 2021
Preliminary Maps and CCO Meeting
Early 2026
End of Appeal Period
90 days after Appeal Start
Updated Effective Maps
6 months after LFD
Discovery Meeting
August 2017
Flood Risk Review Meeting
June 2025
We are here!
Appeal Period Start
Summer 2026
FEMA Issues Letter of Final Determination (LFD)
Early 2027

Flood Study Update

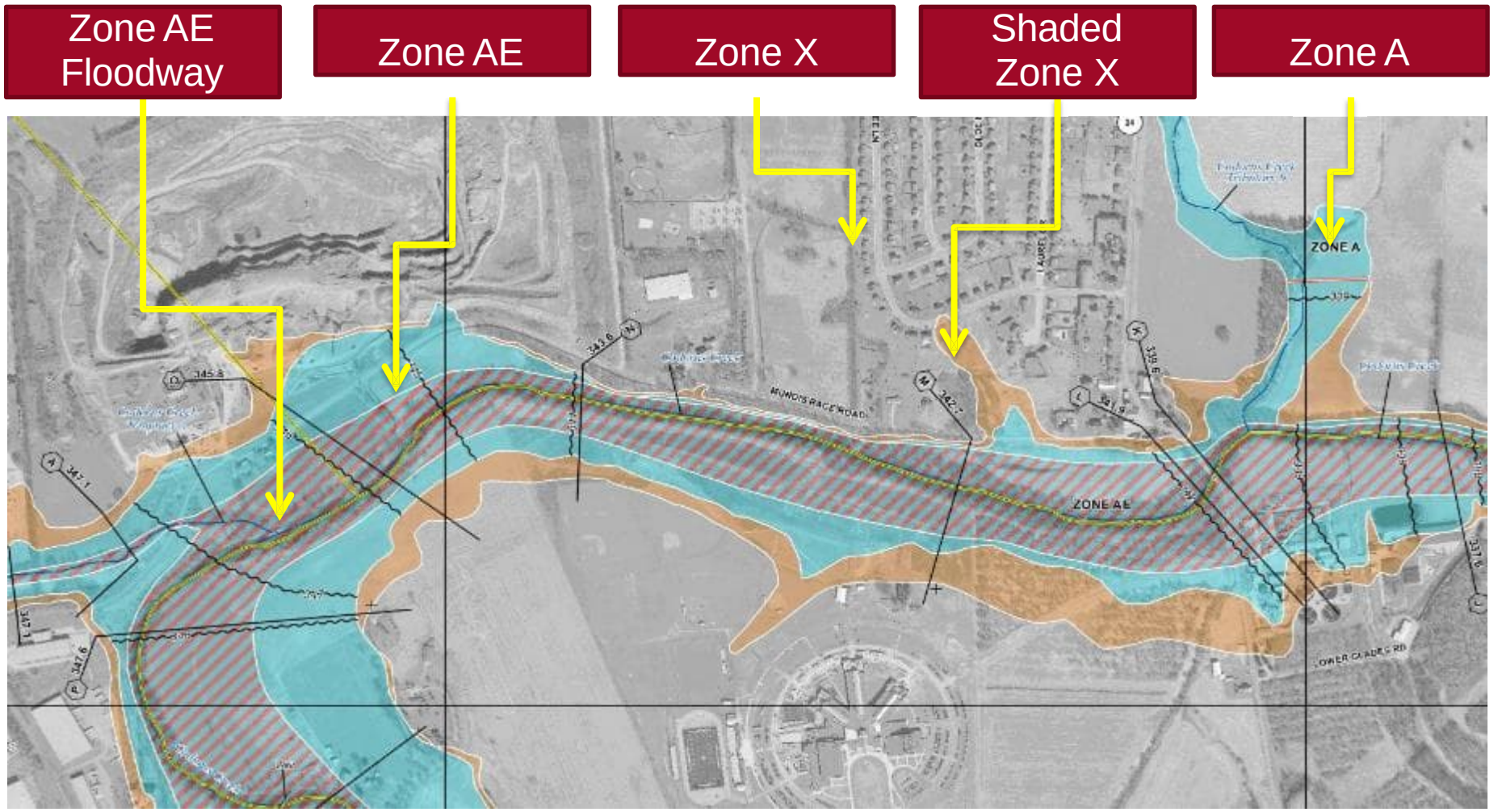
Flood Insurance Rate Maps and Studies

Key Terms:

- Flood Insurance Rate Map (FIRM)
- Flood Insurance Study (FIS) Report
- Special Flood Hazard Area (SFHA)
- Flood Zone
- Base Flood Elevation (BFE)
- Regulatory Floodway
- Cross Section



Typical FIRM Panel and Flood Zones



Floodplain Map Overview

HIGH RISK
(Special Flood Hazard Area)

Regulatory Floodway

ZONE AE

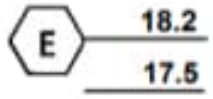
1%-Annual-Chance Flood Hazard Area **with BFEs**

ZONE A

1%-Annual-Chance Flood Hazard Area **without published BFEs**

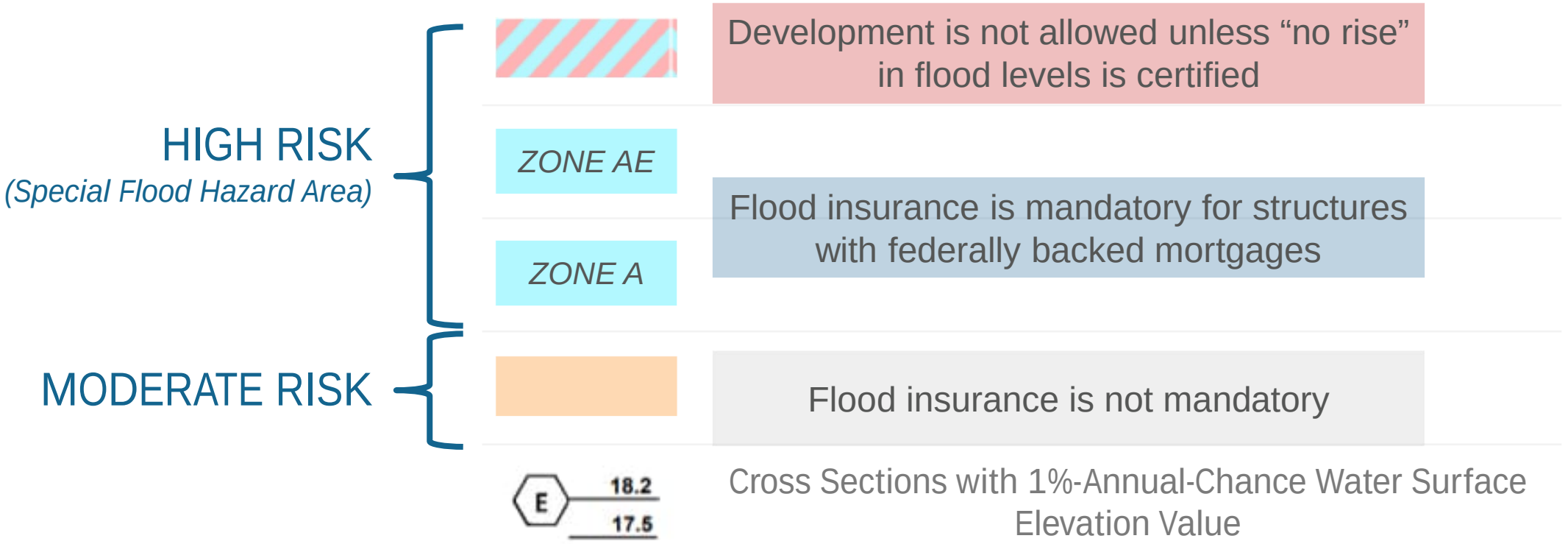
MODERATE RISK

0.2%-Annual-Chance Flood Hazard Area



Cross Sections with 1%-Annual-Chance Water Surface Elevation Value

Floodplain Map Overview



FEMA

Study Overview

Revised Modeling and Mapping, including:

- Updated GIS-based regulatory products, including:
  - Updated FIRMs / GIS database / FIS report formats based on new FEMA guidelines and specifications
- Used high-resolution topographic data (for modeling and mapping)
- Detailed “Zone AE” Studies – 90 miles
- Model-backed Approximate “Zone A” Studies – 168 miles
- 2D analysis for Fourpole Creek (City of Huntington & Cabell County)
- Mud River LOMR (City of Milton & Cabell County)

Study Overview (continued)

Revised Modeling and Mapping, including:

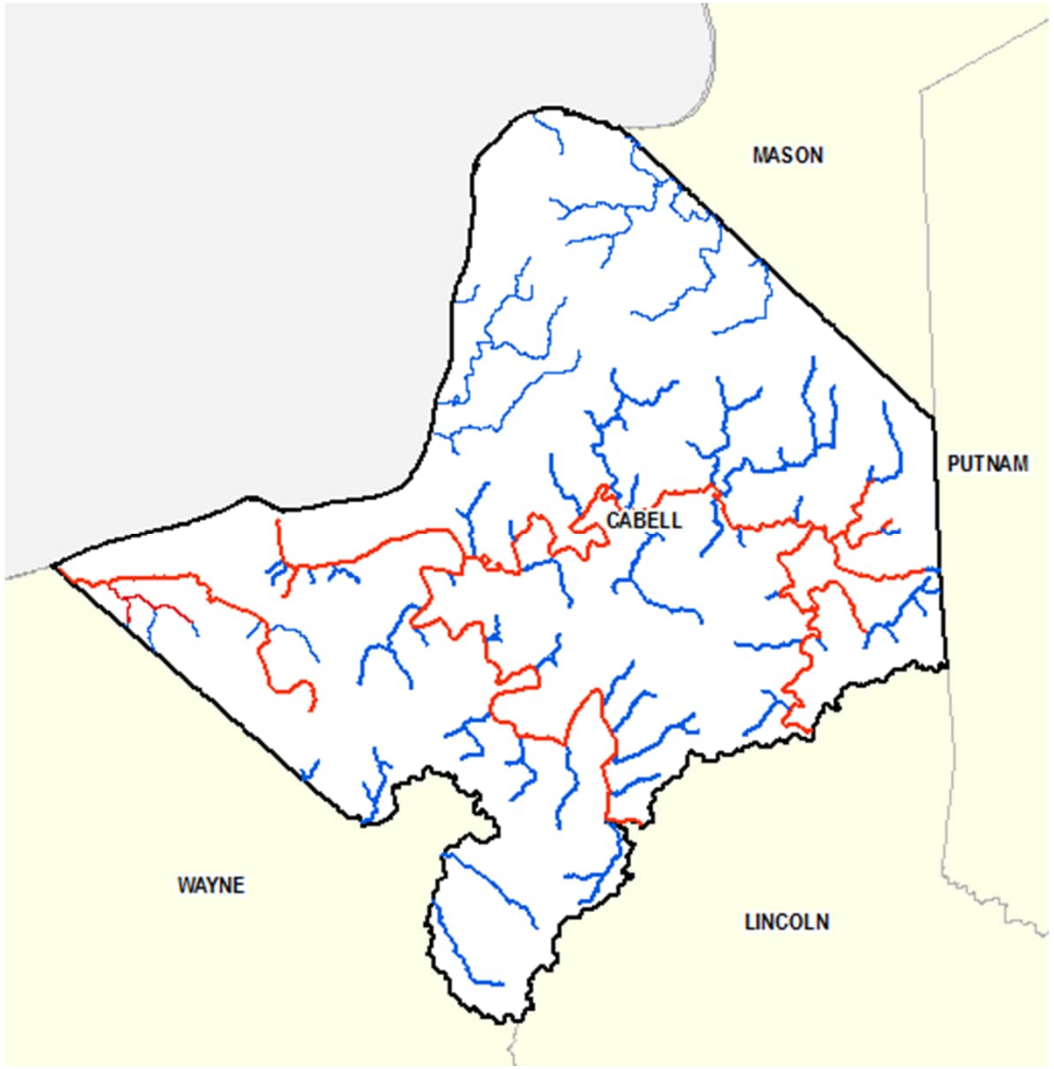
- ❑ Evaluation of Letters of Map Change (LOMCs)
  - – Case-by-case results shown in a Summary of Map Actions (SOMA) that is sent to applicable communities with Preliminary Maps and Letters of Final Determination (LFDs)
  - – Letters of Map Revision (LOMRs)
  - – Letters of Map Amendment (LOMAs) – including rectified LOMA locations on the WV Flood Tool
- ❑ Production of associated non-regulatory flood risk

