FEMA Region 3

Flood Risk Review Meeting

Mercer County

June 3, 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

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Introductions

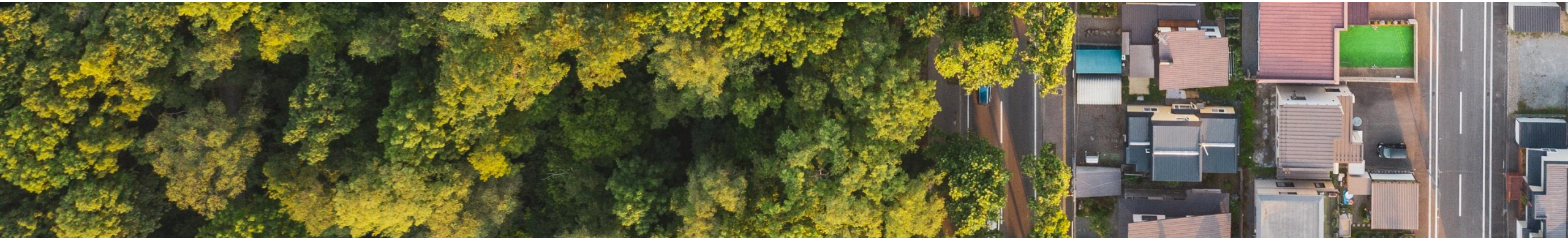
Please Introduce Yourself

- Name
- Position
- Organization

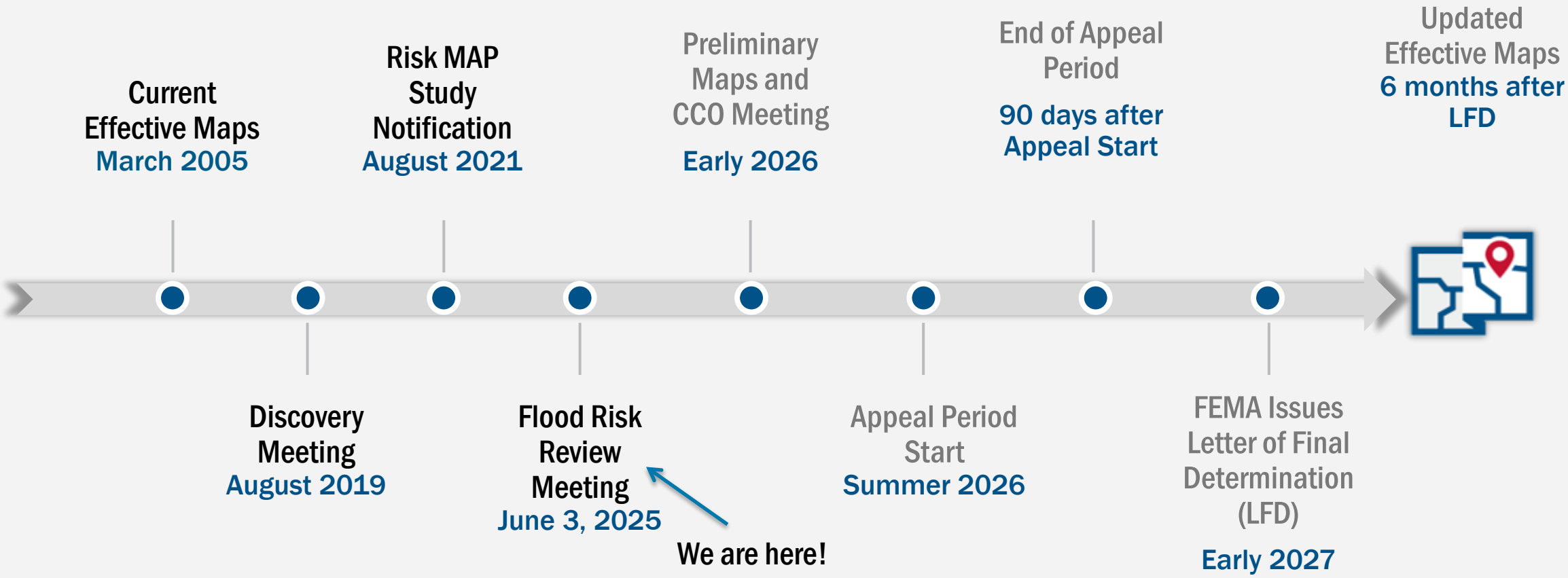
Where We Are – Draft Maps

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 Mercer 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

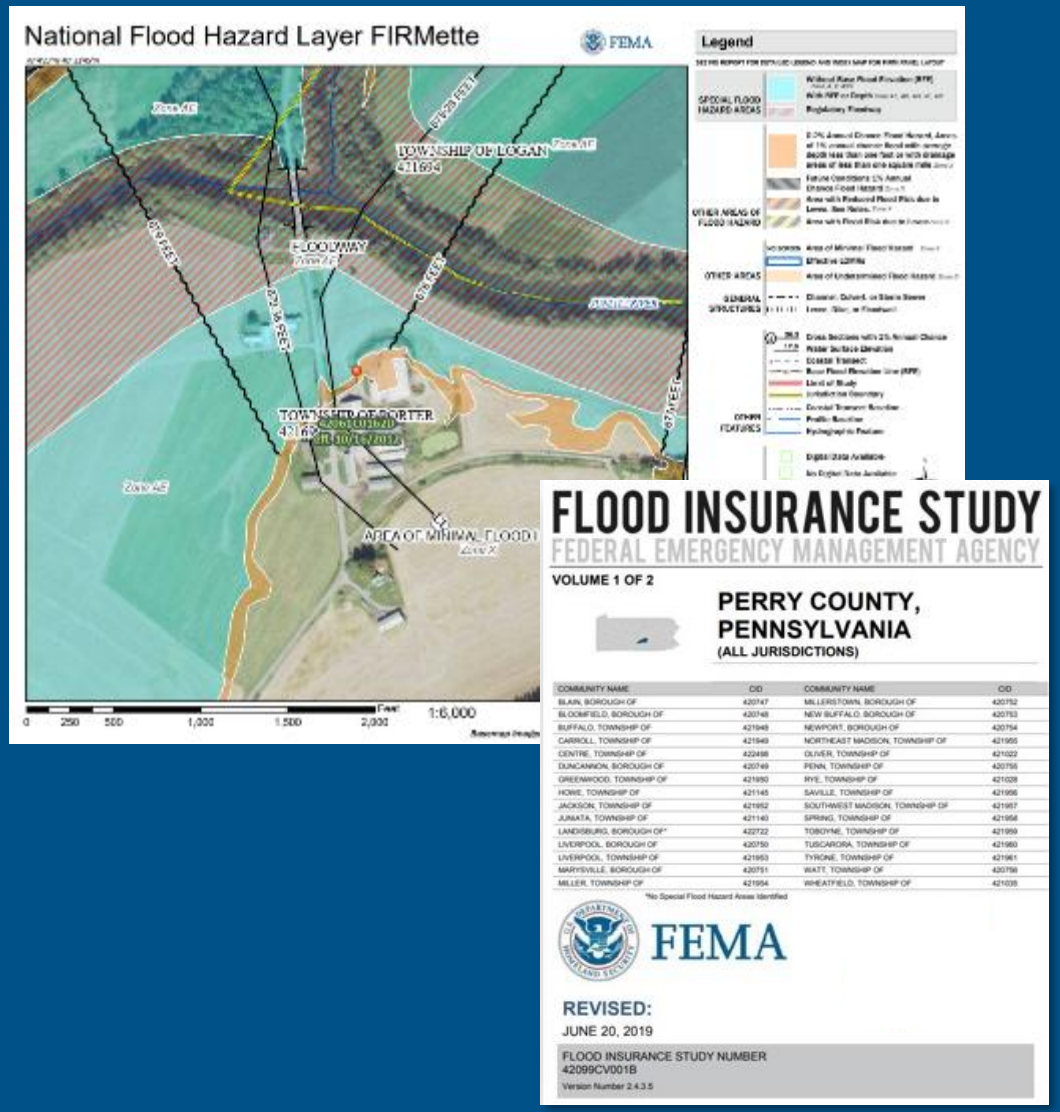

Current Effective Maps
March 2005
Discovery Meeting
August 2019
Risk MAP Study Notification
August 2021
Flood Risk Review Meeting
June 3, 2025
We are here!
Preliminary Maps and CCO Meeting
Early 2026
Appeal Period Start
Summer 2026
End of Appeal Period
90 days after Appeal Start
FEMA Issues Letter of Final Determination (LFD)
Early 2027
Updated Effective Maps
6 months after LFD

Flood Study Update

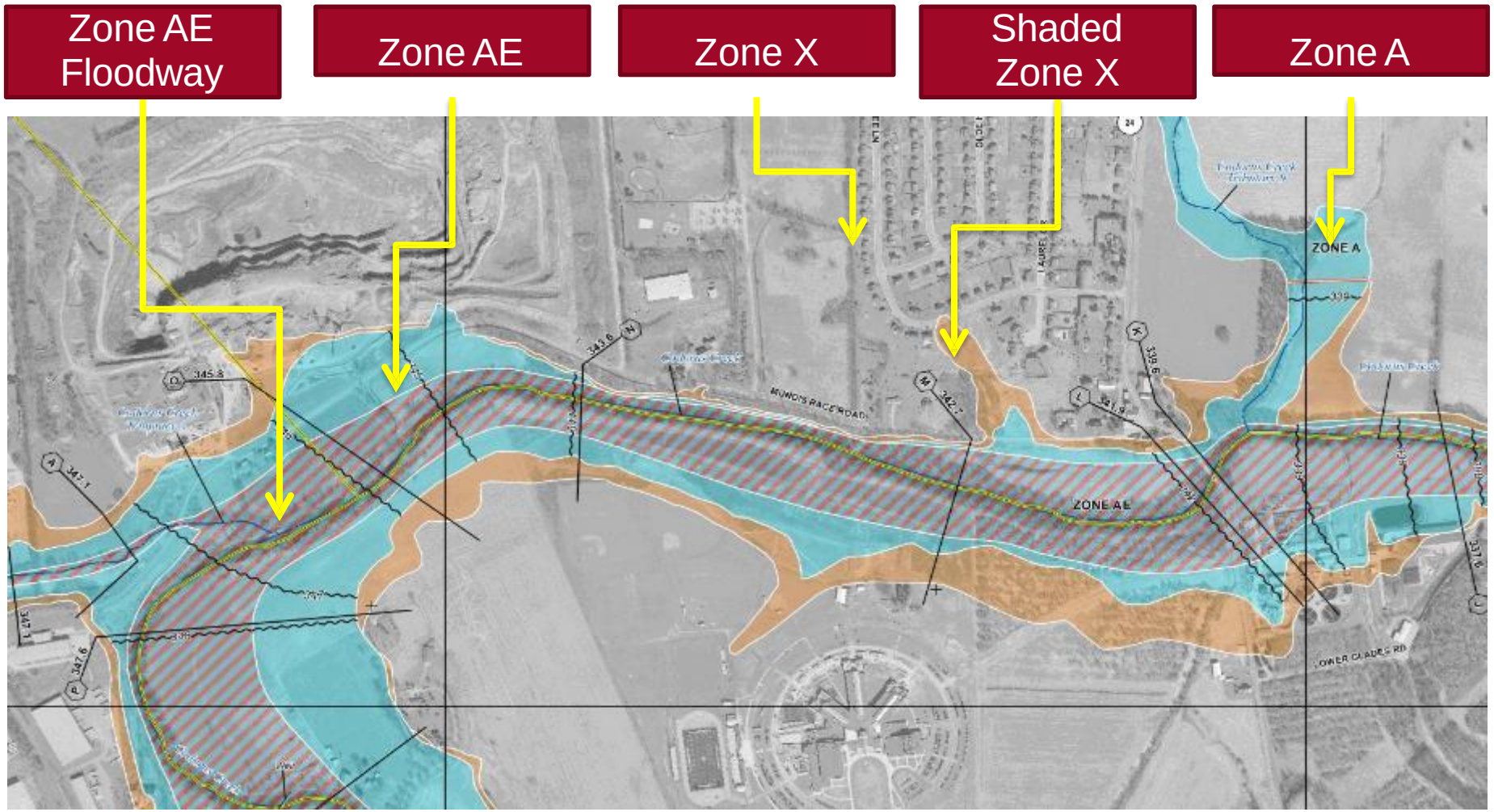
Flood Insurance Rate Maps and Studies

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)

