



# West Virginia Risk Explorer

Localized risk assessment tools for analysis and visualization

## West Virginia Flood Resiliency Framework (WVFRF)

June 12, 2025



WV GIS Technical Center  
West Virginia University



# Flood Risk in WV

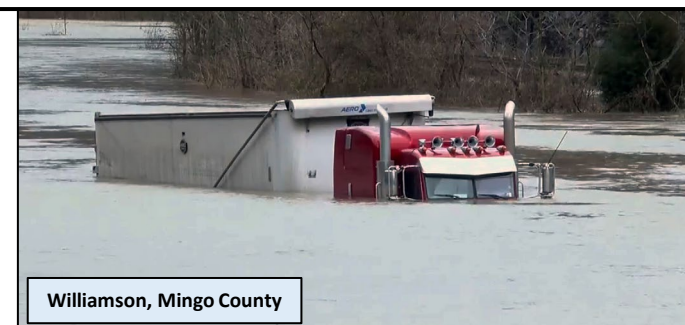
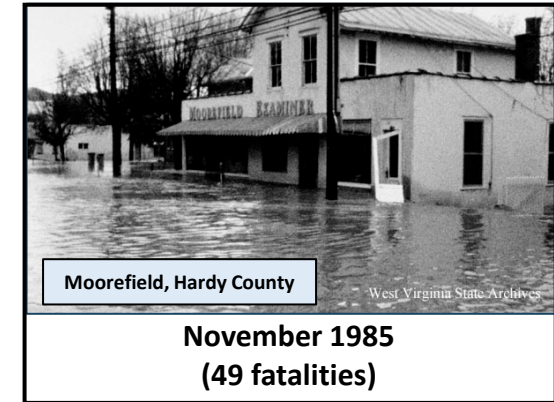
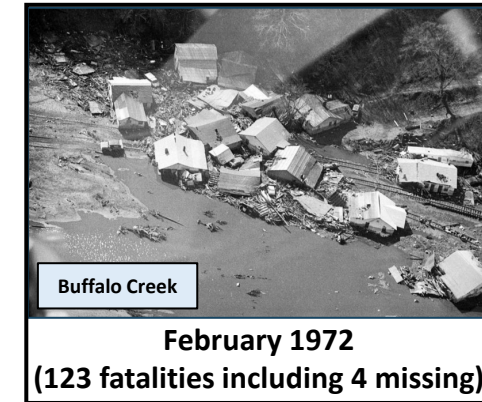
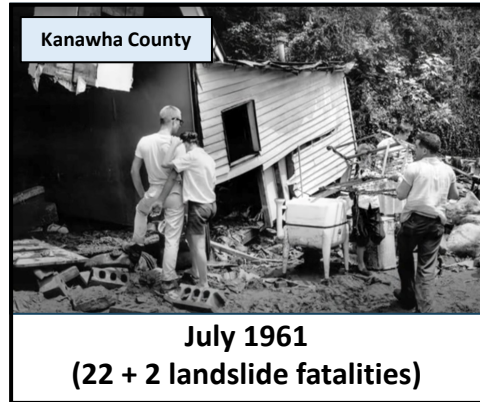


64 Federally-Declared Flood Disasters since 1953

220 Loss of Lives

About 98,000 Buildings (9%)  
in 1%-annual-chance (100-yr) Floodplain

About 199,000 Persons (11%)  
Reside in 100-yr Floodplain





# WV Floodplain Building Inventory (BI)



## Flood Exposure Assessment (Building-Level)

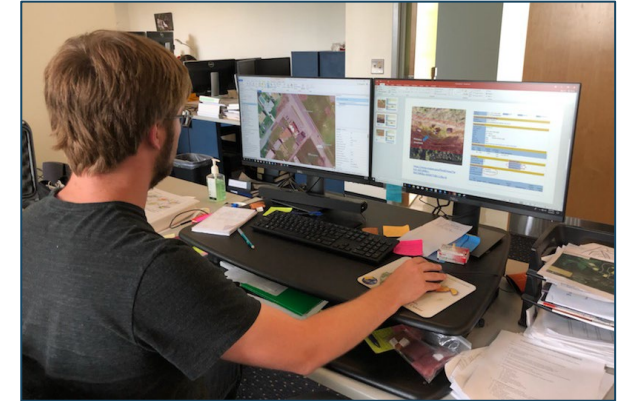
Funded by: FEMA Hazard Mitigation Grant Program (HMGP) and State Hazard Mitigation Office

- All primary (insurable) structures in the 1%-annual-chance (100-yr) floodplain
- Community Assets (Historical & Non-Historical) in the 100-yr floodplain
- Essential Facilities in the 100-yr and 500-yr floodplains

### Essential Facilities



### Community Assets



Detailed building characteristics from tax assessment

+

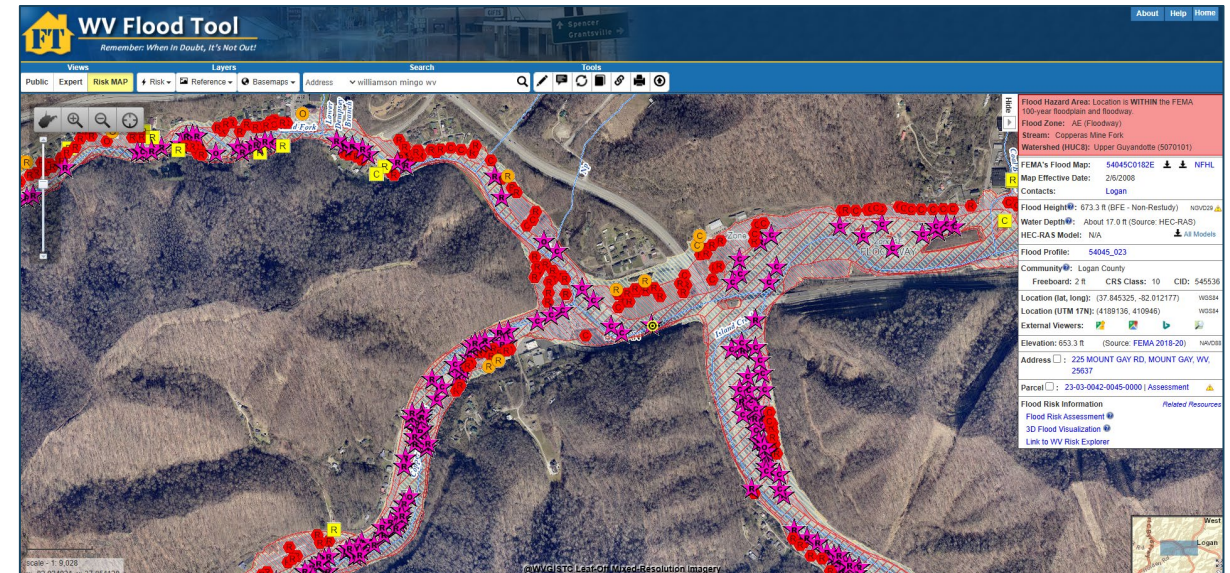
Population exposure and displacement estimates (100-yr flood)

Manual process of identification using Arc GIS

+

Programmed scripts to extract and process data

Product: **WV Flood Tool**  [mapwv.gov/flood](http://mapwv.gov/flood)



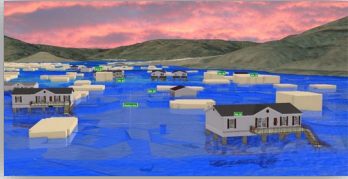


# WV Flood Resiliency Framework (WVFRF)



*A virtual hub of risk assessment, visualization, planning, and training resources for building community flood resiliency in WV*

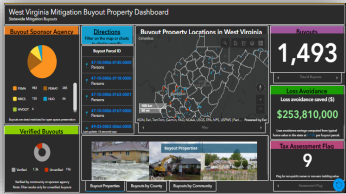
## Flood Visualizations



## WV Flood Tool



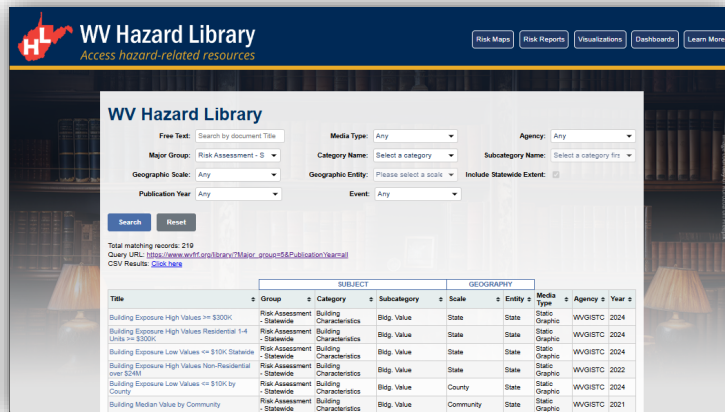
## Flood Dashboards



## WV Risk Explorer



## Example Tools



## Hazard Library

## RISK TOOLS

- WV Risk Explorer
- WV Flood Tool
- Visualizations
- Dashboards

*9 Geographic Scales*

## COMMUNITY ENGAGEMENT

- Focused Outreach Meetings
- Flood Symposium
- Resiliency Tools & Products
- Learning Resources & Reports

## HAZARD LIBRARY

Search online hazard resources by title, subject, media, event, geography, data, etc.

## STAKEHOLDERS

- Risk Reduction Associates
- Emergency Responders
- Floodplain Managers
- Local Officials
- Volunteers
- Public



## Community Engagement Meeting



## Flood Symposium Stakeholders





WVFRF (BETA)

[PROJECT OVERVIEW](#) [WV RISK EXPLORER](#) [WV FLOOD TOOL](#) [CONTRIBUTORS](#) [CONTACT US](#)

## WEST VIRGINIA FLOOD RESILIENCY FRAMEWORK

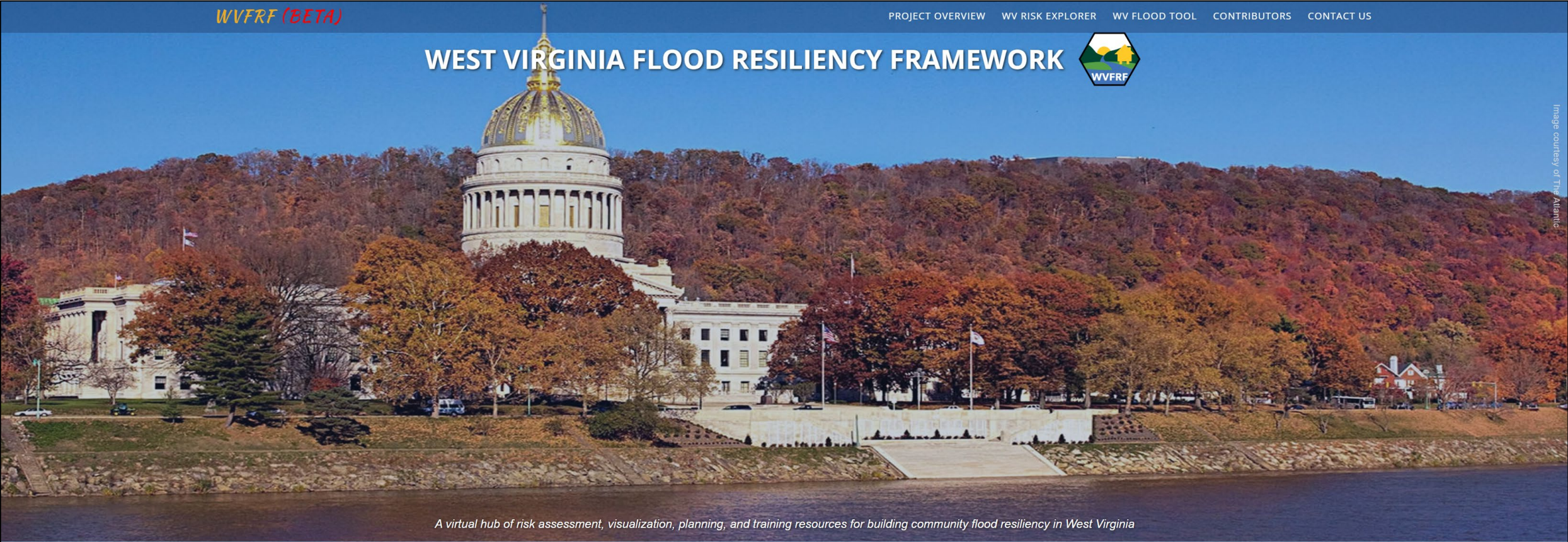


Image courtesy of The Atlantic

A virtual hub of risk assessment, visualization, planning, and training resources for building community flood resiliency in West Virginia