Study Area

The Project Area

Legend

- Zone AE
- Zone A
- WV County Boundaries
- Cabell County
- West Virginia
- Ohio



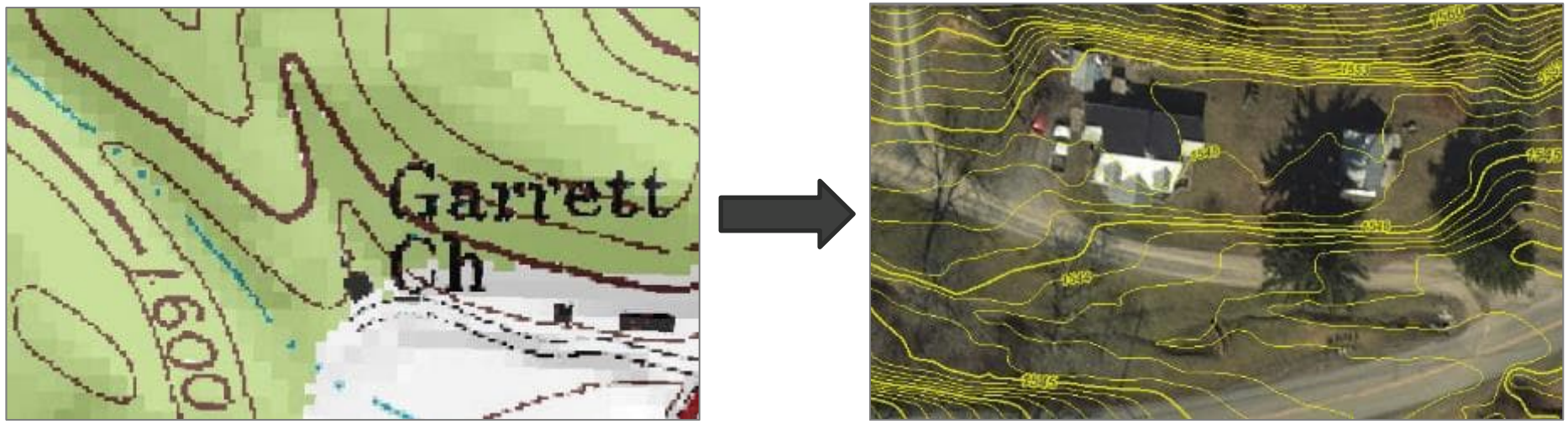
FEMA

Topographic Data

2017-2020 LiDAR-Based Digital Elevation Model

LiDAR = Light Detection and Ranging

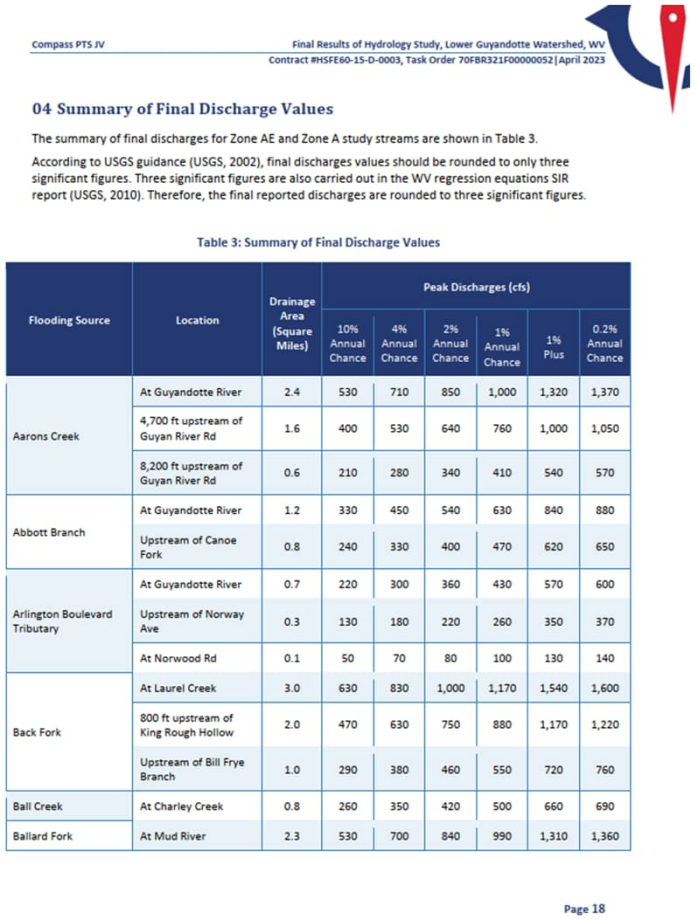
- *Uses light pulses and GPS to survey elevation data*
- *Improves the level of detail for hydraulic modeling and floodplain delineation*



Hydrologic Analyses

- Hydrologic study methods included:
  - USGS Regression Equations
  - Regression Equations Supplemented with USGS Gage Analysis (Bulletin 17C)
  - Rainfall Runoff (Mud River at Dam 2A)
  - Rain-on-grid for 2D analysis (Fourpole Creek, Krouts Creek)
- A comprehensive **Hydrology Report** details the study methods for each reach and compares the effective and proposed discharges.
- The hydrologic study methods will also be published in the FIS Report.

Sample page from the Risk MAP Hydrology Report



04 Summary of Final Discharge Values

The summary of final discharges for Zone AE and Zone A study streams are shown in Table 3.

According to USGS guidance (USGS, 2002), final discharges values should be rounded to only three significant figures. Three significant figures are also carried out in the WV regression equations SIR report (USGS, 2010). Therefore, the final reported discharges are rounded to three significant figures.

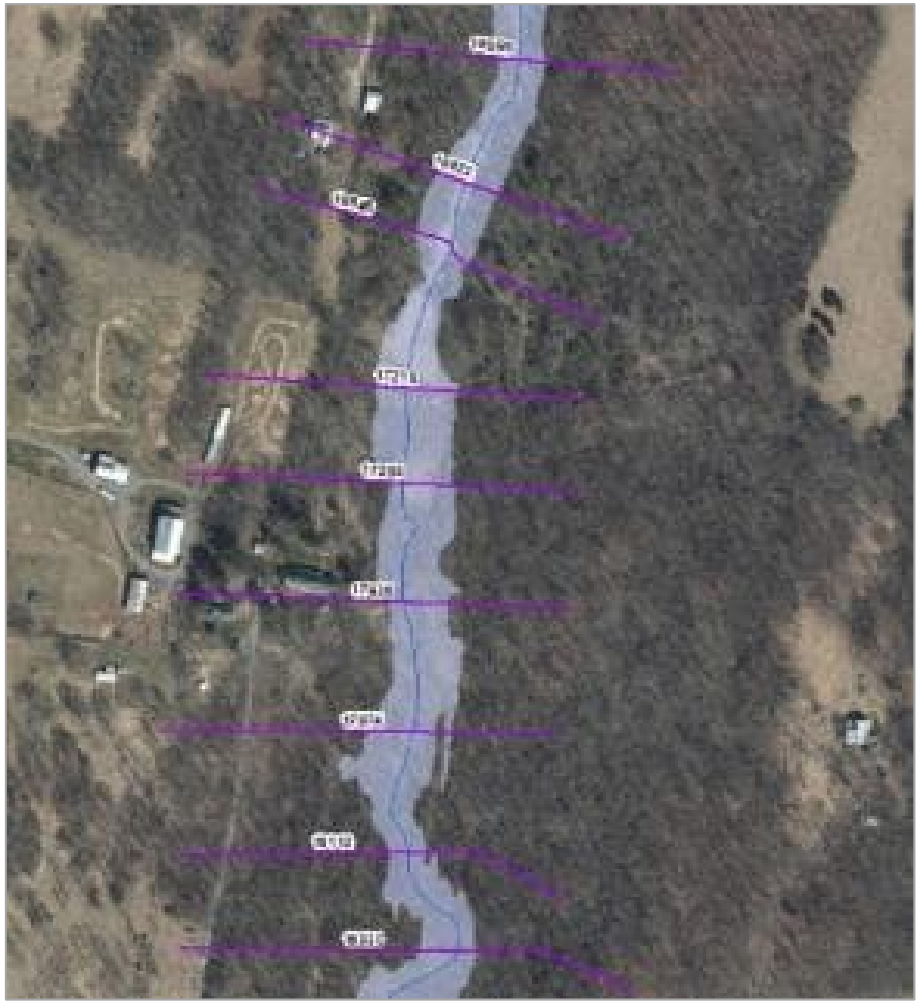
Table 3: Summary of Final Discharge Values

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharges (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	1% Plus	0.2% Annual Chance
Aarons Creek	At Guyandotte River	2.4	530	710	850	1,000	1,320	1,370
	4,700 ft upstream of Guyan River Rd	1.6	400	530	640	760	1,000	1,050
	8,200 ft upstream of Guyan River Rd	0.6	210	280	340	410	540	570
Abbott Branch	At Guyandotte River	1.2	330	450	540	630	840	880
	Upstream of Canoe Fork	0.8	240	330	400	470	620	650
Arlington Boulevard Tributary	At Guyandotte River	0.7	220	300	360	430	570	600
	Upstream of Norway Ave	0.3	130	180	220	260	350	370
	At Norwood Rd	0.1	50	70	80	100	130	140
Back Fork	At Laurel Creek	3.0	630	830	1,000	1,170	1,540	1,600
	800 ft upstream of King Rough Hollow	2.0	470	630	750	880	1,170	1,220
	Upstream of Bill Frye Branch	1.0	290	380	460	550	720	760
Ball Creek	At Charley Creek	0.8	260	350	420	500	660	690
Ballard Fork	At Mud River	2.3	530	700	840	990	1,310	1,360

Hydraulic Analyses – Zone A

Approximate "Zone A" Base Level Study (168 miles)

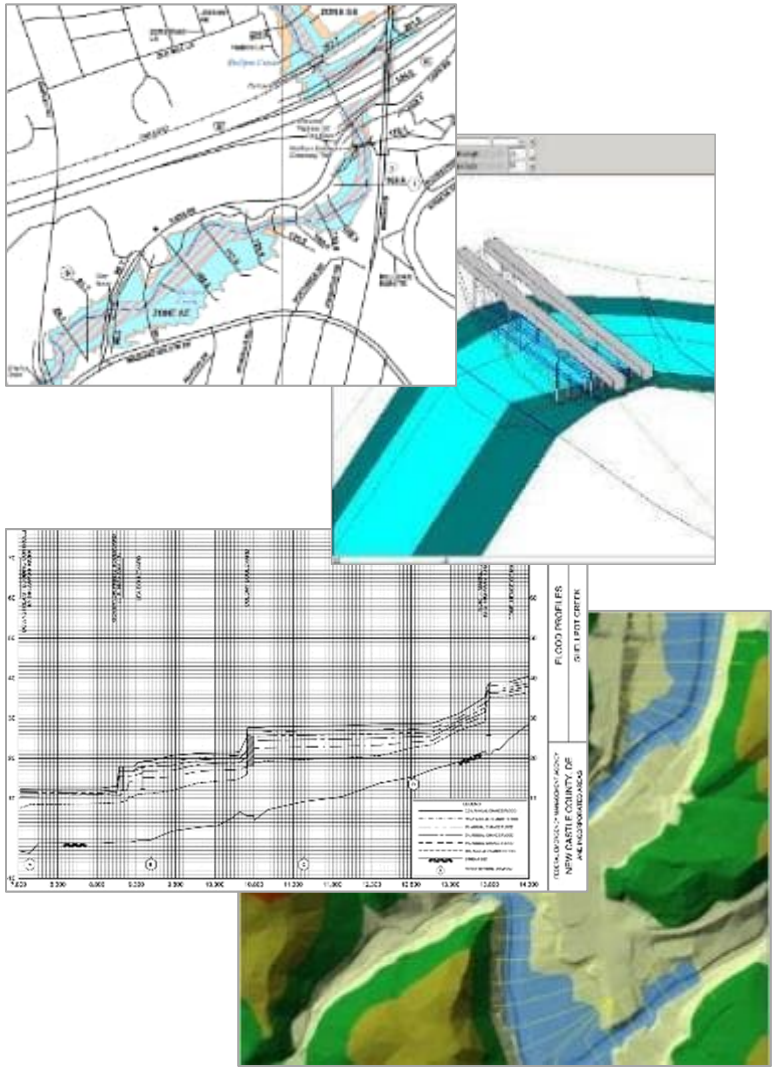
- Generally used in areas with lower development or lower development potential
- Cross sections generated from LiDAR (automated processes)
  - No bathymetric survey (approximate trapezoidal channel)
  - No hydraulic structures are surveyed or modeled (some exceptions for 2D Zone A)
- FIRM **will not** show Floodway or BFEs (**but** FIRM database will include cross sections and their associated water surface elevations in the FIRM GIS Database **which will be viewable on the WV Flood Tool!**)
- FIS Report **will not** show flood profiles for Zone A reaches



Hydraulic Analyses – Zone AE

Detailed "Zone AE" Study (90 miles)

- Generally used in areas with higher development or higher development potential
- Cross sections use information from survey and field reconnaissance
  - Include channel bathymetry
  - Structures are modeled (e.g., culverts, bridges)
- Detailed hydraulic parameter refinement (coefficients, obstructions, Manning's 'n' values)
- FIRM **will** show Floodway, BFEs, 1% and 0.2%-annual-chance event floodplains
- FIS Report **will** show flood profiles for 10-, 4-, 2-, 1-, 0.2-, and 1% Plus flood frequencies (1D only)



Hydrologic Analyses – Mud River (Milton)

- Hydrologic study methods included:
  - USGS Regression Equations
  - Regression Equations Supplemented with USGS Gage Analysis (Bulletin 17C)
  - Rainfall Runoff for Un-Regulated Flow Analysis (Mud River Dam 2a)
- A comprehensive **Hydrology Report** details the study methods for each reach and compares the effective and proposed discharges.
- The hydrologic study methods will also be published in the FIS Report.

