RiskMAP
Increasing Resilience Together

Flood Risk Review (FRR) Meeting

Monroe County, West Virginia
May 31, 2022

FEMA

Agenda

- Welcome and Introductions
- Where We Are - Draft Maps
- Flood Study Update
- Using Flood Risk Data to Reduce Risk
- Map Changes and Flood Insurance
- Discussion

Welcome and Introductions

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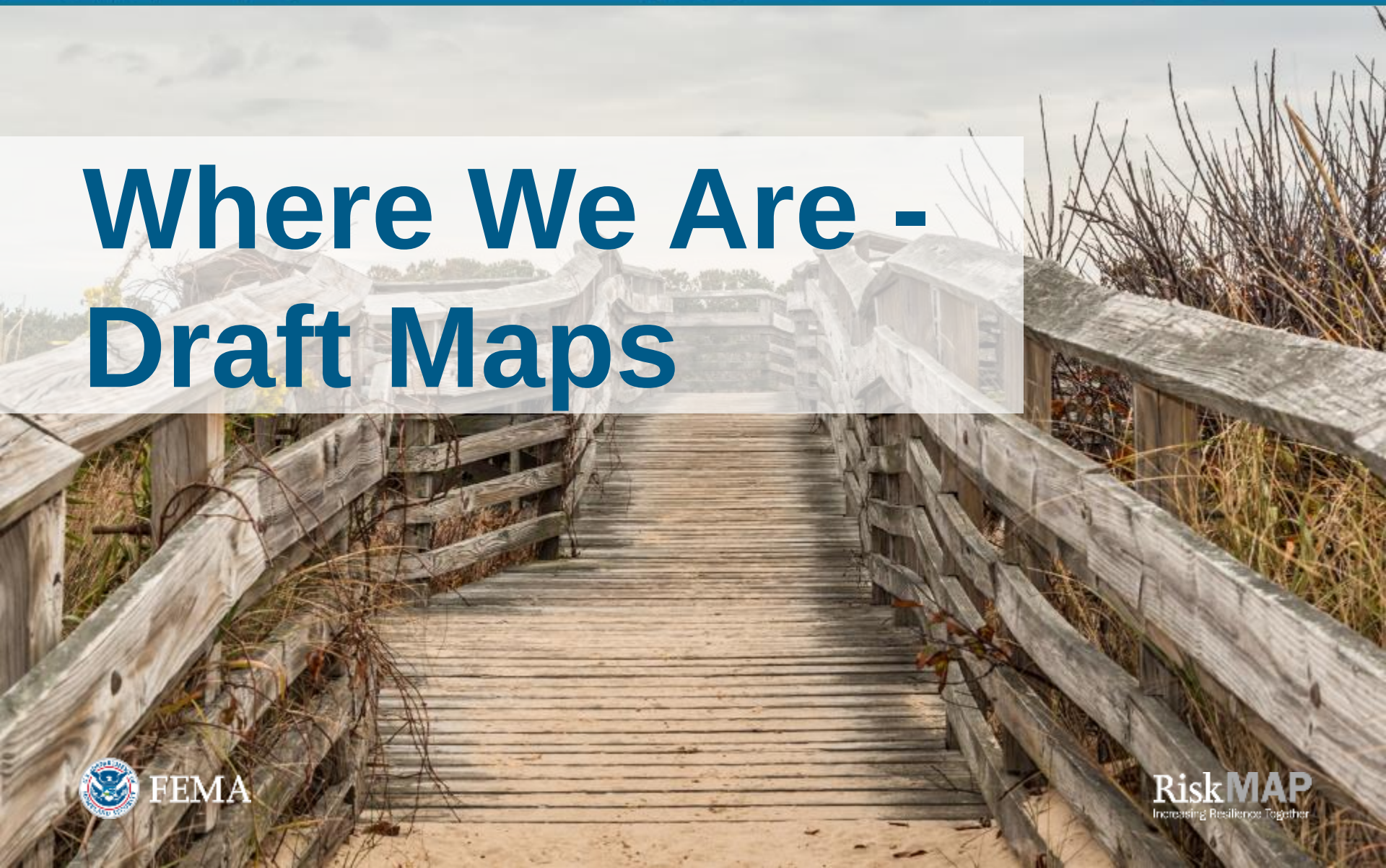
Where We Are - Draft Maps



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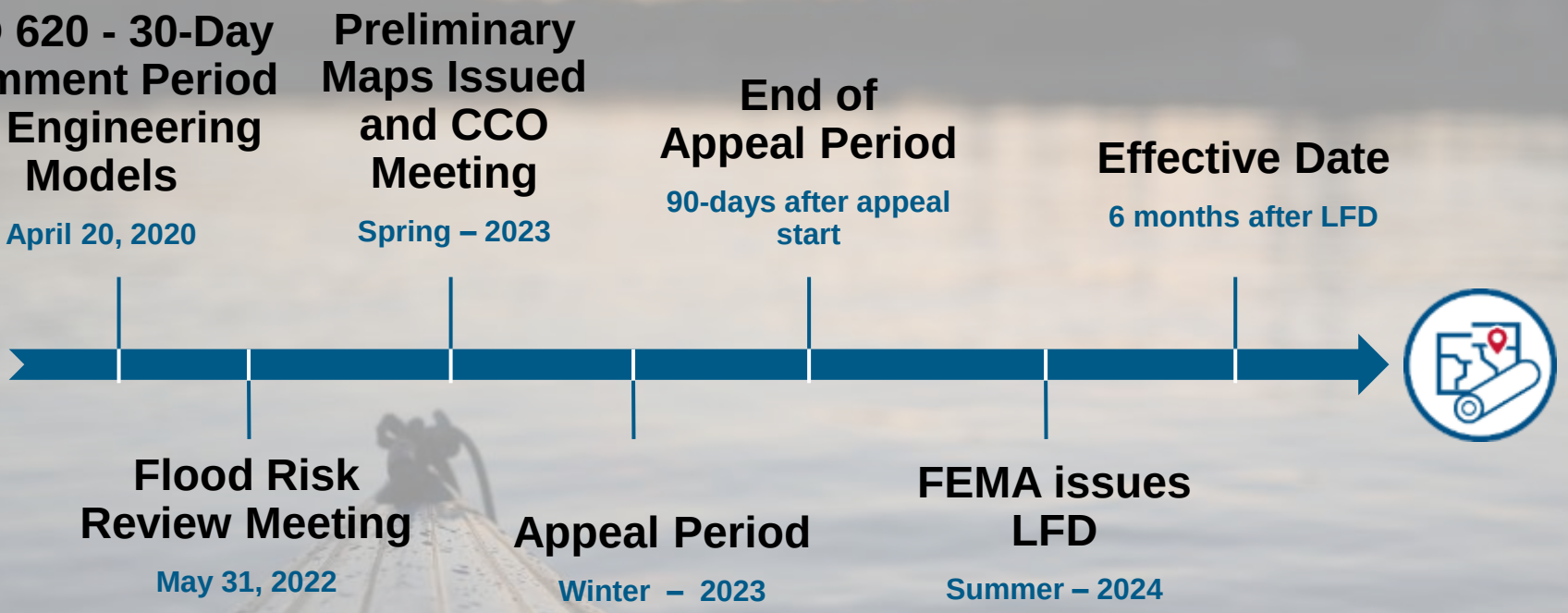
3 Reasons We Are Here Today

- To preview and discuss the update of Flood Insurance Study (FIS) report and Flood Insurance Rate Map (FIRM) for Monroe County, West Virginia
- To examine the new study areas, discuss how the analysis and mapping have changed since the previous FIRM, and work collaboratively to ensure that the needs of the community and its partners are met. **BECAUSE THE EARLIER YOU KNOW THE BETTER!**
- To present a timeline of next steps

Timeline for Monroe County



As of now the Monroe disaster PMR (prelim 4/9/2020) is still going on its separate "track" and needs to get the proposed FHD notice published in the Federal Register. Please fill out the CIS sheet that will be distributed after the meeting to help us confirm key information such as Map Repository addresses

Flood Study Update

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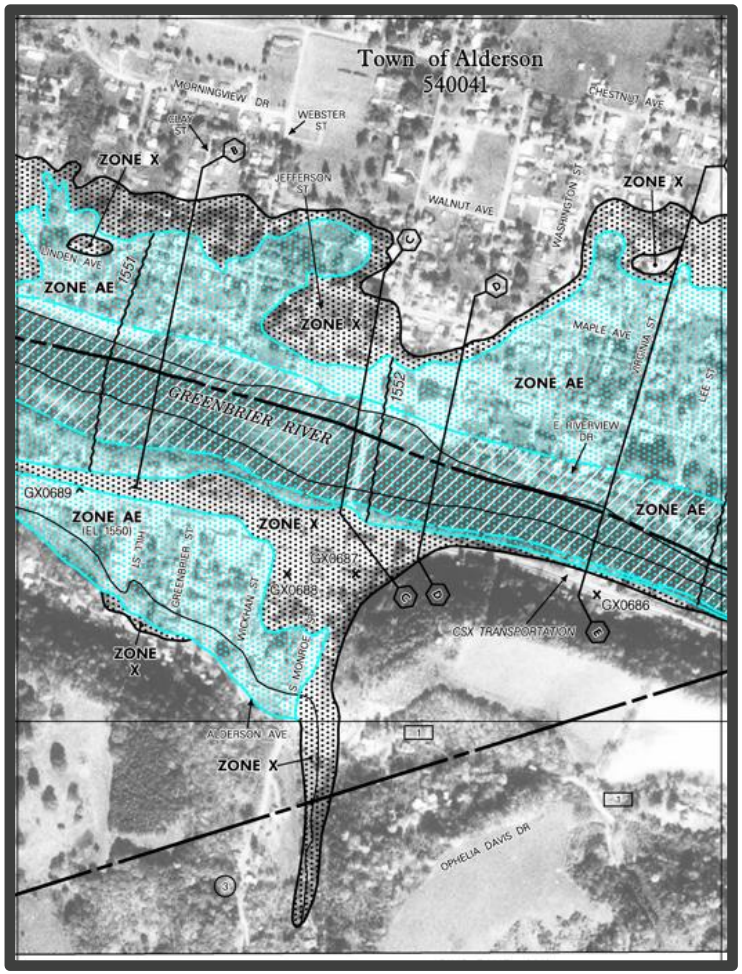
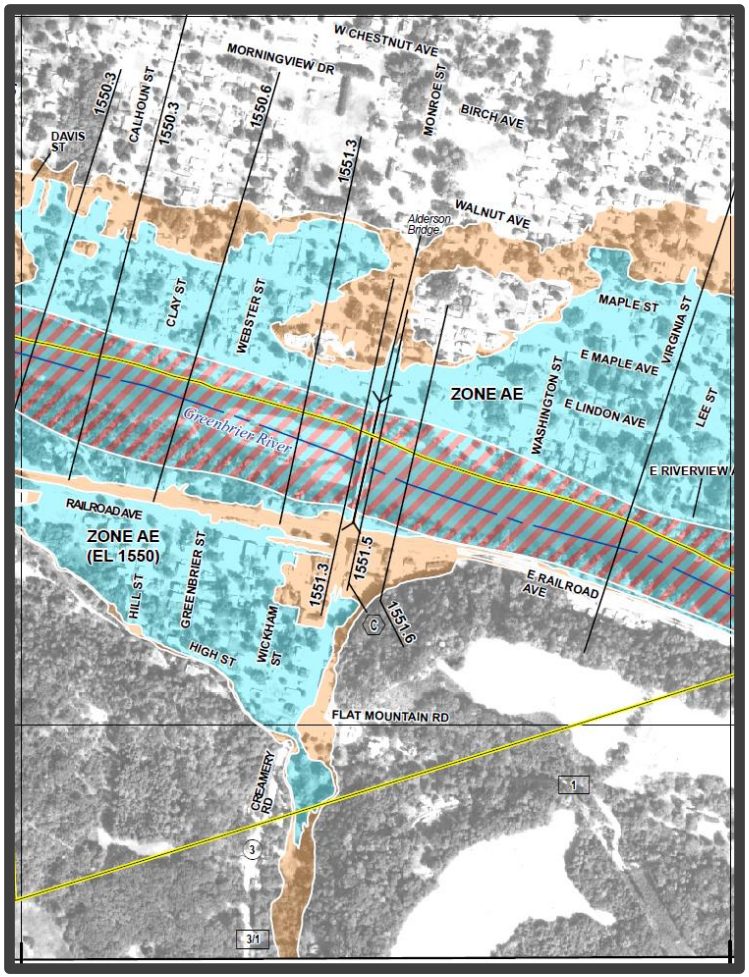
Current vs. New FIRM Panels