### PRIMARY TOOLS



WV Risk Explorer



WV Flood Tool



WV Property Viewer



WV Hazard Library



## Overall Flood Risk

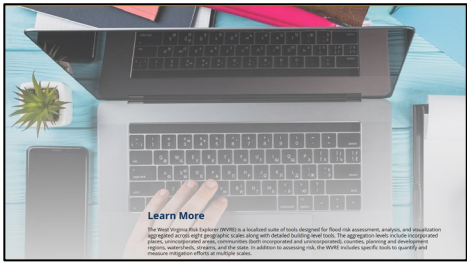
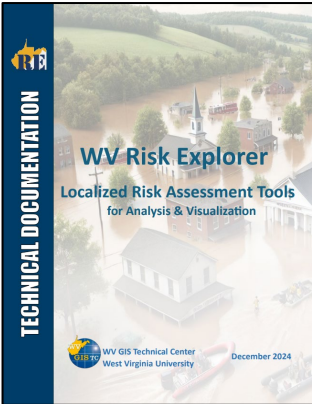
(1) FLOODPLAIN CHARACTERISTICS	(2) BUILDING EXPOSURE	(3) BUILDING CHARACTERISTICS	(4) CRITICAL INFRASTRUCTURE	(5) COMMUNITY ASSETS	(6) BUILDING DAMAGE LOSS	(7) PEOPLE / SOCIAL VULNERABILITIES	(8) OTHER HAZARDS
Floodplain Area	Building Floodplain Count <sup>1 2</sup>	Building Value <sup>1 2</sup>	Essential Facilities	Historical Assets	Substantial Damage Estimates* <sup>1 2</sup>	Population in Floodplain	Landslides
Floodplain Length <sup>1 2</sup>	Building Floodway Count <sup>1 2</sup>	Mobile Homes	Roads Inundated	Non-Historical Assets	Previous Claims	Population Displaced	Karst**
Floodplain Depth <sup>1 2</sup>	Building Floodplain Ratio <sup>2</sup>	Basement			Repetitive Losses	WV Social Vulnerability Index	Dam/Levee Failure**
Flood Disaster Frequency	Building Density <sup>1 2</sup>	One Story					
		Building Year*					

\* Multiple Indicators

\*\* In Progress

<sup>1</sup> River/Stream Indicator

<sup>2</sup> Watershed Indicator



# Analytical & Visualization Tools at Multiple Scales

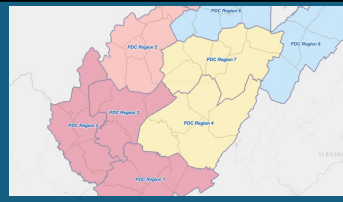


## Political Boundaries

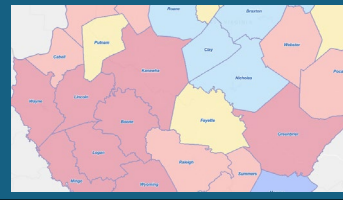
State



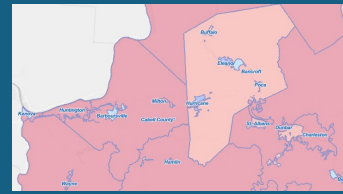
PDC Regions (11)



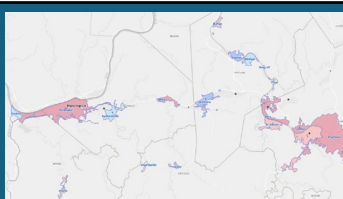
Counties (55)



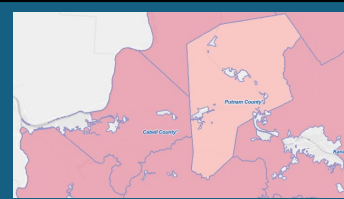
Communities (284)



Incorporated  
Places  
(229)

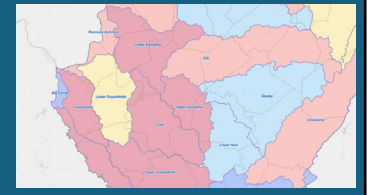


Unincorporated  
Areas  
(55)

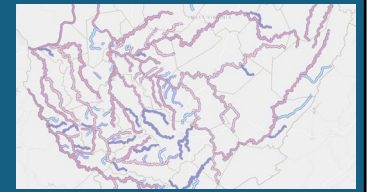


## Drainage Areas / Streams

Watersheds  
(33)



Streams/Rivers  
(156)

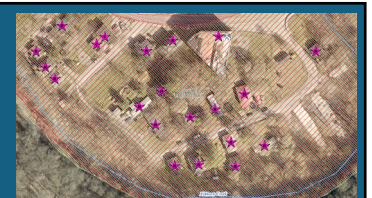


## Property Levels

Parcels



Buildings





# Geographic Entities at VERY HIGH Risk (Top 10%)



RANK	All Communities	Index Score	Incorporated Places	Index Score	Unincorporated Areas	Index Score	Counties	Index Score	Regions	Index Score
1	New Martinsville - Incorporated	100.0%	Clendenin - Incorporated	100.0%	Kanawha County* - Unincorporated	100.0%	Kanawha	100.0%	PDC Region 2	100%
2	Boone County* - Unincorporated	99.6%	New Martinsville - Incorporated	99.5%	Boone County* - Unincorporated	98.1%	Boone	98.1%	PDC Region 3	90%
3	Clendenin - Incorporated	99.2%	Alderson** - Incorporated	99.1%	Wayne County* - Unincorporated	96.2%	McDowell	96.2%		
4	Marlinton - Incorporated	98.9%	Marlinton - Incorporated	98.6%	McDowell County* - Unincorporated	94.4%	Logan	94.4%		
5	Wheeling** - Incorporated	98.5%	Kimball - Incorporated	98.2%	Mingo County* - Unincorporated	92.5%	Mingo	92.5%		
6	McDowell County* - Unincorporated	98.2%	Parsons - Incorporated	97.8%	Logan County* - Unincorporated	90.7%	Wyoming	90.7%		
7	Alderson** - Incorporated	97.8%	Wheeling** - Incorporated	97.3%						
8	Wayne County* - Unincorporated	97.5%	Northfork - Incorporated	96.9%						
9	Parsons - Incorporated	97.1%	Danville - Incorporated	96.4%						
10	Kanawha County* - Unincorporated	96.8%	Madison - Incorporated	96.0%						
11	Madison - Incorporated	96.4%	Milton - Incorporated	95.6%						
12	Kimball - Incorporated	96.1%	Oceana - Incorporated	95.1%						
13	Lincoln County* - Unincorporated	95.7%	Keystone - Incorporated	94.7%						
14	Milton - Incorporated	95.4%	Wellsburg - Incorporated	94.2%						
15	Mingo County* - Unincorporated	95.0%	Gary - Incorporated	93.8%						
16	Logan County* - Unincorporated	94.6%	Rowlesburg - Incorporated	93.4%						
17	Danville - Incorporated	94.3%	Grantsville - Incorporated	92.9%						
18	Wellsburg - Incorporated	93.9%	Richwood - Incorporated	92.5%						
19	Oceana - Incorporated	93.6%	Rainelle - Incorporated	92.1%						
20	Rowlesburg - Incorporated	93.2%	Mannington - Incorporated	91.6%						
21	Northfork - Incorporated	92.9%	Spencer - Incorporated	91.2%						
22	Gary - Incorporated	92.5%	Welch - Incorporated	90.7%						
23	Wyoming County* - Unincorporated	92.2%	Buckhannon - Incorporated	90.3%						
24	Welch - Incorporated	91.8%								
25	Summers County* - Unincorporated	91.5%								
26	Buckhannon - Incorporated	91.1%								
27	Richwood - Incorporated	90.8%								
28	Ceredo - Incorporated	90.4%								
29	Mannington - Incorporated	90.1%								

RANK	Streams	Index Score	Watersheds	Index Score
1	Coal River	100.0%	Lower Kanawha	100.0%
2	Ohio River	99.3%	Coal	96.8%
3	Greenbrier River	98.7%	Tug	93.7%
4	Island Creek	98.0%	Upper Kanawha	90.6%
5	Little Coal River	97.4%		
6	Cacapon River	96.7%		
7	Kanawha River	96.1%		
8	Campbells Creek	94.8%		
9	South Branch Potomac River	94.8%		
10	Mud River	94.1%		
11	Pocatalico River	93.5%		
12	Davis Creek	92.9%		
13	Cabin Creek	92.2%		
14	Wheeling Creek	91.6%		
15	Big Coal River	90.9%		
16	Pond Fork	90.3%		

<b>Colors:</b>
Black --> Incorporated places
Black on yellow** --> Split communities
Black on blue: Incorporated communities included in the detailed risk report (Camden-on-Gauley, Clendenin, Marlinton, Rainelle, Richwood, and White Sulphur Springs)
Brown on gray --> Unincorporated areas
Green --> Counties (Total)

Last update: Aug. 2024

# Risk Tools Comparison



## WV Flood Tool

Determine the degree of flood risk for a *specific area or property* using the Public and Expert Views. View building risk assessments and mitigation measures using the Risk Map View.

### Primary Components:

- Public View
- Expert View (Floodplain Management)
- RiskMap View (Risk Reduction)
- Reference Layers & Basemaps
- Property Search Tools
- Links to External Viewers & Resources



### Applications:

- Flood Risk Determinations at Property Level
- Floodplain Management
- Mitigation Measures
- Damage Assessments
- Property Identification
- Flood Visualizations & Risk Communications
- CRS Map Credits
- Other Hazards

## WV Risk Explorer

View and analyze riverine flood risk at the *aggregate level* for community, county, region, watershed, and stream scales. *Compare risk* among different geographic entities, complete with risk scores and rankings, from the building level to state scales.

### Primary Components:

- Risk Maps Tool
- Risk Reports Tool
- Risk & Mitigation Dashboard Tools
- Building Level Risk Tools
- Flood Visualization Tools
- Data linkages WV Flood Tool & Hazard Library



### Applications:

- Plans (Resiliency, Emergency Operations, Hazard Mitigation)
- Risk Studies (Risk MAP, Risk Reduction, Community Focused)
- Mitigation Measures, Tracking & Monitoring
- Flood Visualizations & Risk Communications
- CRS Programming Variables
- Other Hazards



# West Virginia Risk Explorer (WVRE)



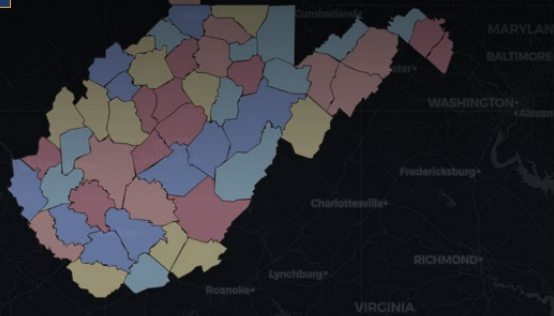
**Risk Assessment Tools:** Localized risk assessment tools for analysis

**WVRE Landing Page:** [wvfrf.org/wvre](https://wvfrf.org/wvre)

## WV Risk Explorer Maps

Interactively view and explore flood risk indicators on a map to identify areas of higher risk.

Risk Maps



## WV Risk Explorer Reports

View and download flood risk assessment and comparison reports in more detail.

Risk Reports



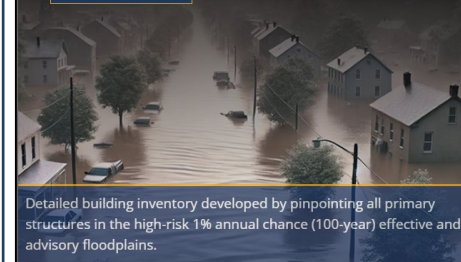
## WV Building-Level (BL) Risk

Analyze flood risk at the level of individual structures in detail.

BL Risk



Primary Structures



Detailed building inventory developed by pinpointing all primary structures in the high-risk 1% annual chance (100-year) effective and advisory floodplains.

Significant Structures



Historical and non-historical community assets in the high-risk 100-year effective and advisory floodplains and essential facilities inventoried to the 500-year flood event.

## WV Flood Dashboards

Use the interactive dashboards to analyze risk factors and mitigation measures.

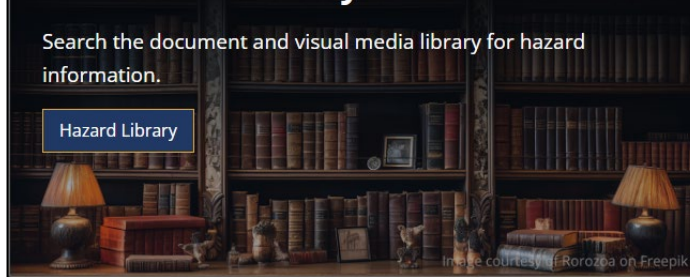
Dashboards



## WV Hazard Library

Search the document and visual media library for hazard information.