MODERATE RISK

Regulatory Floodway

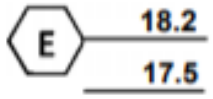
ZONE AE

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

ZONE A

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

0.2%-Annual-Chance Flood Hazard Area



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

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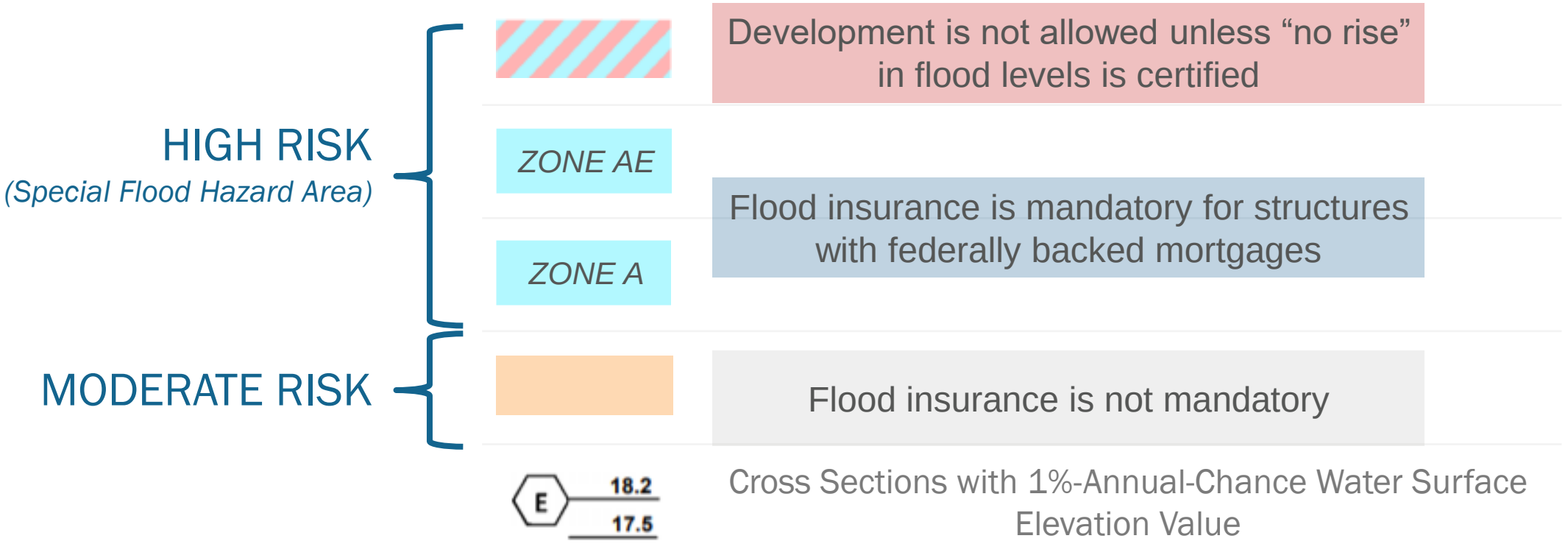
Floodplain Map Overview



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Study Overview

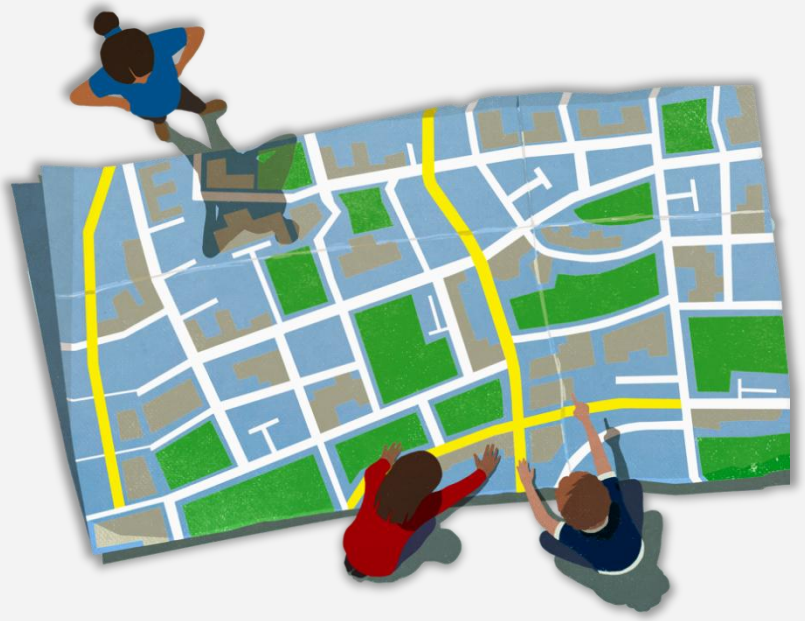
Revised Modeling and Mapping, including:

- 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” 1D Studies – 76 miles
- Detailed “Zone AE” 2D Studies – 24 miles
- Model-backed Approximate “Zone A” Studies – 300 miles
- Stillwater BFEs upstream of mapped SCS reservoirs
- Vertical datum updated from NGVD29 to NAVD88 (-0.4’)

Study Overview (continued)

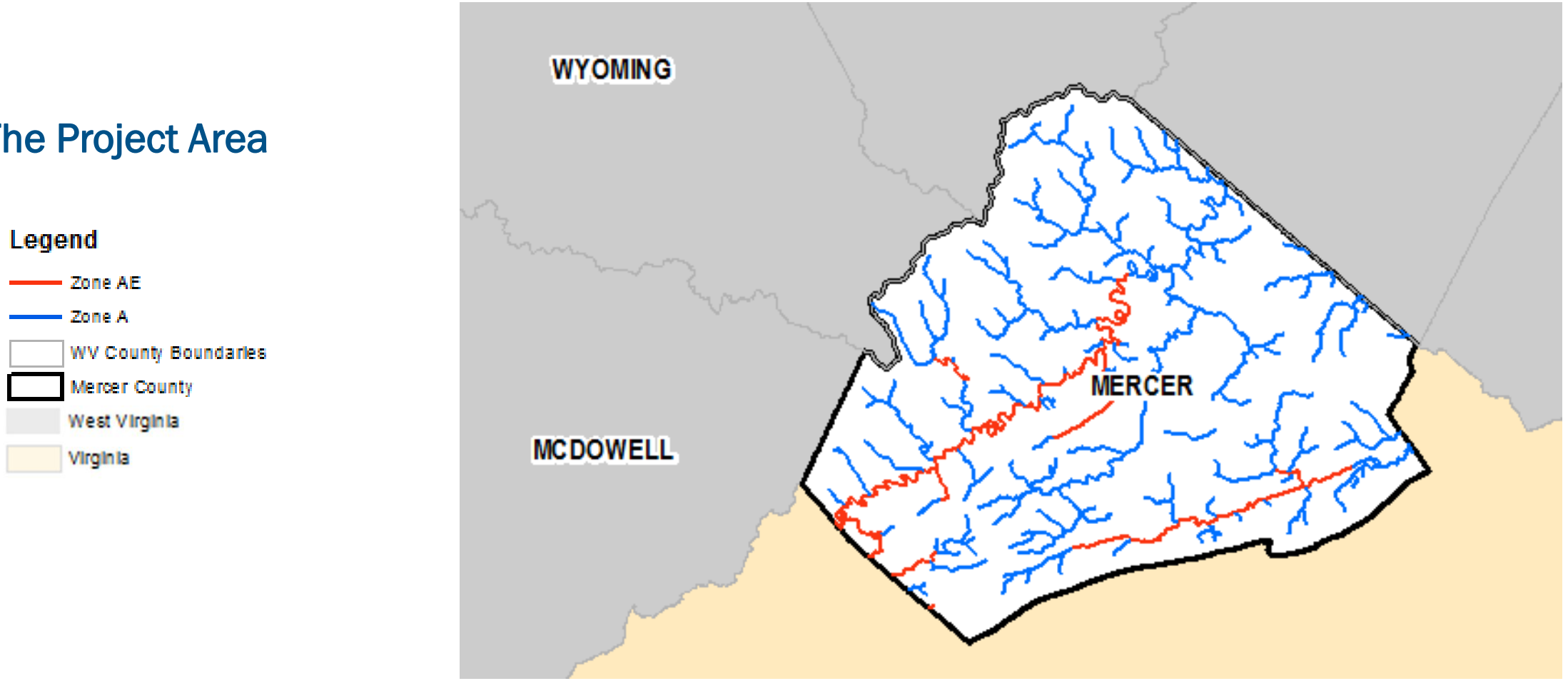
Revised Modeling and Mapping, including:

- ❑ 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

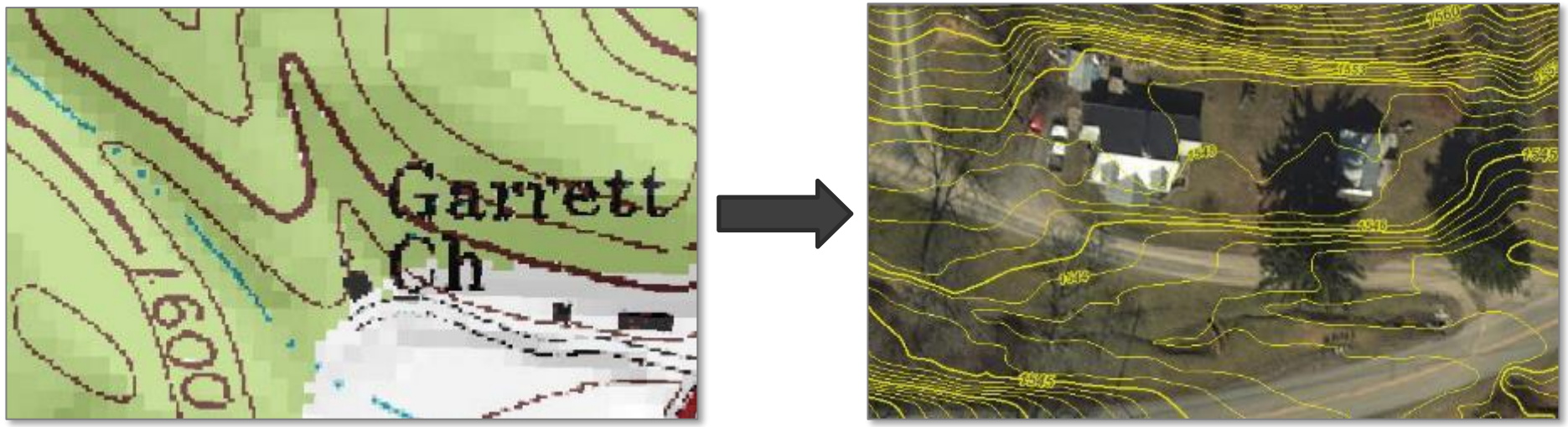


Topographic Data

2017 LiDAR-Based Digital Elevation Model

LiDAR = Light Detection and Ranging

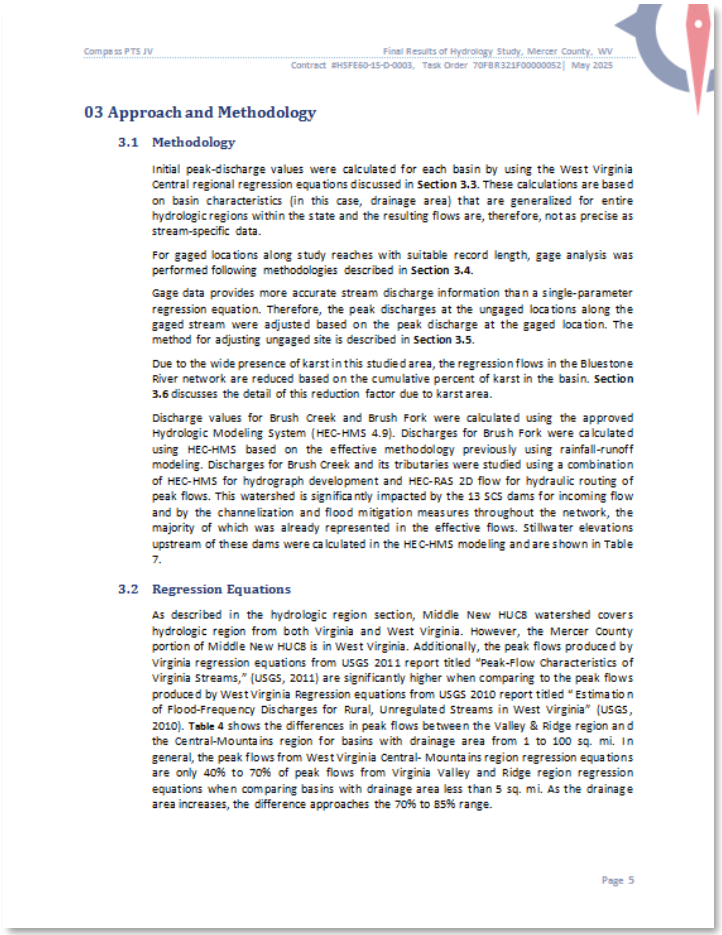
- *Uses light pulses and GPS to survey elevation data*
- *Improves the level of detail for hydraulic modeling and floodplain delineation*