TABLE 2 - SUMMARY OF DISCHARGES - continued

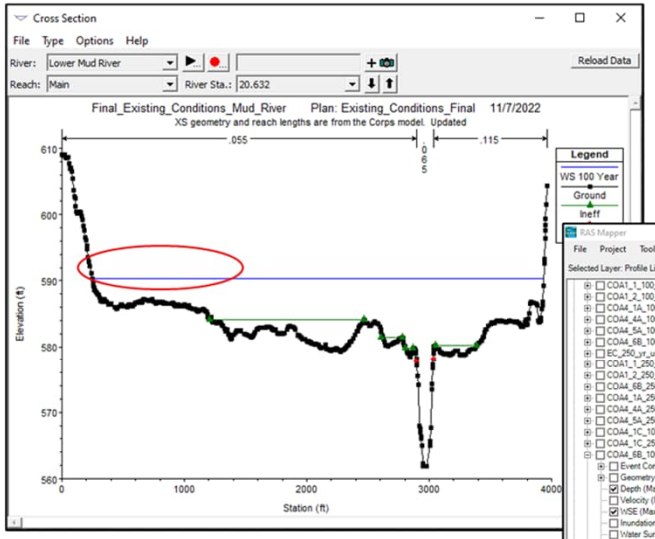
FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
INDIAN FORK					
Upstream of confluence With Mud River	16.73	*	*	2,950	*
Upstream of confluence Of Kilgore Creek	5.10	*	*	1,210	*
KILGORE CREEK					
Upstream of confluence With Indian Creek	11.03	*	*	2,150	*
Upstream of confluence Of Lee Creek	7.60	*	*	1,630	*
KROUT CREEK					
At downstream study limit	1.9	465	860	1,070	1,700
LEE CREEK					
At confluence with Kilgore Creek	2.99	*	*	810	*
Upstream of confluence Of Unnamed Tributary	1.12	*	*	390	*
MEDLEY FORK					
At stream mile 0.50	1.9	280	450	520	675
At upstream Huntington corporate limits	1.6	220	350	400	500
MUD RIVER					
At confluence with Guyandotte River	359.0	13,200	18,000	20,000	24,800
Upstream of Prichard Road	330.4	12,800	17,400	19,200	23,600
Upstream of Mill Creek	299.6	12,300	16,600	18,400	22,700
Upstream of State Route 25	256.0	11,200	15,800	17,800	22,900
OHIO RIVER					
At Huntington Gage (river mile 311.6)	55,900	425,000	518,000	560,000	672,000
Upstream of confluence of Guyandotte River	53,773	417,000	507,000	549,000	656,000

* Only the 1% annual chance discharge was computed

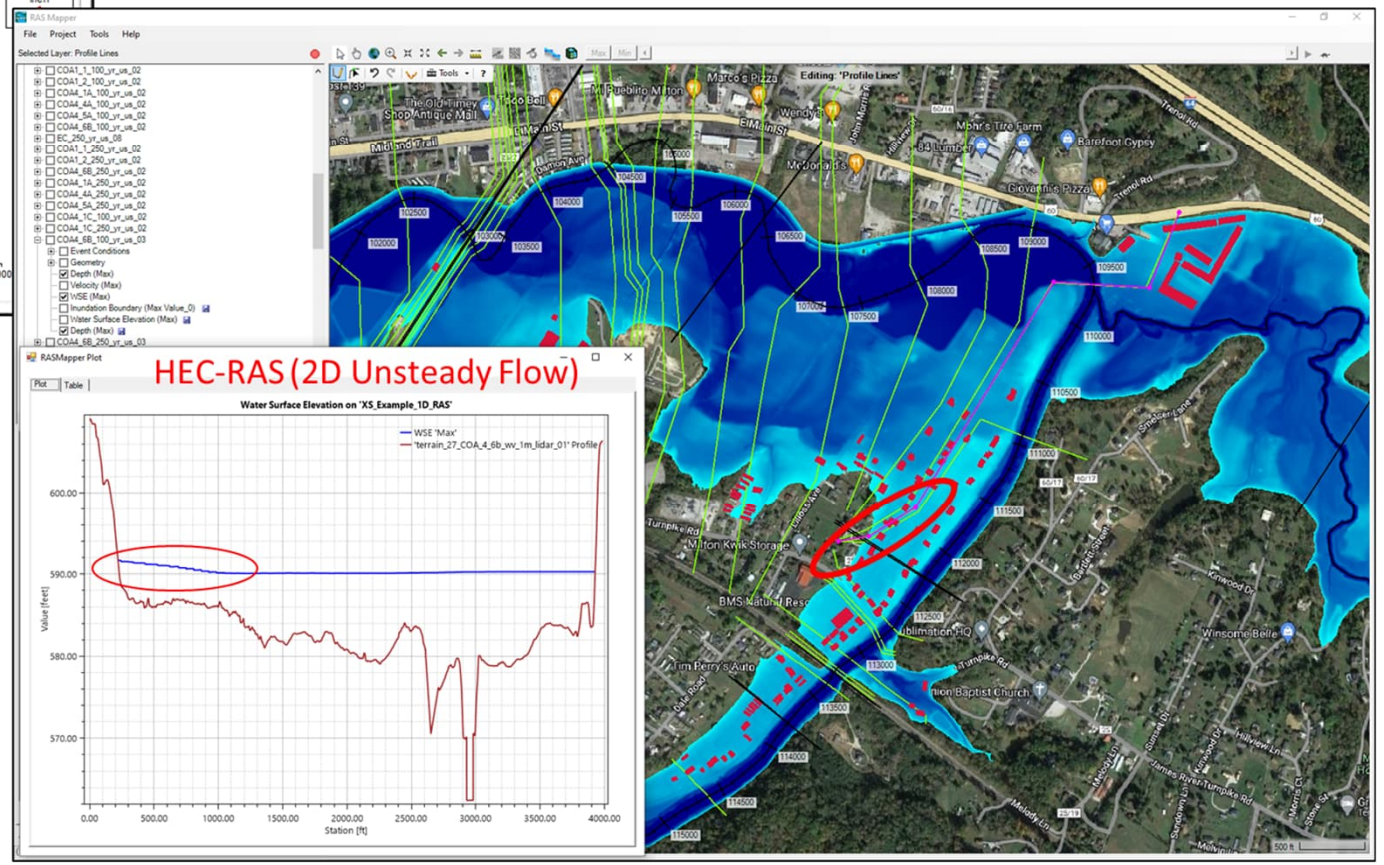
2023 USACE Bulletin 17C Update:
Mud River at Mill Creek 26,200 cfs
Mud River at Milton USGS Gage 23,900 cfs

FEMA

Hydraulic Analyses – Mud River (Milton)



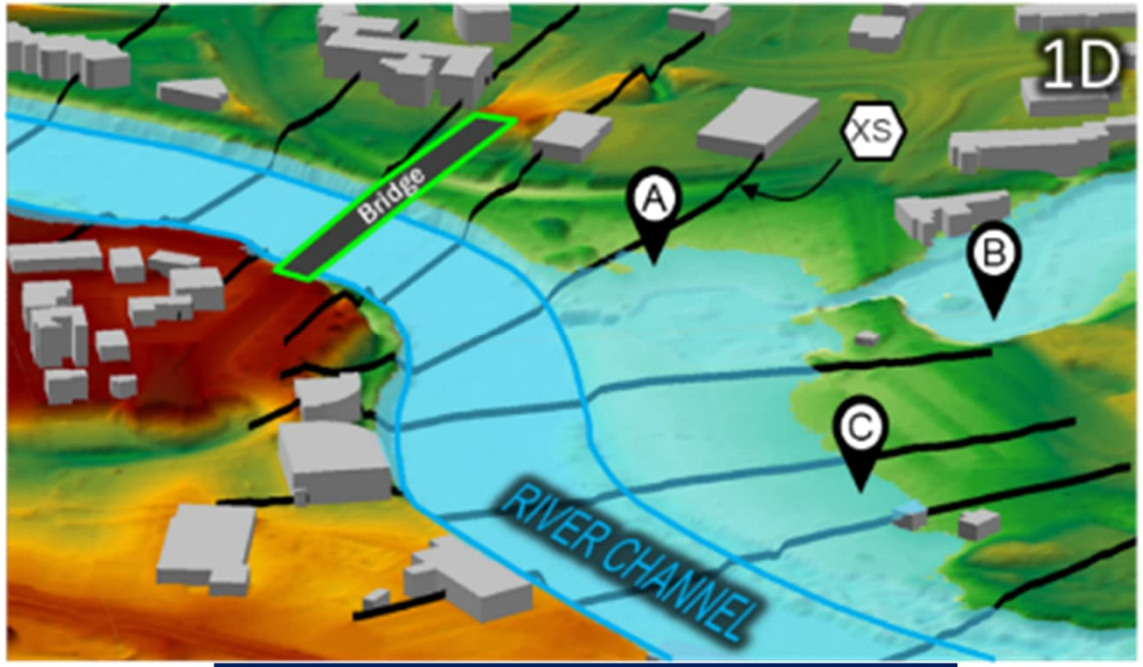
Why use HEC-RAS 2D?



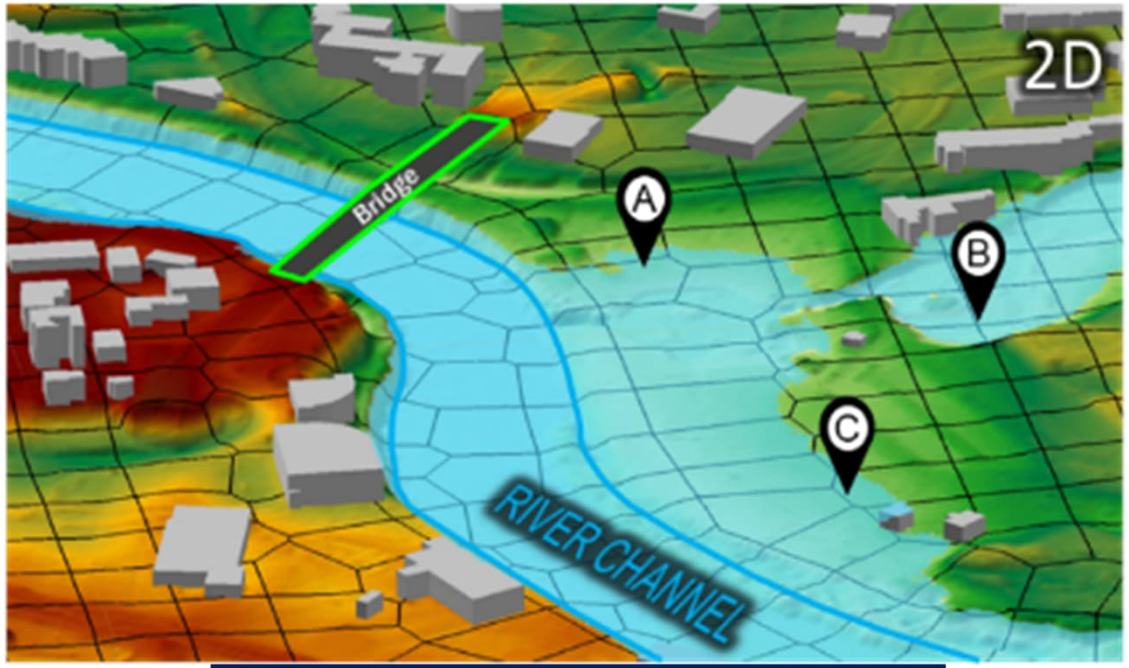
It is the right tool for the job!