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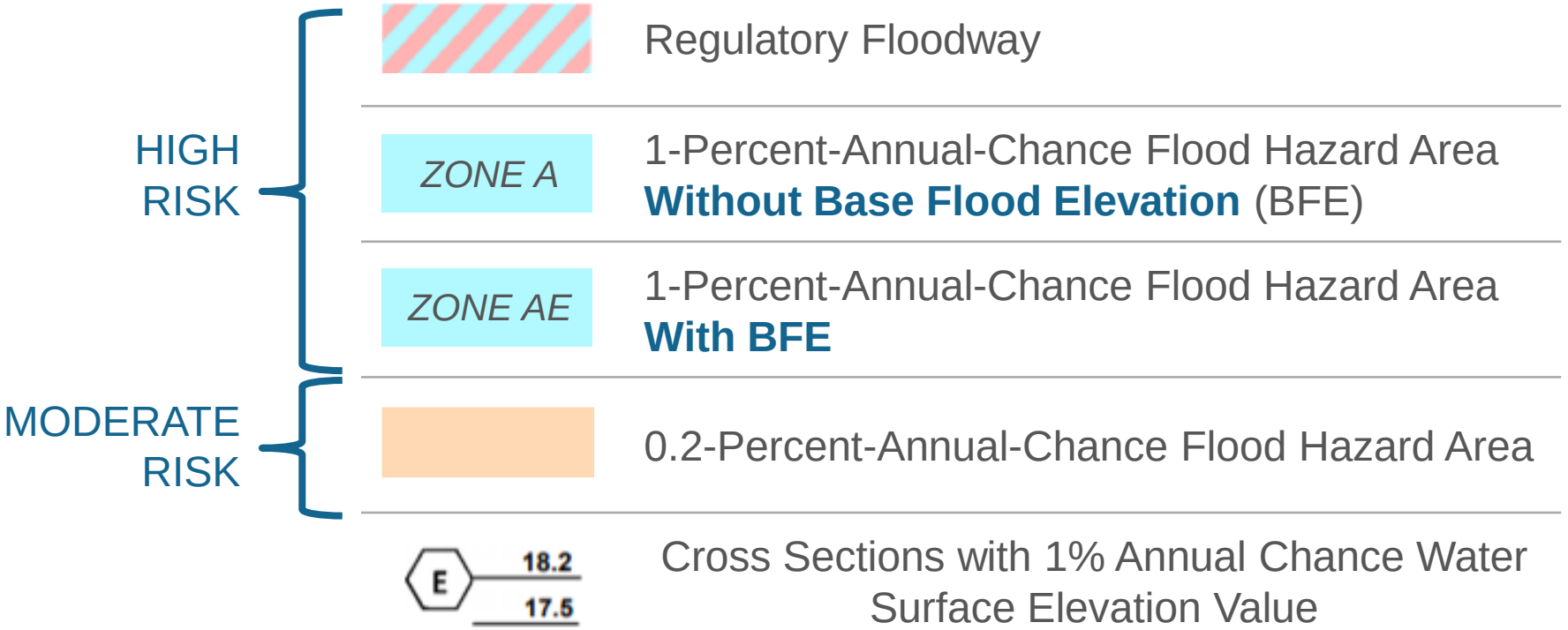
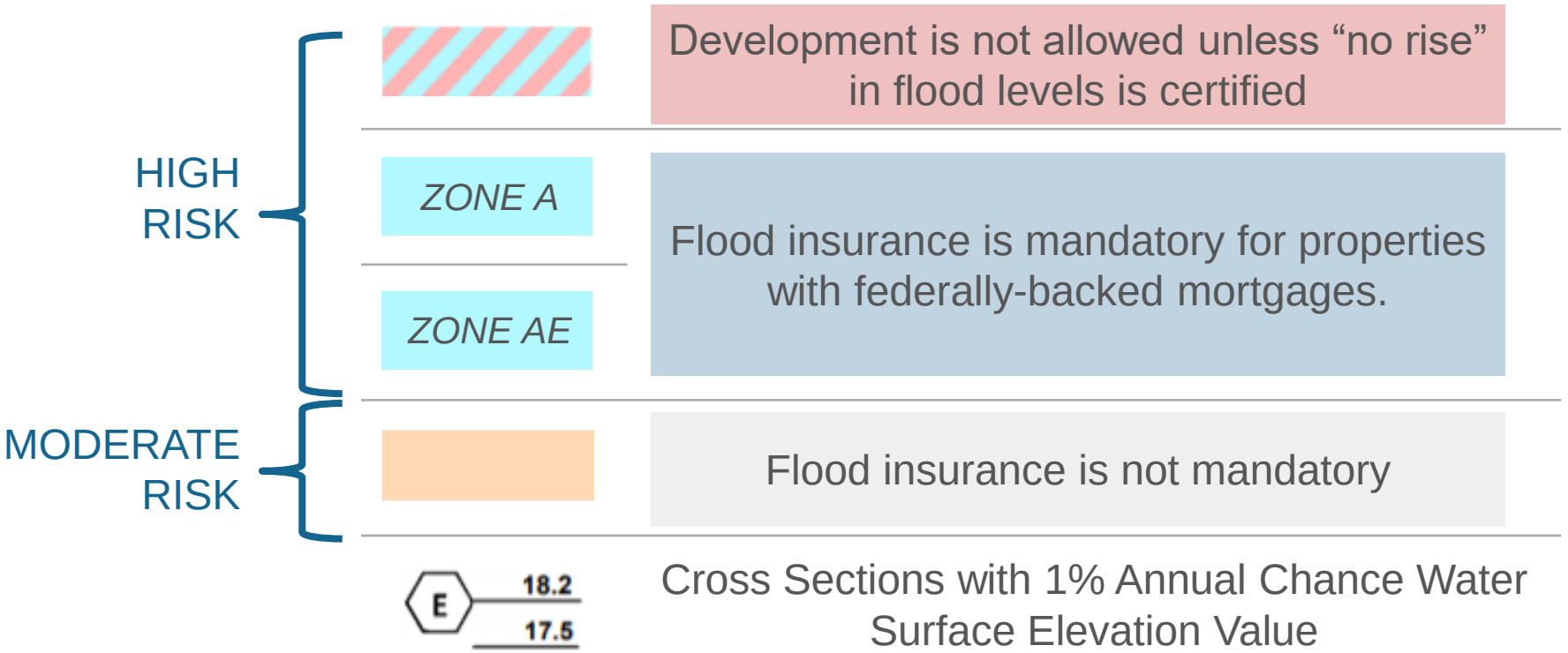
Floodplain Map Overview



Floodplain Map Overview

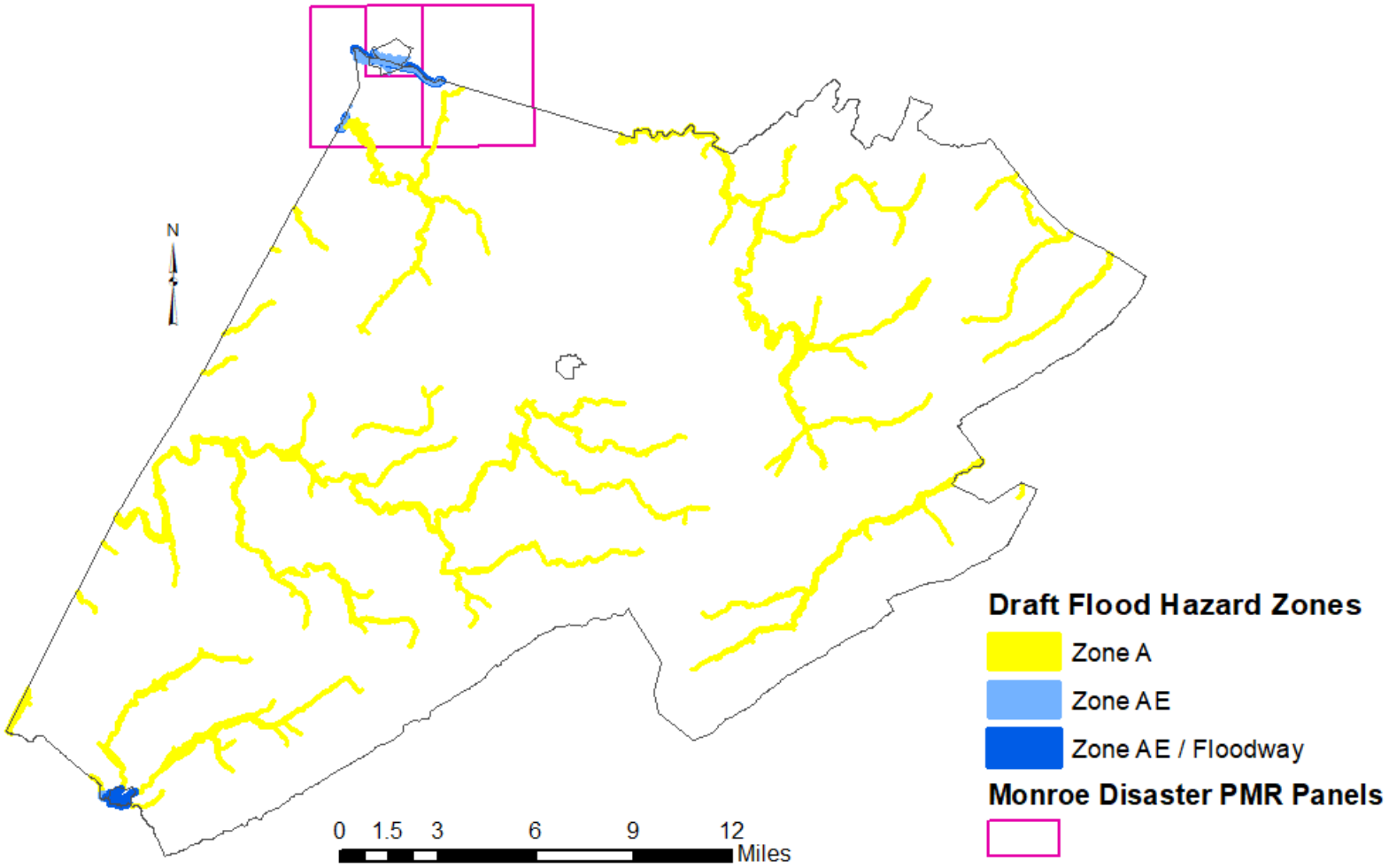


What We Studied

- Communities
  - Monroe County
  - Town of Alderson
  - Town of Peterstown
  - Town of Union (non-floodprone)
- Streams
  - Limited change in the ongoing disaster PMR study area – a segment of Greenbrier River upgraded to AE, some updates to Zone A
  - Outside the PMR area, all AE and A are updated. Previously unmapped open/continuous streams draining 2 square miles or more are modeled and added as Zone A
  - 3.5 miles (including 1 mile of 2D analysis) of new or updated Zone AE and 247 miles of Zone A




What We Studied



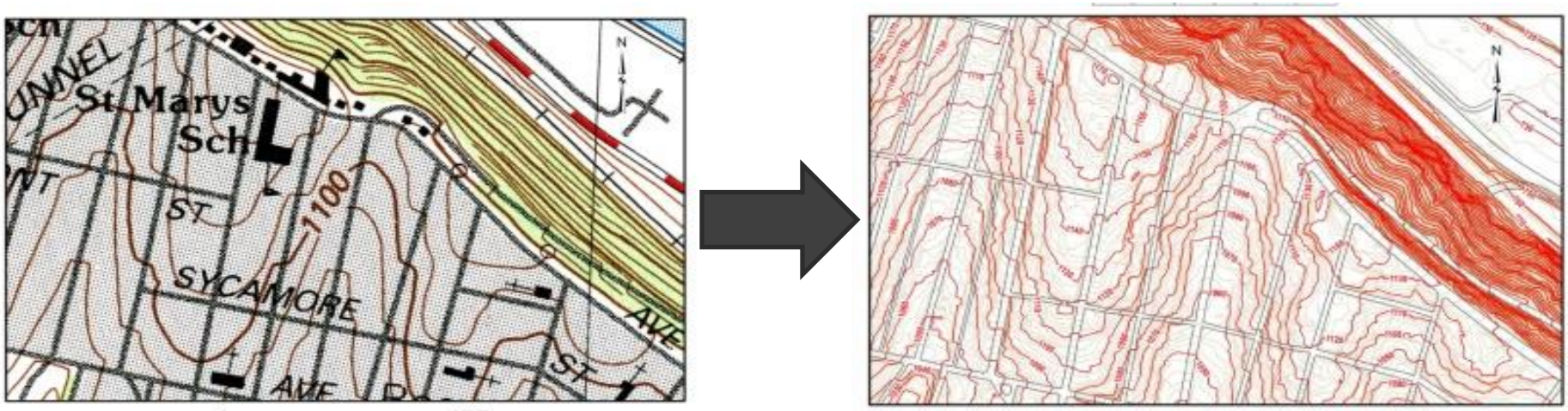
Data Collection

Because conditions change over time, FEMA's updated data analysis used the most recent available data:

- **Topographic data**: 2016 / 2017
- **Field Reconnaissance for stream crossings**: 2020

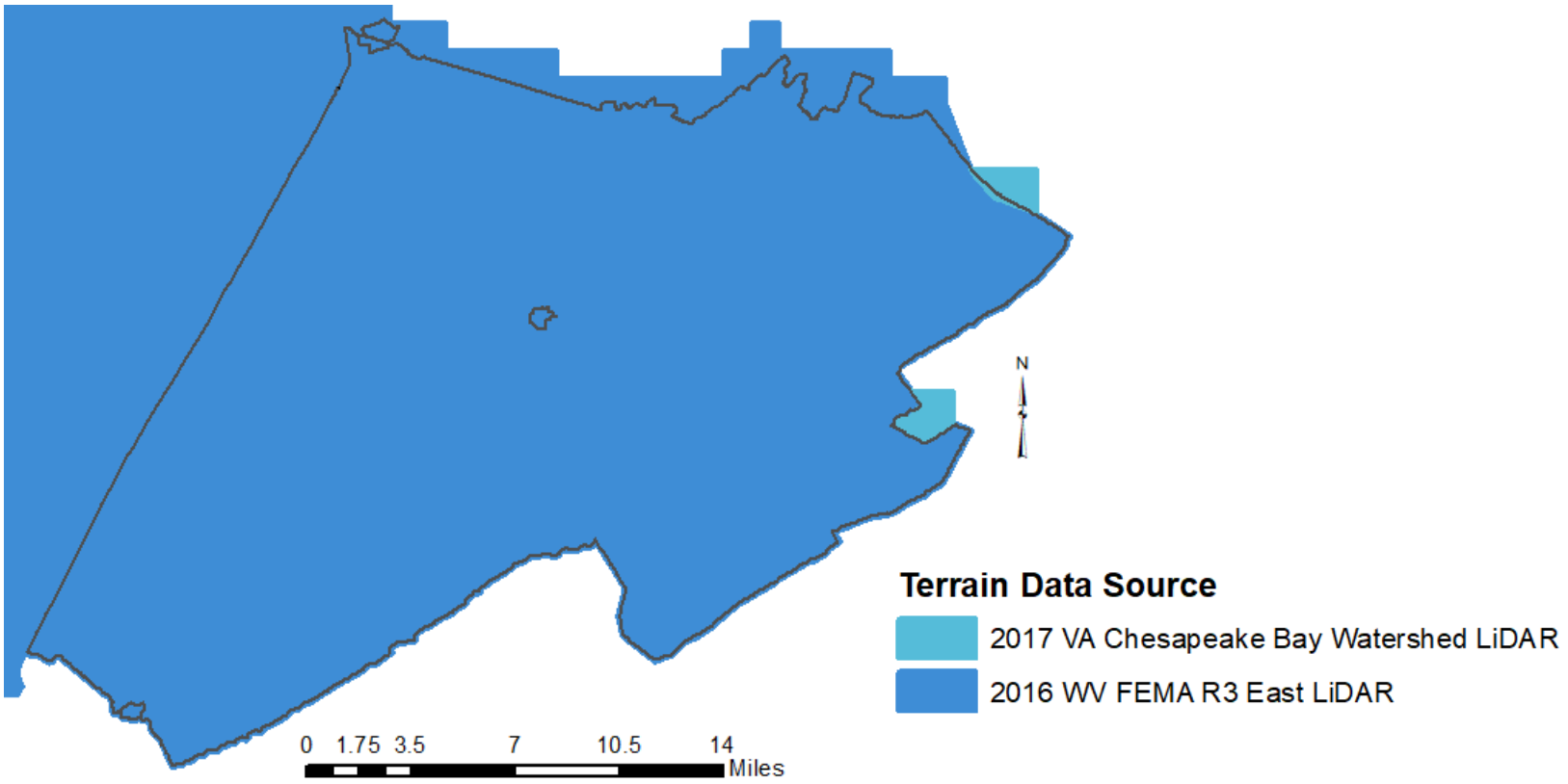
Data Collection – Terrain

- LiDAR = Light Detection and Ranging
- Uses light pulses and GPS to survey elevation data
- Improves the level of detail available for hydraulic modeling and floodplain delineation