Hydrologic Analyses

- Hydrologic study methods included:
  - USGS Regression Equations
  - Regression Equations Supplemented with USGS Gage Analysis (Bulletin 17C)
  - Regulated Flow Analysis – 13 SCS dams
  - Rainfall-runoff analysis
- 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



Compass PTS JV Final Results of Hydrology Study, Mercer County, WV
Contract #HSFE60-15-D-0003, Task Order 70FBR321F00000052| May 2025

03 Approach and Methodology

3.1 Methodology

Initial peak-discharge values were calculated for each basin by using the West Virginia Central regional regression equations discussed in **Section 3.3**. These calculations are based on basin characteristics (in this case, drainage area) that are generalized for entire hydrologic regions within the state and the resulting flows are, therefore, not as precise as stream-specific data.

For gaged locations along study reaches with suitable record length, gage analysis was performed following methodologies described in **Section 3.4**.

Gage data provides more accurate stream discharge information than a single-parameter regression equation. Therefore, the peak discharges at the ungaged locations along the gaged stream were adjusted based on the peak discharge at the gaged location. The method for adjusting ungaged site is described in **Section 3.5**.

Due to the wide presence of karst in this studied area, the regression flows in the Bluestone River network are reduced based on the cumulative percent of karst in the basin. **Section 3.6** discusses the detail of this reduction factor due to karst area.

Discharge values for Brush Creek and Brush Fork were calculated using the approved Hydrologic Modeling System (HEC-HMS 4.9). Discharges for Brush Fork were calculated using HEC-HMS based on the effective methodology previously using rainfall-runoff modeling. Discharges for Brush Creek and its tributaries were studied using a combination of HEC-HMS for hydrograph development and HEC-RAS 2D flow for hydraulic routing of peak flows. This watershed is significantly impacted by the 13 SCS dams for incoming flow and by the channelization and flood mitigation measures throughout the network, the majority of which was already represented in the effective flows. Stillwater elevations upstream of these dams were calculated in the HEC-HMS modeling and are shown in Table 7.

3.2 Regression Equations

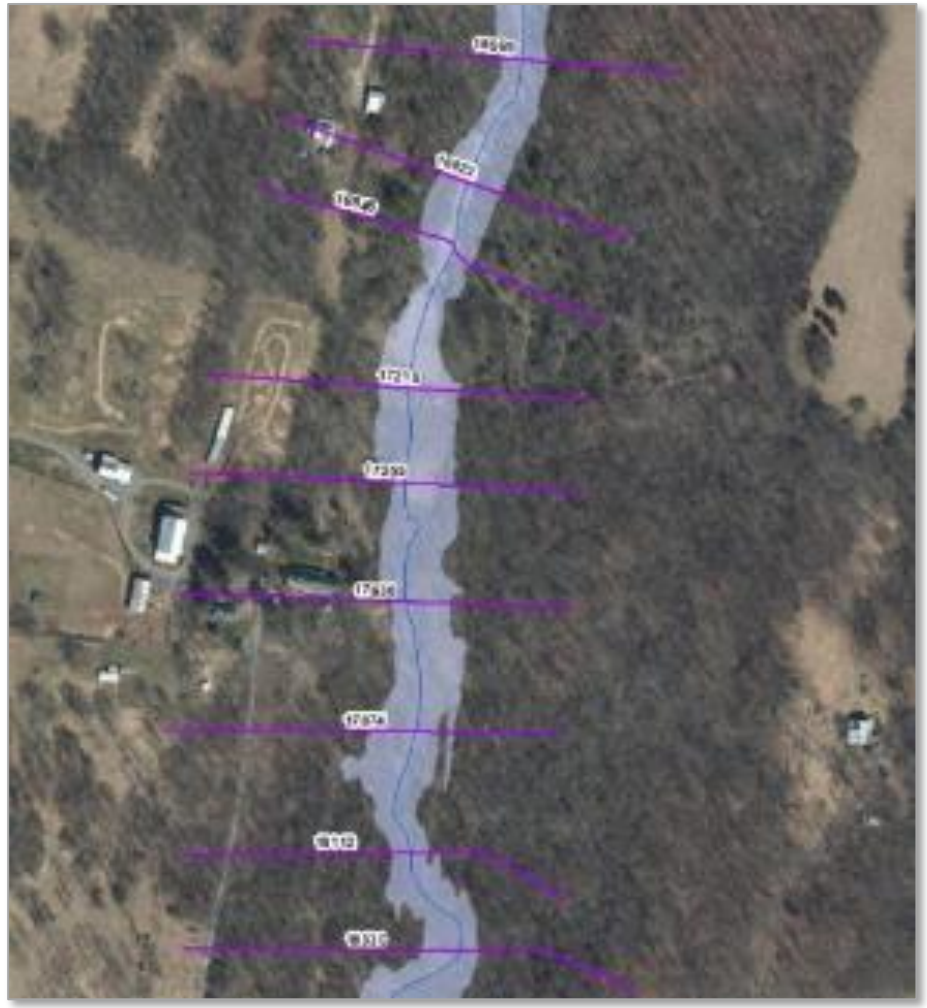
As described in the hydrologic region section, Middle New HUC8 watershed covers hydrologic region from both Virginia and West Virginia. However, the Mercer County portion of Middle New HUC8 is in West Virginia. Additionally, the peak flows produced by Virginia regression equations from USGS 2011 report titled "Peak-Flow Characteristics of Virginia Streams," (USGS, 2011) are significantly higher when comparing to the peak flows produced by West Virginia Regression equations from USGS 2010 report titled "Estimation of Flood-Frequency Discharges for Rural, Unregulated Streams in West Virginia" (USGS, 2010). **Table 4** shows the differences in peak flows between the Valley & Ridge region and the Central-Mountains region for basins with drainage area from 1 to 100 sq. mi. In general, the peak flows from West Virginia Central- Mountains region regression equations are only 40% to 70% of peak flows from Virginia Valley and Ridge region regression equations when comparing basins with drainage area less than 5 sq. mi. As the drainage area increases, the difference approaches the 70% to 85% range.

Page 5

Hydraulic Analyses – Zone A

Approximate "Zone A" Base Level Study (300 miles)

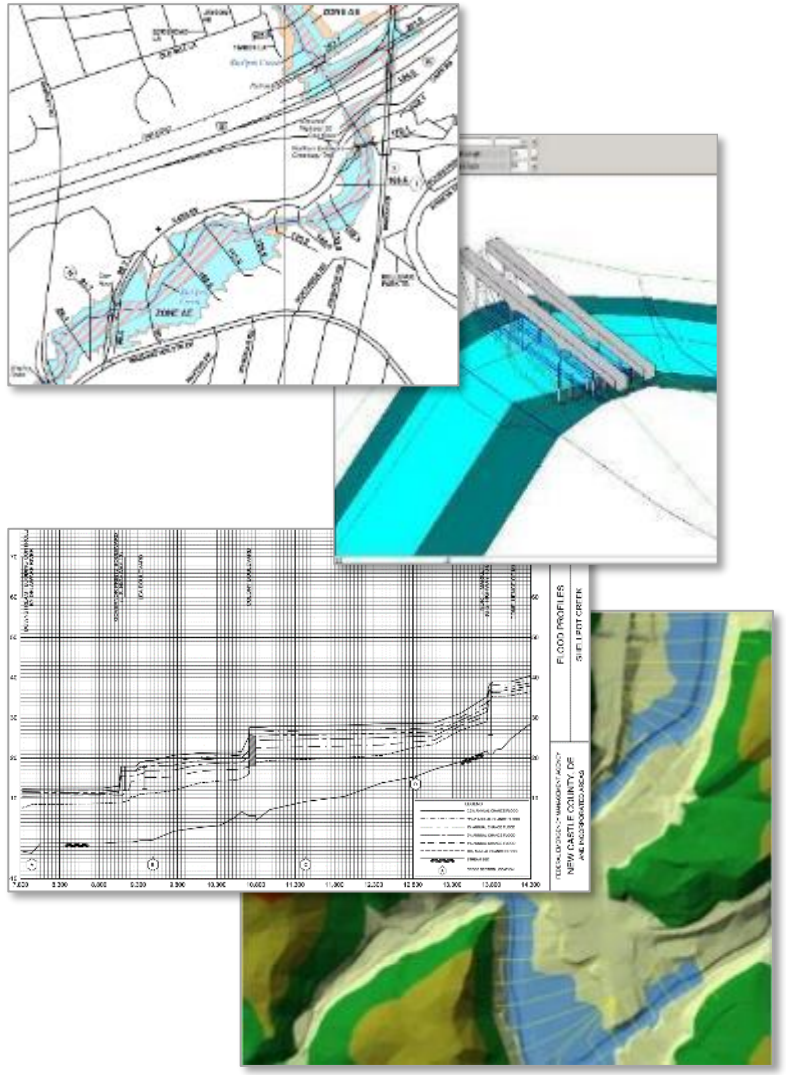
- Generally used in areas with lower development or lower development potential
- Cross sections generated from LiDAR (automated processes)
  - No bathymetric survey (approximated trapezoidal channel)
  - No hydraulic structures are surveyed or modeled (some exceptions for 2D Zone A)
- FIRM **will not** 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



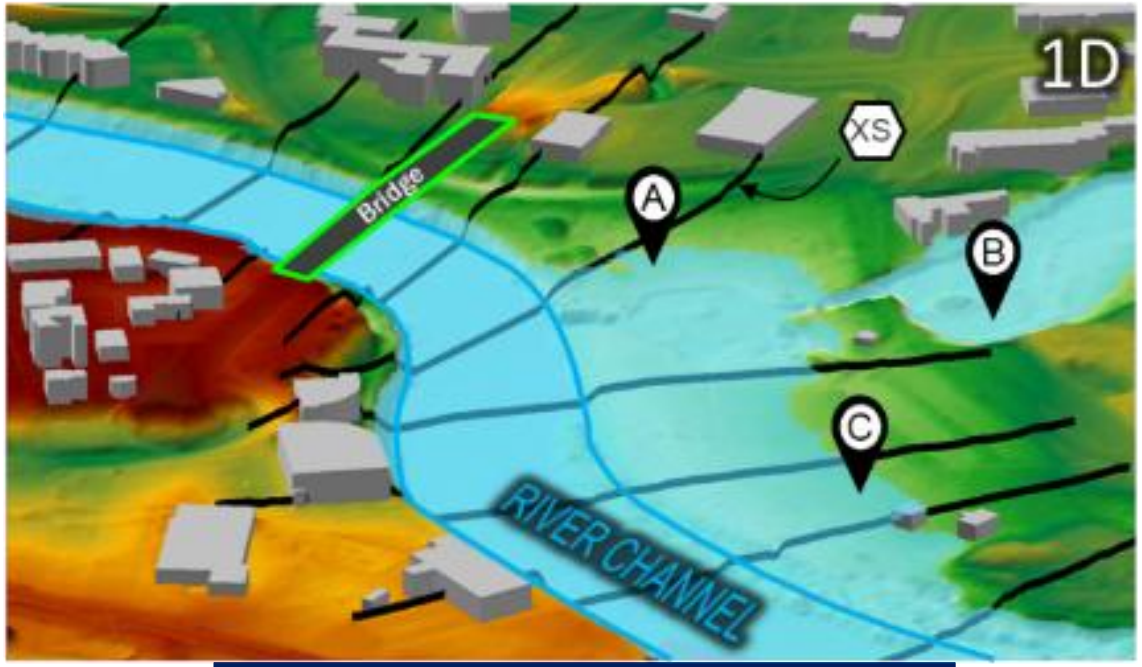
Hydraulic Analyses – Zone AE

Detailed "Zone AE" Study (1D 76 miles, 2D 24 miles)