Hazard Library

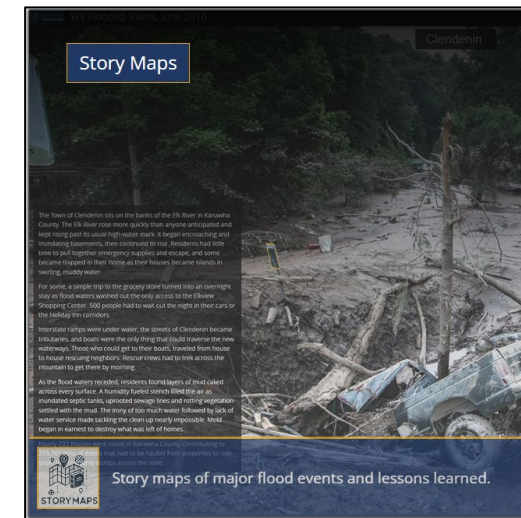
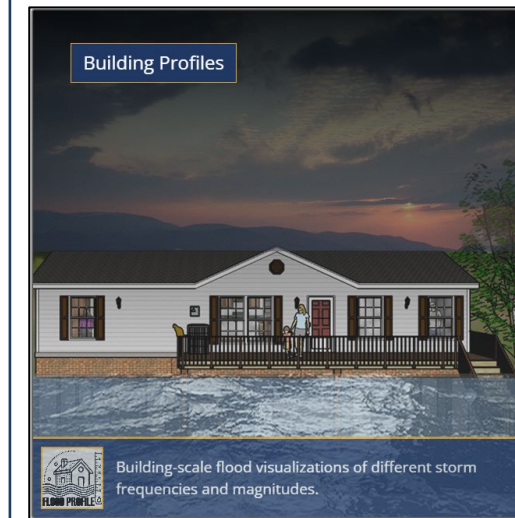
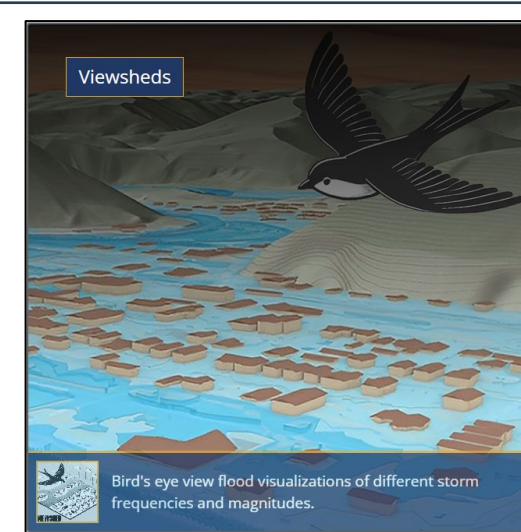


# West Virginia Risk Explorer (WVRE)...



## Risk Communication Tools:

Facilitating risk comprehension for different groups of stakeholders

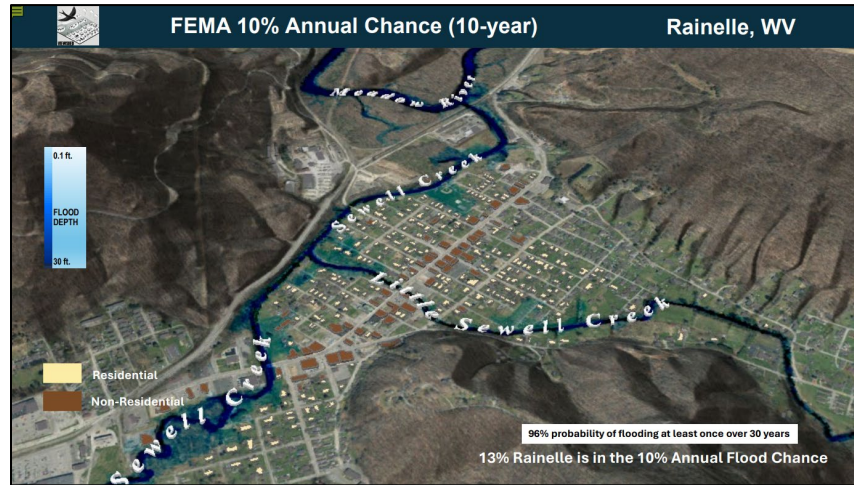




# West Virginia Risk Explorer (WVRE)...



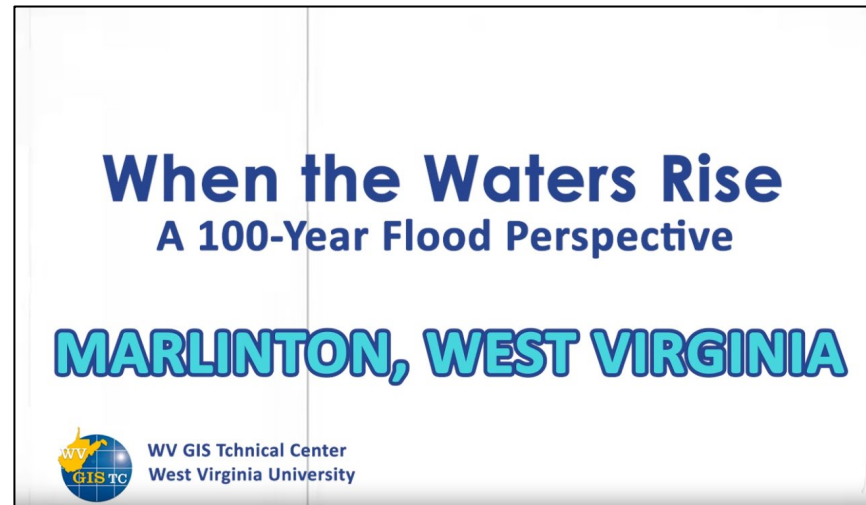
## Visualization Examples:



Viewshed for Rainelle



Building Profile in Clendenin



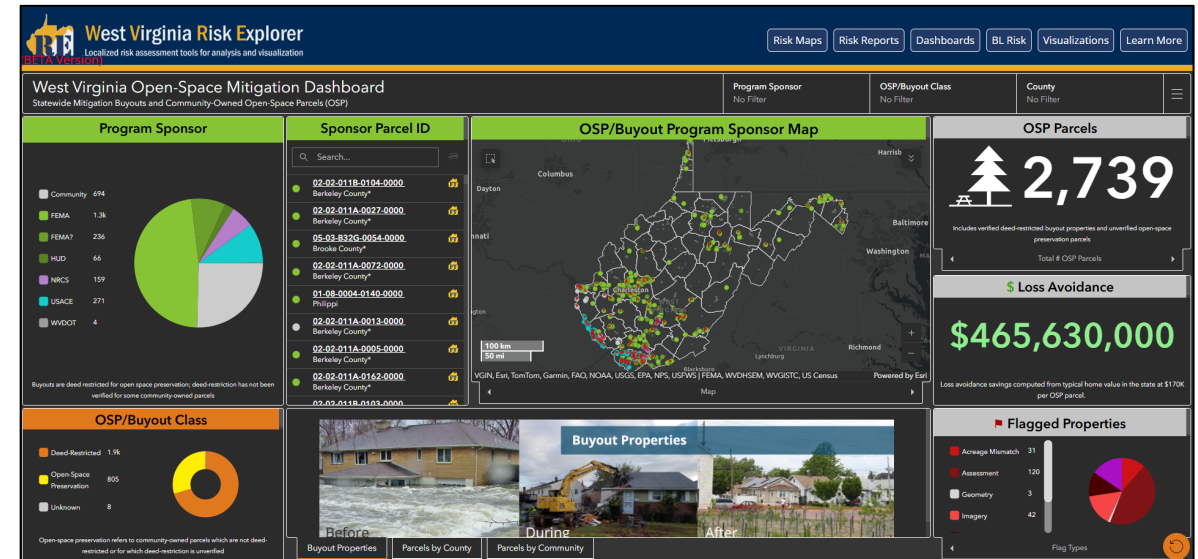
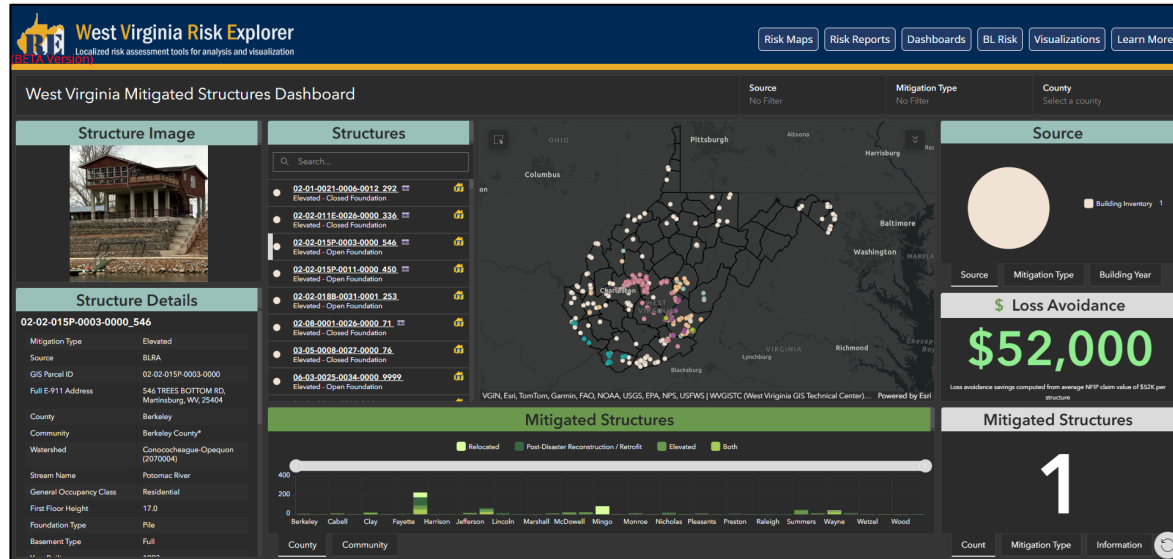
3D Movie for Marlinton

# West Virginia Risk Explorer (WVRE)...



## Mitigation Assessment Tools:

- Mitigated Structures Dashboard
- Open-Space Mitigation Dashboard





# Future Direction



Finalizing the Hazard Library (soon)

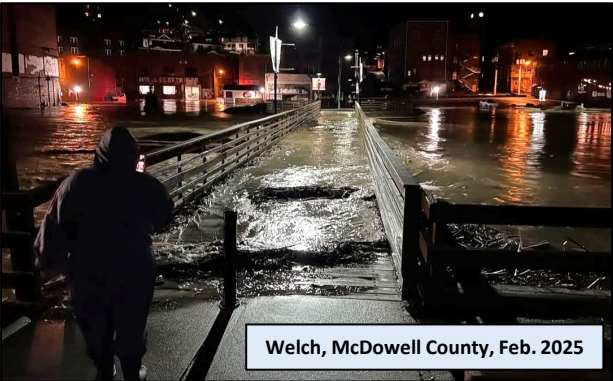
Future Maintenance and data updates?

Training?