- Sloping and varying WSE in key critical areas to inform buy-outs/relocations.
- Varied overland flow roughness values based on land use
- Overland hydrographs for flooding depths and durations
- Unsteady tributary inflows
- Calibration to recent flood events
- New RAS features within past few years to model complex interactions between overland flow and bridges

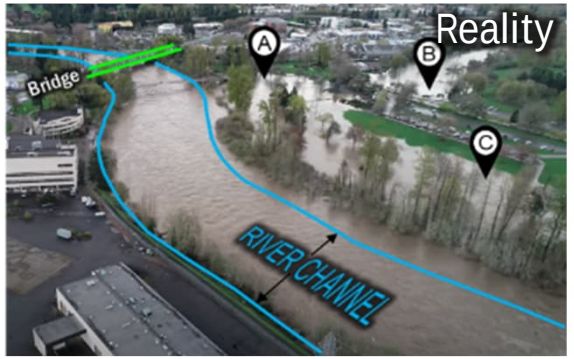
Hydraulic Analyses – 1D vs 2D



1D: most existing NFIP studies; confined flow; flow generally in one direction

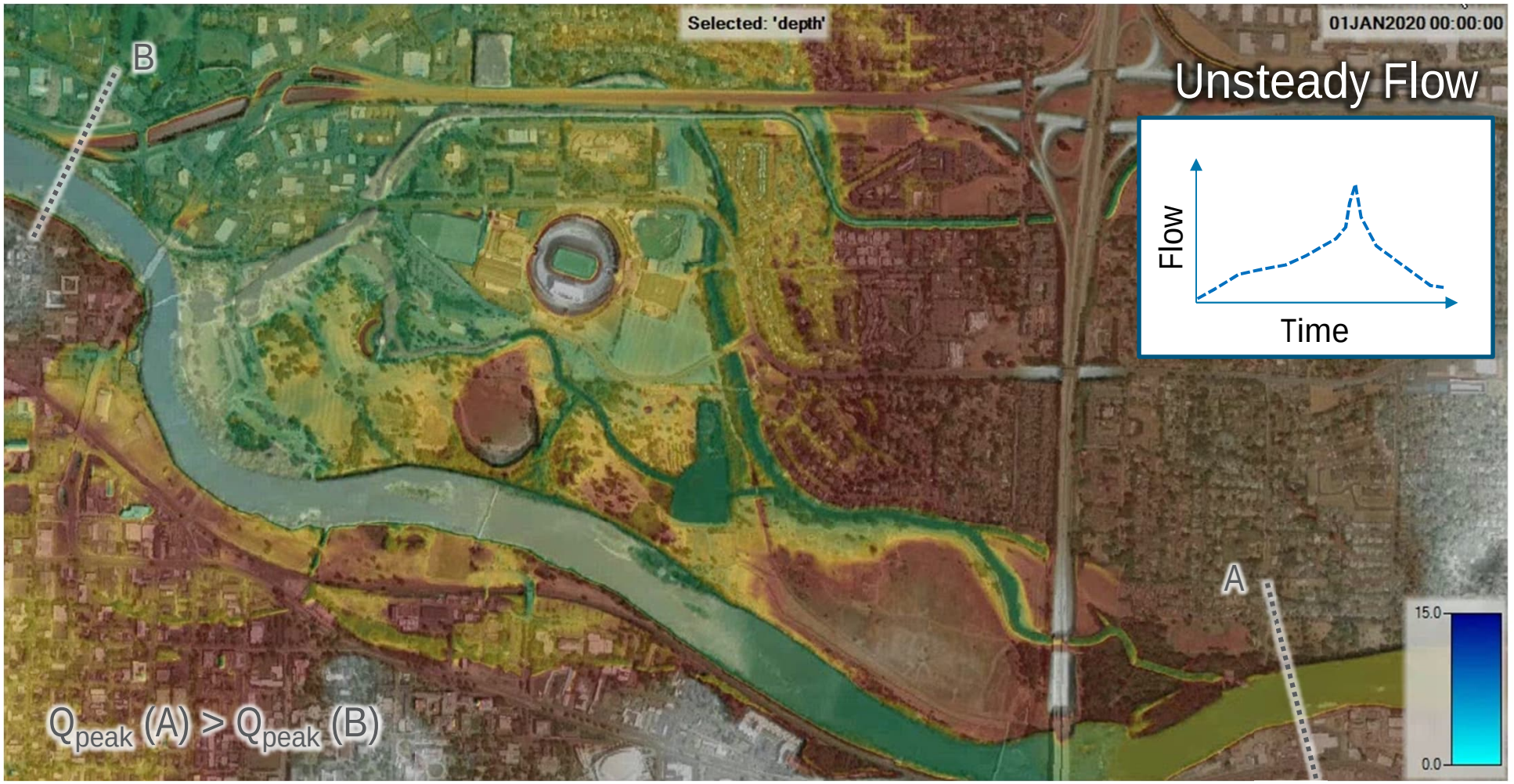


2D: unconfined, split/diverted flows; flow in multiple directions; wide/flat floodplains; shallow

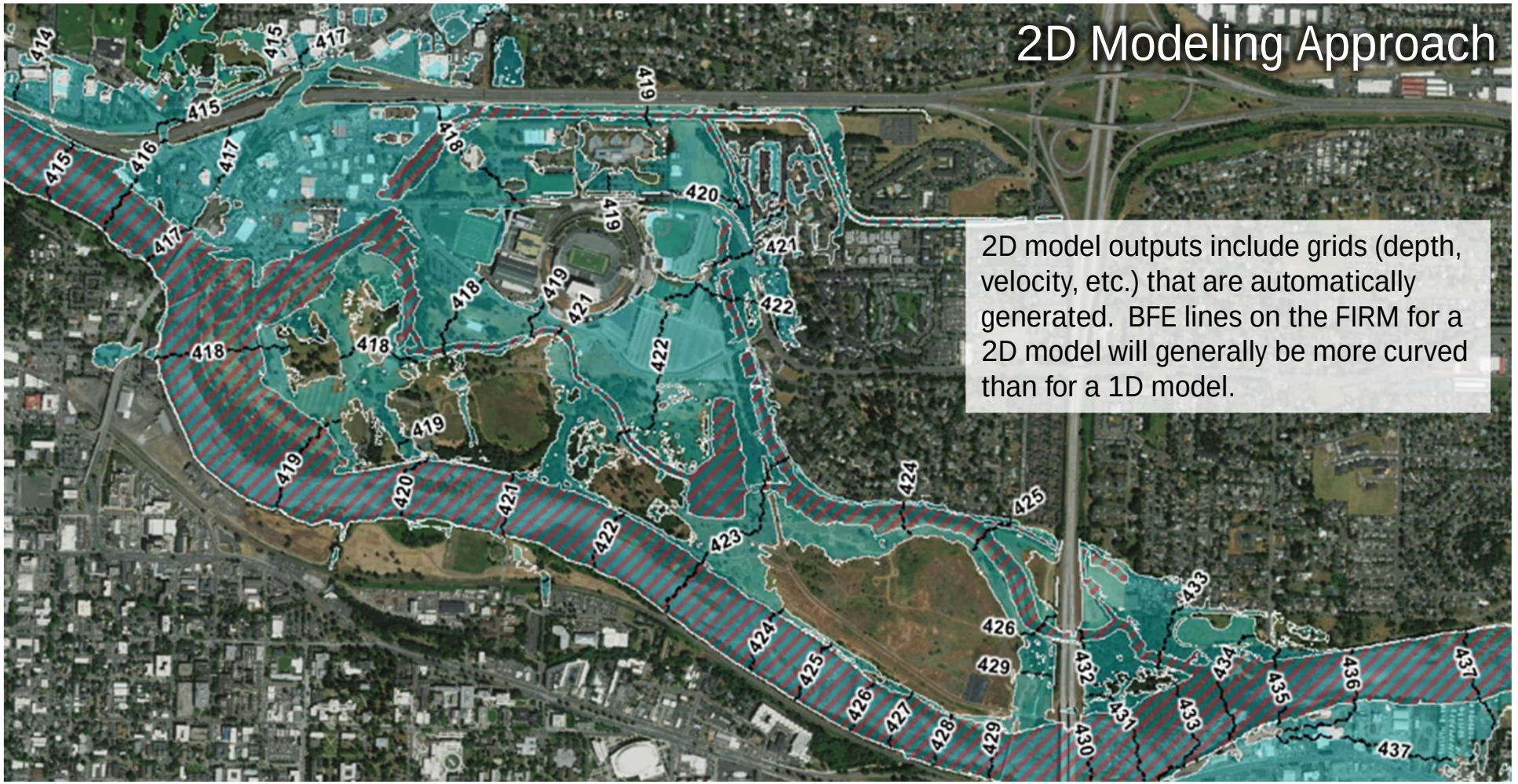


FEMA

Example 2D Modeling – Unsteady Flow



Example 2D Modeling – FIRM Depiction



Study Impacts

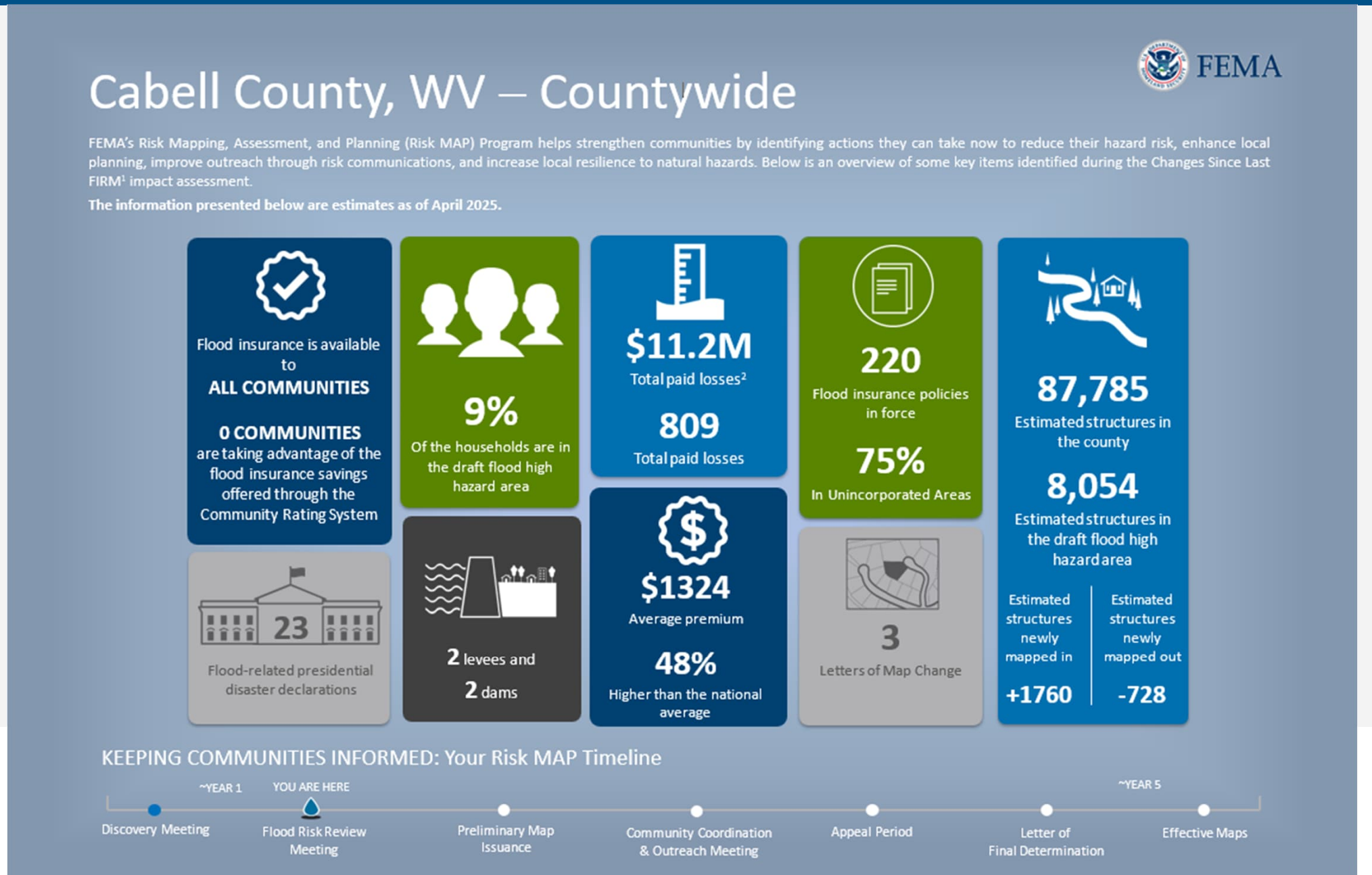
Significant Impacts Overview

- Compared to the effective NFHL, widening and narrowing of the 1%-annual-chance floodplain (SFHA) extent was observed throughout the county.
- Extended study reaches (with drainage areas of 1 square miles and greater, and not on current effective FIRM) result in new properties within the SFHA.
- Most streams experienced both increases and decreases when comparing the computed model WSELs to the current regulatory BFEs.