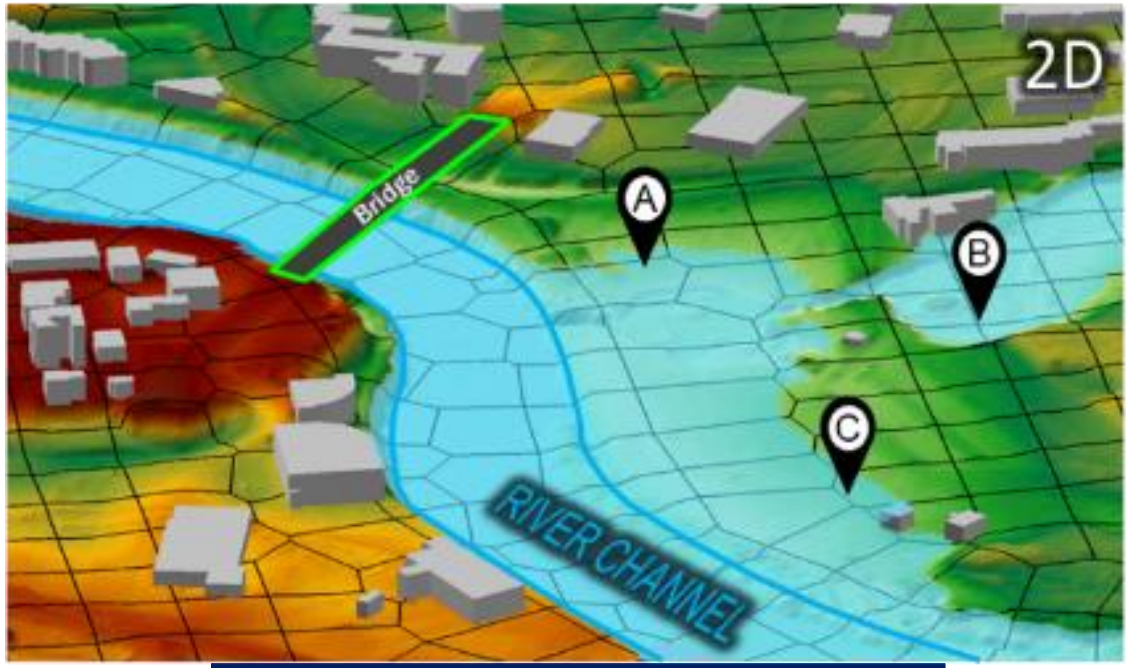
- Generally used in areas with higher development or higher development potential
- Cross sections use information from survey and field reconnaissance
  - Include channel bathymetry
  - Structures are modeled (e.g., culverts, bridges)
- Detailed hydraulic parameter refinement (coefficients, obstructions, 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)



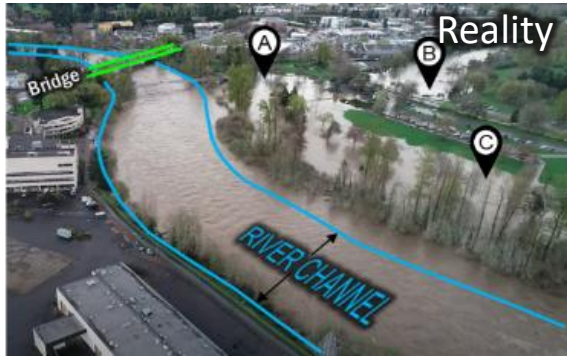
Hydraulic Analyses – 1D vs 2D



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



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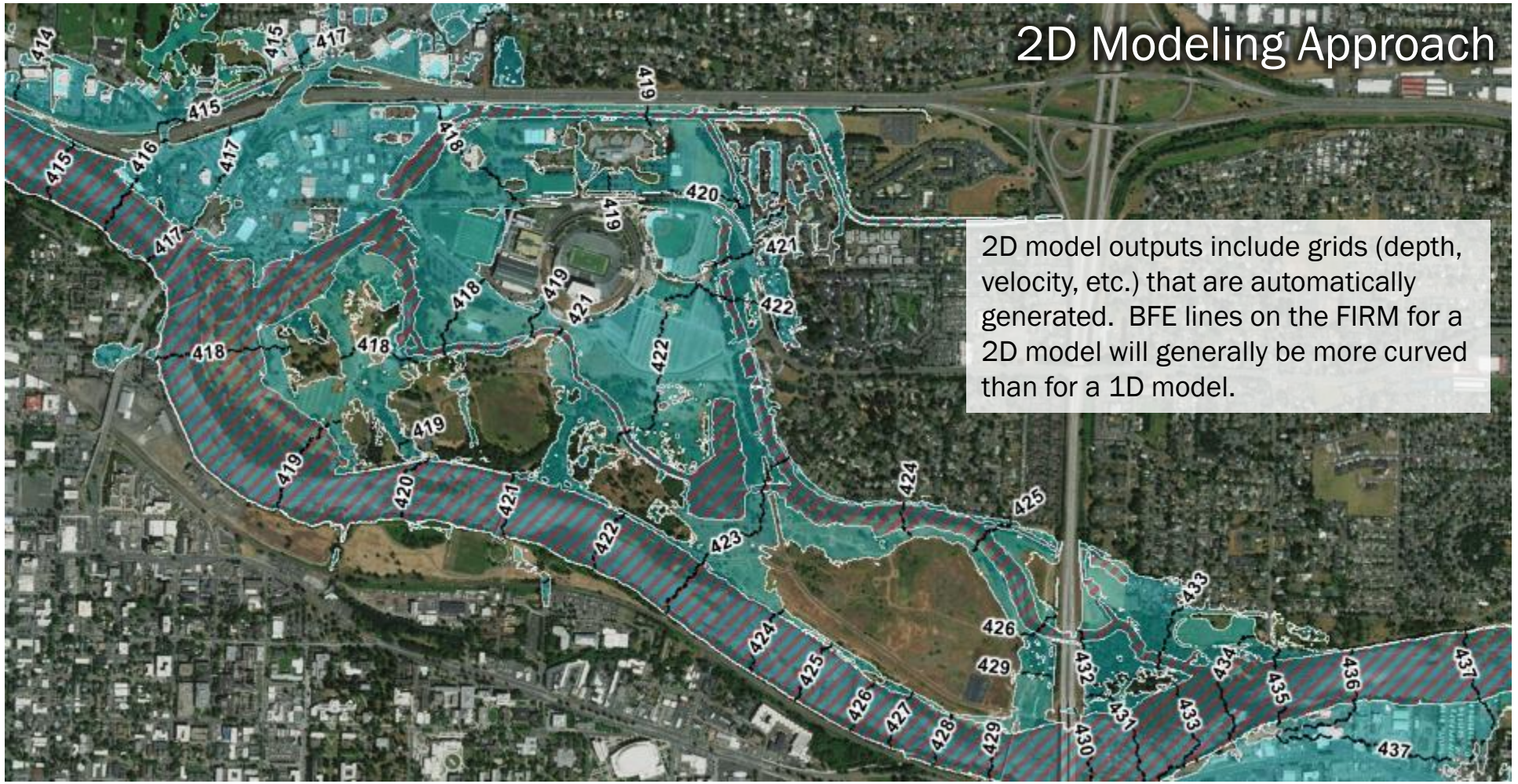
Example 2D Modeling – Unsteady Flow

Example 2D Modeling – FIRM Depiction



Study Impacts

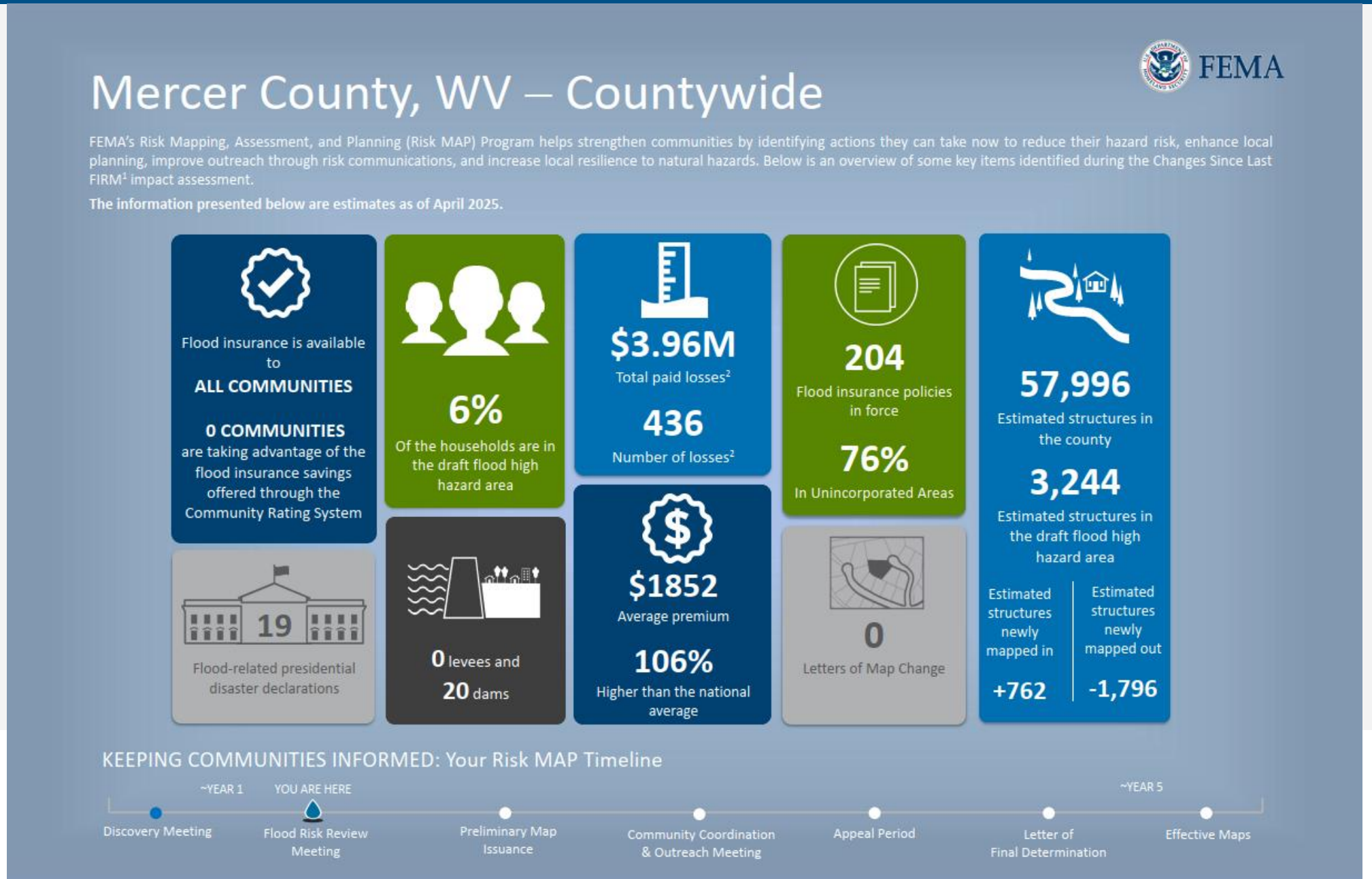
Significant Impacts Overview

- 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.
- More structures will be mapped out than mapped in.