**Please  
start using  
the new  
tools!**



# Recent Flood, Feb. 2025



Welch, McDowell County, Feb. 2025



Welch, McDowell County, Feb. 2025



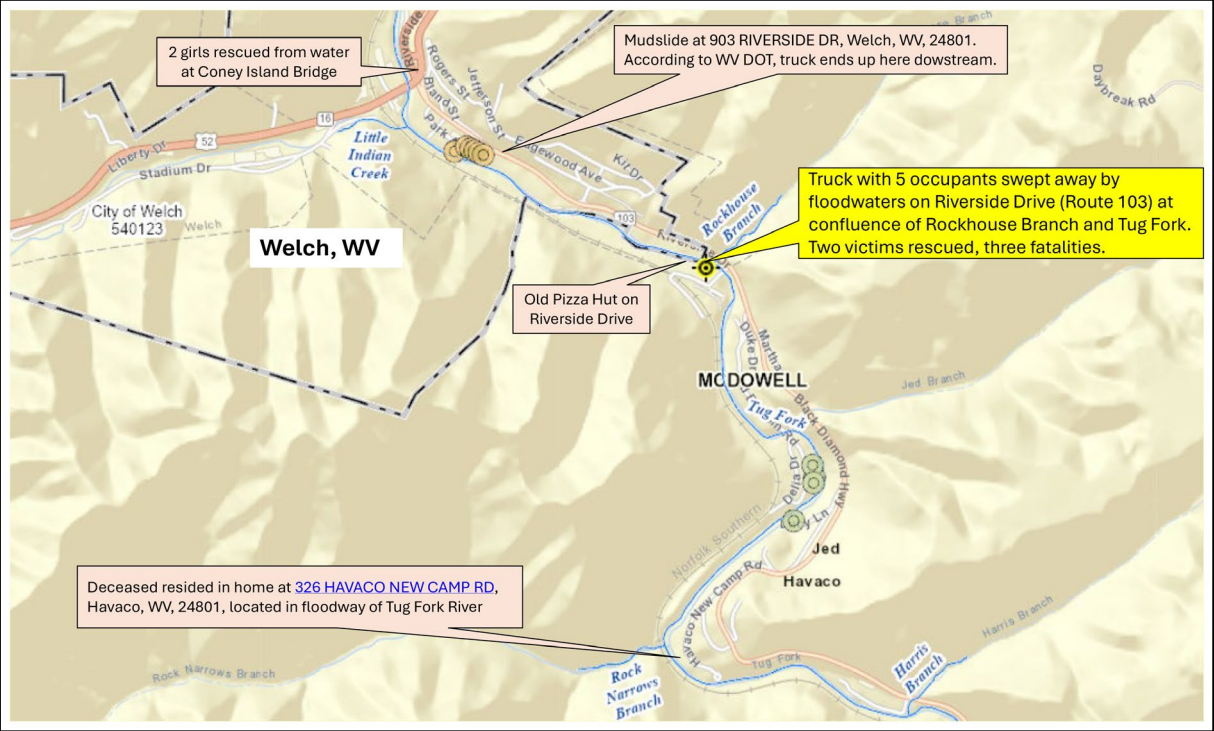
McDowell County, Feb. 2025

## Highlights:

**Mobile Homes**, vulnerable and challenging to manage

**Significant Structures** flooded

**Mitigation Efforts**, building to higher protection levels



Mingo County, Feb. 2025



Mingo County, Feb. 2025



Williamson, Mingo County, Feb. 2025



# Mobile Home in Floodway Destroyed (Edgerton, Mingo)

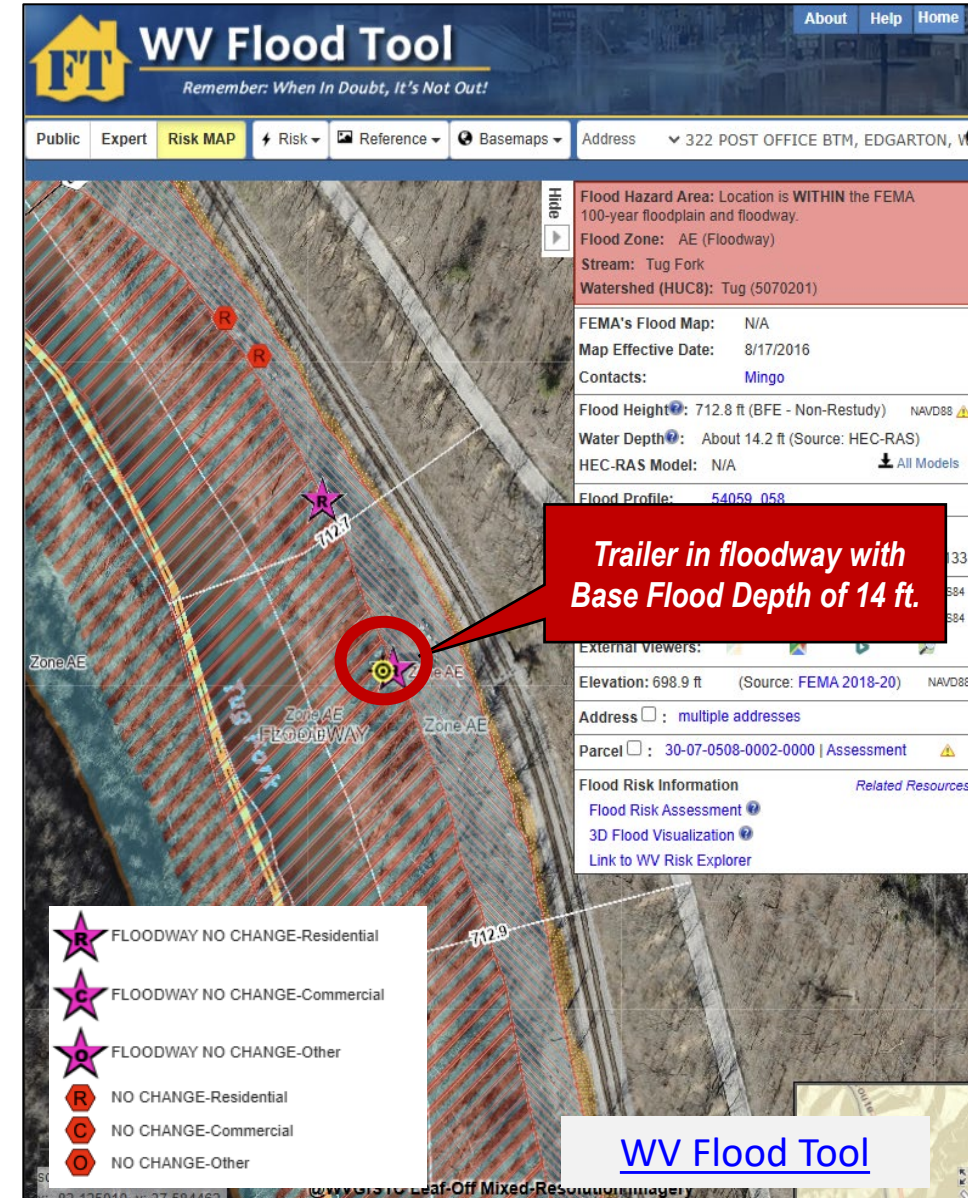


322 POST OFFICE BTM, EDGARTON, WV  
Building ID: [30-07-0508-0002-0000](#) 322

1977 Flood Elev: 722.0 ft. (24 ft. depth)  
FEMA 500-YR Elev: 718.8 ft. (20 ft. depth)  
FEMA 100-YR BFE: 712.8 ft. (14 ft. depth)



**Non-compliant Post-FIRM  
trailer in floodway  
destroyed in 2025 flood**





# Mobile Home in Floodway Destroyed (Edgerton, Mingo)...

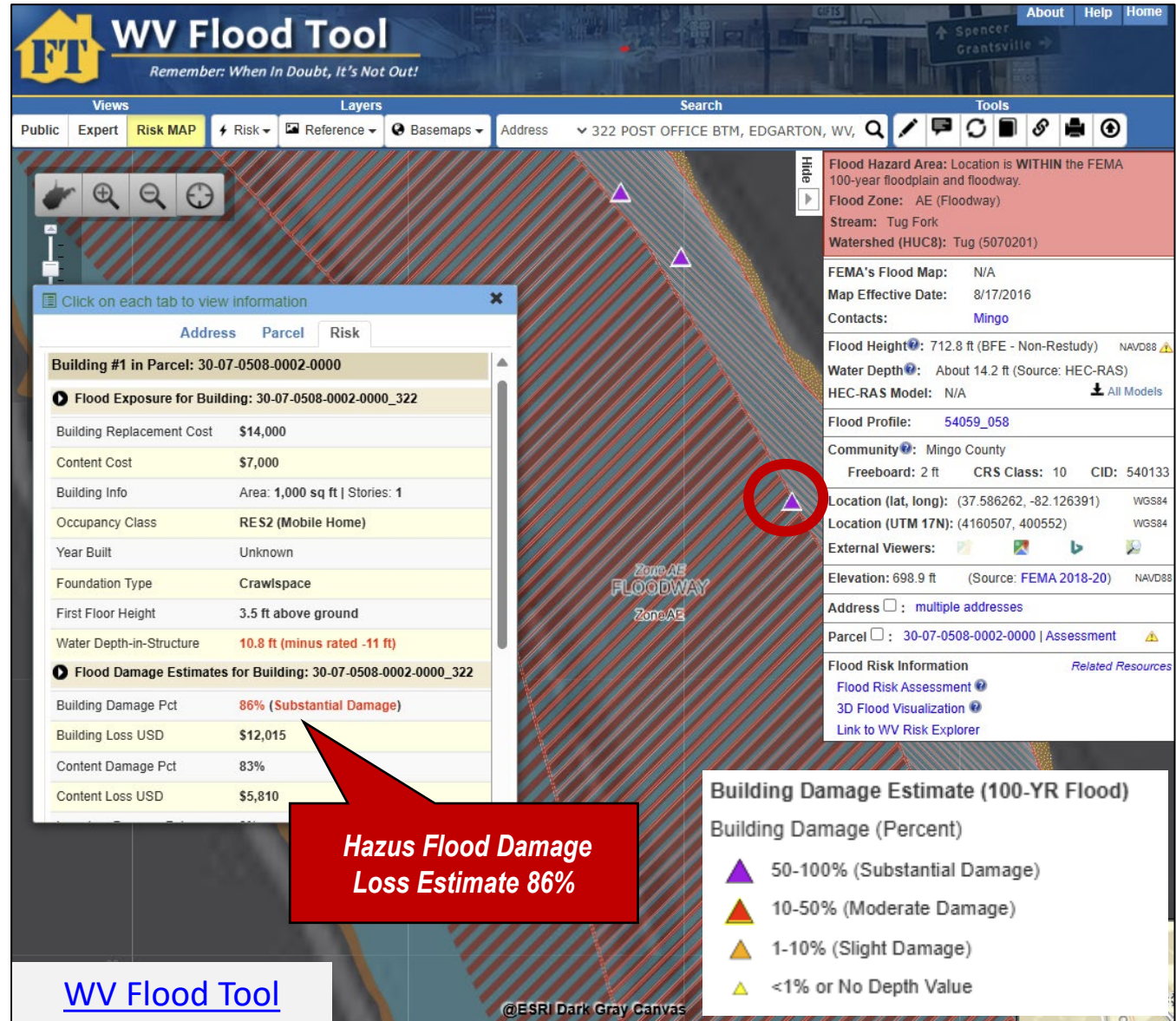


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FEMA 100-YR BFE: 712.8 ft. (14 ft. depth)



**Non-compliant Post-FIRM  
trailer in floodway  
destroyed in 2025 flood**



**Hazus Flood Damage  
Loss Estimate 86%**




# Mobile Home in Floodway Destroyed (Edgarton, Mingo)...



## WV Risk Explorer's BL Risk Tool for Primary Structures in Floodplain

<< Mingo County [Query](#) on highest estimated Flood Depths >>

**West Virginia Risk Explorer**  
Localized risk assessment tools for analysis and visualization  
(BETA Version)

Risk MapsRisk ReportsDashboardsBL RiskVisualizationsLearn More

Select Geographic ScaleCountySelect Geographic EntityMingo

COLUMNSAdvanced SearchPRIMARY STRUCTURES TABLEReport Date: March 2025Metadata

SQL Filter: County = MingoSQL Filter: Stream\_Name NOT\_IN (Trace Fork)Clear all Filters

3509 Records Selected. Export to CSV (2000 record limit)

SPATIAL IDENTIFIERS			GEOGRAPHIC UNITS		FLOOD ZONE		BUILDING CHARACTERISTICS		BUILDING DAMAGE ESTIMATE	
Building ID	E-911 Address	Flood Tool	Community	Stream	Flood Zone	In Floodway	General Occupancy	Specific Occupancy	Flood Depth	Bldg. Damage %
<a href="#">30-07-0508-0002-0000_308</a>	308 POST OFFICE BTM, EDGARTON, WV, 25672		Mingo County* - Unincorporated	Tug Fork	AE	Yes	Residential	RES2	14.8 Ft	86%
<a href="#">30-07-0508-0002-0000_322</a>	322 POST OFFICE BTM, EDGARTON, WV, 25672		Mingo County* - Unincorporated	Tug Fork	AE	Yes	Residential	RES2	14.3 Ft	85%
<a href="#">30-11-001A-0001-0000_320</a>	320 STEPP BLVD, WEST WILLIAMSON, WV, 25661		Williamson - Incorporated	Tug Fork	AE	Yes	Non-Residential	COM2	12.6 Ft	39%
<a href="#">30-10-0001-0123-0000_139</a>	139 DILLON LN, CHATTAROY, WV, 25667		Mingo County* - Unincorporated	Buffalo Creek	AE	No	Non-Residential	GOV1	12.1 Ft	33%
<a href="#">30-11-0007-0233-0000_317</a>	317 E FOURTH AVE, WILLIAMSON, WV, 25661		Williamson - Incorporated	Tug Fork	AE	Yes	Non-Residential	COM4	12.1 Ft	54%
<a href="#">30-05-0001-0027-0000_57</a>	57 TUSCANY LN, EAST KERMIT, WV, 25674		Mingo County* - Unincorporated	Tug Fork	AE	Yes	Residential	RES1	11.8 Ft	74%
<a href="#">30-10-0008-0016-0000_9996</a>	9996 SR 49, RAWL, WV, 25691		Mingo County* - Unincorporated	Tug Fork	AE	No	Residential		10.6 Ft	82%
<a href="#">30-10-0008-0015-0000_9997</a>	9997 SR 49, RAWL, WV, 25691		Mingo County* - Unincorporated	Tug Fork	AE	No	Residential		10.4 Ft	81%
<a href="#">30-03-0302-0056-0002_277</a>	277 OLD FIELD BR, MAHER, WV, 25661		Mingo County* - Unincorporated	Tug Fork	AE	No	Residential		10.3 Ft	81%
<a href="#">30-10-0008-0020-0000_9998</a>	9998 SR 49, RAWL, WV, 25691		Mingo County* - Unincorporated	Tug Fork	AE	No	Residential		9.9 Ft	81%