Data Collection – Terrain

- New terrain data: Collected in 2016 and 2017



Data Collection – Field Reconnaissance

- Stream crossings for Zone AE
  - Bridges, culverts etc., access permitting
  - Observations
    - Photographs
    - Structure material
    - Relative structure and channel geometry
  - Survey
    - Structure geometry, including piers
    - Deck
    - Immediate upstream/downstream channel

Stream Name	# Surveyed Structures	# Relative Structure Geometry
Brush Creek	2	
Brush Creek (split flow)		2
Rich Creek	4	0
Scott Branch	2	0

What We Studied – Hydrology

- **Storm events** (Annual Exceedance Probability)
  - 1%, 10%, 4%, 2%, 1%, 0.2%, 1%+
- **Regression Equations**
  - USGS SIR2010-5033: Estimation of Flood-Frequency Discharges for Rural, Unregulated Streams in West Virginia (Wiley and Atkins, 2010)
    - Central Mountains region
    - Drainage Area (DA) only
- **Updated Gage Analyses**
  - Not applicable. Requirements include:
    - 9+ years of record
    - Within 0.4 - 26.4 x gage drainage area
    - Within drainage area limits for region
      - Central Mountains: 0.10 to 1,619 sq mi

Gage Analysis	#
Total Examined	**3**
Updated in this Study	0
Ineligible for Reanalysis	2
Leveraged*	1

*from Greenbrier County RiskMAP

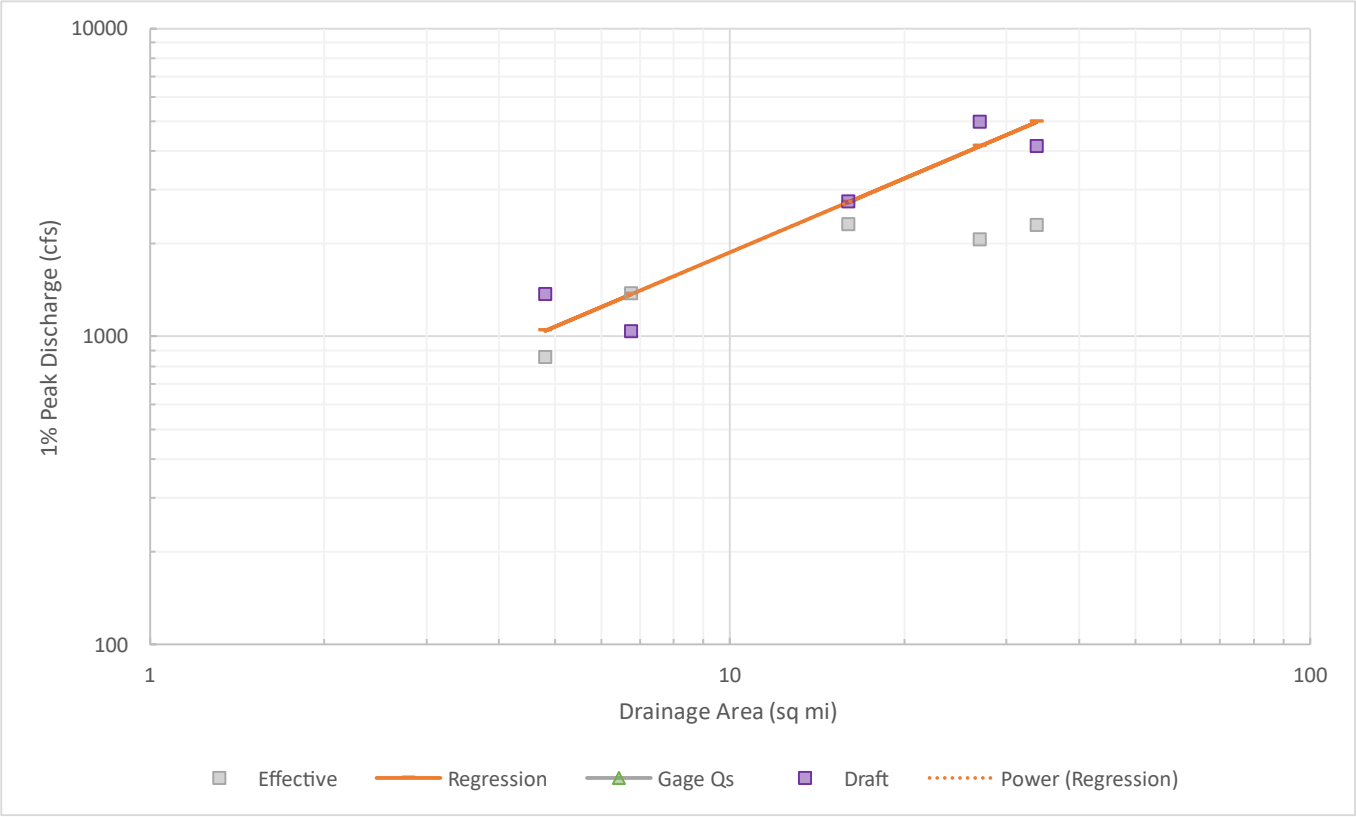
What We Studied – Hydrology

Hydrologic Study Method	Study Type	Stream Names	Reach Lengths (Miles)
Gage Analysis weighted with Regional Regression Equations	A	Second Creek*	6
Regional Regression Equations	A	All Other Zone A Studies	247
Regional Regression Equations	AE	Brush Creek, Rich Creek, Scott Branch	3.5

*Leveraged from Greenbrier County RiskMAP

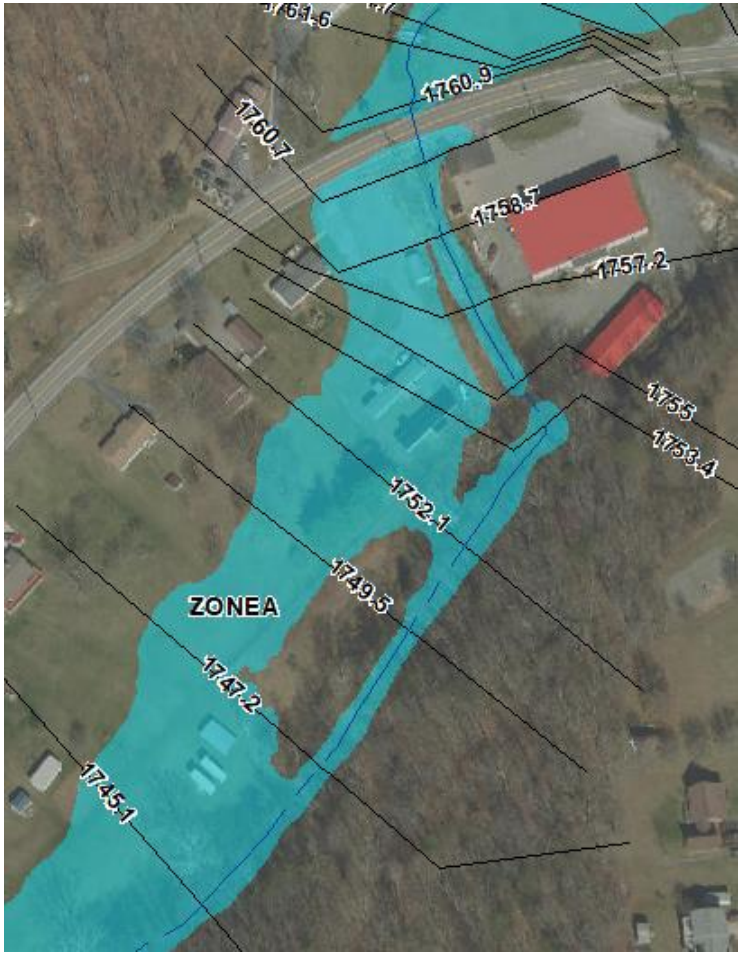
What We Studied – Hydrology

Comparison of 1% peak discharges between the effective and draft studies. Available for Detailed Zone AE studies only



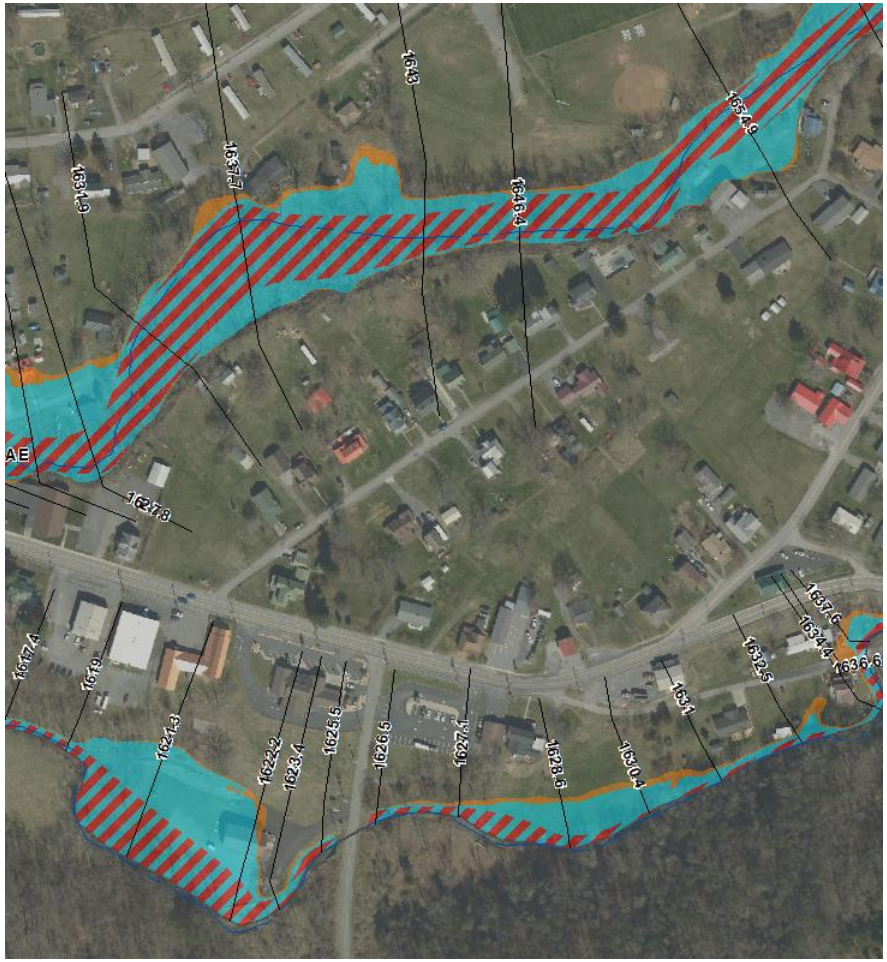
What We Studied – Zone A (1D)

- Based on approximate analysis
- Developed using 1D Steady HEC-RAS 5.0.7
- Generally used in areas with low development / low development potential
- Cross sections generated from LiDAR
  - Less manual adjustment to cross sections
  - Automated processes for hydraulic parameters
  - Does not include information below normal water surface
  - No explicit structure modeling
  - No floodway or BFEs
  - No cross section on FIRM but included in FIRM Database
  - Multi-frequency flood values computed but only 1% annual chance published on FIRMs/FIS
    - Floodplain Administrators can use WSELs from model as best available data for permitting in Zone A



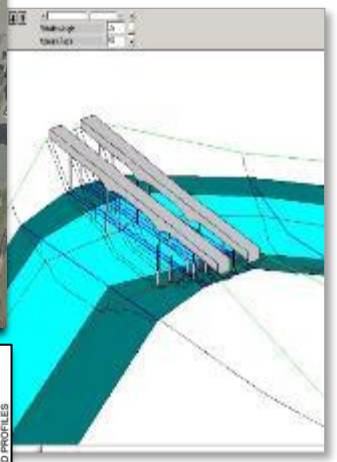
What We Studied – Zone AE (1D)