SFHA Updated Map Conditions

Remaining in SFHA	Newly Mapped In SFHA	Newly Mapped Out of SFHA	Total Structures in New SFHA
6,294	1,760	728	8,054

Flood Risk Dashboard



Flood Risk Dashboard

FEMA

Unincorporated Areas/Cabell County, WV

KNOW YOUR RISK (The information presented below are estimates as of April 2025.) [1] Flood Insurance Rate Map. [2] Since initial

$3,504,463
Total paid losses[2]

296
Total paid claims[2]

09/30/1987
Initial FIRM[1] date

02/19/2014
Effective FIRM date

53,601
Estimated structures in the community

5,336
Estimated structures in the draft flood high hazard area

Estimated structures newly mapped in	Estimated structures newly mapped out
+1113	-658

164
Flood insurance policies in force

10%
Of the households are in the draft flood high hazard area

23
Flood-related countywide presidential disaster declarations

KEEPING COMMUNITIES INFORMED: Your Risk MAP Timeline

~YEAR 1 — YOU ARE HERE

- Flood Risk Review Meeting
- Preliminary Map Issuance
- Community Coordination and Outreach Meeting
- Appeal Period
- Letter of Final Determination

~YEAR 5

- Effective Maps

Flood Risk Dashboard

FEMA

City of Huntington/Cabell County, WV

KNOW YOUR RISK (The information presented below are estimates as of April 2025.) [1] Flood Insurance Rate Map. [2] Since initial FIRM date

$4,812,271
Total paid losses[2]

316
Total paid claims[2]

01/17/1990
Initial FIRM[1] date

02/19/2014
Effective FIRM date

32,139
Estimated structures in the community

2,081
Estimated structures in the draft flood high hazard area

Estimated structures newly mapped in **+633**

Estimated structures newly mapped out **-85**

172
Flood insurance policies in force

6%
Of the households are in the draft flood high hazard area

23
Flood-related countywide presidential disaster declarations

KEEPING COMMUNITIES INFORMED: Your Risk MAP Timeline

~YEAR 1 — YOU ARE HERE

- Flood Risk Review Meeting
- Preliminary Map Issuance
- Community Coordination and Outreach Meeting
- Appeal Period
- Letter of Final Determination

~YEAR 5

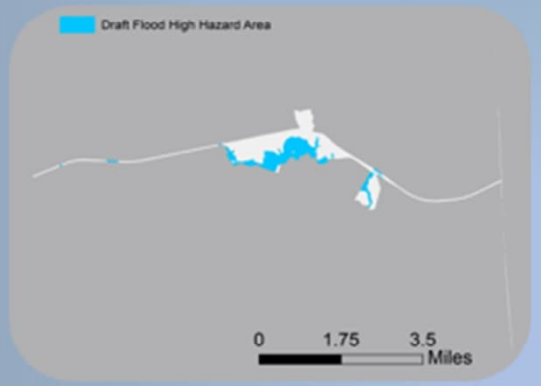
- Effective Maps

Flood Risk Dashboard

FEMA

City of Milton/Cabell County, WV

KNOW YOUR RISK (The information presented below are estimates as of April 2025.) [1] Flood Insurance Rate Map. [2] Since initial FIRM date



$2,670,969
Total paid losses[2]

189
Total paid claims[2]

09/30/1987
Initial FIRM[1] date

06/16/2005
Effective FIRM date

2,529
Estimated structures in the community

1,039
Estimated structures in the draft flood high hazard area

Estimated structures newly mapped in	Estimated structures newly mapped out
+107	-6

55
Flood insurance policies in force

41%
Of the households are in the draft flood high hazard area

23
Flood-related countywide presidential disaster declarations

KEEPING COMMUNITIES INFORMED: Your Risk MAP Timeline

~YEAR 1 — YOU ARE HERE

- Flood Risk Review Meeting
- Preliminary Map Issuance
- Community Coordination and Outreach Meeting
- Appeal Period
- Letter of Final Determination

~YEAR 5

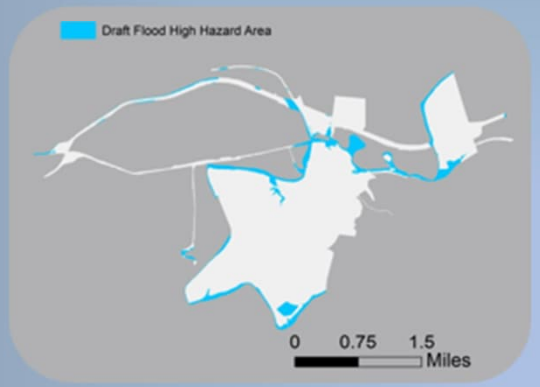
- Effective Maps

Flood Risk Dashboard

FEMA

Village of Barboursville/Cabell County, WV

KNOW YOUR RISK (The information presented below are estimates as of April 2025.) [1] Flood Insurance Rate Map. [2] Since initial FIRM date



$65,339
Total paid losses[2]

13
Total paid claims[2]

06/03/1988
Initial FIRM[1] date

02/19/2014
Effective FIRM date

2,873
Estimated structures in the community

52
Estimated structures in the draft flood high hazard area

Estimated structures newly mapped in **+3**

Estimated structures newly mapped out **-29**

15
Flood insurance policies in force

2%
Of the households are in the draft flood high hazard area

23
Flood-related countywide presidential disaster declarations

KEEPING COMMUNITIES INFORMED: Your Risk MAP Timeline

~YEAR 1 — YOU ARE HERE

- Flood Risk Review Meeting
- Preliminary Map Issuance
- Community Coordination and Outreach Meeting
- Appeal Period
- Letter of Final Determination

~YEAR 5

- Effective Maps

Flood Risk Dashboard (page 2)

TAKE ACTION: Next Steps

Your Hazard Mitigation Plan was approved **October 2023** and now may be the time to update and review. Some projects you identified to reduce flood risk were:

- Reduce or eliminate the impact of hazards on infrastructure throughout the State
- Provide consistent, continual education of the whole community on reducing long-term vulnerability throughout the State of West Virginia.

Find ideas to mitigate flood risk here: ***https://www.fema.gov/sites/default/files/2020-06/fema-mitigation-ideas_02-13-2013.pdf***

Immediate Next Steps:

1. **Attend the Flood Risk Review Meeting**

FRR Meeting is on **June 5, 2025** at **1:00pm** (Digital/Online Meeting)

2. **Review your preliminary FIRM/FIS**[1]

The preliminary FIRMs are scheduled to be issued in **Early 2026**

What's on the Horizon:

1. **Community Coordination and Outreach Meeting**

2. 90-day regulatory **Appeal Period** following the Community Coordination and Outreach Meeting

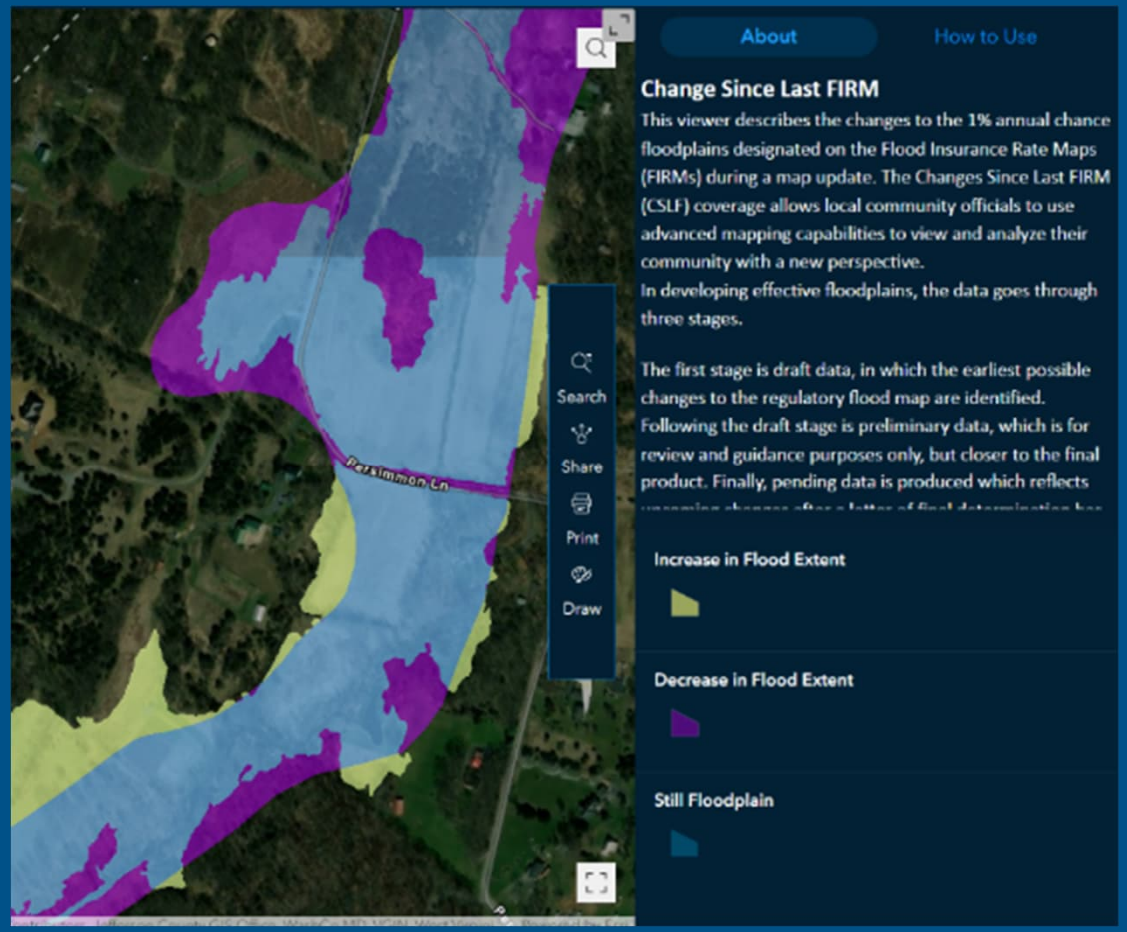
3. Letter of Final Determination issued following Appeal Period

[1] Flood Insurance Rate Map / Flood Insurance Study (FIRM/FIS)

How Did the Floodplain Maps Change?

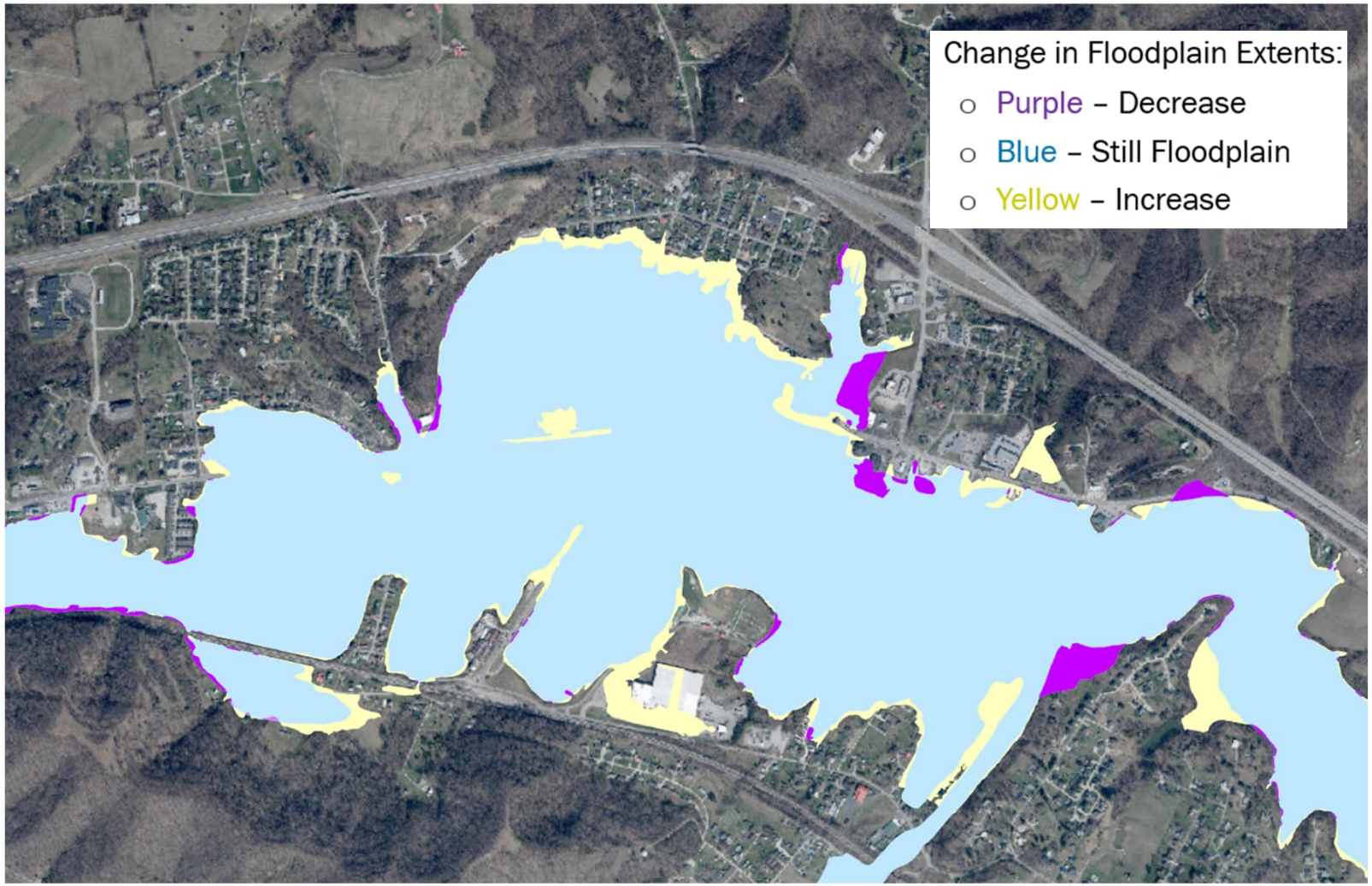
- FEMA Region 3
  Changes Since Last FIRM (CSLF) Viewer:
  https://arcg.is/1GS0T80
- Change in Floodplain Extents:
  - Purple – Decrease
  - Blue – Still Floodplain
  - Yellow – Increase