Rows per page: 10

10 of 3509Next>Last>>

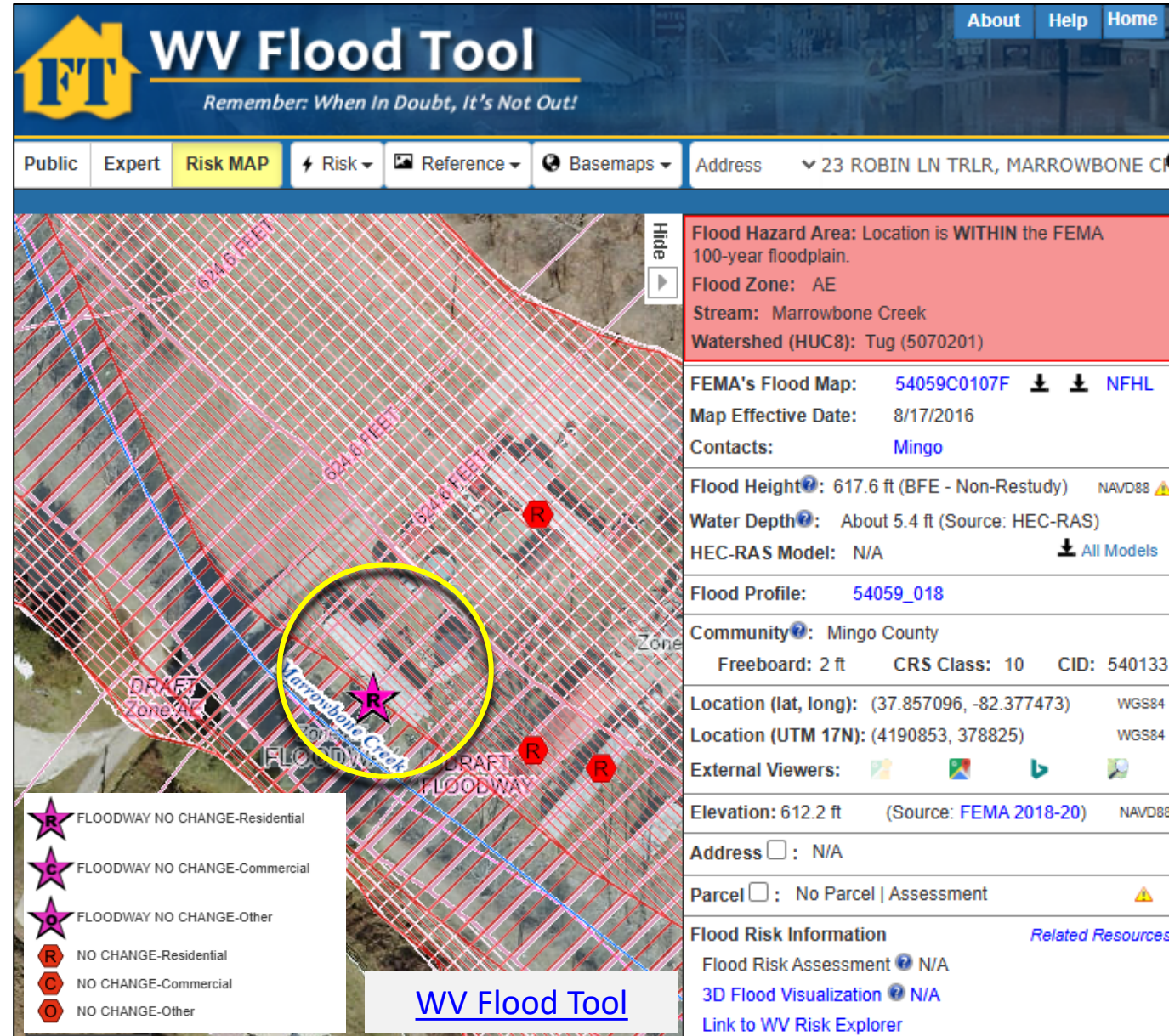
Trailer [30-07-0508-0002-0000\\_322](#) that was destroyed in 2025 Flood was the second highest damage loss estimate for Mingo County

322 POST OFFICE BTM, EDGARTON, WV  
Building ID: [30-07-0508-0002-0000\\_322](#)

# Mobile Home in Floodway Destroyed (Mingo County)

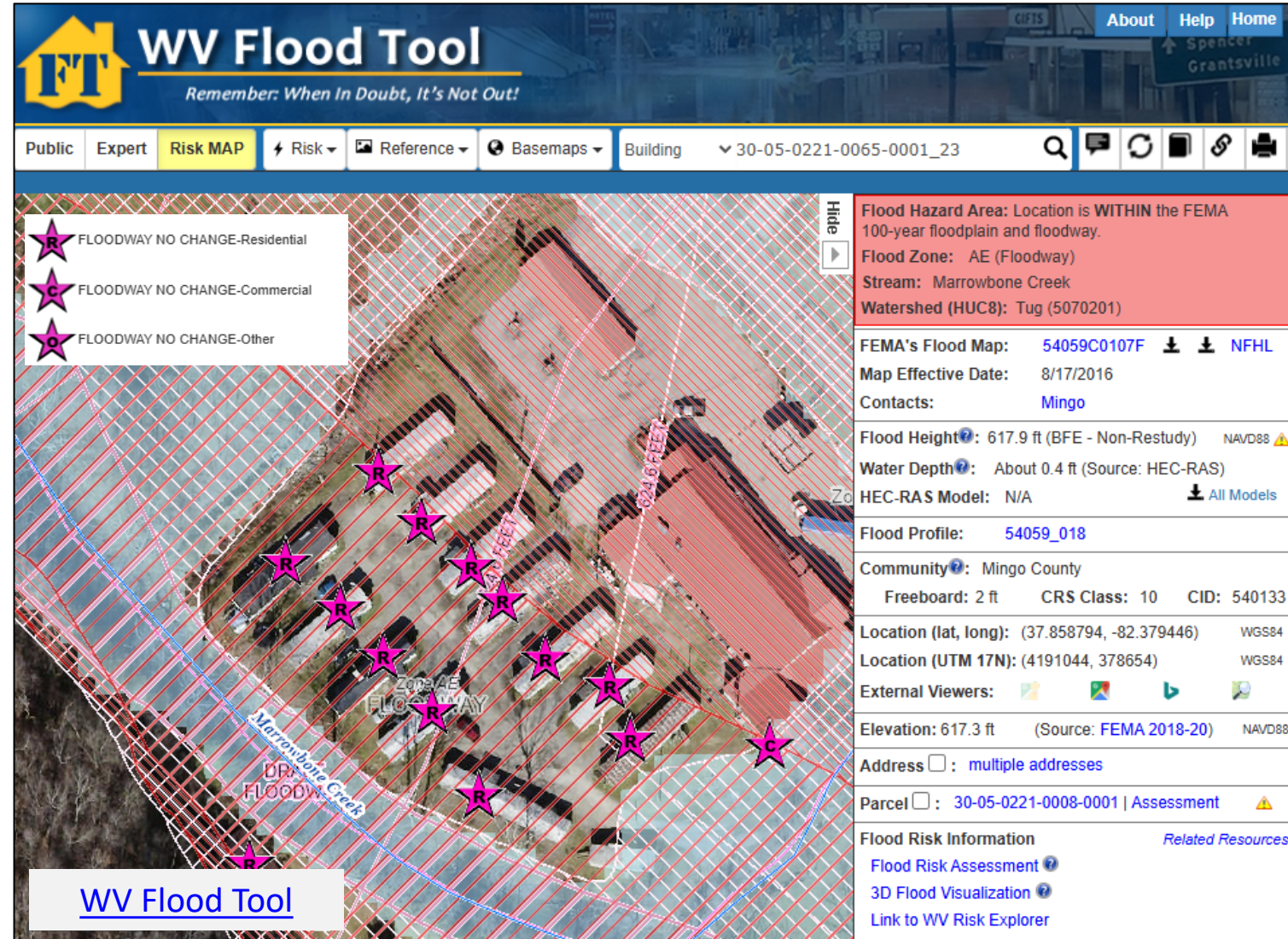
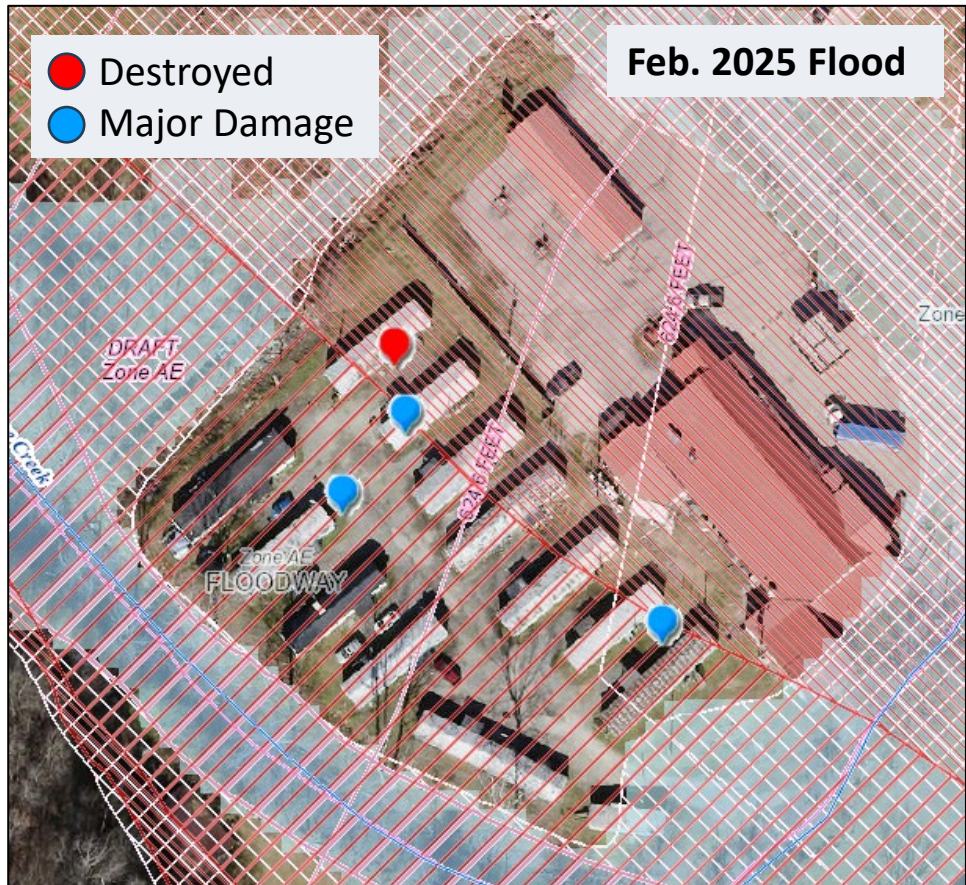


23 ROBIN LN TRLR, MARROWBONE CREEK, WV  
Building ID: [30-05-0221-0065-0001\\_23](#)





# Mobile Home Park in Floodway (Mingo County)

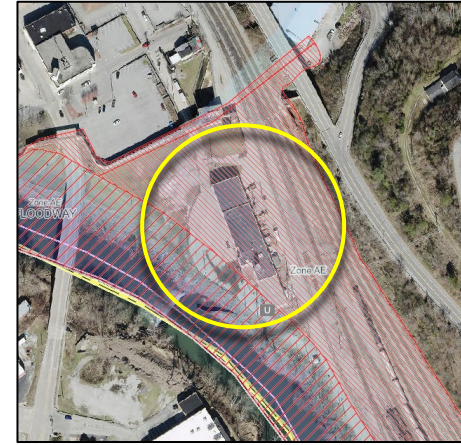
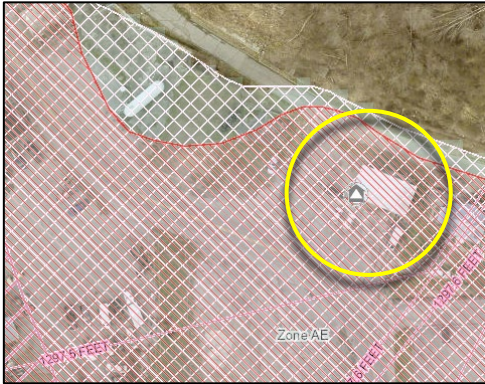




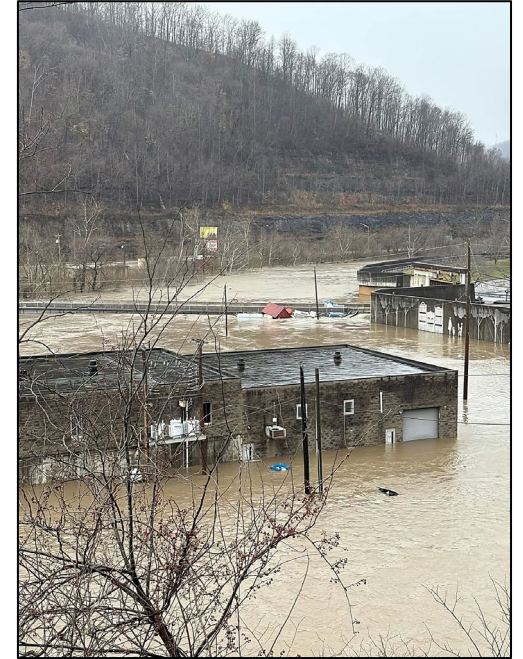
# Flooded Significant Structures, Feb. 2025