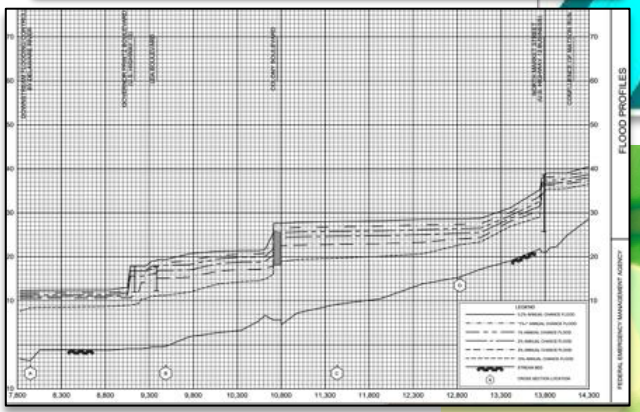
- Based on detailed analysis
- With (2.5 miles) or without (1 mile) floodway
- Used in areas with high development or high development potential
- Structures are modeled
- Developed using 1D Steady HEC-RAS 5.0.7

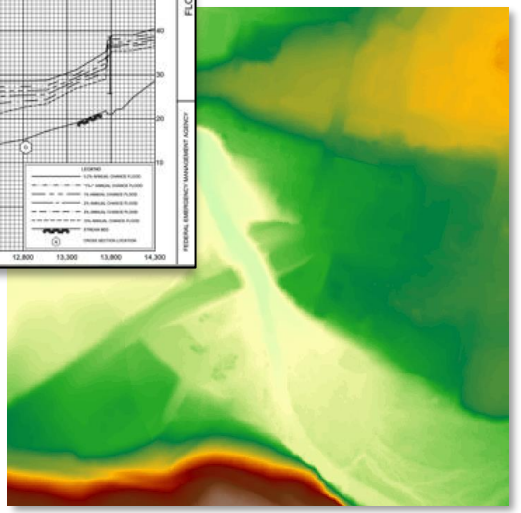


Hydraulic Analyses – Zone AE (1D)

- Cross sections generated from LiDAR
  - Manual adjustment to cross sections
  - Structures are modeled (e.g. culverts, bridges)
  - Channel bathymetry
    - Updated at structures using field survey
    - For large channels: inverts verified and adjusted against effective flood profiles
  - Detailed hydraulic parameter refinement (Manning's ‘n’ values, blocked obstructions, expansion/contraction coefficients, etc.)
  - Encroachments computed and regulatory floodways mapped for certain reaches
  - Multiple flood profiles included in FIS
  - Floodway (if applicable), cross sections, BFEs (if applicable), 1%-annual-chance and 0.2%-annual-chance event floodplains shown on FIRMs
- Model calibration
  - Not possible due to lack of HWM data
  - Validation from community feedback







What We Studied – Zone AE

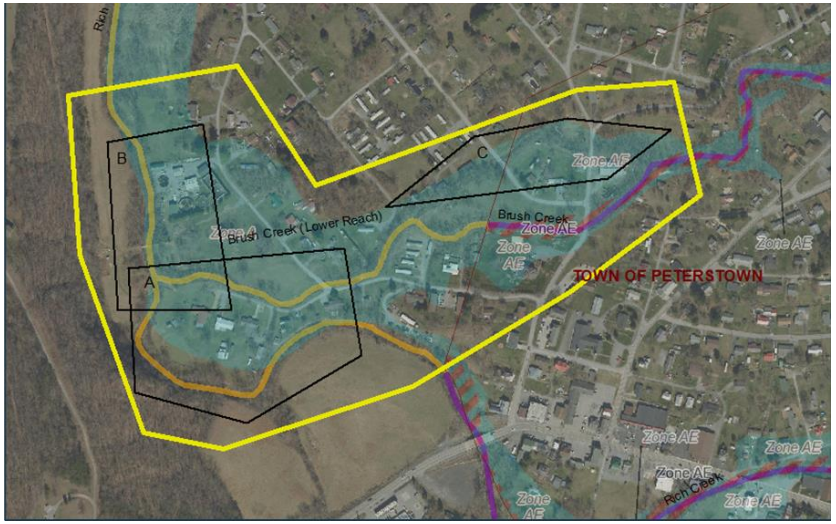
- **Changes likely due to:**
  - Updated flows
  - More detailed topography
  - Updated structure modeling
  - Updated modeling methodology

WSEL Draft vs. Effective	Stream Name
Comparable (minimal +/-)	Brush Creek
Trends Higher (+)	NA
Trends Lower (-)	NA
Trends Variable (+/-)	Rich Creek, Scott Branch

*available for Detailed Zone AE studies only

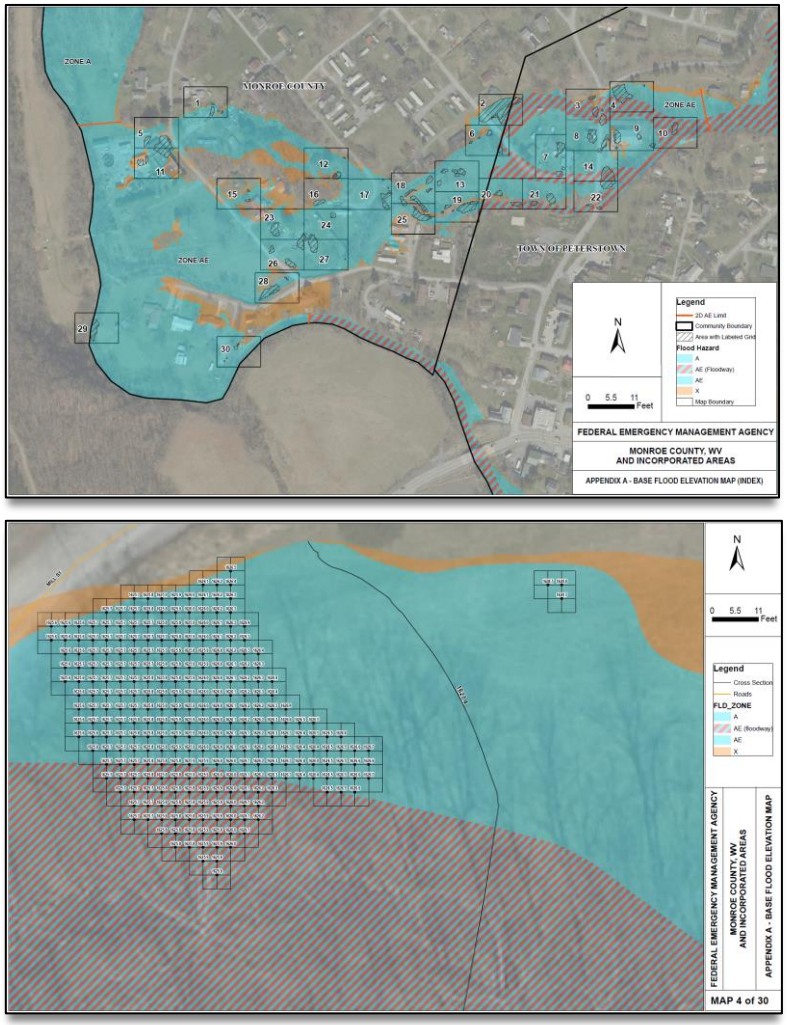
What We Studied – Zone AE (2D)

- 1 mile
- 2D Unsteady HEC-RAS 6.1
- Additional accuracy and precision for areas with:
  - Multi-directional or split flows (A, C)
  - Complicated confluences (A, B)
  - Flat topography (A, B, C)
- 2D mesh/cells instead of cross section:
  - Hydraulic data input for each cell
  - Similar detail given to updating hydraulic parameters as in 1D Steady Zone AE



What We Studied – Zone AE (2D)

- 2D analysis results have more variability
- Limited number of evaluation lines can be shown on the map (to avoid legibility issues)
- Interpolation results based on published 1% WSE may not provide sufficient accuracy
- In Monroe, where such interpolation may not be within 0.5’ of the model output, FIS insert maps are created, showing annotated water surface grid



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What We Studied – Zone AE

Stream	1D or 2D	Floodway	Miles
Brush Creek (lower reach)	2D	No	0.3
Brush Creek (middle reach)	2D	Yes	0.2
Brush Creek (upper reach)	1D	Yes	0.3
Brush Creek (downstream split flow)	2D	No	0.3
Brush Creek (split flow, downstream reach)	2D	No	0.1
Brush Creek (split flow, upstream reach)	2D	Yes	0.1
Rich Creek (lower reach)	2D	No	0.4
Rich Creek (upper reach)	1D	Yes	1.2
Scott Branch	1D	Yes	0.6

What We Studied – Leveraged Data

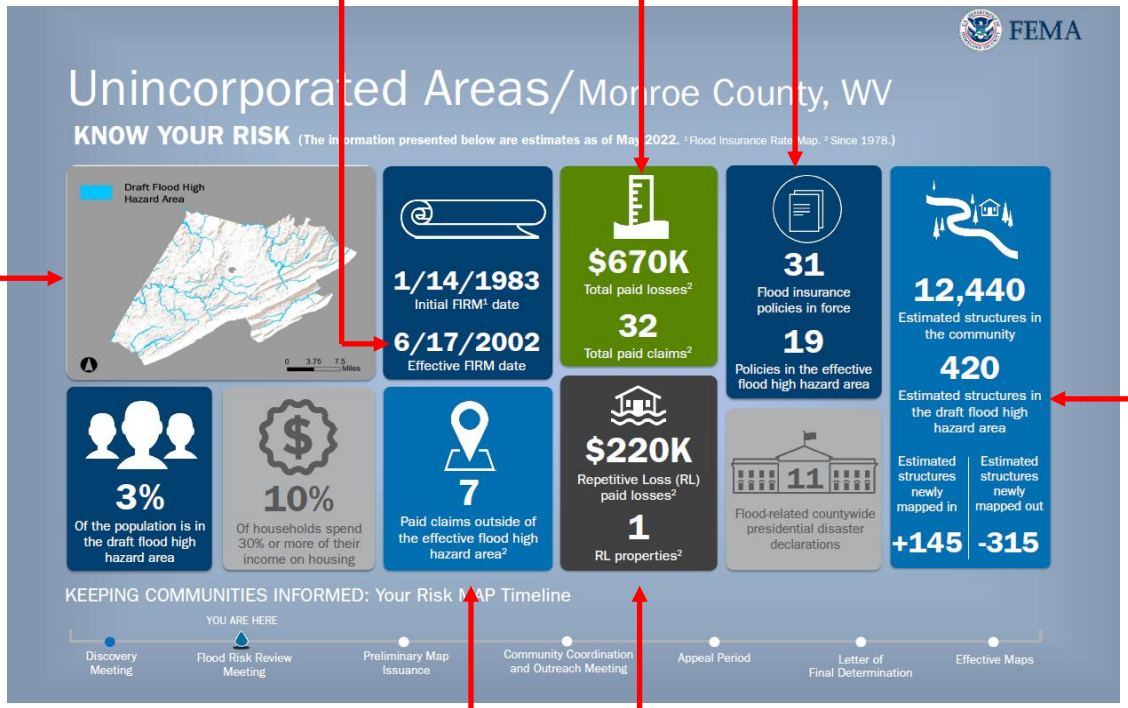
- **Greenbrier County RiskMAP / Monroe County Disaster PMR**
  - Greenbrier River, Zone AE with floodway, 3 miles
  - Second Creek, Zone A, 6 miles
- **Summers County RiskMAP**
  - Greenbrier River, Zone AE with floodway, 0.5 miles

Flood Risk Dashboards

Total Number of paid flood insurance claims and the total amount paid for these claims in your community since 1978

The current total number of NFIP flood insurance policies in your community and the number of those policies for structures in the effective SFHA.

Your community's Flood Insurance Rate Map (FIRM) was last updated on this date.



This map shows the changes in the flood high hazard area in your community

These numbers are estimates of based on structure data. It shows how many are expected newly mapped into and mapped out of the flood high hazard area.

This is the number of paid flood insurance claims for structures outside of your community's flood high hazard area since 1978.

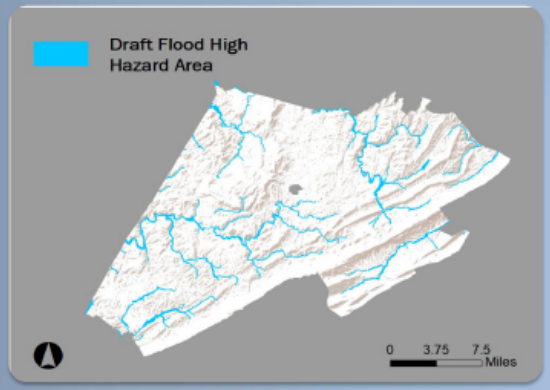
A repetitive loss (RL) property is a structure for which FEMA has paid 2+ flood insurance claims of >$1,000 within a 10-year period since 1978.

Flood Risk Jurisdictional Dashboards 1/4

FEMA

Unincorporated Areas/Monroe County, WV

KNOW YOUR RISK (The information presented below are estimates as of May 2022. [1]Flood Insurance Rate Map. [2] Since 1978.)



1/14/1983
Initial FIRM[1] date

6/17/2002
Effective FIRM date

$670K
Total paid losses[2]

32
Total paid claims[2]

31
Flood insurance policies in force

19
Policies in the effective flood high hazard area

12,440
Estimated structures in the community

420
Estimated structures in the draft flood high hazard area

Estimated structures newly mapped in	Estimated structures newly mapped out
+145	-315

3%
Of the population is in the draft flood high hazard area

10%
Of households spend 30% or more of their income on housing

7
Paid claims outside of the effective flood high hazard area[2]

$220K
Repetitive Loss (RL) paid losses[2]

1
RL properties[2]

11
Flood-related countywide presidential disaster declarations

KEEPING COMMUNITIES INFORMED: Your Risk MAP Timeline

YOU ARE HERE

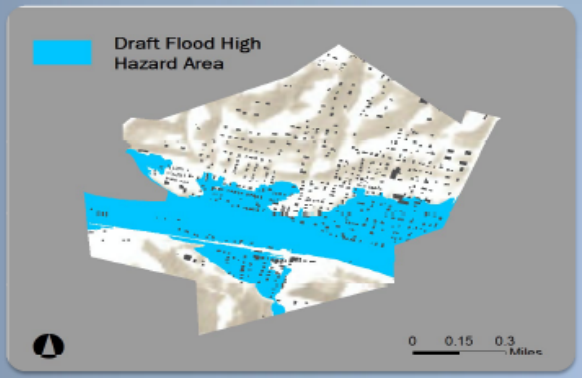
- Flood Risk Review Meeting
- Preliminary Map Issuance
- Community Coordination and Outreach Meeting
- Appeal Period
- Letter of Final Determination
- Effective Maps

Flood Risk Jurisdictional Dashboards 2/4

FEMA

Town of Alderson/Monroe County, WV

KNOW YOUR RISK (The information presented below are estimates as of May 2022. [1] Flood Insurance Rate Map. [2] Since 1978.)