*Map view has scale-dependent layers



FEMA

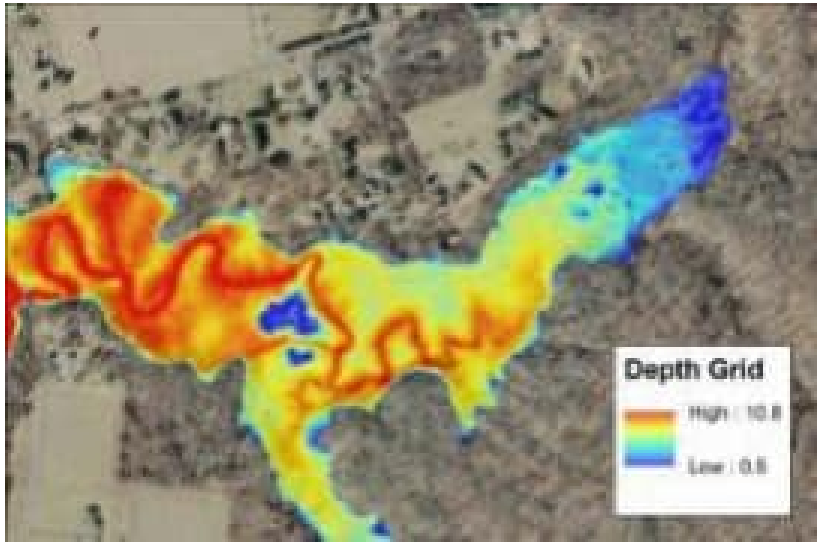
Floodplain Mapping – Mud River (Milton)

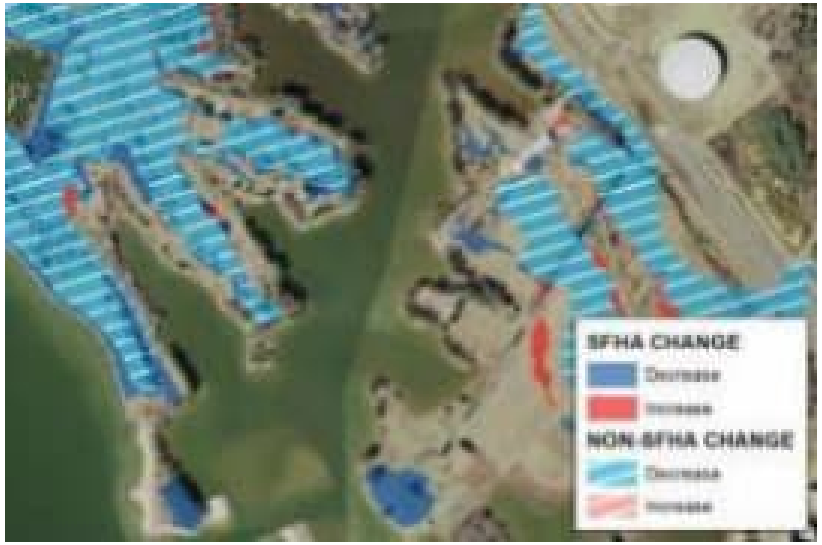


Using Flood Risk Data to Identify and Reduce Risk

FEMA Flood Risk GIS Datasets

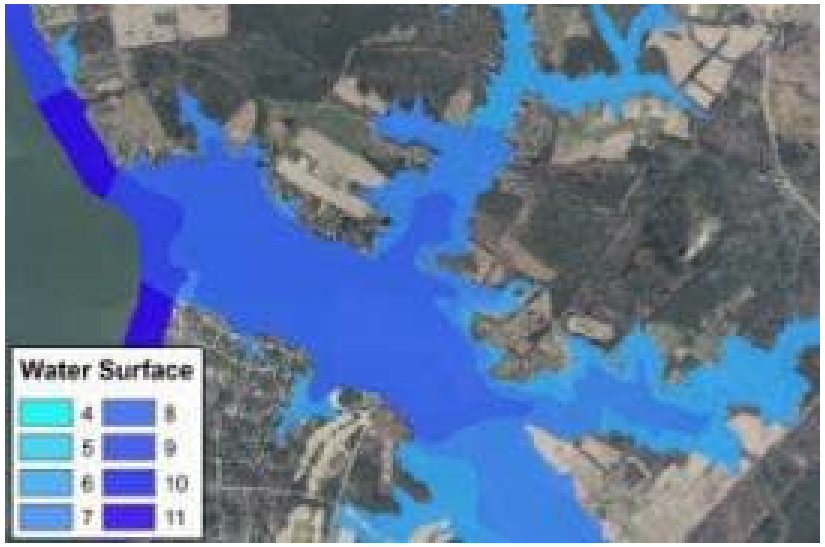
Flood Depth and Analysis Grids





Changes Since Last FIRM

Water Surface Elevation Grids



Where to Find Flood Risk Data

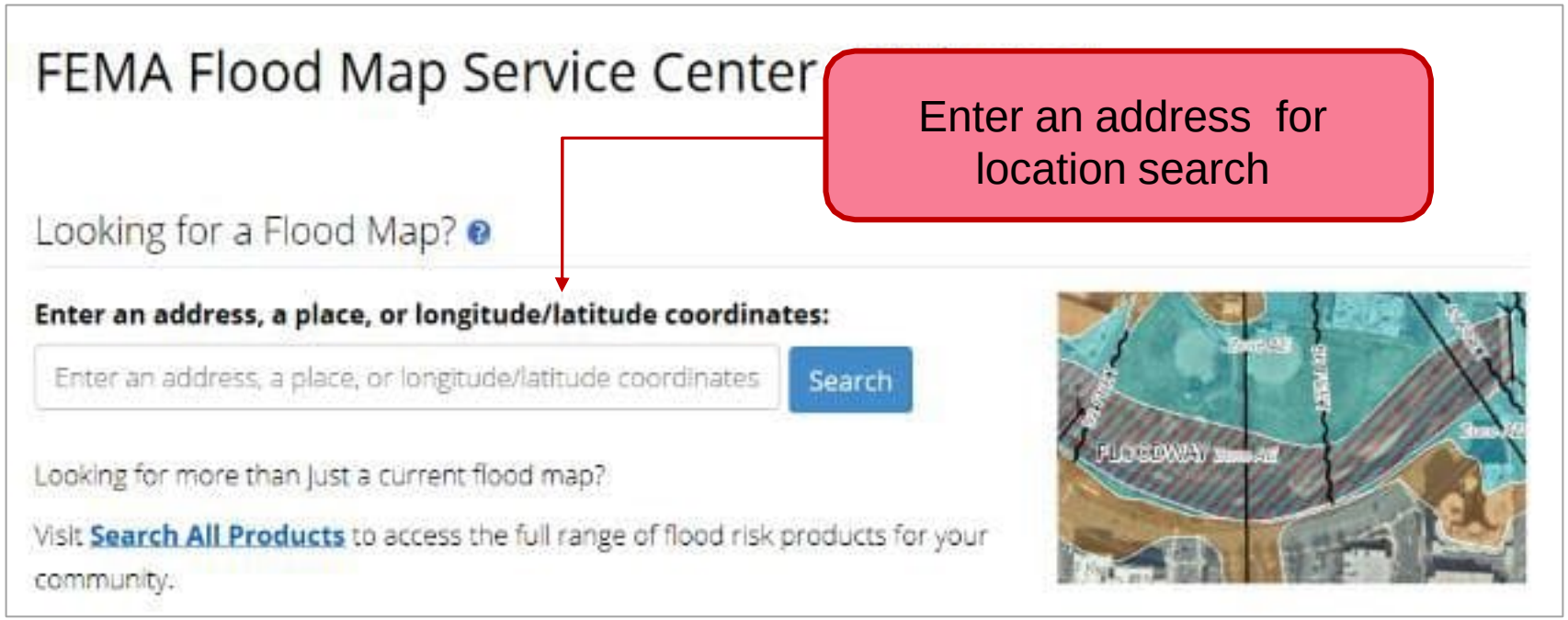
- FEMA's Flood Map Service Center (MSC)
  - Here, you can view effective maps online. You can also download current effective flood hazard data and additional hazard and risk data.
  - https://msc.fema.gov/portal/home

- National Flood Hazard Layer (NFHL)
  - This geospatial data viewer contains current effective flood hazard data.
  - https://www.fema.gov/flood-maps/national-flood-hazard-layer

- State Flood Tool
  - This geospatial data viewer contains current effective flood hazard data and additional hazard and risk data.
  - https://www.mapwv.gov/flood

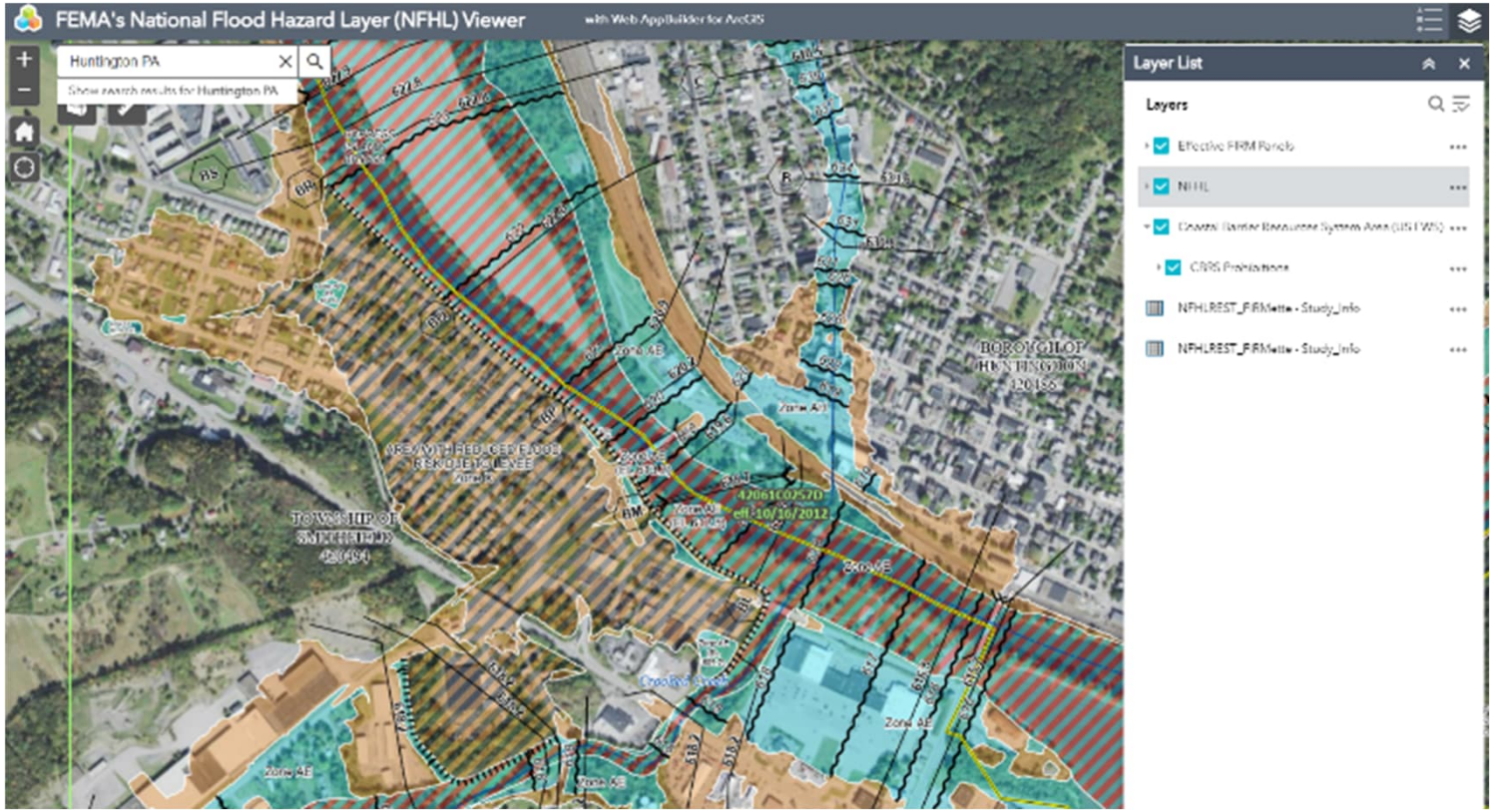
Where Can I Find My Flood Maps?