SFHA Updated Map Conditions

Remaining in SFHA	Newly Mapped in SFHA	Newly Mapped Out of SFHA	Total Structures in New SFHA
2,482	762	1,796	3,244

Flood Risk Dashboard

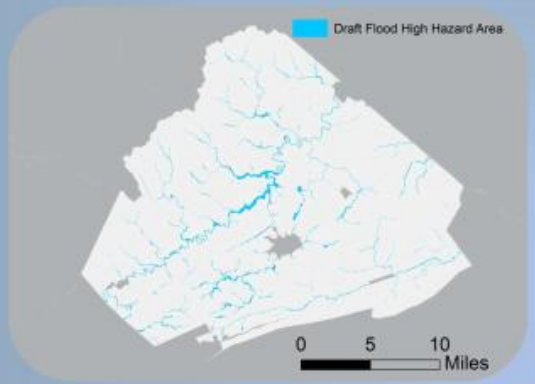


Flood Risk Dashboard

FEMA

Unincorporated Areas/Mercer 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



$2,417,466
Total paid losses[2]

337
Total paid claims[2]

02/01/1985
Initial FIRM[1] date

03/02/2005
Effective FIRM date

45,987
Estimated structures in the community

2,883
Estimated structures in the draft flood high hazard area

Estimated structures newly mapped in	Estimated structures newly mapped out
+688	-1496

156
Flood insurance policies in force

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

19
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
- Effective Maps

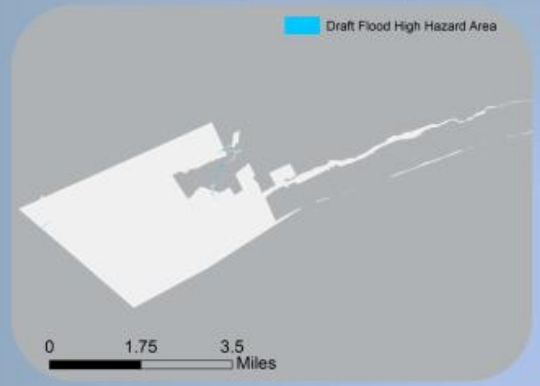
~YEAR 5

Flood Risk Dashboard

FEMA

City of Bluefield/Mercer 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



$129,914
Total paid losses[2]

20
Total paid claims[2]

03/02/2005
Initial FIRM[1] date

03/02/2005
Effective FIRM date

5,986
Estimated structures in the community

4
Estimated structures in the draft flood high hazard area

Estimated structures newly mapped in	Estimated structures newly mapped out
+1	-4

1
Flood insurance policies in force

0%
Of the households are in the draft flood high hazard area

19
Flood-related countywide presidential disaster declarations

KEEPING COMMUNITIES INFORMED: Your Risk MAP Timeline

~YEAR 1 — YOU ARE HERE — ~YEAR 5

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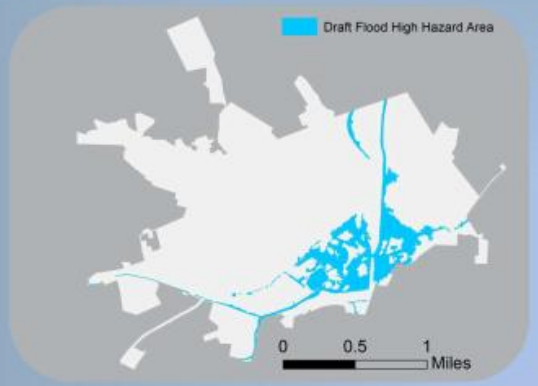
Flood Risk Dashboard

FEMA

City of Princeton/Mercer 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



$1,242,024
Total paid losses[2]

49
Total paid claims[2]

02/01/1984
Initial FIRM[1] date

03/02/2005
Effective FIRM date

4,928
Estimated structures in the community

228
Estimated structures in the draft flood high hazard area

Estimated structures newly mapped in	Estimated structures newly mapped out
+17	-290

43
Flood insurance policies in force

5%
Of the households are in the draft flood high hazard area

19
Flood-related countywide presidential disaster declarations

KEEPING COMMUNITIES INFORMED: Your Risk MAP Timeline

~YEAR 1 — YOU ARE HERE — ~YEAR 5

- Flood Risk Review Meeting
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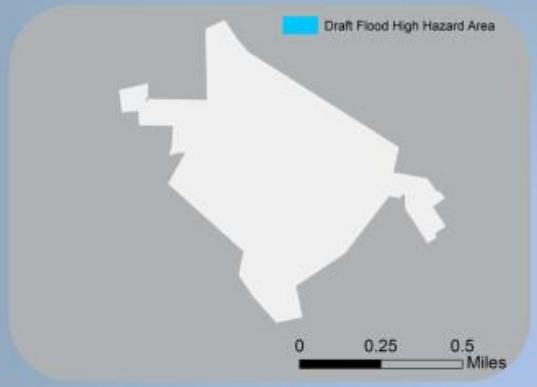
Flood Risk Dashboard

FEMA

Town of Athens/Mercer 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



$0
Total paid losses[2]

0
Total paid claims[2]

03/02/2005
Initial FIRM[1] date

03/02/2005
Effective FIRM date

599
Estimated structures in the community

0
Estimated structures in the draft flood high hazard area

Estimated structures newly mapped in **+0**

Estimated structures newly mapped out **-0**

0
Flood insurance policies in force

0%
Of the households are in the draft flood high hazard area

19
Flood-related countywide presidential disaster declarations

KEEPING COMMUNITIES INFORMED: Your Risk MAP Timeline

~YEAR 1 — YOU ARE HERE

- Flood Risk Review Meeting
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- Appeal Period
- Letter of Final Determination

~YEAR 5

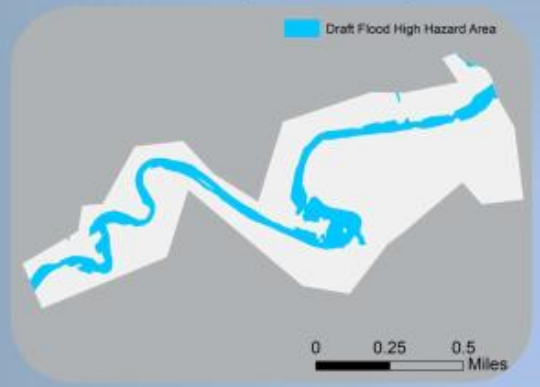
- Effective Maps

Flood Risk Dashboard

FEMA

Town of Bramwell/Mercer 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



$29,106
Total paid losses[2]

7
Total paid claims[2]

12/01/1983
Initial FIRM[1] date

03/02/2005
Effective FIRM date

373
Estimated structures in the community

91
Estimated structures in the draft flood high hazard area

Estimated structures newly mapped in **+55**

Estimated structures newly mapped out **-4**

2
Flood insurance policies in force

24%
Of the households are in the draft flood high hazard area

19
Flood-related countywide presidential disaster declarations

KEEPING COMMUNITIES INFORMED: Your Risk MAP Timeline

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~YEAR 5

- Effective Maps

Flood Risk Dashboard

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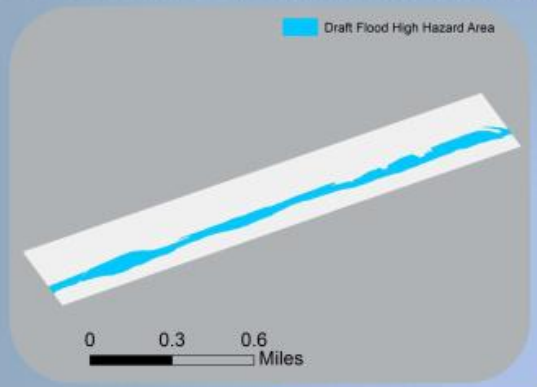
Town of Oakvale/Mercer County, WV

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



$73,029
Total paid losses[2]

12
Total paid claims[2]

12/15/1983
Initial FIRM[1] date

03/02/2005
Effective FIRM date

123
Estimated structures in the community

38
Estimated structures in the draft flood high hazard area

Estimated structures newly mapped in **+1**

Estimated structures newly mapped out **-2**

2
Flood insurance policies in force

31%
Of the households are in the draft flood high hazard area

19
Flood-related countywide presidential disaster declarations

KEEPING COMMUNITIES INFORMED: Your Risk MAP Timeline

~YEAR 1 — YOU ARE HERE

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- Community Coordination and Outreach Meeting
- Appeal Period
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~YEAR 5

- Effective Maps

Flood Risk Dashboard

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 3, 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

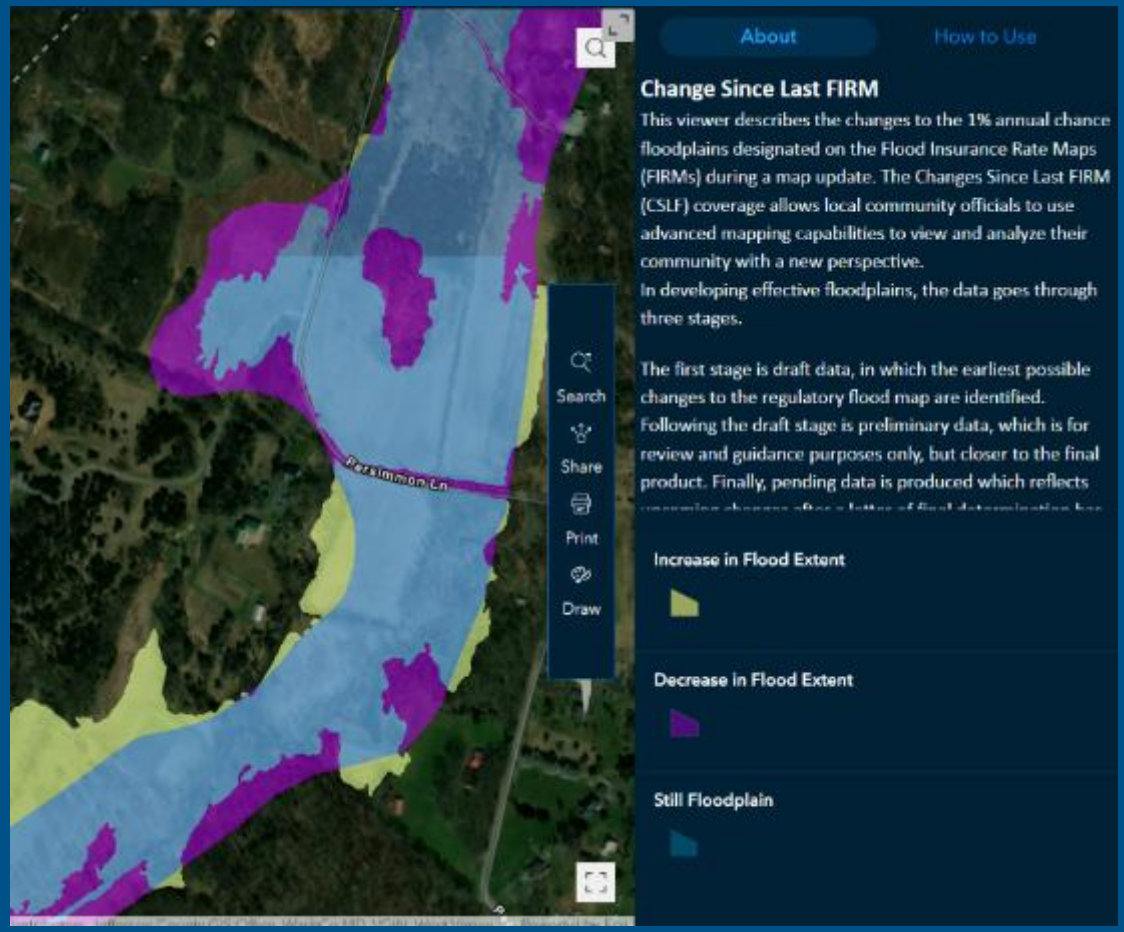
3. Letter of Final Determination issued following Appeal Period