9/27/1991
Initial FIRM[1] date

6/17/2002
Effective FIRM date

$3.5M
Total paid losses[2]

201
Total paid claims[2]

58
Flood insurance policies in force

51
Policies in the effective flood high hazard area

620
Estimated structures in the community

230
Estimated structures in the draft flood high hazard area

Estimated structures newly mapped in **+25**

Estimated structures newly mapped out **-5**

32%
Of the population is in the draft flood high hazard area

43%
Of households spend 30% or more of their income on housing

11
Paid claims outside of the effective flood high hazard area[2]

$440K
Repetitive Loss (RL) paid losses[2]

24
RL properties[2]

11
Flood-related countywide presidential disaster declarations

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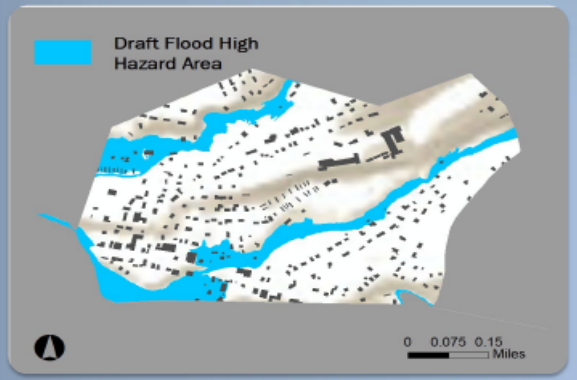
Flood Risk Jurisdictional Dashboards 3/4

FEMA

Town of Peterstown/Monroe County, WV

KNOW YOUR RISK (The information presented below are estimates as of May 2022. [1] Flood Insurance Rate Map. [2] Since 1978.)



8/1/1979
Initial FIRM[1] date

6/17/2002
Effective FIRM date

$28K
Total paid losses[2]

2
Total paid claims[2]

5
Flood insurance policies in force

3
Policies in the effective flood high hazard area

330
Estimated structures in the community

40
Estimated structures in the draft flood high hazard area

Estimated structures newly mapped in **+5**

Estimated structures newly mapped out **-5**

15%
Of the population is in the draft flood high hazard area

12%
Of households spend 30% or more of their income on housing

0
Paid claims outside of the effective flood high hazard area[2]

$0
Repetitive Loss (RL) paid losses[2]

0
RL properties[2]

11
Flood-related countywide presidential disaster declarations

KEEPING COMMUNITIES INFORMED: Your Risk MAP Timeline

YOU ARE HERE

- Flood Risk Review Meeting
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- Community Coordination and Outreach Meeting
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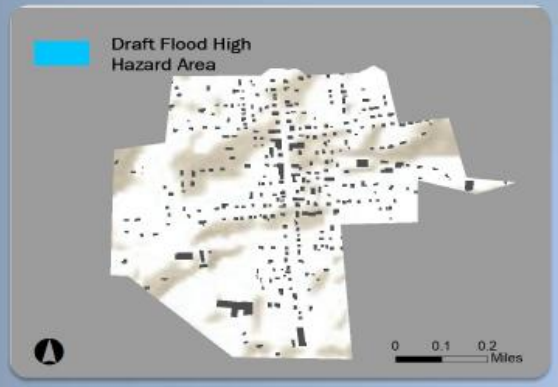
- Letter of Final Determination
- Effective Maps

Flood Risk Jurisdictional Dashboards 4/4

FEMA

Town of Union/ Monroe County, WV

KNOW YOUR RISK (The information presented below are estimates as of May 2022. [1] Flood Insurance Rate Map. [2] Since 1978.)



6/17/2002
Initial FIRM[1] date

6/17/2002
Effective FIRM date

$0
Total paid losses[2]

0
Total paid claims[2]

0
Flood insurance policies in force

0
Policies in the effective flood high hazard area

290
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%
Of the population is in the draft flood high hazard area

18%
Of households spend 30% or more of their income on housing

0
Paid claims outside of the effective flood high hazard area[2]

$0
Repetitive Loss (RL) paid losses[2]

0
RL properties[2]

11
Flood-related countywide presidential disaster declarations

KEEPING COMMUNITIES INFORMED: Your Risk MAP Timeline

~YEAR 1 — YOU ARE HERE — ~YEAR 5

- Flood Risk Review Meeting
- Preliminary Map Issuance
- Community Coordination and Outreach Meeting
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- Effective Maps

Significant Impacts: Study-Wide Dashboards

Monroe County, WV – Countywide

FEMA

FEMA's Risk Mapping, Assessment, and Planning (Risk MAP) Program helps strengthen communities by identifying actions they can take now to reduce their hazard risk, enhance local planning, improve outreach through risk communications, and increase local resilience to natural hazards. Below is an overview of some key items identified during the Changes Since Last FIRM[1] impact assessment.

The information presented below are estimates as of MAY 2022

Flood insurance is available to
4 COMMUNITIES

NO COMMUNITIES are taking advantage of the flood insurance savings offered through the Community Rating System

11
Flood-related presidential disaster declarations

6%
Of the population is in the draft flood high hazard area

0 levees and
3 dams

$4.2M
Total paid losses[2]

235
Total paid claims[2]

$1,826
Average premium

153%
Higher than the national average

18
Paid claims outside of the effective flood high hazard area[2]

$660K
Repetitive Loss (RL) paid losses[2]

25
RL properties[2]

94
Flood insurance policies in force

62%
In the Town of Alderson

73
Policies in the effective flood high hazard area

13,680
Estimated structures in the community

690
Estimated structures in the draft flood high hazard area

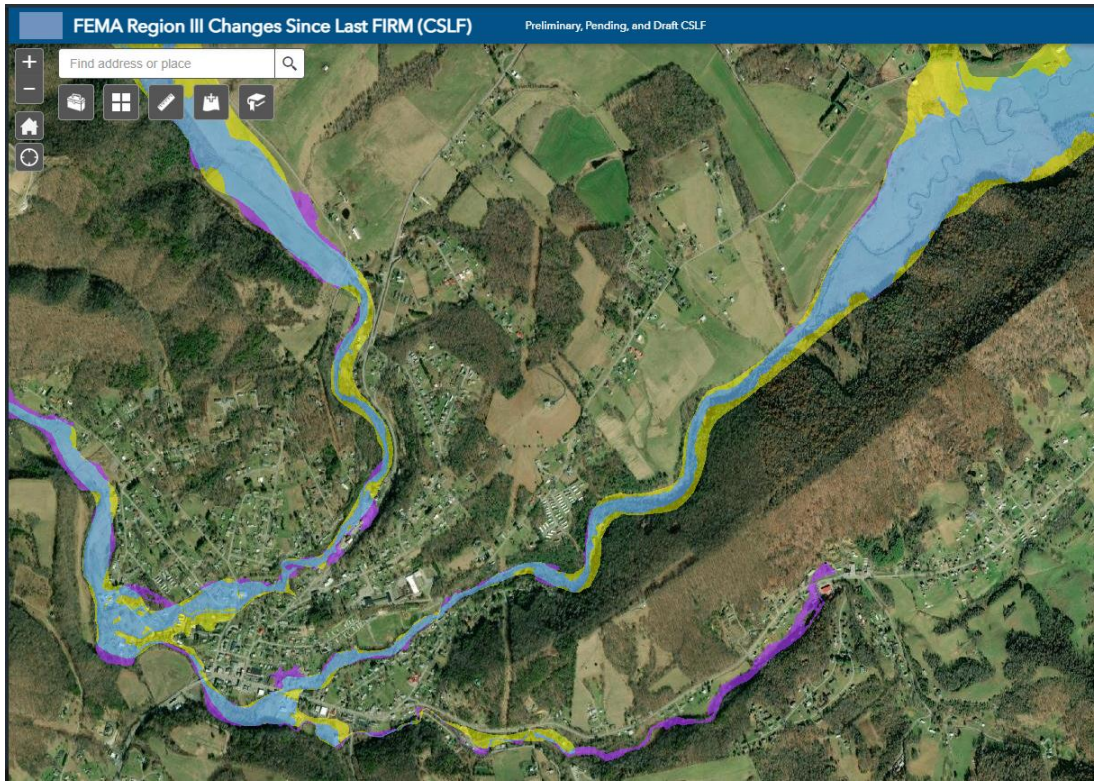
Estimated structures newly mapped in	Estimated structures newly mapped out
+175	-330

KEEPING COMMUNITIES INFORMED: Your Risk MAP Timeline

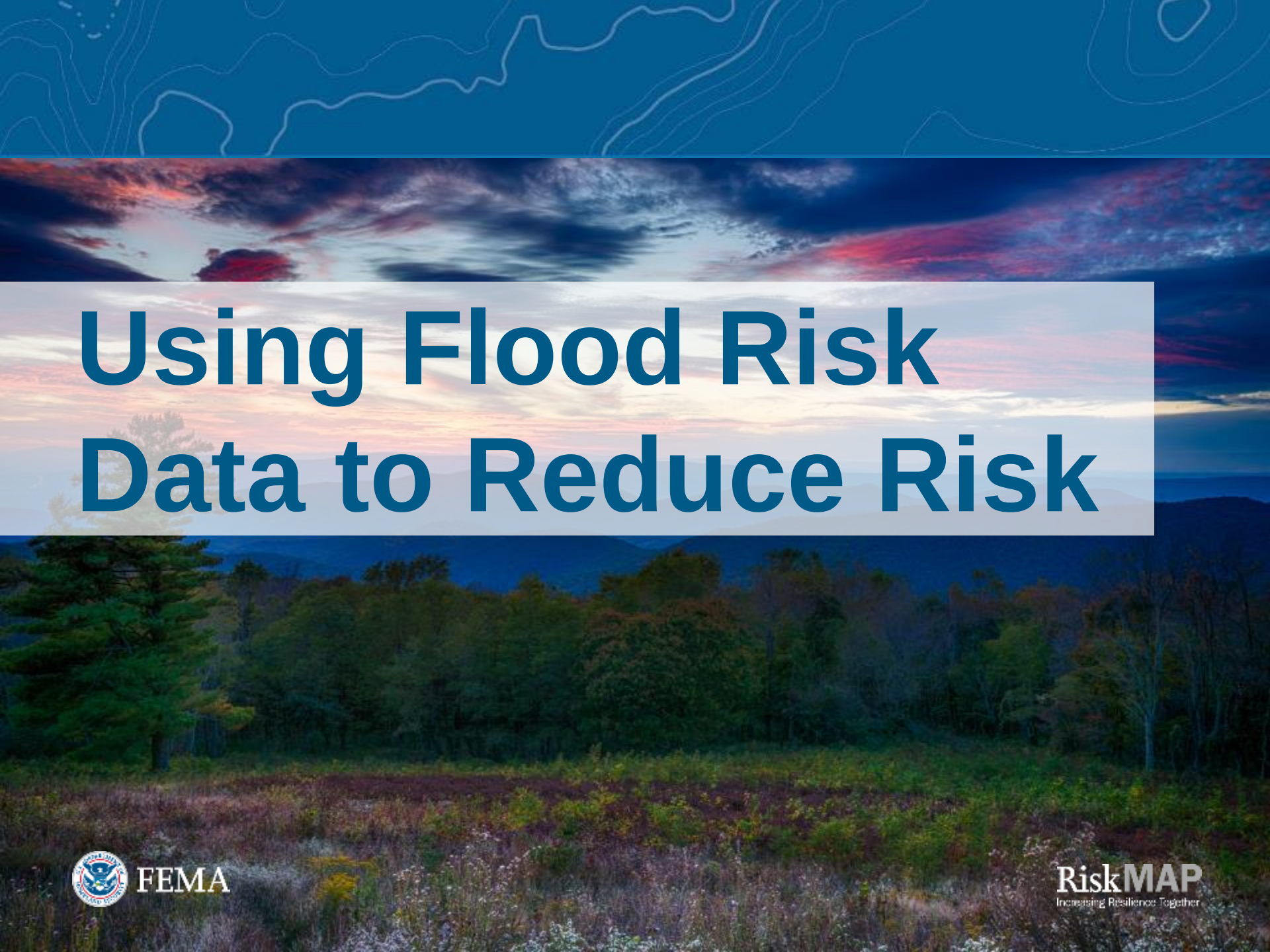
~YEAR 1 — YOU ARE HERE — Flood Risk Review Meeting — Preliminary Map Issuance — Community Coordination & Outreach Meeting — Appeal Period — Letter of Final Determination — ~YEAR 5 — Effective Maps

How Did the Floodplain Map Change?

- FEMA Region III Changes Since Last FIRM (CSLF) Viewer: https://arcg.is/149DrC
- Change in Floodplain Extents:
  - Purple – Increase
  - Blue – Still Floodplain
  - Yellow – Decrease
- FEMA Draft National Flood Hazard Viewer: https://msc.fema.gov/draft



The CSLF link zooms to the entire county. The CSLF data will be displayed when you zoom in closer.


Using Flood Risk
Data to Reduce Risk
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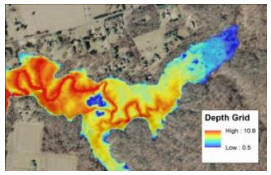
What are Flood Risk Products (FRPs)?