The FEMA Map Service Center (MSC) is the official public source for flood hazard information: https://msc.fema.gov/portal/home.



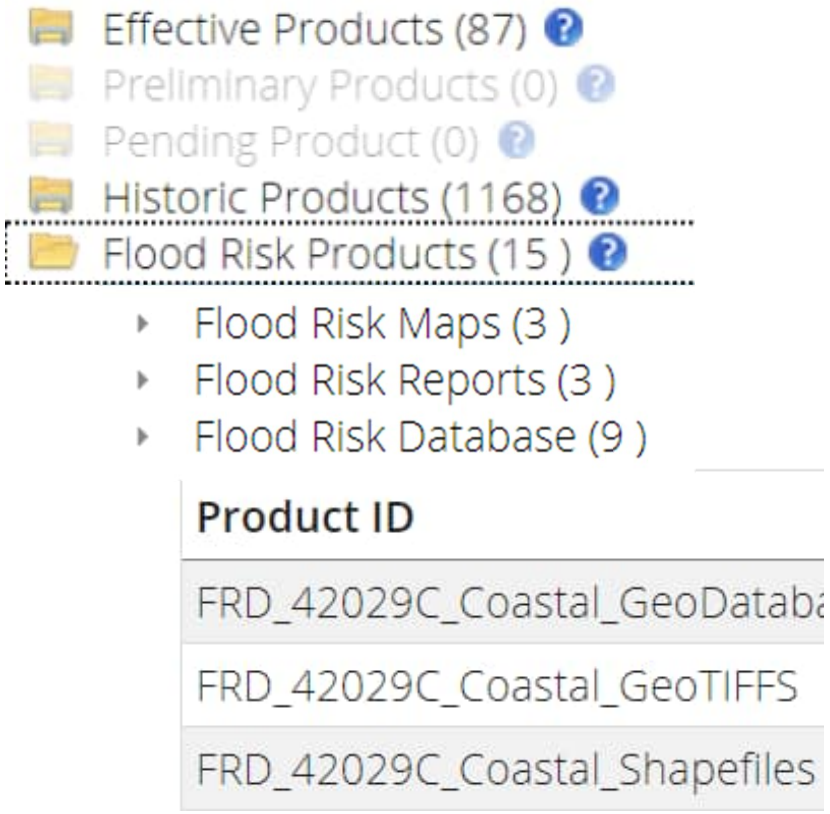
National Flood Hazard Layer

The NFHL shows the effective FEMA flood map data, including Letters of Map Revision (LOMRs).Visit https://www.fema.gov/national-flood-hazard-layer-nfhl for multiple options to view and download NFHL data.



Additional Hazard and Risk Data

If additional hazard and risk data are available for your community, the MSC Search Results will allow you to expand the Flood Risk Products folder.

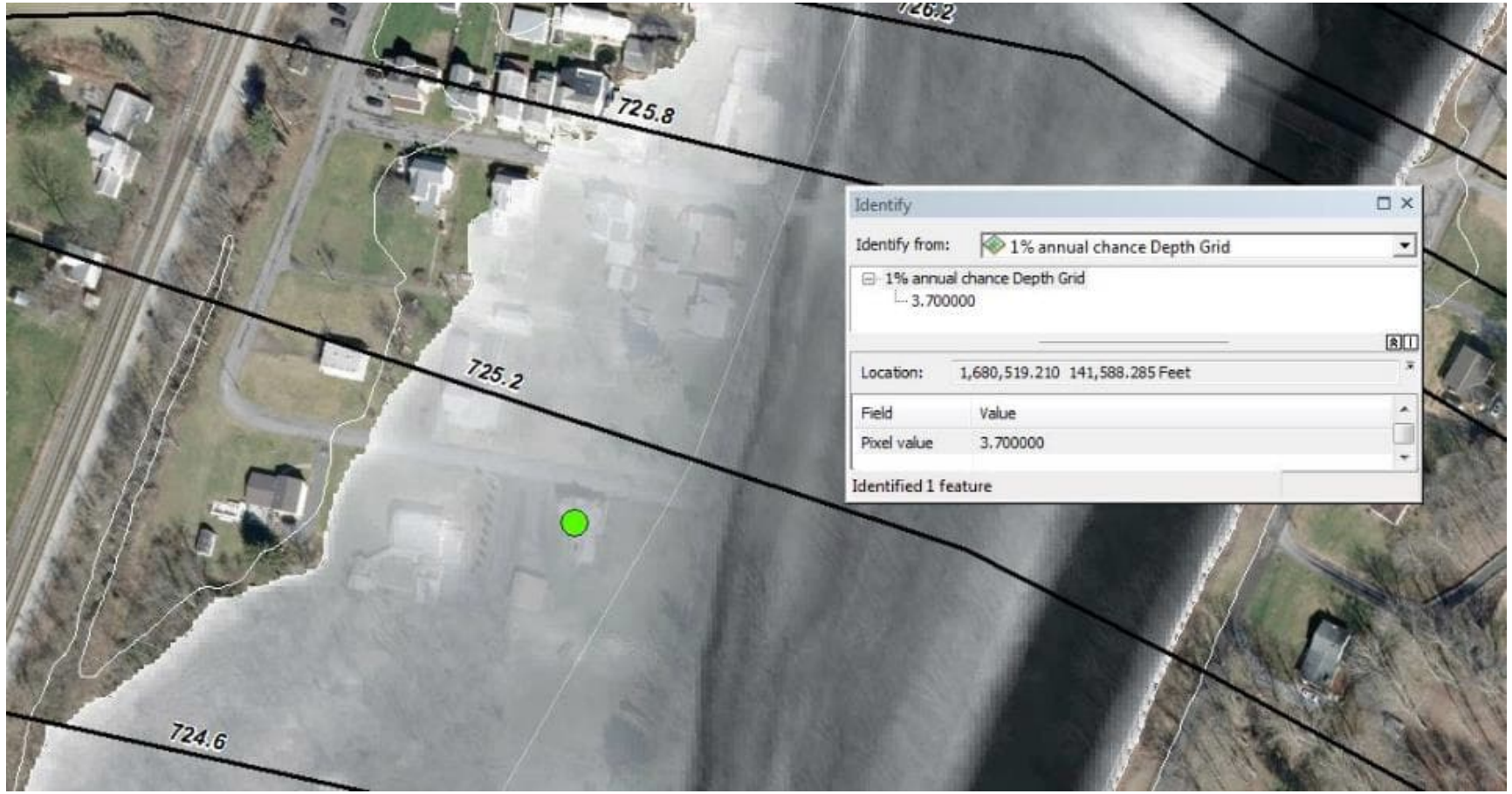


Water Surface Elevation Grids

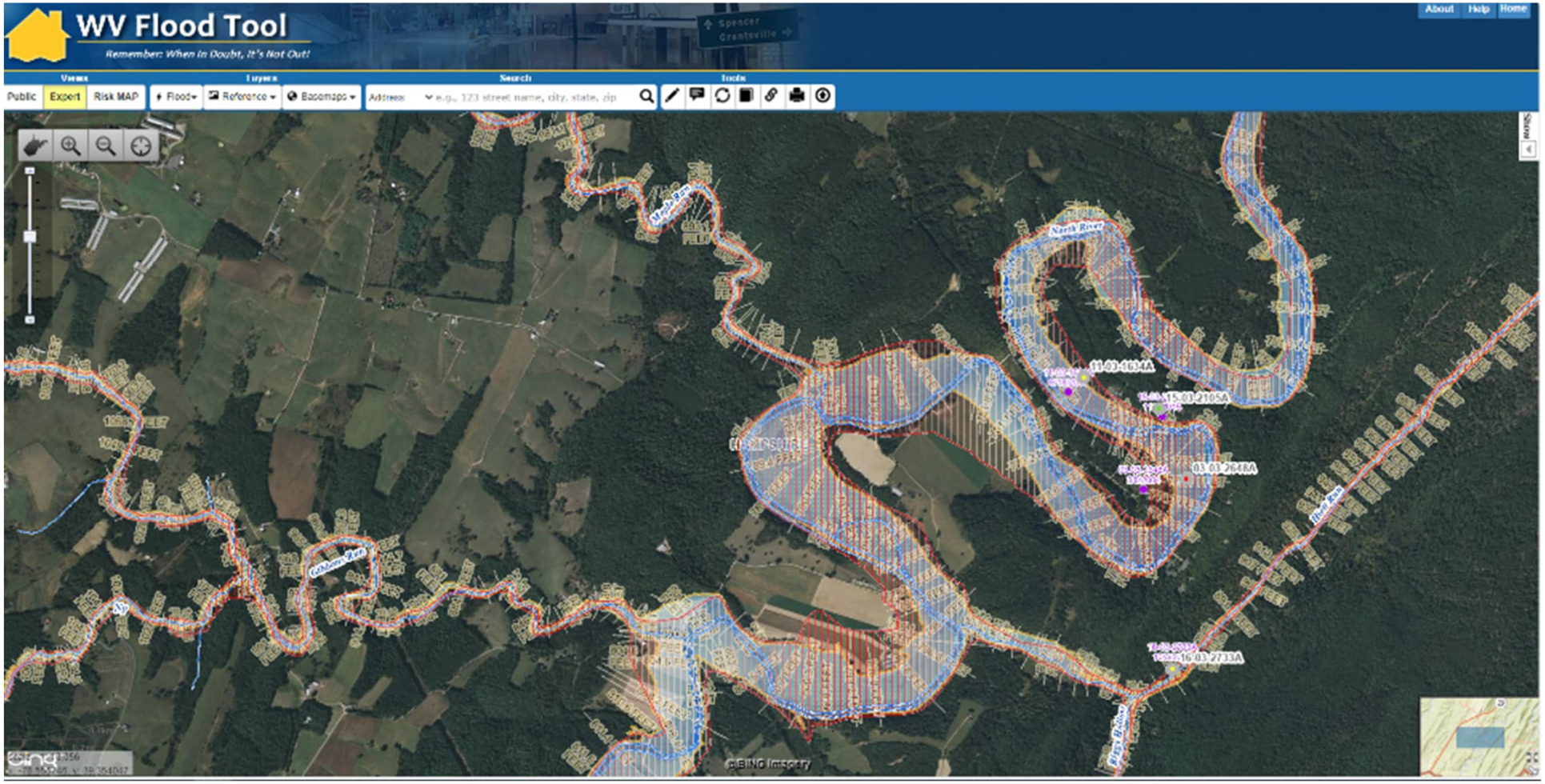
Represents the continuous water surface elevations (as determined at modeled cross sections and interpolated between cross sections) for each of the modeled flood frequencies.

Depth Grids

Represents the difference between the ground surface elevation and the water surface elevations in feet for each of the modeled flood frequencies.



West Virginia Flood Risk Tool

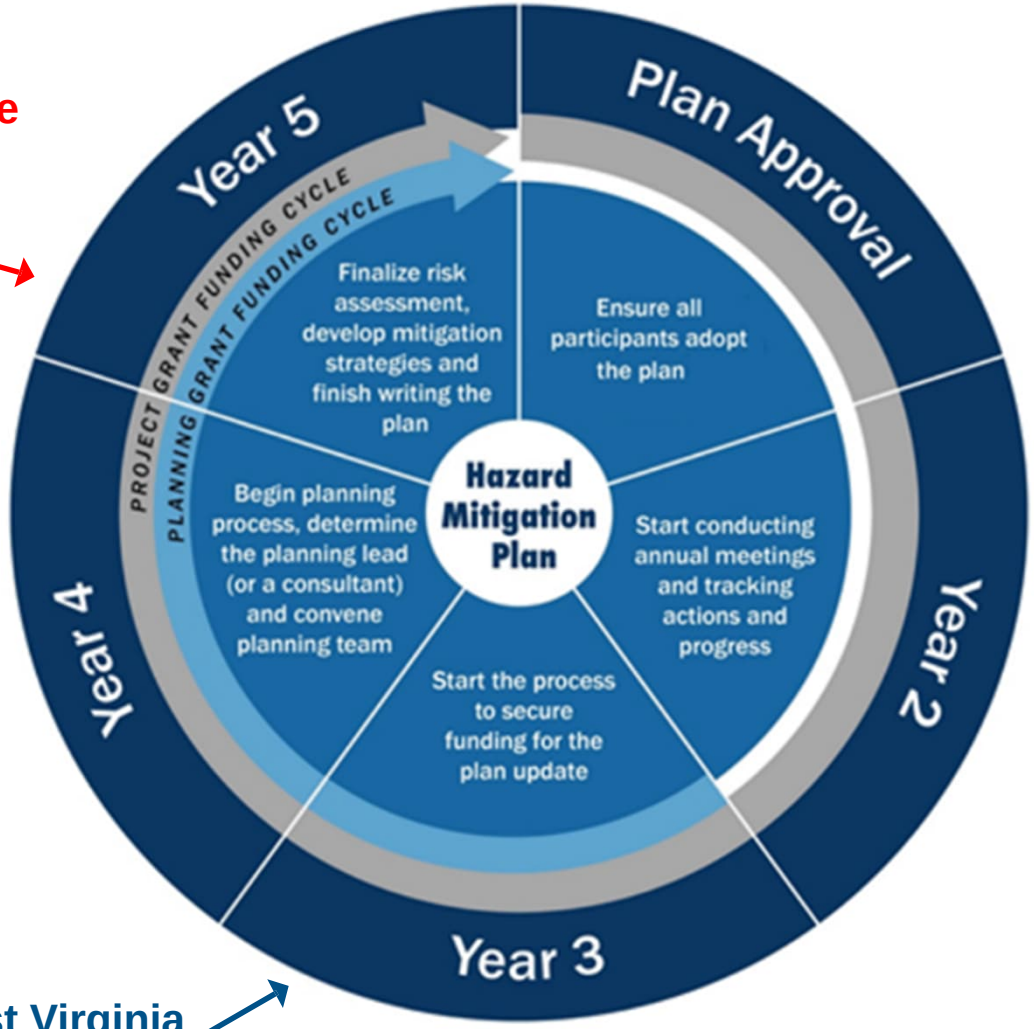


[WV Flood Tool (mapwv.gov)]