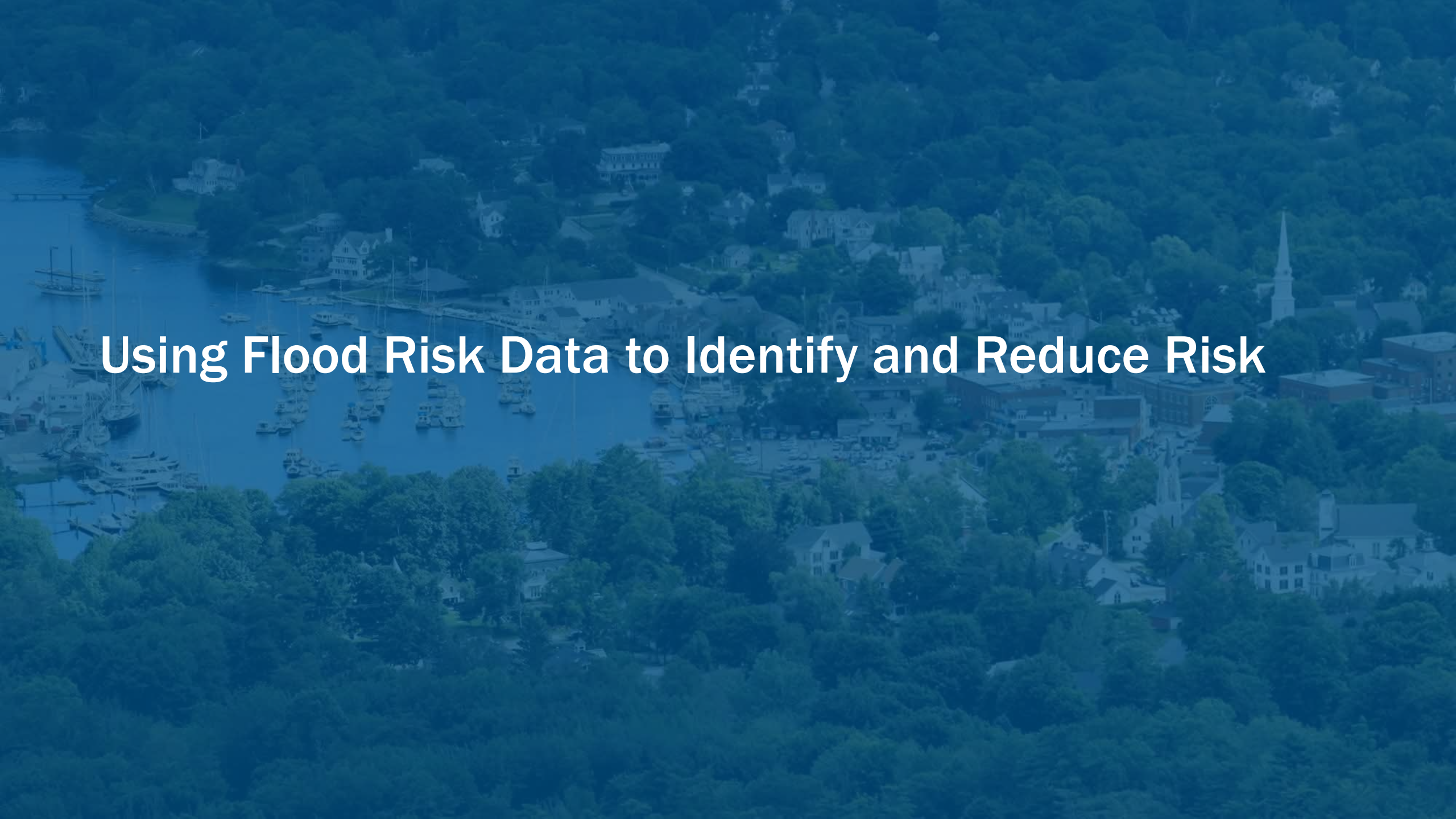
[1] Flood Insurance Rate Map / Flood Insurance Study (FIRM/FIS)

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

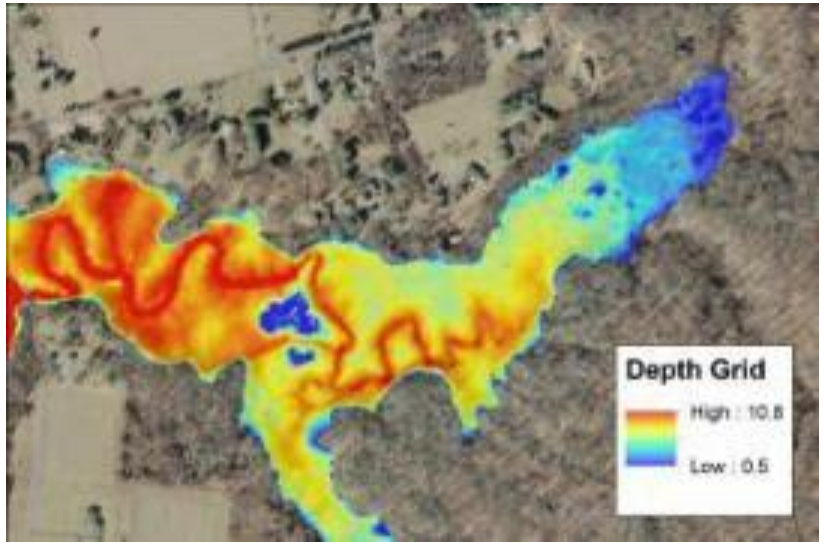




Using Flood Risk Data to Identify and Reduce Risk

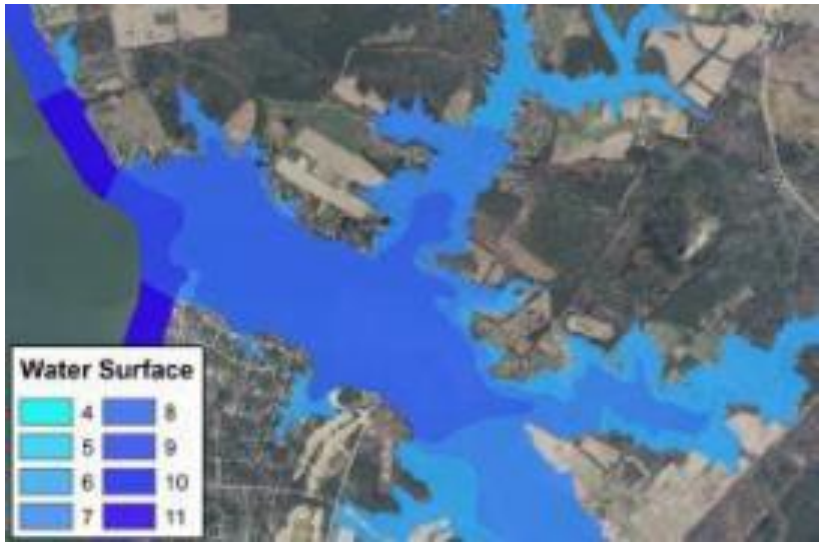
FEMA Flood Risk GIS Datasets

Flood Depth Grids



Changes Since Last FIRM

Water Surface Elevation Grids



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Where to Find Flood Risk Data

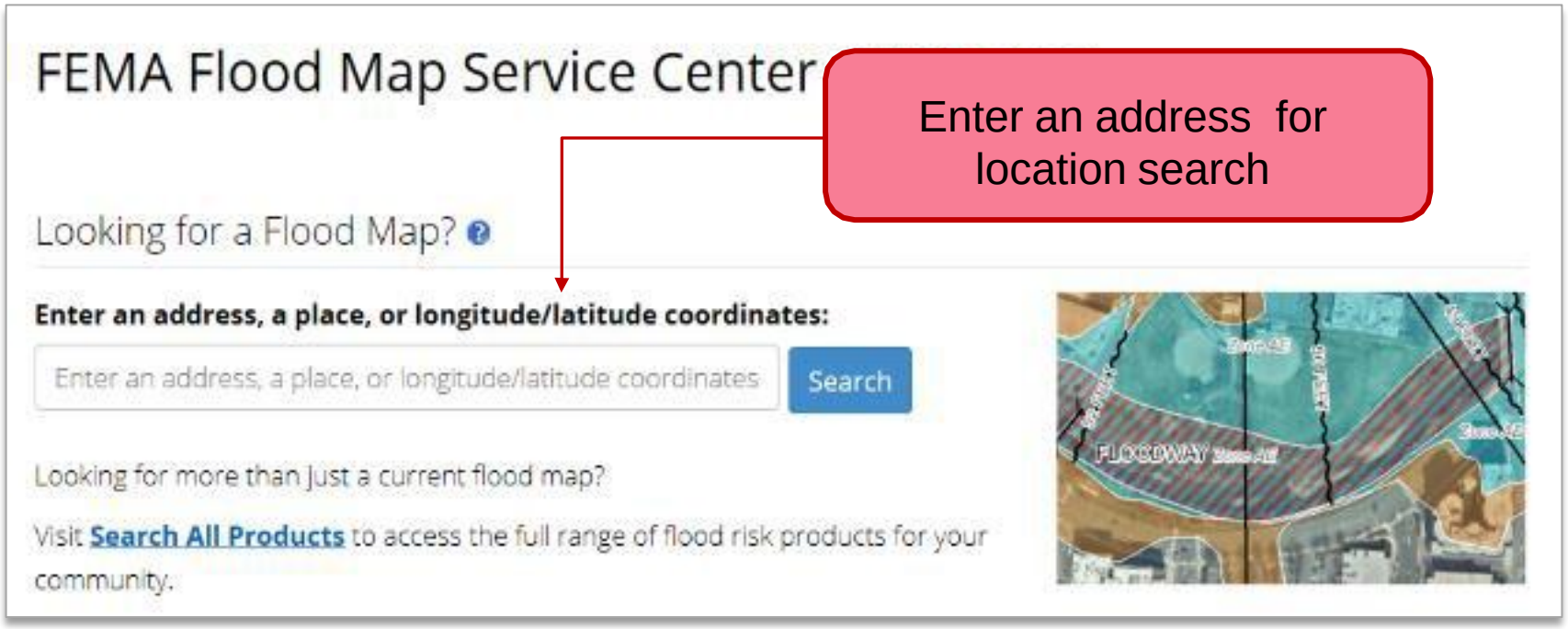
- FEMA's Flood Map Service Center (MSC)
  - Here, you can view effective maps online. You can also download current effective flood hazard data and additional hazard and risk data.
  - https://msc.fema.gov/portal/home

- 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

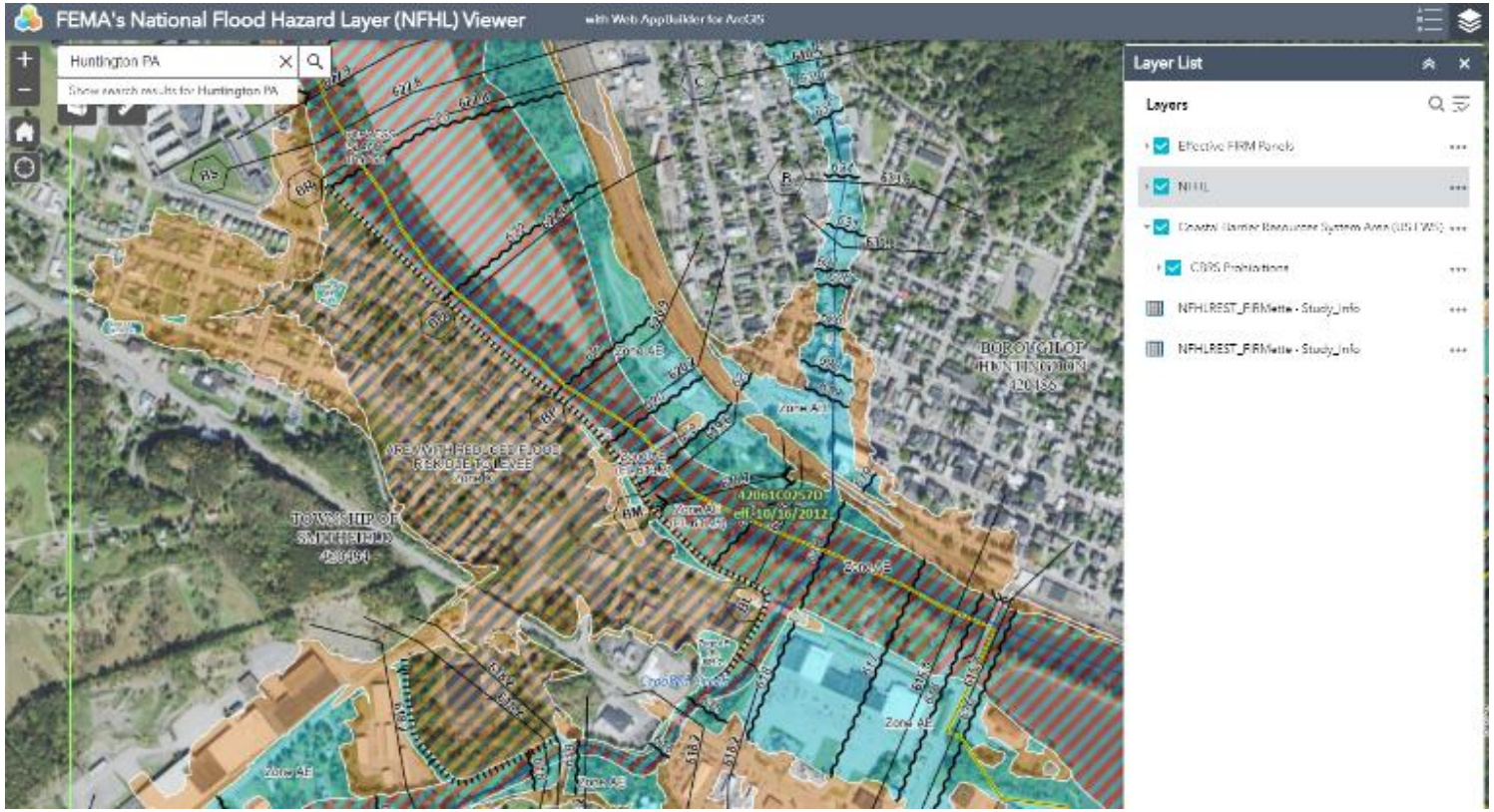
Where Can I Find My Flood Maps?