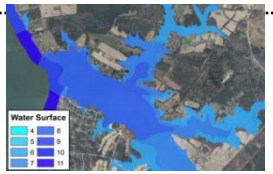
- Flood Risk Map
  - Illustrates an overall picture of flood risk
- Flood Risk Report
  - Explains the concept of flood risk
  - Identifies useful tools and reference materials
- Flood Risk Database
  - GIS and tabular data useful for making more informed flood mitigation decisions

Types of Flood Risk Products



Flood Depth & Analysis Grids

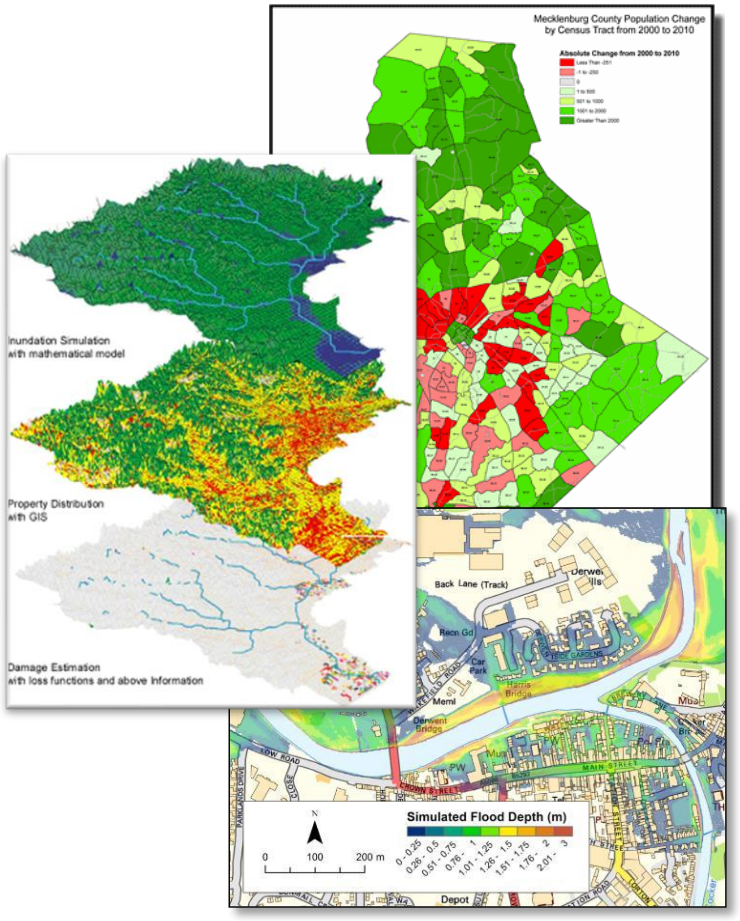
Changes Since Last FIRM



Water Surface Elevation Grids

Using FRPs 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



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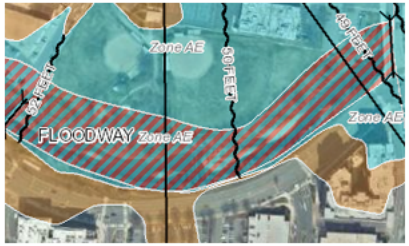
Where Can I Find Flood Risk Products?

FEMA Flood Map Service Center : Welcome!

Looking for a Flood Map?

Enter an address, a place, or longitude/latitude coordinates:

Enter an address, a place, or longitude/latitude coordinates | Search



Looking for more than just a current flood map?

Visit **Search All Products** to access the full range of flood risk products for your community.

About Flood Map Service Center

The FEMA Flood Map Service Center (MSC) is the official public source for flood hazard information produced in support of the National Flood Insurance Program (NFIP). Use the MSC to find your official flood map, access a range of other flood hazard products, and take advantage of tools for better understanding flood risk.

https://msc.fema.gov/portal/home

Where Can I Find NFHL Data?

National Flood Hazard Layer (NFHL)

The National Flood Hazard Layer (NFHL) is a geospatial database that contains current effective flood hazard data. FEMA provides the flood hazard data to support the National Flood Insurance Program. You can use the information to better understand your level of flood risk and type of flooding. The simplest way for you to access the flood hazard data, including the NFHL, is through FEMAs Map Service Center (MSC).

If you want to explore the current digital effective flood hazard data in a map, the best tool to use is the NFHL Viewer. From the NFHL Viewer, you may view, download, and print flood maps for your location.

https://www.fema.gov/national-flood-hazard-layer-nfhl

National Flood Hazard Layer

Visit https://www.fema.gov/national-flood-hazard-layer-nfhl for multiple options to view and download NFHL data.

Accessing the National Flood Hazard Layer

Map Service Center

Access localized National Flood Hazard Layer data by searching FEMA's Map Service Center.

FEMA's Map Service Center

NFHL ArcGIS Viewer

Or you you may view, download, and print current local digital effective flood hazard data in an ArcGIS map.

NFHL Viewer

In the NFHL Viewer, you can use the address search or map navigation to locate an area of interest and the NFHL Print Tool to download and print a full Flood Insurance Rate Map (FIRM) or FIRMette (a smaller, printable version of a FIRM) where modernized data exists. Technical GIS users can also utilize a series of dedicated GIS web services that allow the NFHL database to be incorporated into websites and GIS applications. For more information on available services, go to the NFHL GIS Services User Guide.

You can also use the address search on the FEMA Flood Map Service Center (MSC) to view the NFHL data or download a FIRMette. Using the "Search All Products" on the MSC, you can download the NFHL data for a County or State in a GIS file format. This data can be used in most GIS applications to perform spatial analyses and for integration into custom maps and reports. To do so, you will need GIS or mapping software that can read data in shapefile format.

FEMA also offers a download of a KMZ (keyhole markup file zipped) file, which overlays the data in Google Earth™. For more information on using the data in Google Earth™, please see Using the National Flood Hazard Layer Web Map Service (WMS) in Google Earth™.

Draft National Flood Hazard Layer

The Draft National Flood Hazard Layer is for early awareness of possible changes to regulatory flood map information. Until the data becomes effective and it appears in the National Flood Hazard Layer, the data cannot be used to rate flood insurance policies or enforce the federal mandatory purchase requirement.

Preliminary Flood Hazard Data

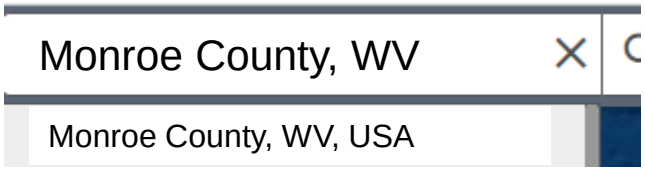
Preliminary flood hazard data provides the public an early look at their home or community's projected risk to flood hazards. Preliminary data may include new or revised Flood Insurance Rate Maps (FIRM), Flood Insurance Study (FIS) Reports and FIRM Databases. View your community's preliminary flood hazard data.

Pending Flood Hazard Data

Pending flood hazard data provides the public an early look at their home or community's projected risk to flood hazards. Pending data may include new or revised Flood Insurance Rate Maps (FIRM), Flood Insurance Study (FIS) Reports and FIRM Databases. View your community's preliminary flood hazard data.

FEMA Draft Data Viewer

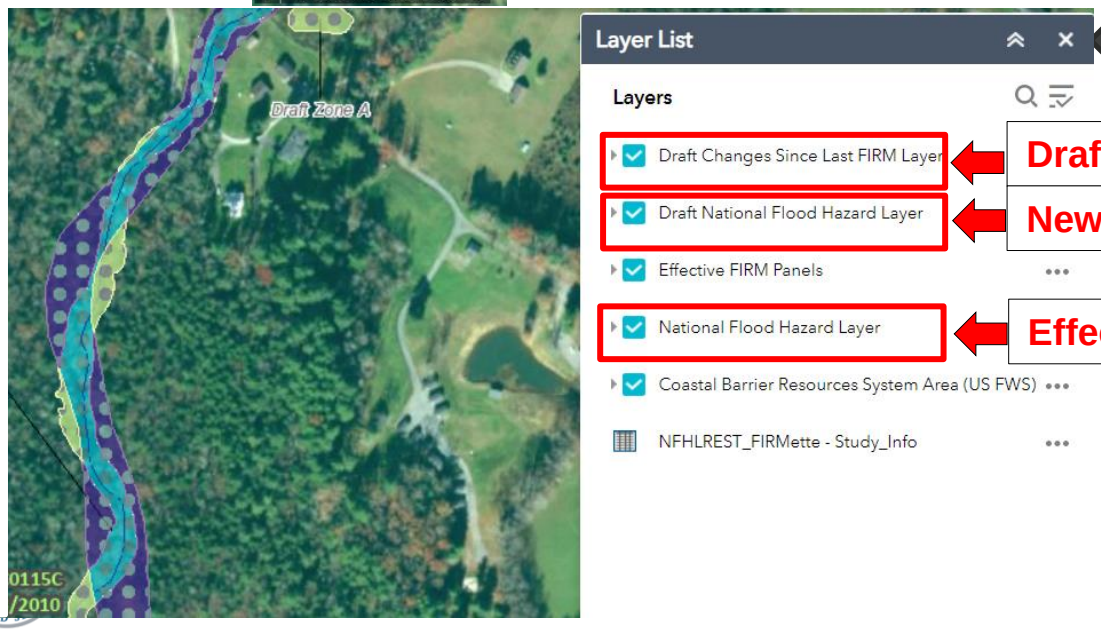
Weblink:[FEMA Draft Data Viewer]



1. Search for Monroe County, WV

2. Zoom in to area to view floodplains

3. Choose type of data to view (Draft CSLF, New Draft floodplains, or Effective floodplains



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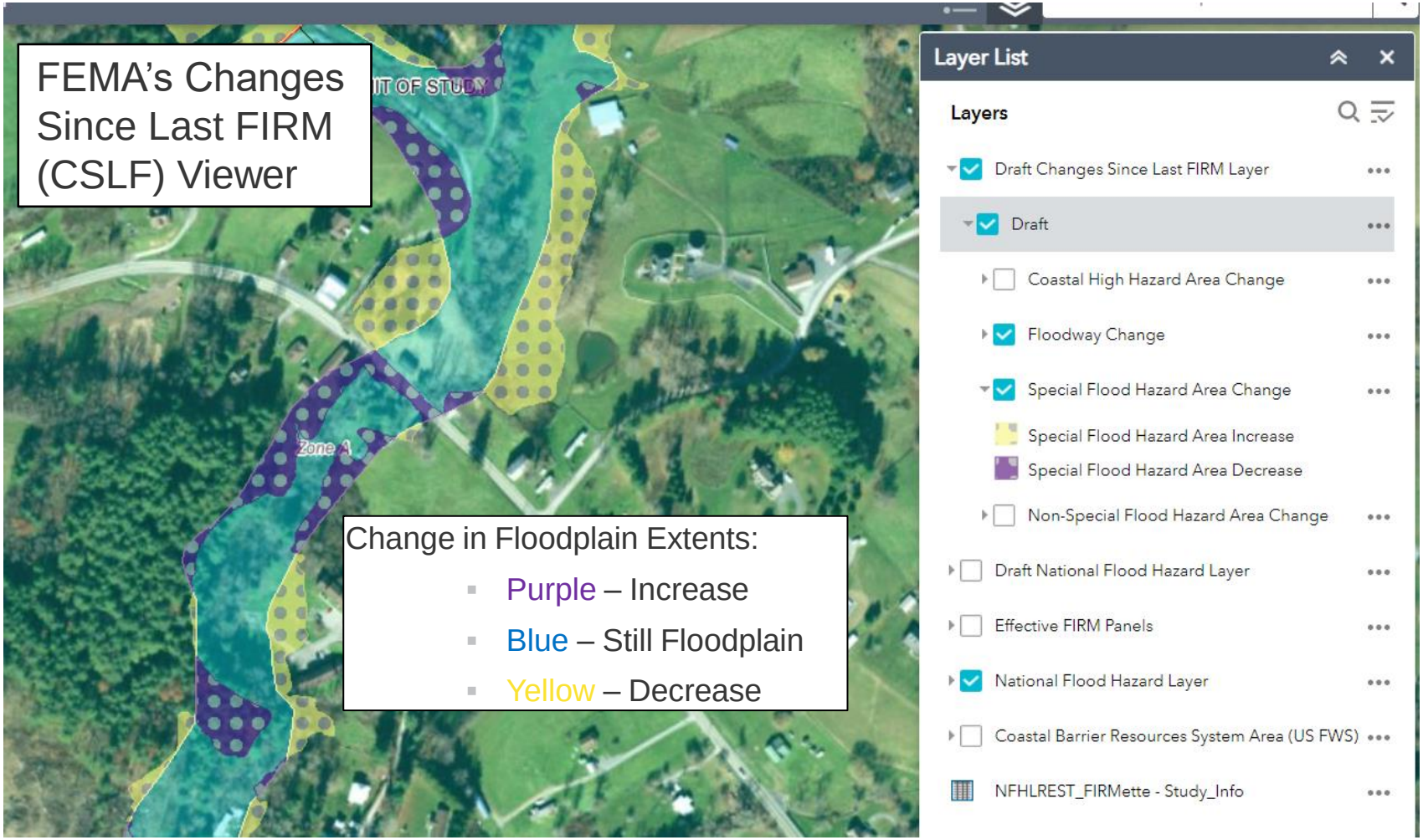
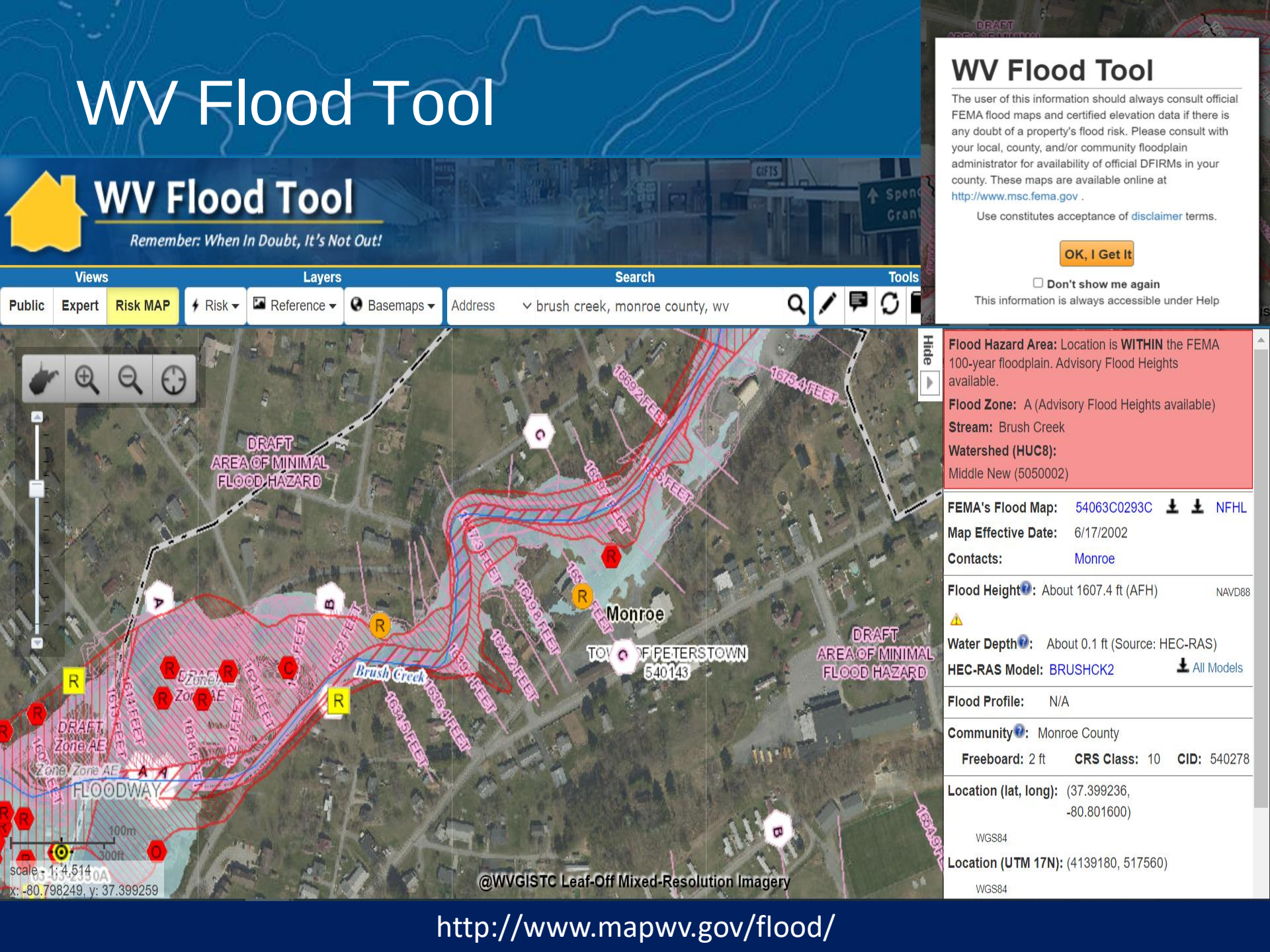
How Did the Floodplain Maps Change?