FEMA

Flood Hazard Mitigation Planning

It's time to update the risk assessment in your hazard mitigation plan

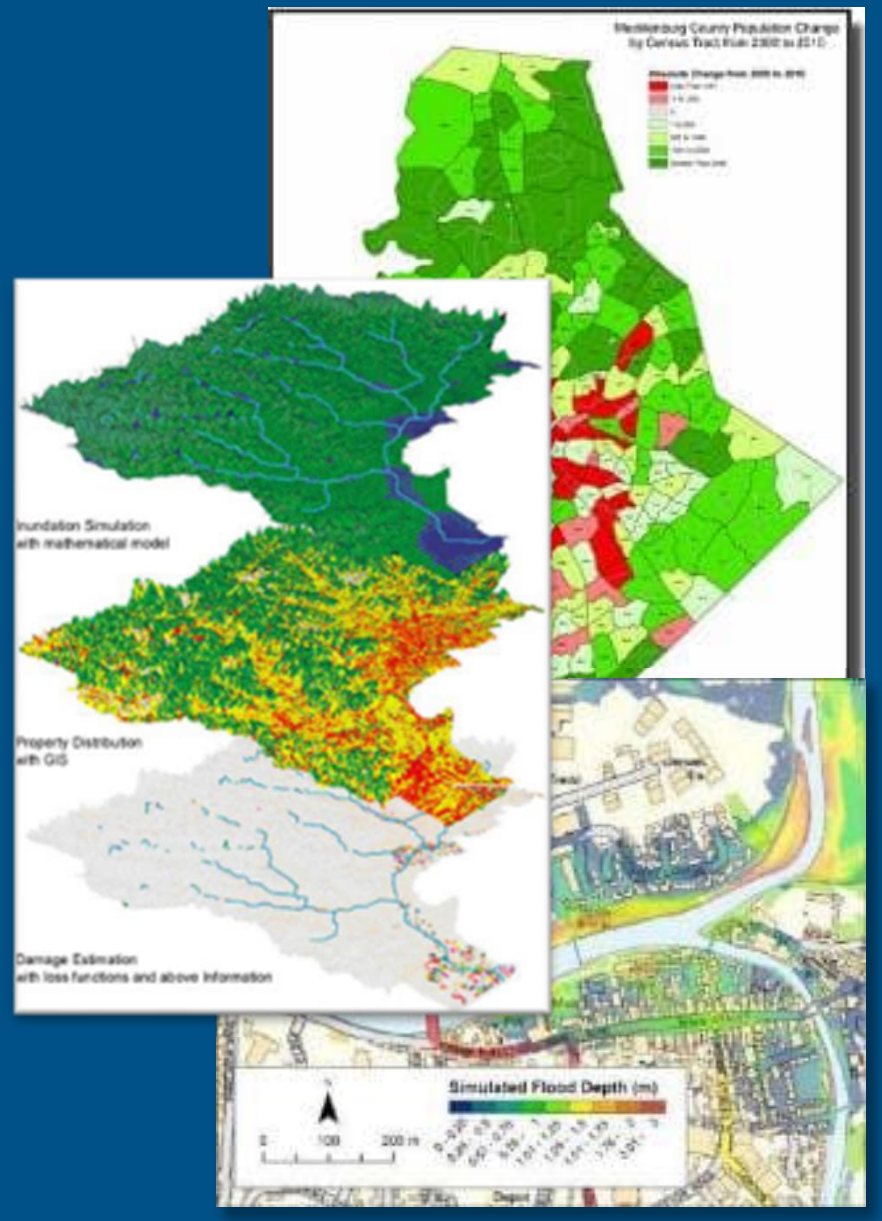


The West Virginia State HMP is here

FEMA

Using Flood Risk Data to Manage Development

- Structure-based depth of flooding analyses
- Prioritization of mitigation action
- Residential/commercial density in the floodplain
- Location/inundation area of historic events
- Properties with insurance policies and as a percentage of the population
- Areas of population growth
- Areas requiring protection



FEMA

Floodplain Management

Flood Risk Doesn't Stop at a Line

- 40% of all flood insurance claims come from outside high-risk areas.
- Your community can regulate to standards higher than the NFIP minimum standards. Consider strengthening regulations using:
  - 0.2%-annual-chance flood zone
  - "Freeboard" – require additional feet above a BFE
  - Buffer around SFHA
  - Flood depth grids

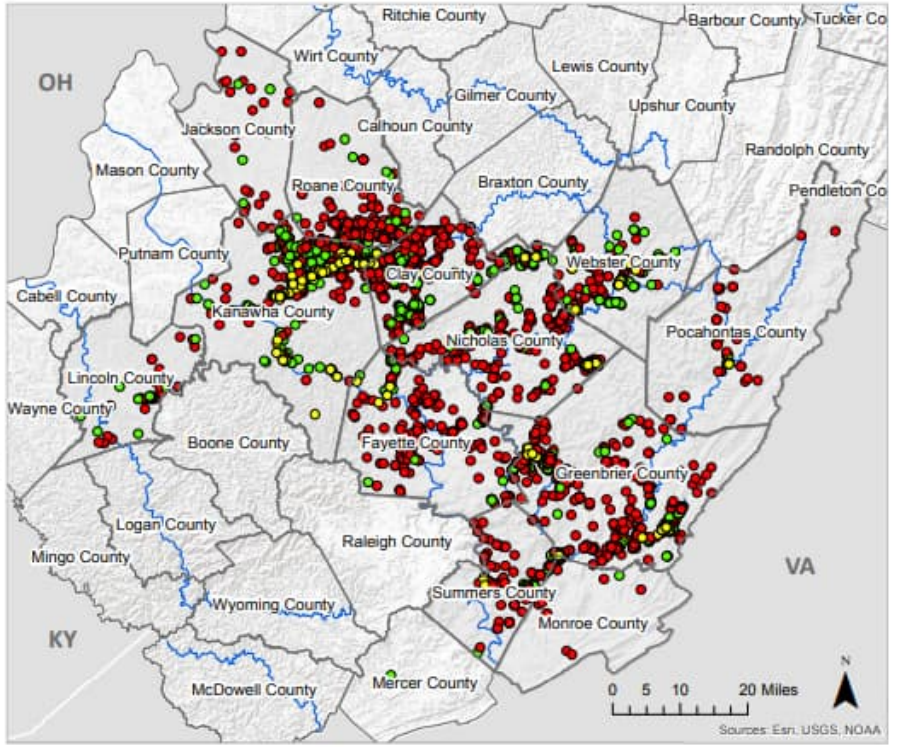


FIGURE 8: Location of NFIP Claims and Individual Assistance Applications. (green = inside 1% annual chance floodplain; yellow = inside 0.2% annual chance floodplain; red = outside mapped floodplain)

June 2016 –West Virginia

- Many homes outside the SFHA also flooded. Some of these households had flood insurance, but many did not. Homeowners with flood insurance recover more quickly than those without.
- The flood in June 2016 was not a rare, "1 in 1,000 year event." Although the amount of rain that fell was unusual; rainfall and flooding are different.
- The latest data shows that the level of flooding that occurred in 2016 could happen more frequently than previously thought. In many areas, the event has at least a 1% chance of happening each year in the future.

Source: https://www.fema.gov/sites/default/files/documents/Region_III_WV_FloodReport.pdf

Floodplain Management at FRR

Look at where there are changes to the SFHA in your community

Share with permitting, planning, and other colleagues to direct development outside of the SFHA today and in future

Consider higher standards or joining the Community Rating System to support your community

FRR: Flood Risk Review
SFHA: Special Flood Hazard Area

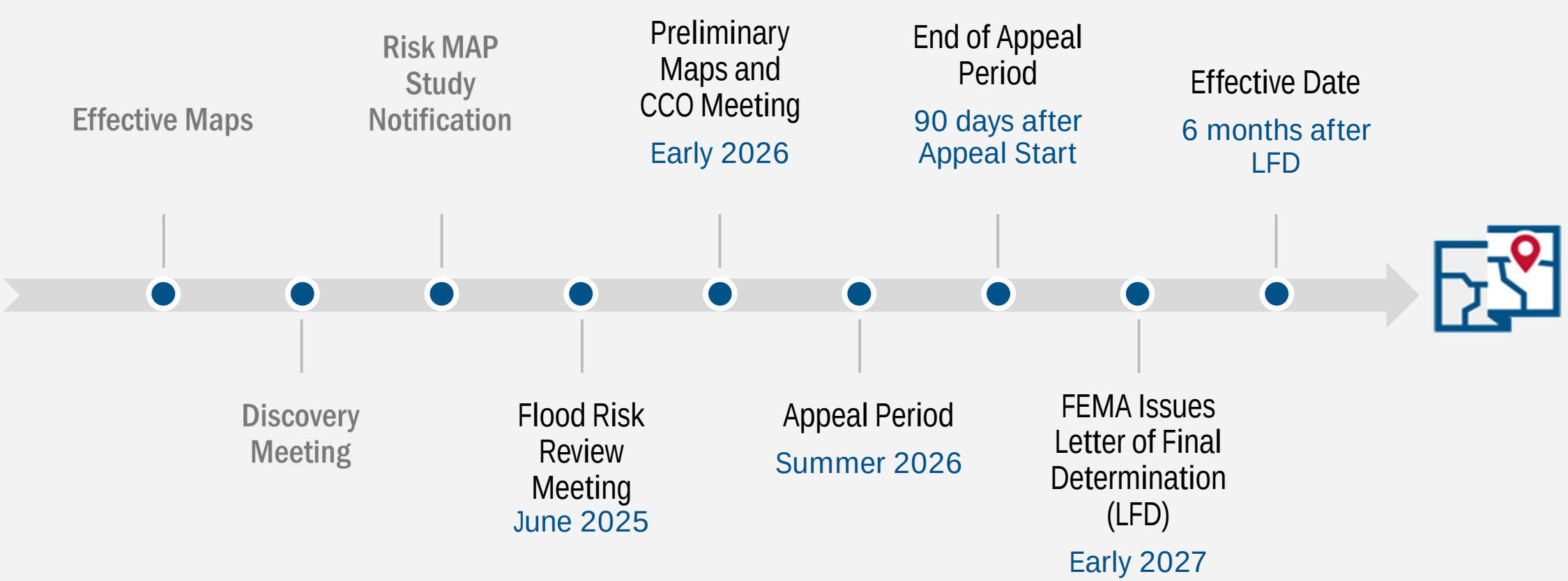
Floodplain Management Big Picture

Build it right and lower the impact of future flood losses while improving resiliency

Build it wrong and the result could be increased flood losses and higher flood insurance premiums

Discussion

Timeline – Looking Ahead



We want to hear from you!

- 30-day review and comment period
- WV Flood Tool: https://www.mapwv.gov/flood
- Review the materials we will be sending you
- We are available to answer questions
- Talk about mitigation actions in your community
- *Thank you for your participation!*

Project Contacts – West Virginia

State NFIP/CTP Office:

Kevin Sneed
CTP Project Officer
(304) 957-2571
kevin.l.snead@wv.gov

Julie Sears
State NFIP Specialist
(304) 989-8330
julia.r.sears@wv.gov

FEMA Region 3:

Bob Pierson
FEMA Project Officer
(215) 931-5650
robert.pierson@fema.dhs.gov

Bill Kuhn
Community Planner
william.kuhn@fema.dhs.gov

Betsy Ranson
Floodplain Management Specialist
(215) 347-0686
elizabeth.ranson@fema.dhs.gov

Bill Bradfield
Insurance Specialist
(202) 880-5906
william.b.bradfield@fema.dhs.gov

FEMA