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



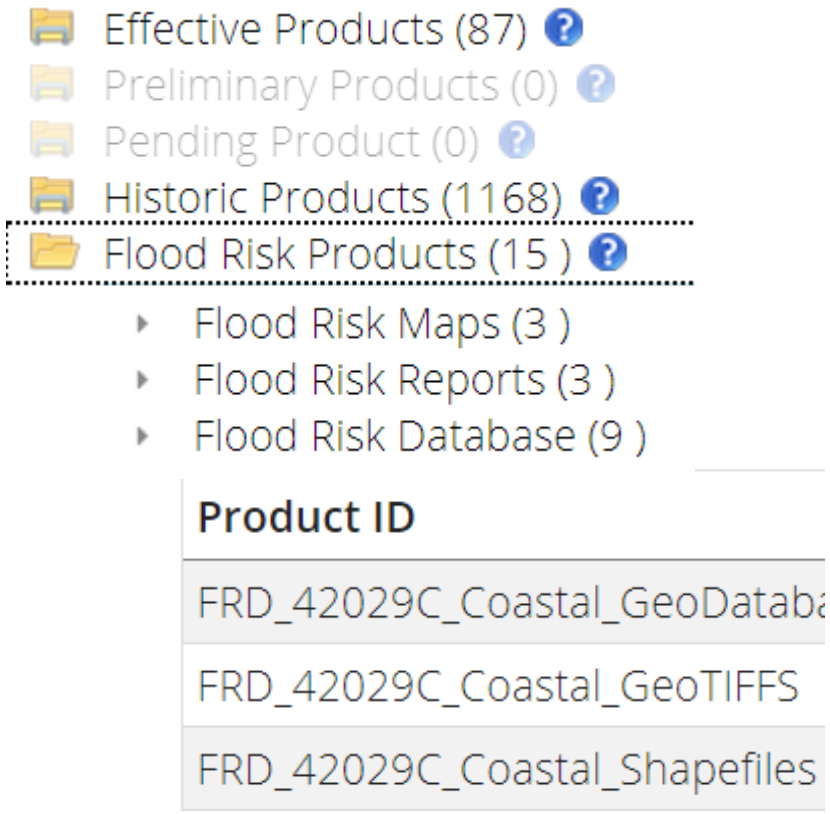
National Flood Hazard Layer

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.

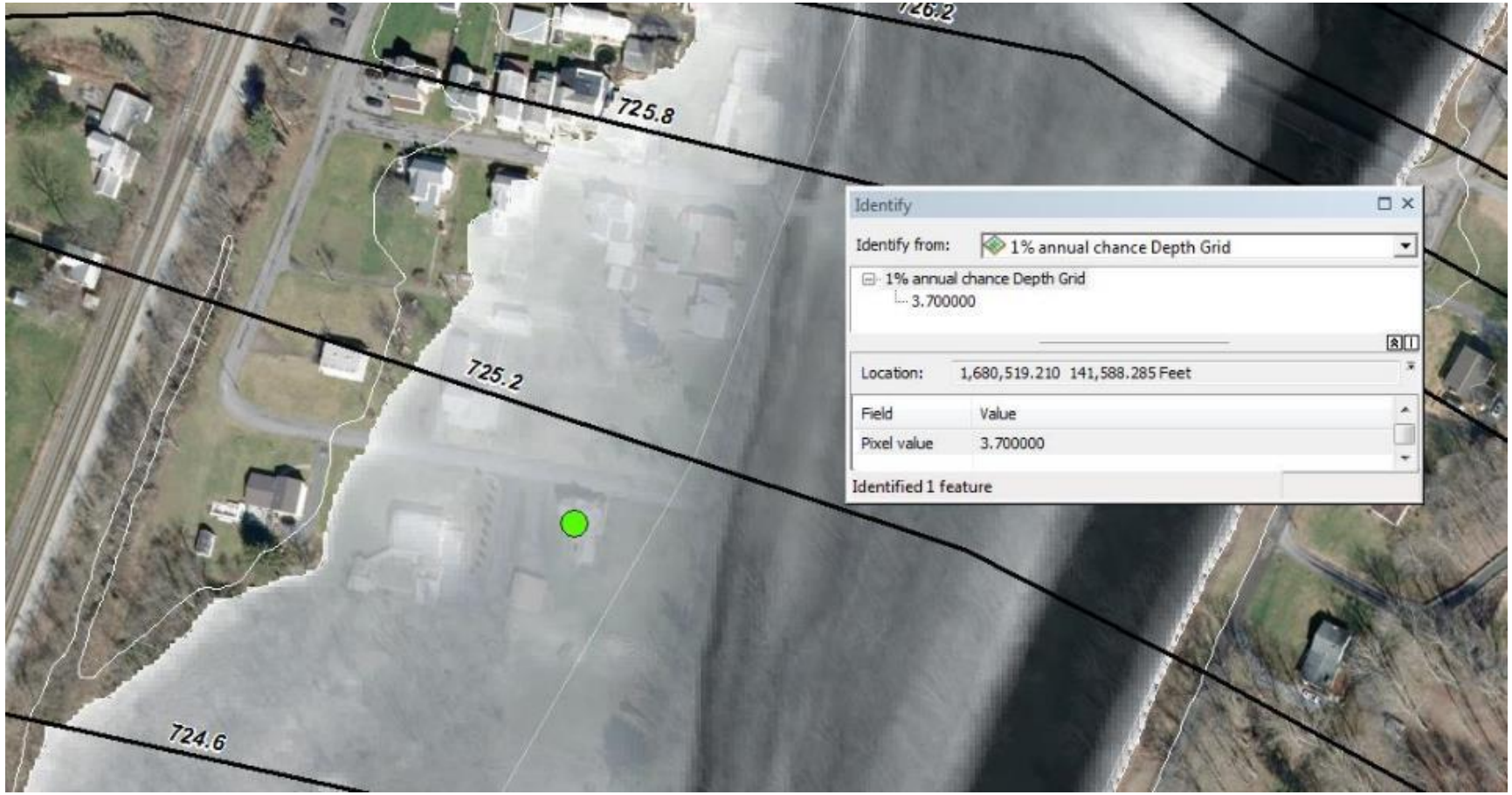


Water Surface Elevation Grids

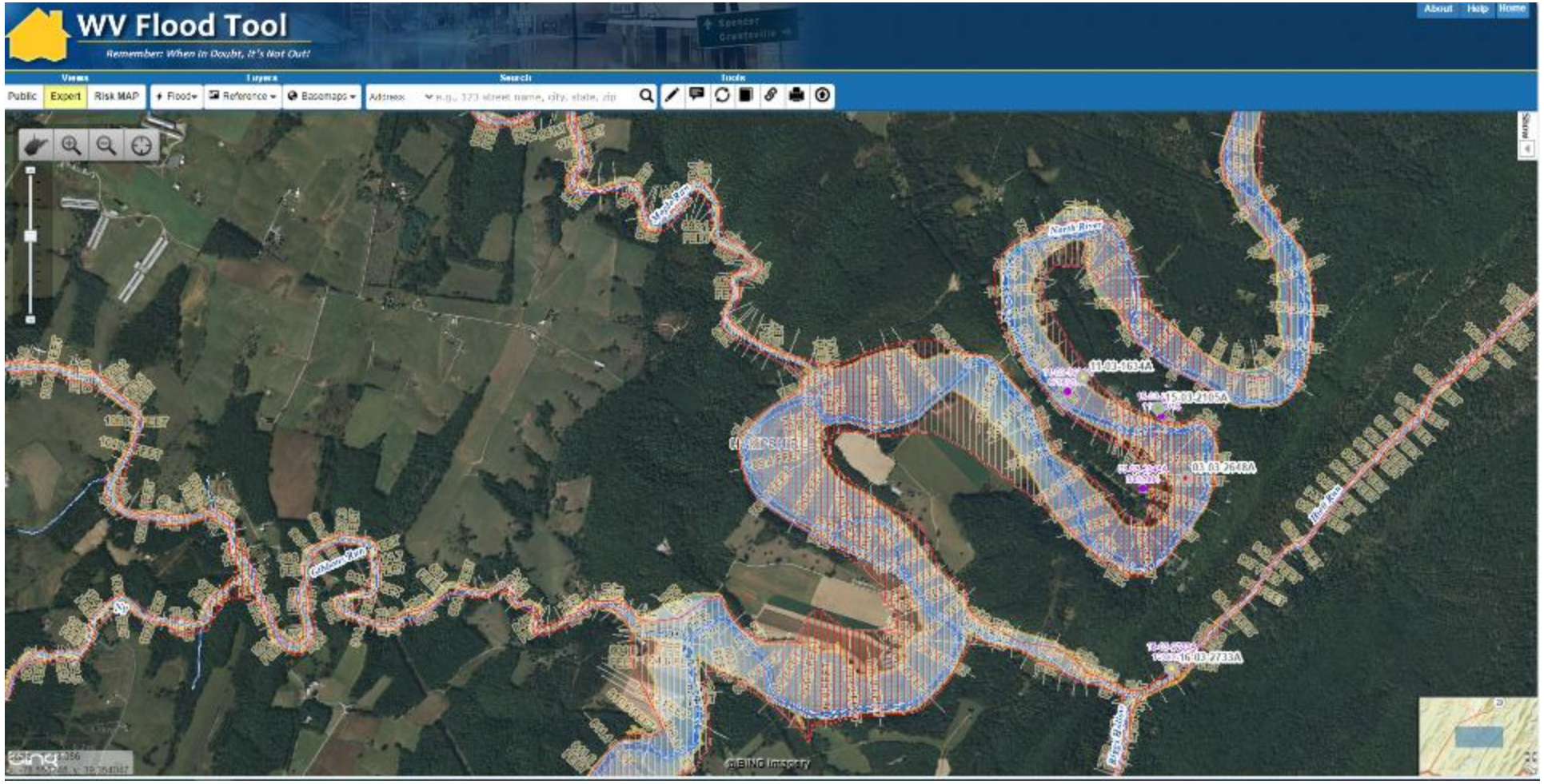
Represents the continuous water surface elevations (as determined at modeled cross sections and interpolated between cross sections) for each of the modeled flood frequencies.