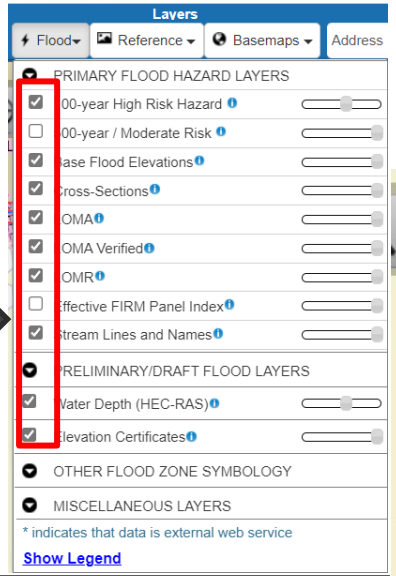
WV Flood Tool



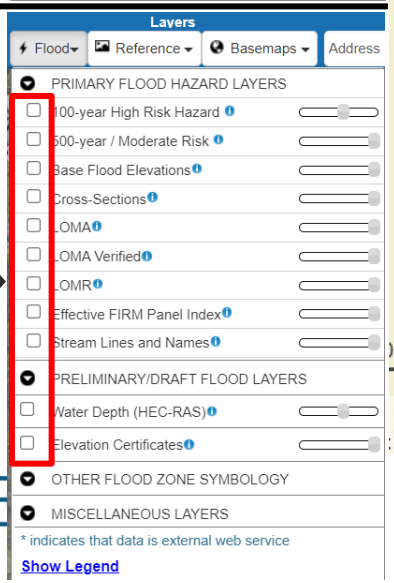
http://www.mapwv.gov/flood/

WVU Draft Data Viewer

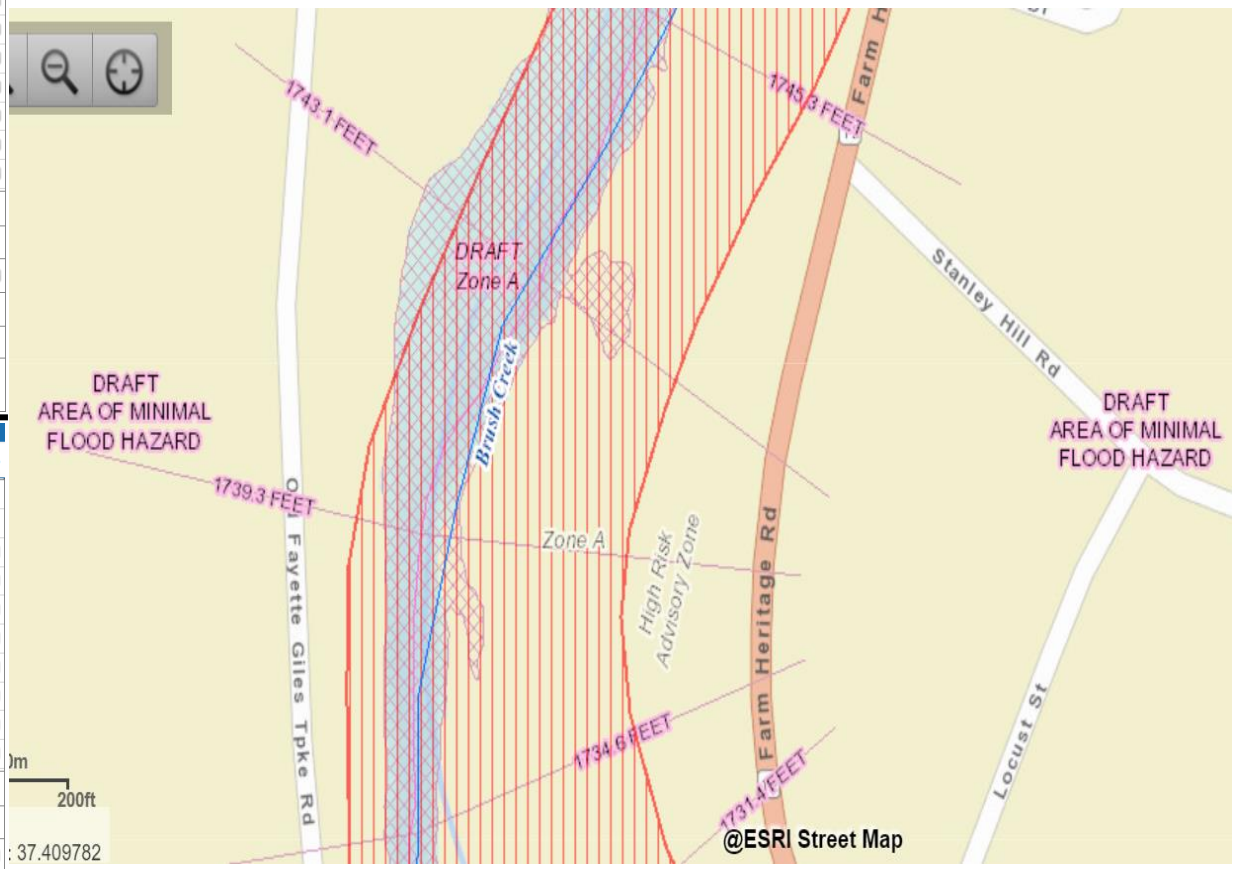
1. Initial Settings



2. Settings to view draft data



Weblink: [WVU Draft Data Viewer]



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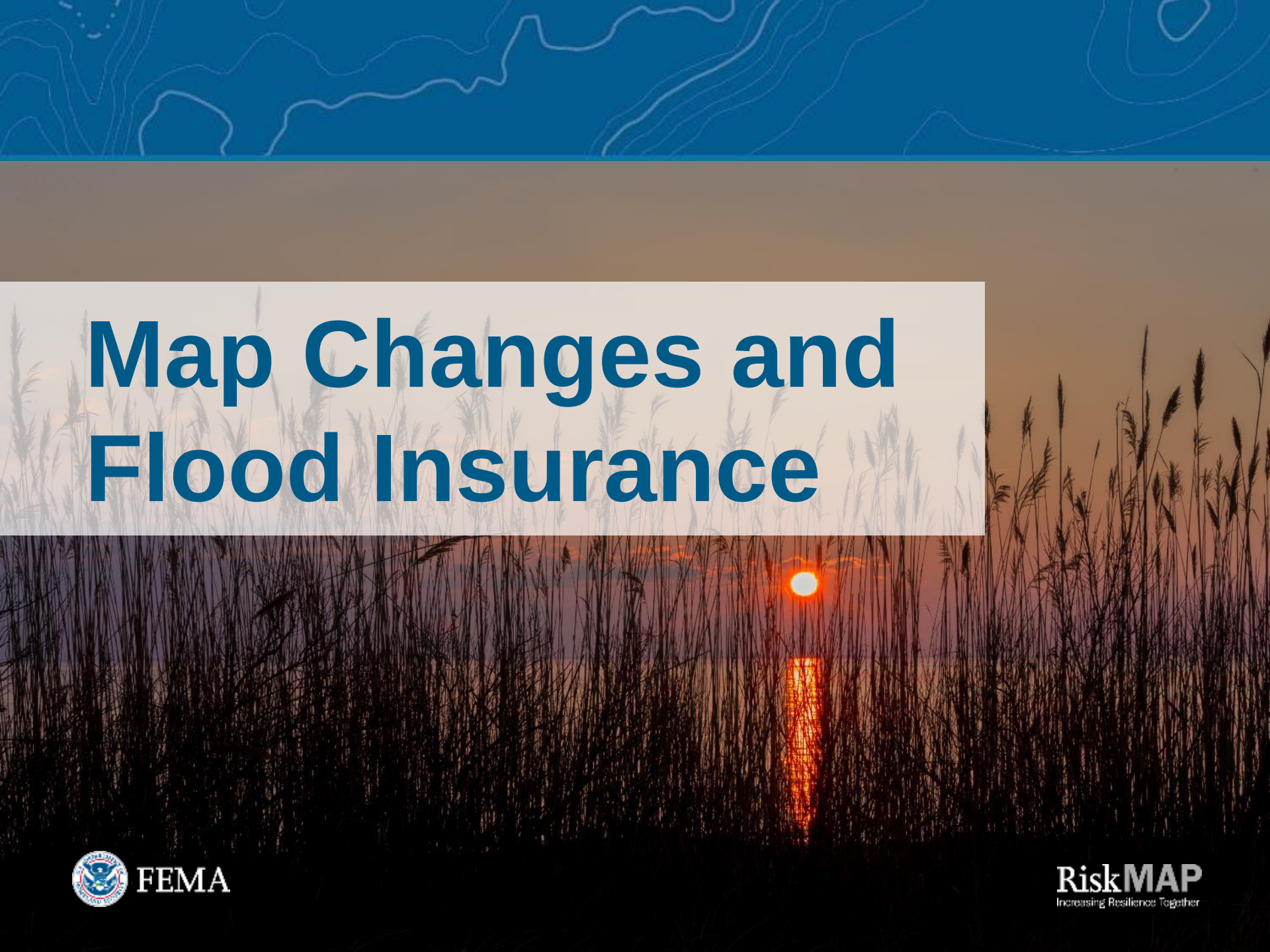
Map Changes and Flood Insurance