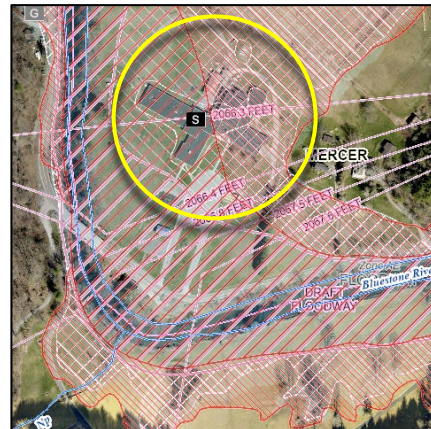
**Jan-Care of Guardian Angel (EMS)**  
**Welch, McDowell County**  
**Inundated, Feb. 2025**  
Building ID: [27-15-0002-0247-0000 58](#)



**Williamson Water Plant (Veolia Water)**  
**Williamson, Mingo County**  
**Inundated, Feb. 2025**  
Building ID: [30-11-0007-0233-0000 317](#)

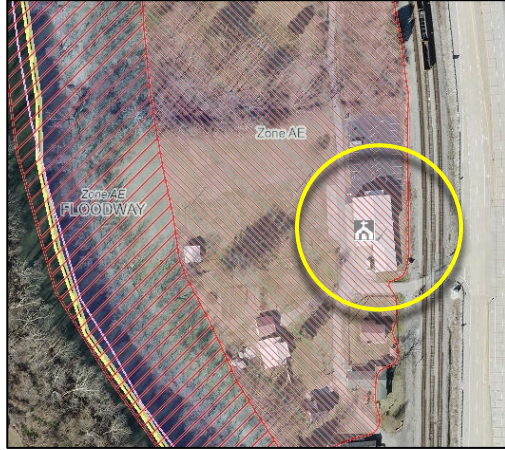


**Spanishburg Elementary School**  
**Mercer County**  
**Inundated, Feb. 2025**  
Building ID: [28-11-0026-0075-0000 8544](#)





# Flooded Significant Structures, Feb. 2025...



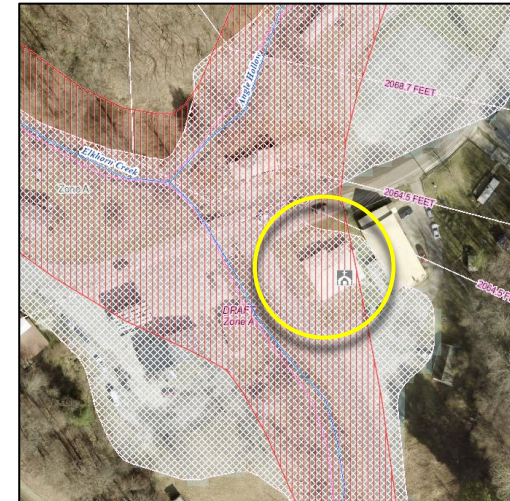
**Borderland Baptist Church**  
**Mingo County**  
**Inundated, Feb. 2025**  
Building ID: [30-10-362K-0010-0000\\_46](#)



**Cornerstone Church**  
**Matewan, Mingo County**  
**Inundated, Feb. 2025**  
Building ID: [30-08-0009-0071-0000\\_1028](#)

**East Williamson Baptist Church**  
**Williamson, Mingo County**  
**Inundated, Feb. 2025**  
Building ID: [30-11-0010-0098-0000\\_9999](#)

[Query: Mingo County, Significant Structures, Religious](#)



**Church Of God Ennis & Maybeury**  
**McDowell County**  
**6 inches of water in basement, Feb. 2025**  
Building ID: [27-06-0011-0019-0000\\_40150](#)





# Mingo County – Borderland Church (Borderland, WV)



## Borderland Church Flood Elevations



46 DESKINS DR, BORDERLAND, WV, 25661

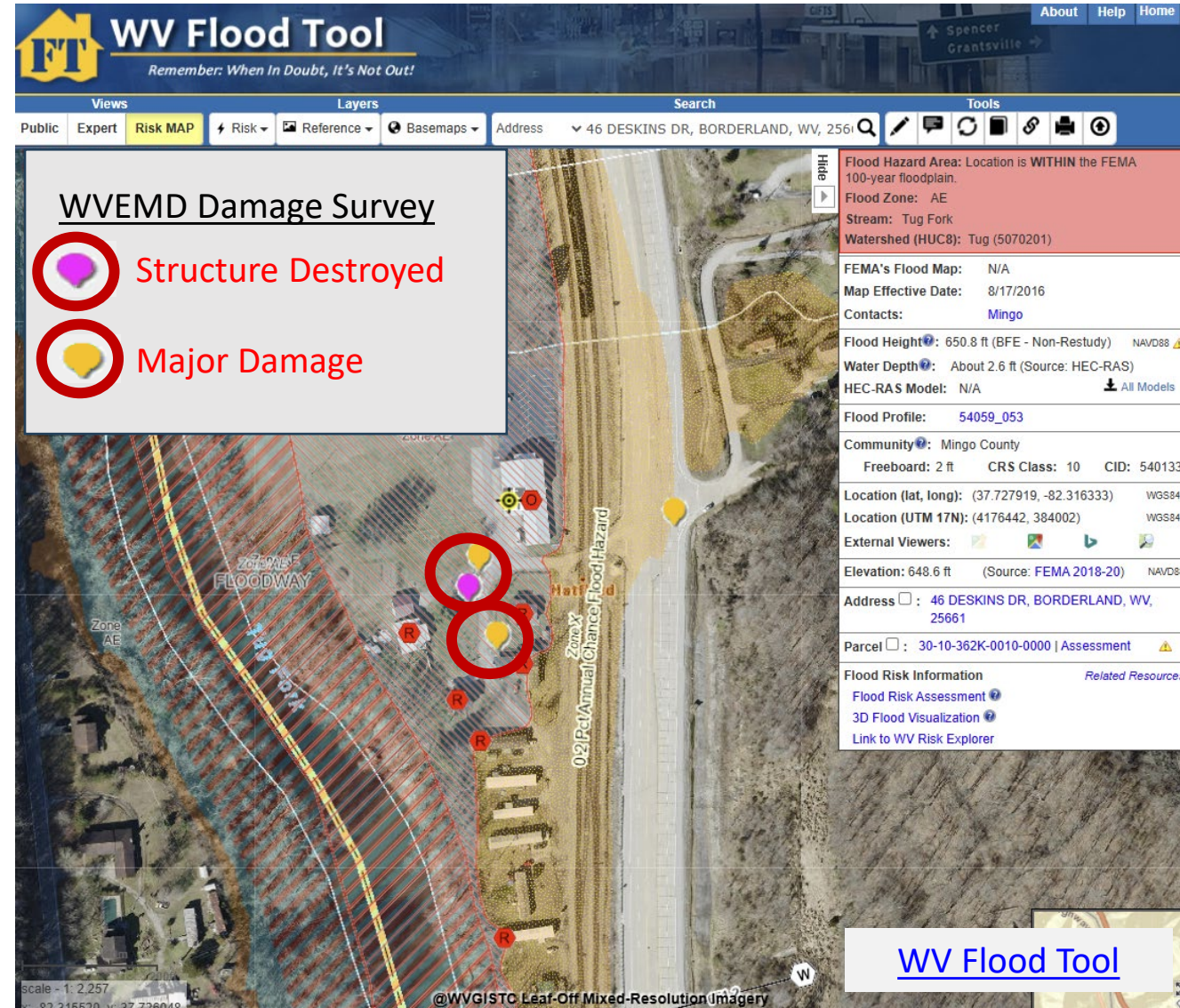
Building ID: [30-10-362K-0010-0000 46](#)

1977 Flood Elev: 659.8 ft. (9 ft. depth)

FEMA 500-YR Elev: 659.8 ft. (9 ft. depth)

2025 Flood Elev: 655.8 ft. (5 ft.; [4 to 5 feet in sanctuary](#))

FEMA 100-YR BFE: 650.8 ft. (2.6 ft. depth)

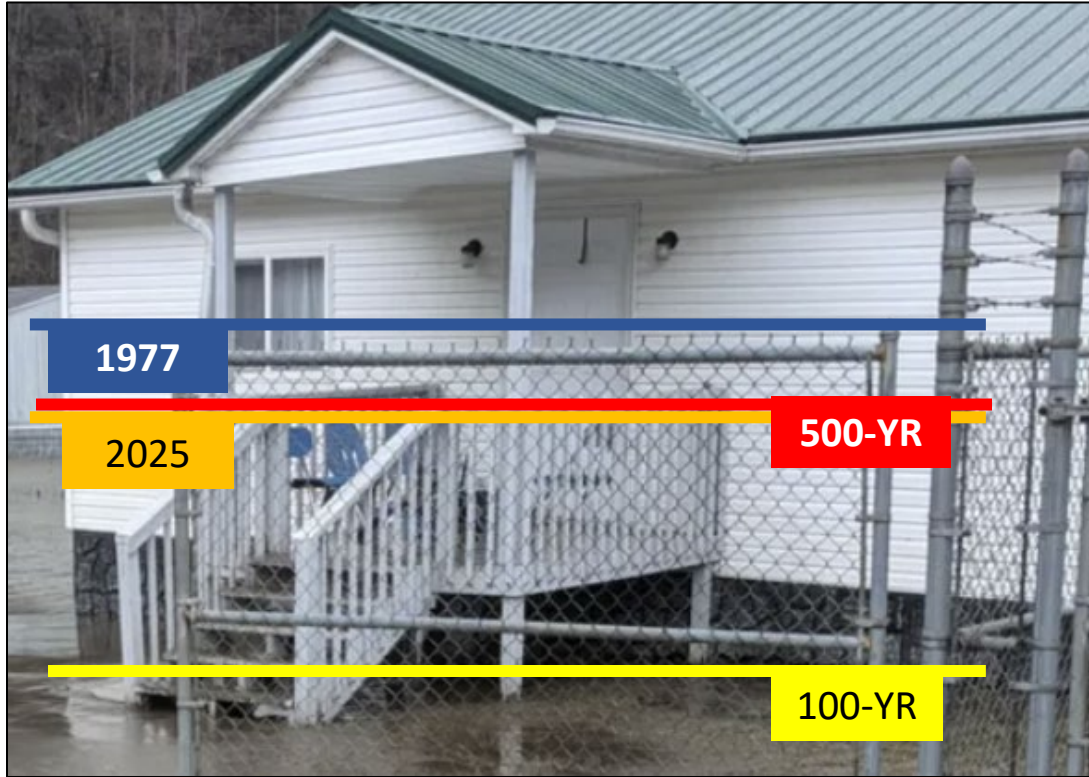




# Mingo County – Cornerstone Church (Matewan, WV)



## Cornerstone Church Flood Elevations



1028 SR 49, MATEWAN, WV, 25678

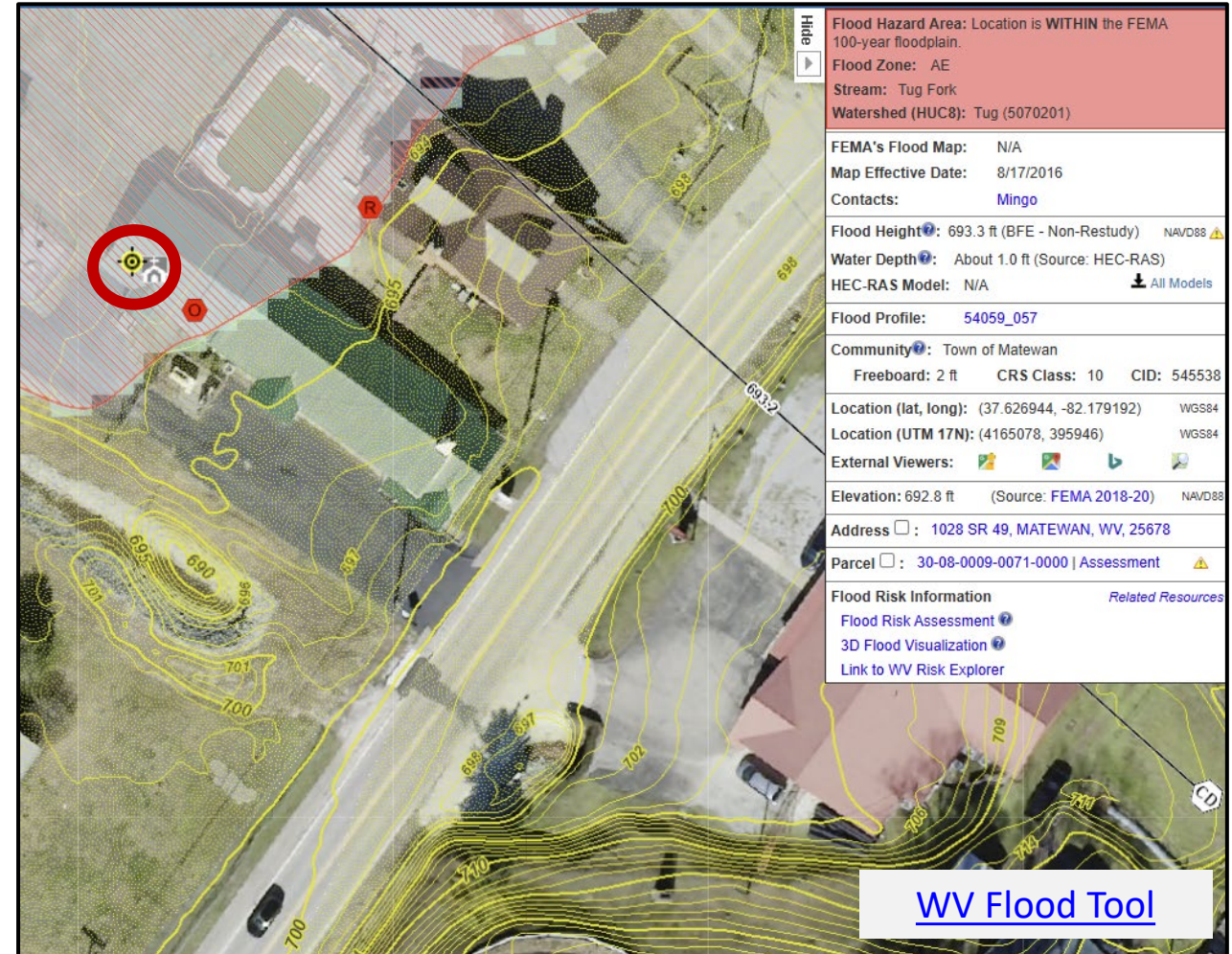
Building ID: [30-08-0009-0071-0000](#) [1028](#)