Depth Grids

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



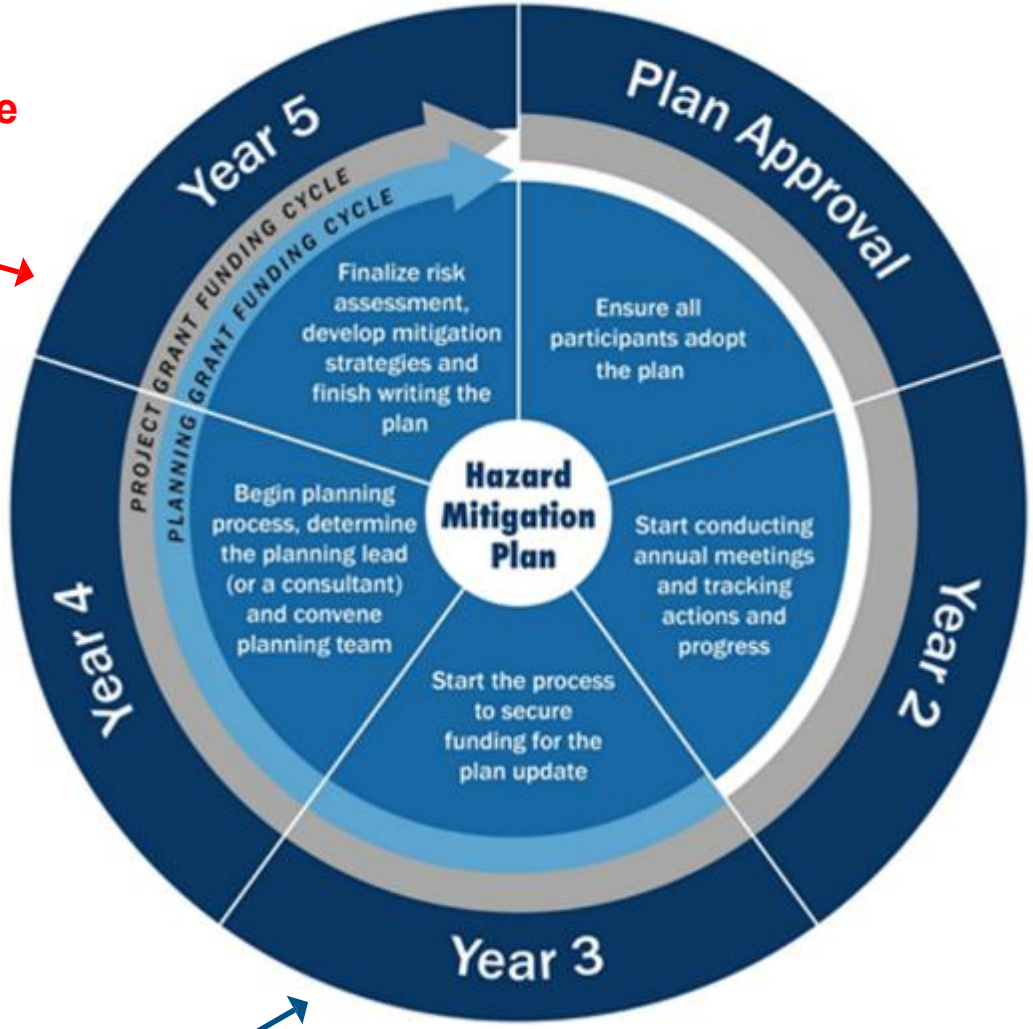
West Virginia Flood Risk Tool



[WV Flood Tool (mapwv.gov)]

Flood Hazard Mitigation Planning

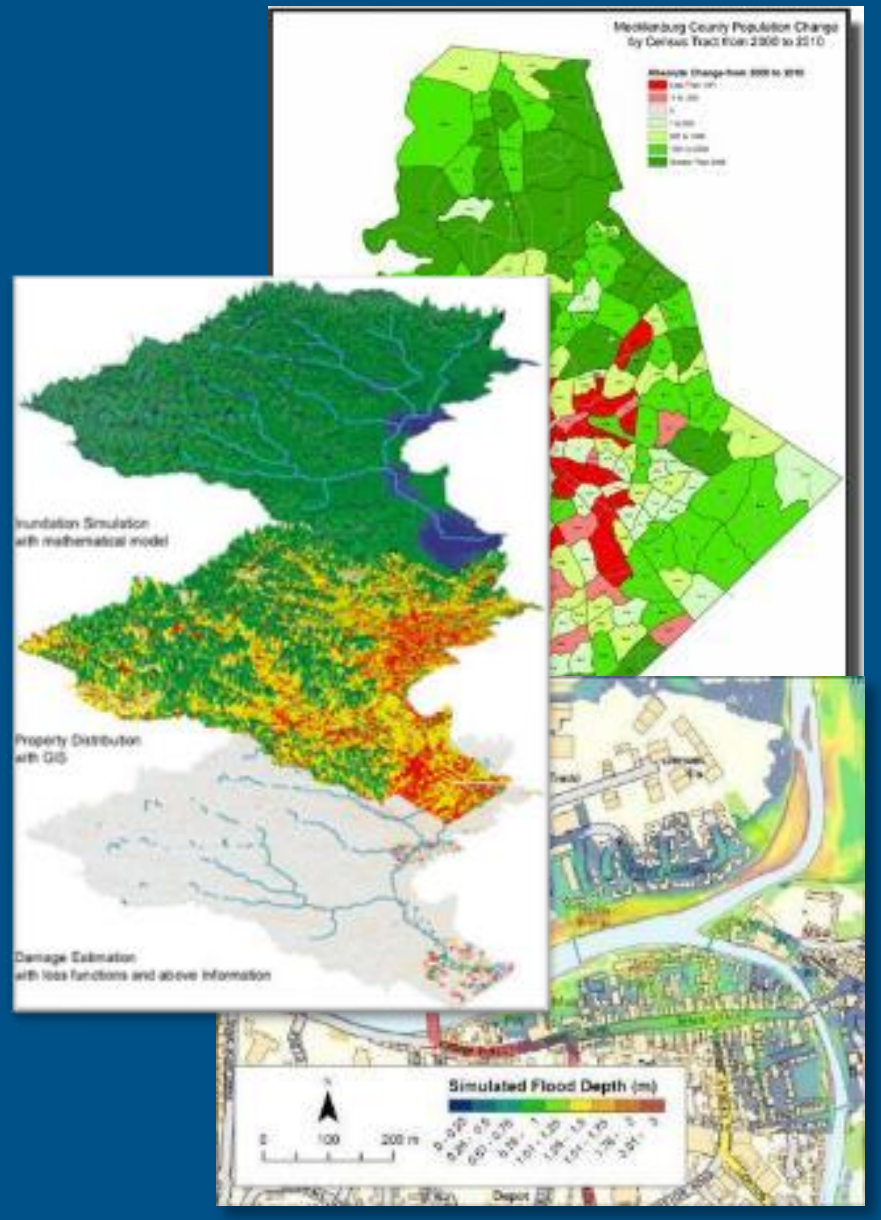
It's time to update the risk assessment in your hazard mitigation plan



The West Virginia State HMP is here

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

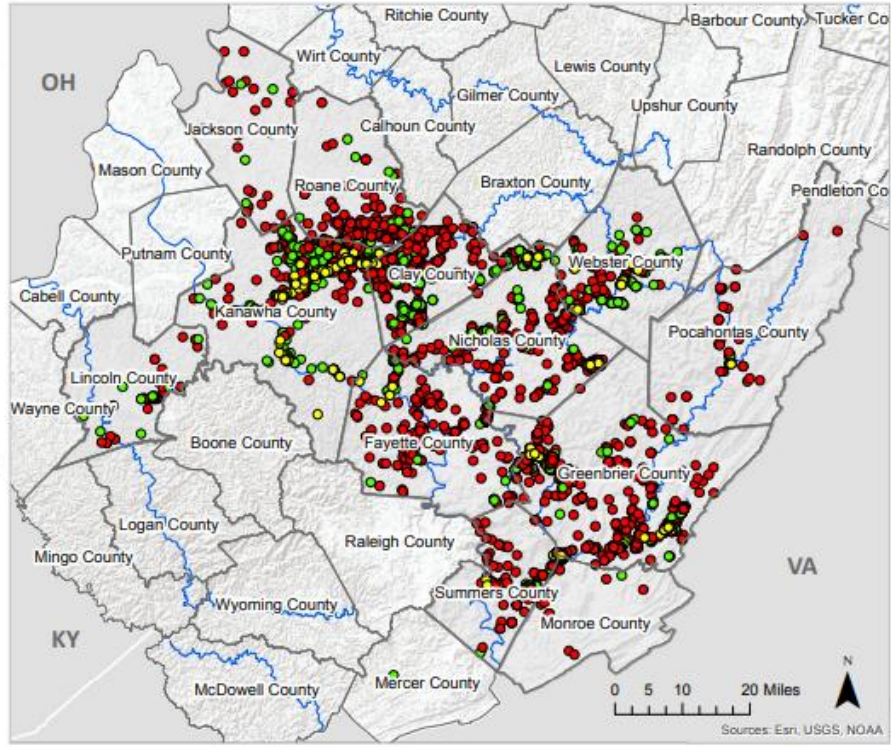


FIGURE 8: Location of NFIP Claims and Individual Assistance Applications. (green = inside 1% annual chance floodplain; yellow = inside 0.2% annual chance floodplain; red = outside mapped floodplain)

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

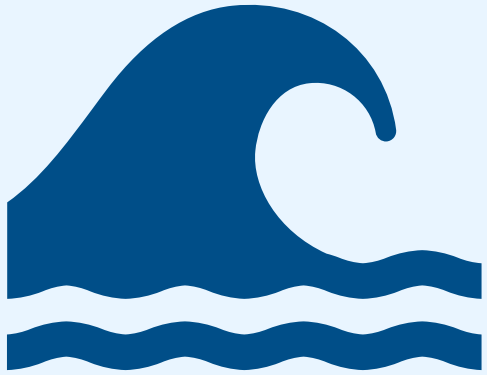
Share with permitting, planning, and other colleagues to direct development outside of the SFHA today and in future

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

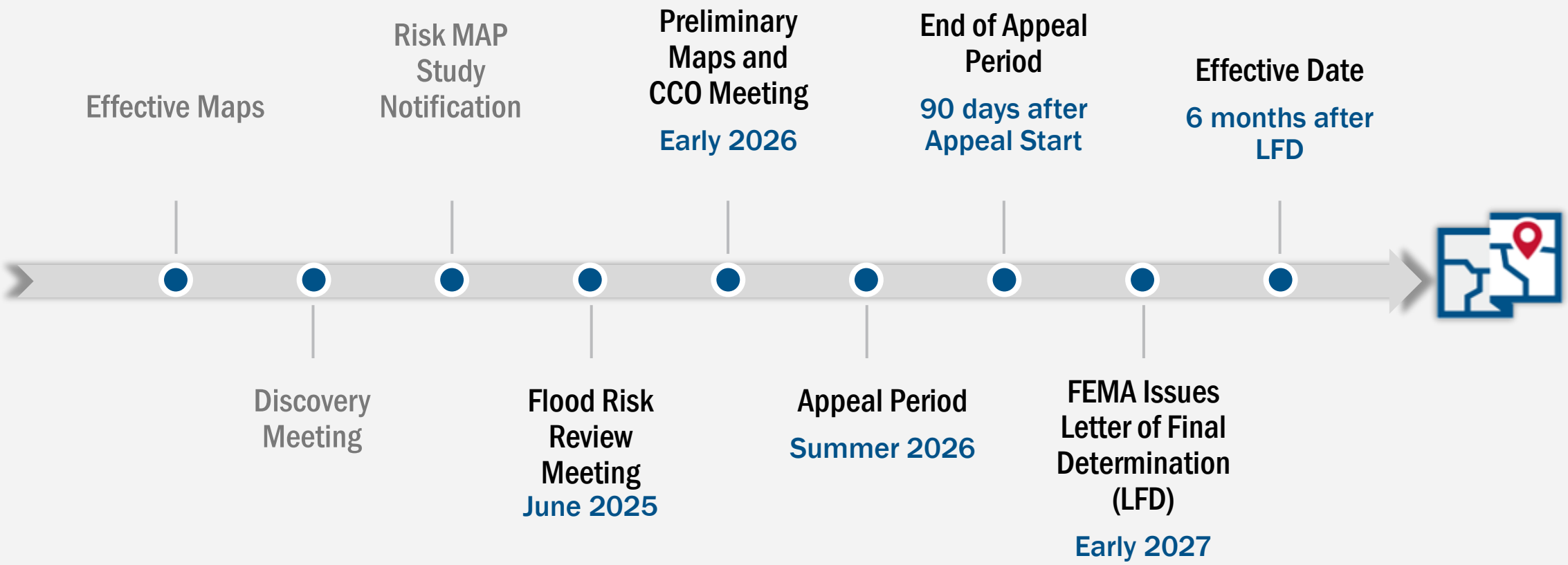
Build it right and lower the impact of future flood losses while improving resiliency



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!***

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