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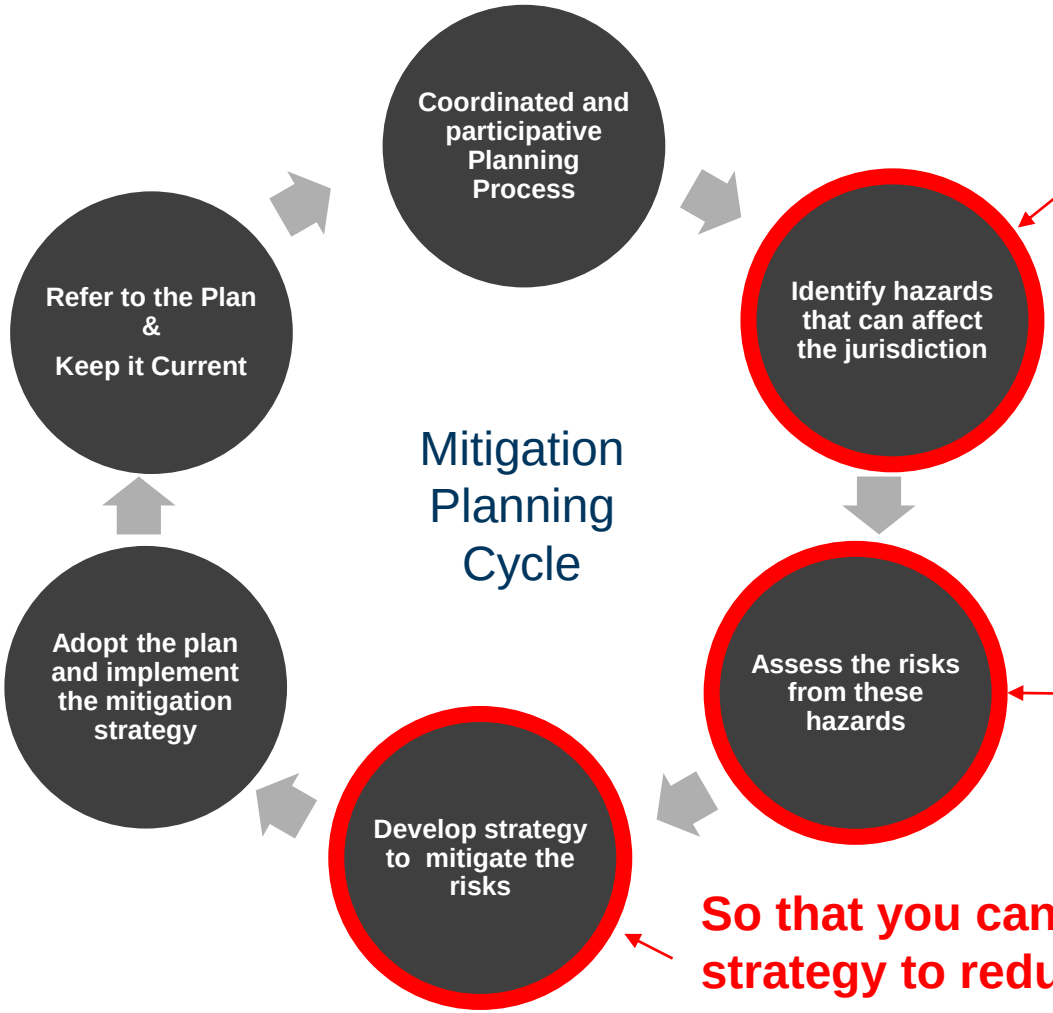
Flood Hazard Mitigation Planning



We are here!

It's time to start assessing the impacts of the new floodplain boundaries

So that you can develop a strategy to reduce flood risk

Floodplain Management

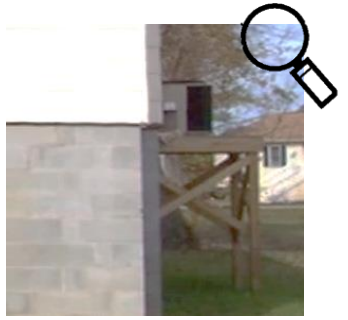
- **Permits are Required for ALL Development in the floodplain!**
- Development means any **manmade change** to improved or unimproved real estate
- Considering flood mitigation when building can help decrease flood insurance costs.

The 2016 flood, Alderson, WV
(from Alderson's Store Facebook post)

Floodplain Management

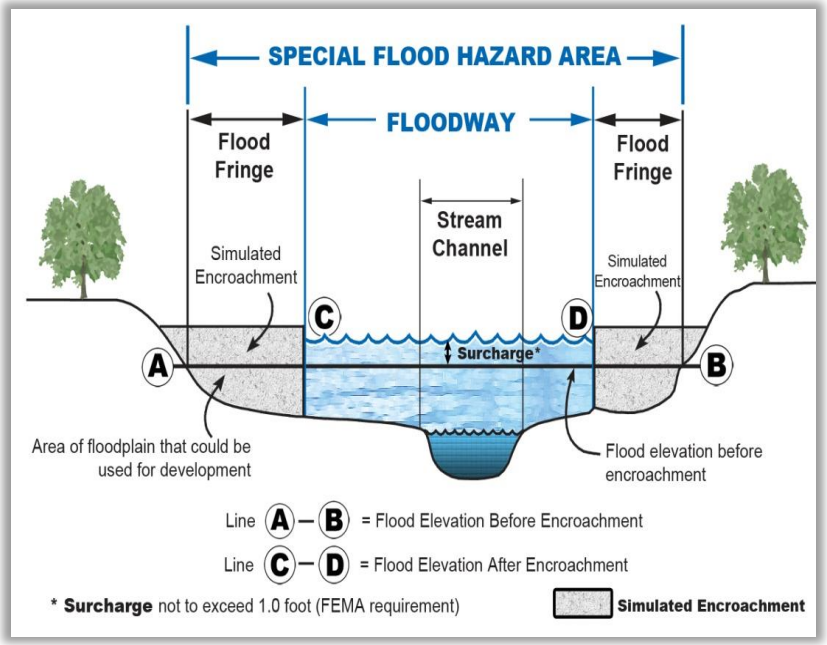
- Communities must regulate based on FIRMs
- Development should be reasonably safe from flooding
- Permits are required for all development
- State/federal permits are required
- Elevate and/or construct with flood-resistant materials
- Locate and design mechanicals to minimize or eliminate flood damage
- Locate and design public utilities and facilities to minimize or eliminate flood damage

A Zones: top of lowest floor (residential) elevated to or above the base flood level



Considerations for Floodways

- Development must prove “no rise”
  - No rise = zero foot (0.00’) rise in flood heights
  - Rise is tracked both upstream and downstream of the development location
- Documentation requirement
  - Hydraulic and Hydrologic (H&H) study
  - In the case of improvements to an existing structure, the footprint shall not expand



Risk Rating 2.0

- Transformational leap forward for NFIP
- Since the 1970s, flood insurance rates have been predominantly based on relatively static measurements, emphasizing a property's location / elevation within a zone on a FIRM
- Risk Rating 2.0 considers more flood risk variables (including cost to rebuild) to more accurately reflect property-specific flood risk

www.fema.gov/NFIPtransformation

Risk Rating 2.0

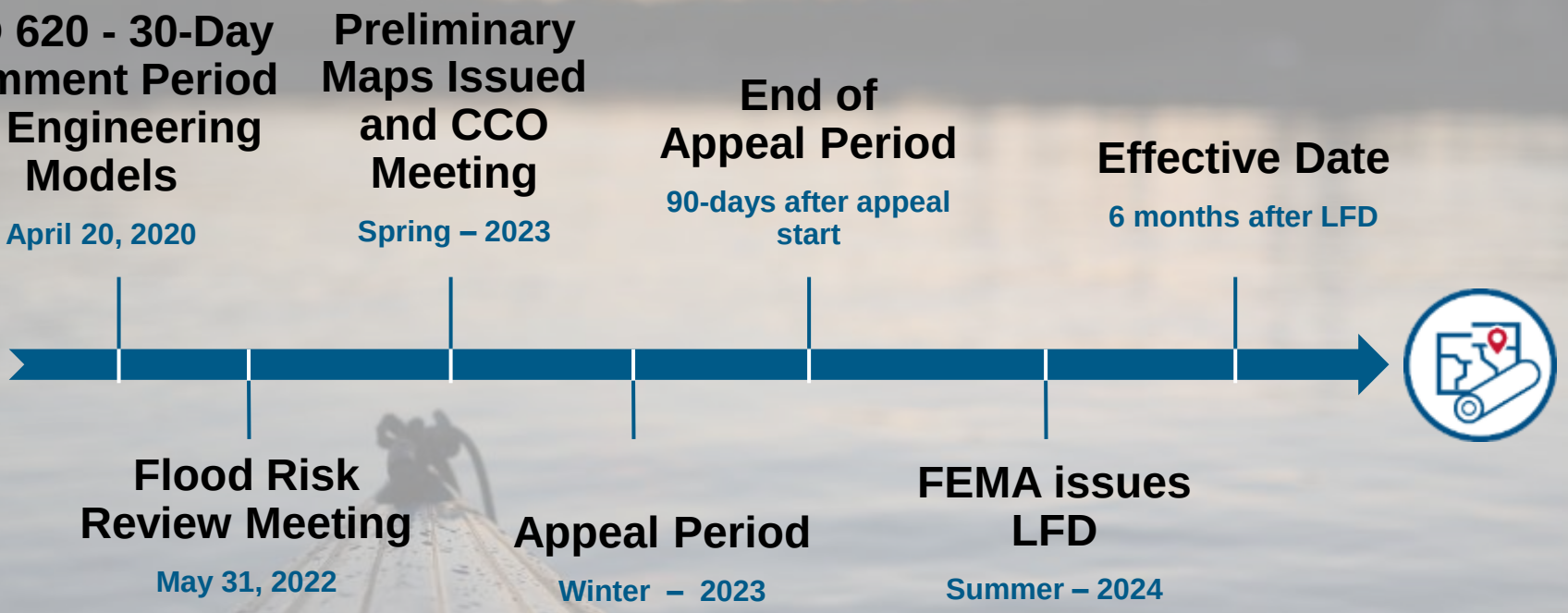
WHAT IS NOT CHANGING?

- FIRM continues to be used for mandatory purchase of flood insurance and Floodplain Management

- FEMA is maintaining some features to simplify the transition to Risk Rating 2.0 by offering premium discounts to eligible policyholders:
  - Statutory rate caps on annual premium increases.
  - Policyholders will still be able to transfer their discount to a new owner by assigning their flood insurance policy when their property changes ownership.
  - Discounts to policyholders in communities who participate in the Community Rating System will continue.

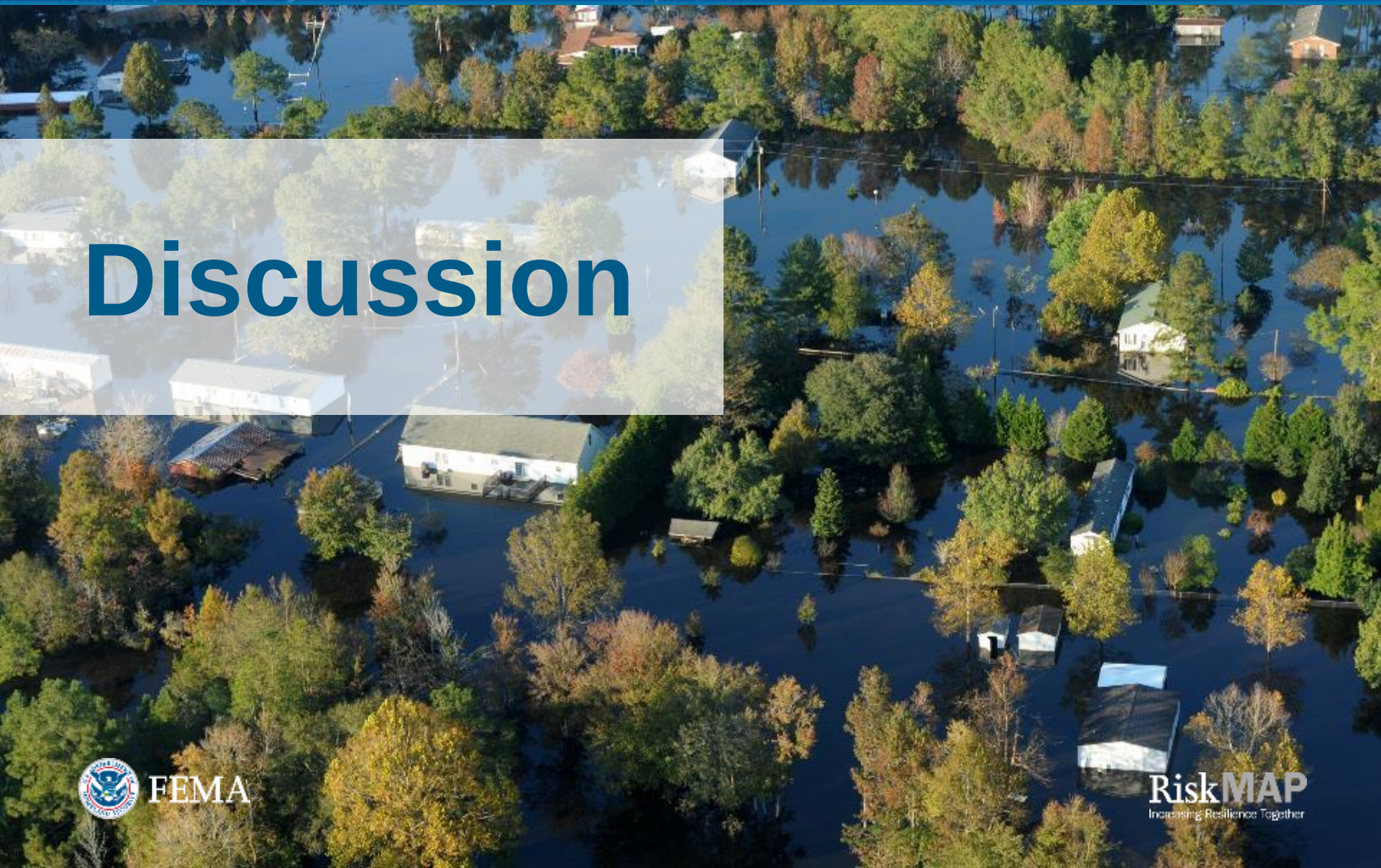
Project Timeline

Timeline for Monroe County



As of now the Monroe disaster PMR (prelim 4/9/2020) is still going on its separate "track" and needs to get the proposed FHD notice published in the Federal Register. Please fill out the CIS sheet that will be distributed after the meeting to help us confirm key information such as Map Repository addresses

Discussion



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We want to hear from you!

- 30 day comment period
- Changes Since Last FIRM viewer located at: https://arcg.is/149DrC
- 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!***

For More Information

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Risk MAP Survey

Purpose: Gauge your satisfaction and the effectiveness of today's meeting.

Timing: 5 to 7 minutes

FAQ:

- Survey responses will remain anonymous.
- If you do not understand a question, please let me know and I can help you.
- Please feel free to provide any other feedback.

https://bit.ly/3LnJNiP