1977 Flood Elev: 701.3 ft. (8 ft. depth)

FEMA 500-YR Elev: 699.5 ft. (6 ft. depth)

2025 Flood Elev: 699.5 ft. (6 ft.; [2 ft. reported in sanctuary](#))

FEMA 100-YR BFE: 693.3 ft. (1 ft. depth)



*Preliminary damage assessment reveals 2025 Flood for this location similar magnitude of FEMA 500-yr Flood Model*



# Mingo County – Trailers at Rawl, WV



**1977 Flood Protection Level**  
26 ALMOND ST TRLR, RAWL, WV  
First Floor Height 10 ft.

**Unelevated Trailer**  
26 WINTERGREEN ST TRLR, RAWL, WV  
MAJOR DAMAGE from 2025 Flood

1977

2025

500-YR

100-YR

26 ALMOND ST TRLR, RAWL, WV, 25691  
Building ID: [30-10-0008-0060-0000 26](#)

First Floor Height: 696.4 ft. (10 feet)  
1977 Flood Elev: 697.6 ft. (8 ft. depth)  
FEMA 500-YR Elev: 694.0 ft. (6 ft. depth)  
2025 Flood Elev: 693.0 ft. (5 ft. estimate)  
FEMA 100-YR BFE: 687.0 ft. (1 ft. depth)  
Ground Elevation: 686.4 ft.

*Trailers not elevated incurred major damage or destroyed*



# Mingo County – Trailers at Rawl, WV

[WV Flood Tool](#)



Views: Public Expert **Risk MAP** Risk Reference Basemaps

Layers: Search Address: 1028 SR 49, MATEWAN, WV, 25678

Tools: [Icons for various map tools]

## WVEMD Damage Survey

- Structure Destroyed
- Major Damage

**1977 Flood Protection Level**  
26 ALMOND ST TRLR, RAWL, WV  
First Floor Height 10 ft.

**Mitigated Structure**

Building ID	30-10-0008-0060-0000_26
Mitigation Source	USACE (5524FP)
Mitigation Type	Elevated - Closed Foundation (≥25ft)
Building Info	Solid Wall   FFH 10 ft.   Built 1989
View Dashboard	<a href="#">Link</a>
Picture	

[Zoom to](#)

**Flood Hazard Area:** Location is **WITHIN** the FEMA 100-year floodplain.

**Flood Zone:** AE

**Stream:** Tug Fork

**Watershed (HUC8):** Tug (5070201)

---

**FEMA's Flood Map:** N/A

**Map Effective Date:** 8/17/2016

**Contacts:** [Mingo](#)

---

**Flood Height:** 687.0 ft (BFE - Non-Restudy) NAVD88

**Water Depth:** About 0.6 ft (Source: HEC-RAS)

**HEC-RAS Model:** N/A [All Models](#)

---

**Flood Profile:** [54059\\_056](#)

---

**Community:** Mingo County

**Freeboard:** 2 ft **CRS Class:** 10 **CID:** 540133

---

**Location (lat, long):** (37.648942, -82.188113) WGS84

**Location (UTM 17N):** (4167529, 395190) WGS84

**External Viewers:**

---

**Elevation:** 686.4 ft (Source: [FEMA 2018-20](#)) NAVD88

---

**Address:** ☒ 26 ALMOND ST TRLR, RAWL, WV, 25691

**Parcel:** ☒ 30-10-0008-0060-0000 | [Assessment](#) [Warning](#)

---

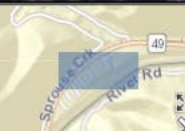
**Flood Risk Information** [Related Resources](#)

- [Flood Risk Assessment](#)
- [3D Flood Visualization](#)
- [Link to WV Risk Explorer](#)

Trailers not elevated incurred major damage or destroyed

26 ALMOND ST TRLR, RAWL, WV, 25691  
Building ID [30-10-0008-0060-0000\\_26](#)

Scale - 1: 1,128  
x: -82.187979, y: 37.648218





# Mingo County – New 2024 Cabin (Matewan, WV)



New 2024 Cabin Built in 2024

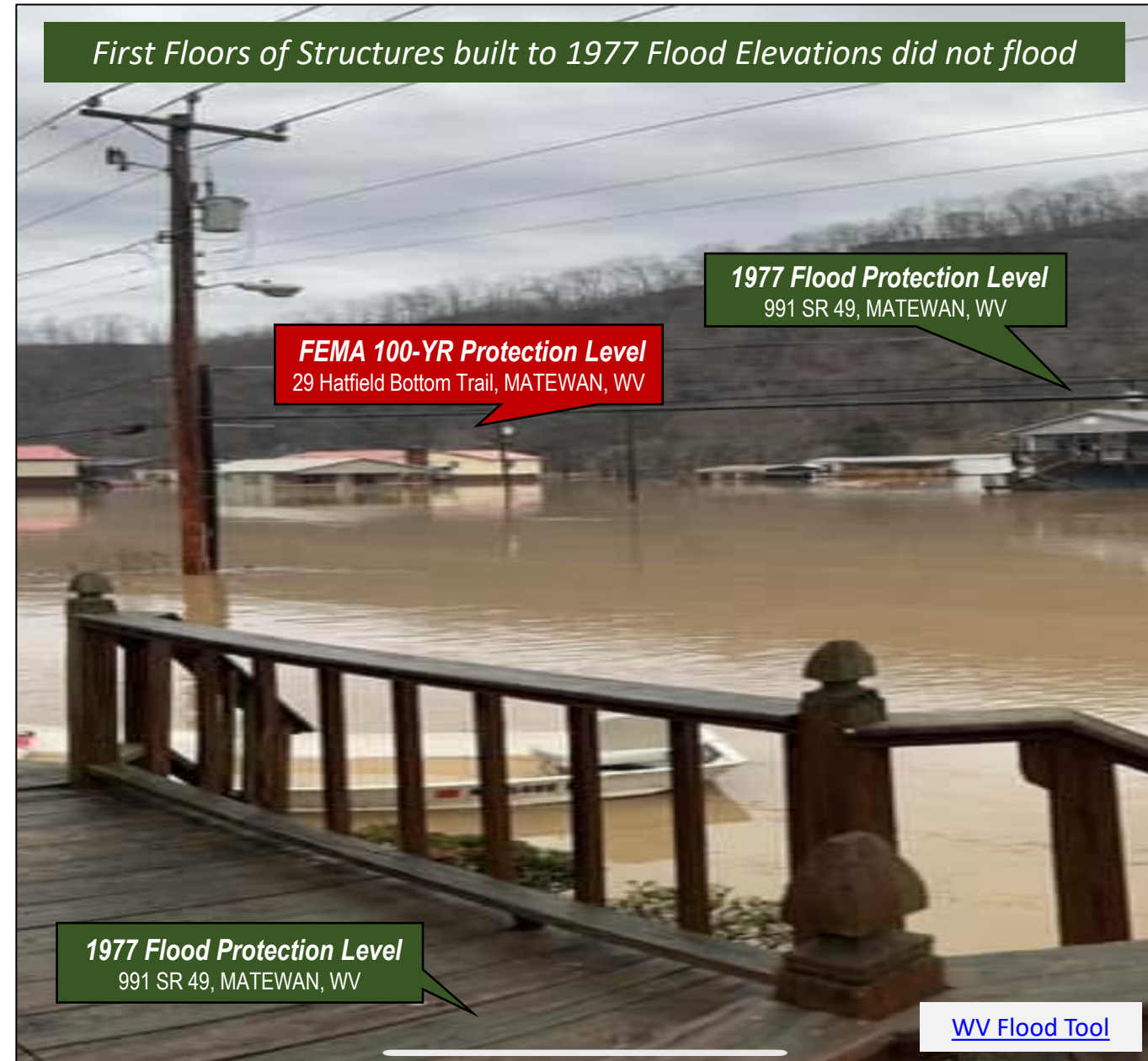


29 Hatfield Bottom Trail (Built in July 2024)

Building ID: [30-08-0008-0016-0000\\_29](#)

FEMA 500-YR Elev: 699.0 ft. (6.6 ft. depth)  
1977 Flood Elev: 698.3 ft. (5.9 ft. depth)  
2025 Flood Elev: 697.7 ft. (5.4 ft.; 2 feet reported in cabin)  
First Floor Height: 695.7 ft. (3.4 feet above ground)  
FEMA 100-YR BFE: 693.0 ft. (0.8 ft. depth)  
LAG from EC: 692.4 ft. (Finished Grade)

First Floors of Structures built to 1977 Flood Elevations did not flood



**1977 Flood Protection Level**  
991 SR 49, MATEWAN, WV

**FEMA 100-YR Protection Level**  
29 Hatfield Bottom Trail, MATEWAN, WV

**1977 Flood Protection Level**  
991 SR 49, MATEWAN, WV

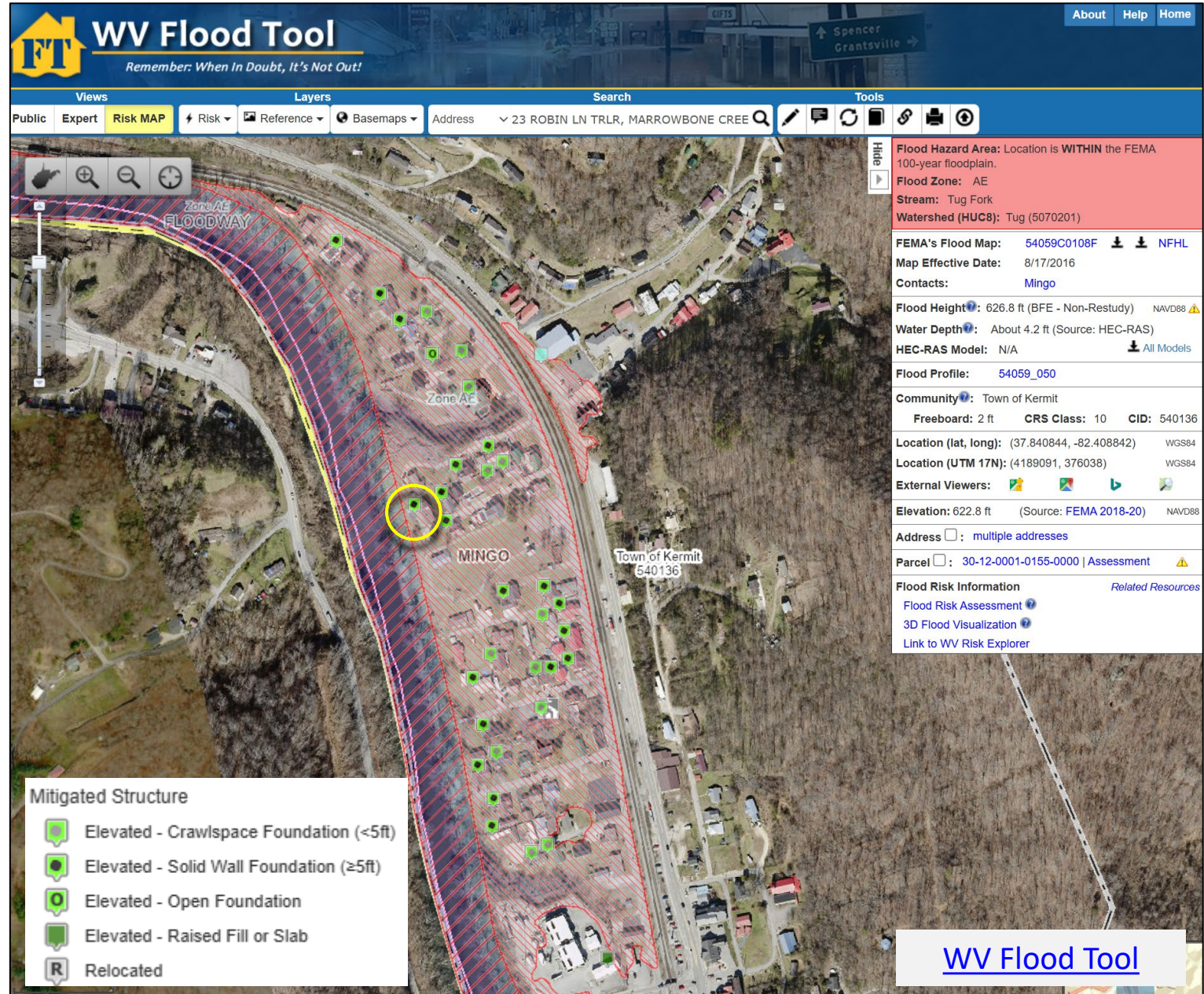
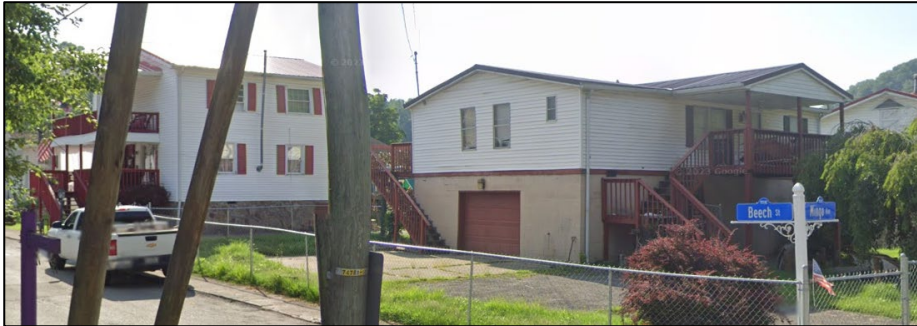
[WV Flood Tool](#)



# Mitigated Structures in Kermit, Mingo County



The town of Kermit has one of the highest percentages in the state of mitigated structures in high-risk flood areas





**MetroNews**  
THE VOICE OF WEST VIRGINIA

Home News Sports Outdoors Podcasts **MetroNews** TELEVISION

Now's the Time [Learn More](#)


**NEWS**

## Many in Kermit clean up and count their blessings

By **Chris Lawrence**  
February 17, 2025 - 6:33 pm

Facebook Twitter Email SMS

**"I had them move it down here because I wanted more closet space upstairs. Now I have a \$10,000 closet."**



Lea Ruble explains the height of the Tug Fork river in her yard from the weekend in Kermit, W.Va. PHOTO: Chris Lawrence

No living spaces below the mitigation level  
No utility equipment below the mitigation level

### USACE TRACT 3316FP (Parcels 30-12-0001-0275-0000 & 1-276)

85 BLANKENSHIP ST, KERMIT, WV, 25674



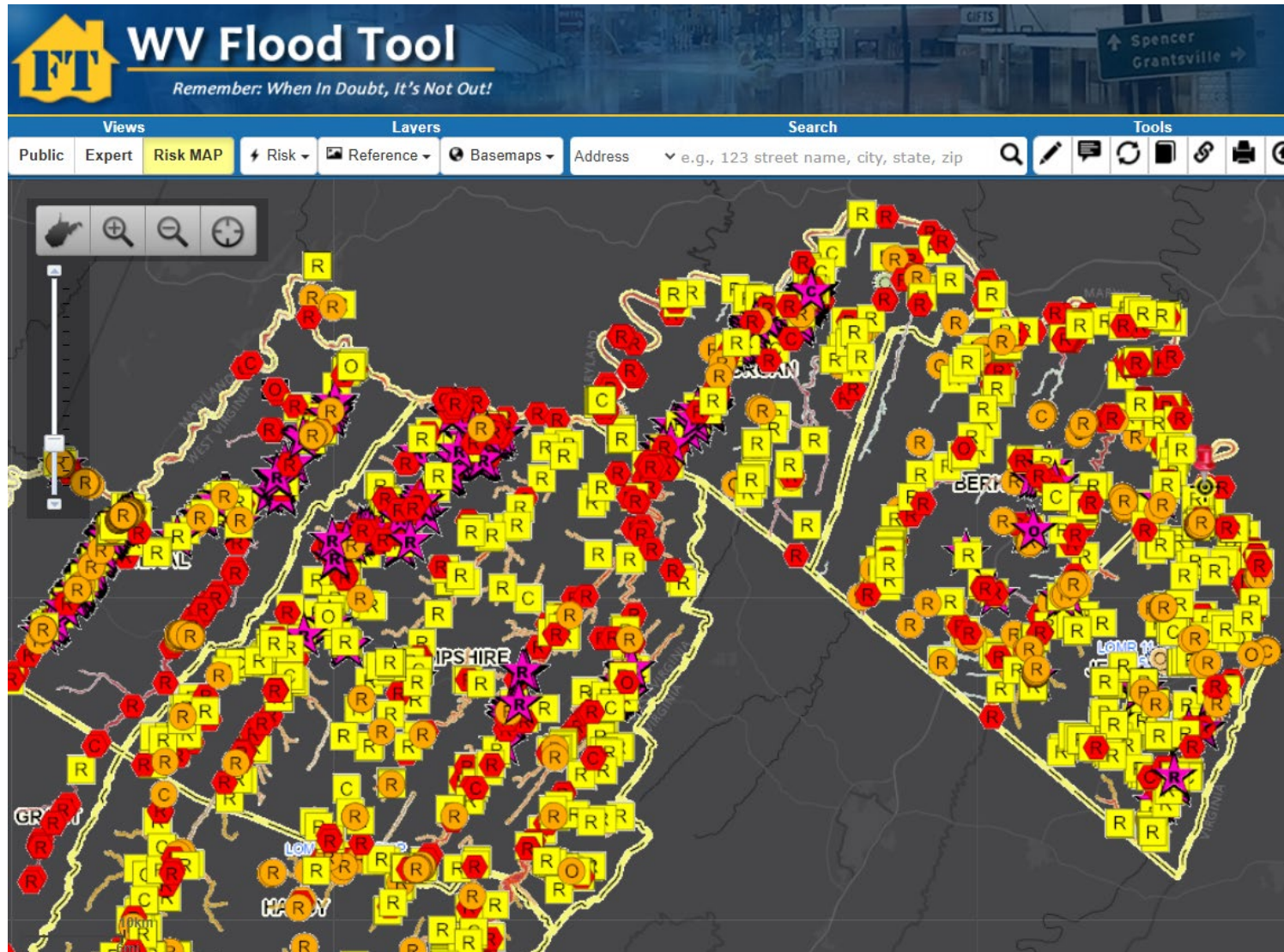
USACE Section 202  
picture of  
Floodproofed  
**Structure 3316FP**  
taken July 2006








According to Lea Ruble in [news article](#), furnace moved from living quarters to lowest enclosure or basement.

85 BLANKENSHIP ST, KERMIT, WV  
Building ID: [30-12-0001-0261-0000](#) 85



# New Flood Maps



Future Map Condition		Land Use Category	
	Mapped Out SFHA		Residential
	Mapped In SFHA		Commercial
	Remains Same		Other
	Floodway		

Kurt Donaldson

WV GIS Technical Center

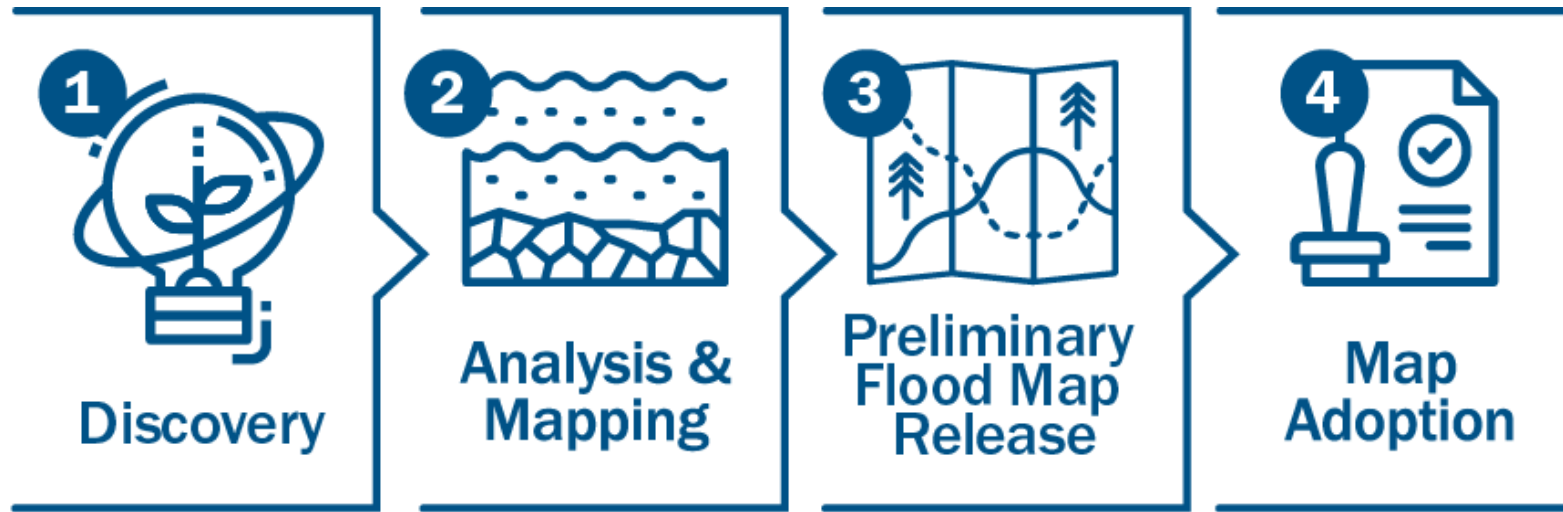
West Virginia University

[kdonalds@wvu.edu](mailto:kdonalds@wvu.edu)

*Difference between FEMA's 2009 and 2024 flood studies*

# Mapping: Risk MAP Process

- FEMA is responsible for mapping our country's flood risk. The agency and its partners do this by making Flood Insurance Rate Maps, or flood maps.
- Risk Mapping, Assessment and Planning, [Risk MAP](#), is the process used to make these maps.

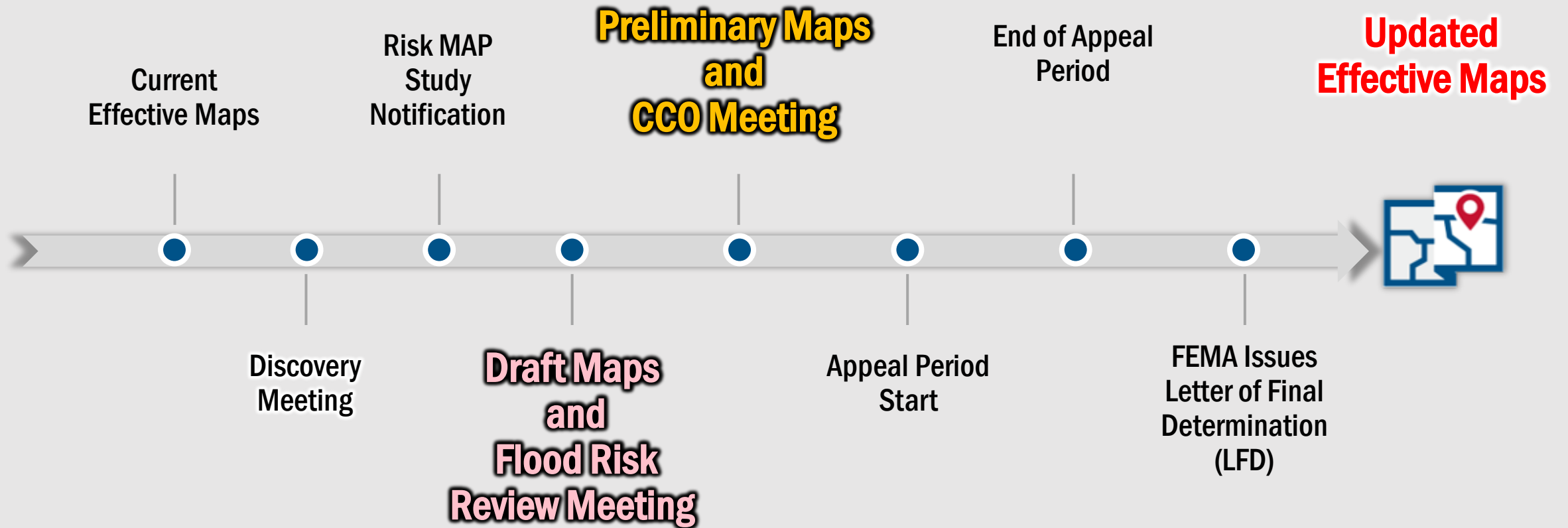


Risk MAP  
Process

- 1) Discovery:** Initial meetings to assess needs and scope the flood map project.
- 2) Analysis & Mapping:** Data collection, modeling, and creating the draft and preliminary maps.
- 3) Preliminary Flood Map Release:** Sharing the preliminary maps with communities and the public, followed by a 90-day appeal period.
- 4) Map Adoption:** Communities adopt the new maps into their floodplain management ordinances, which happens after all appeals are resolved and a six-month compliance period has passed.



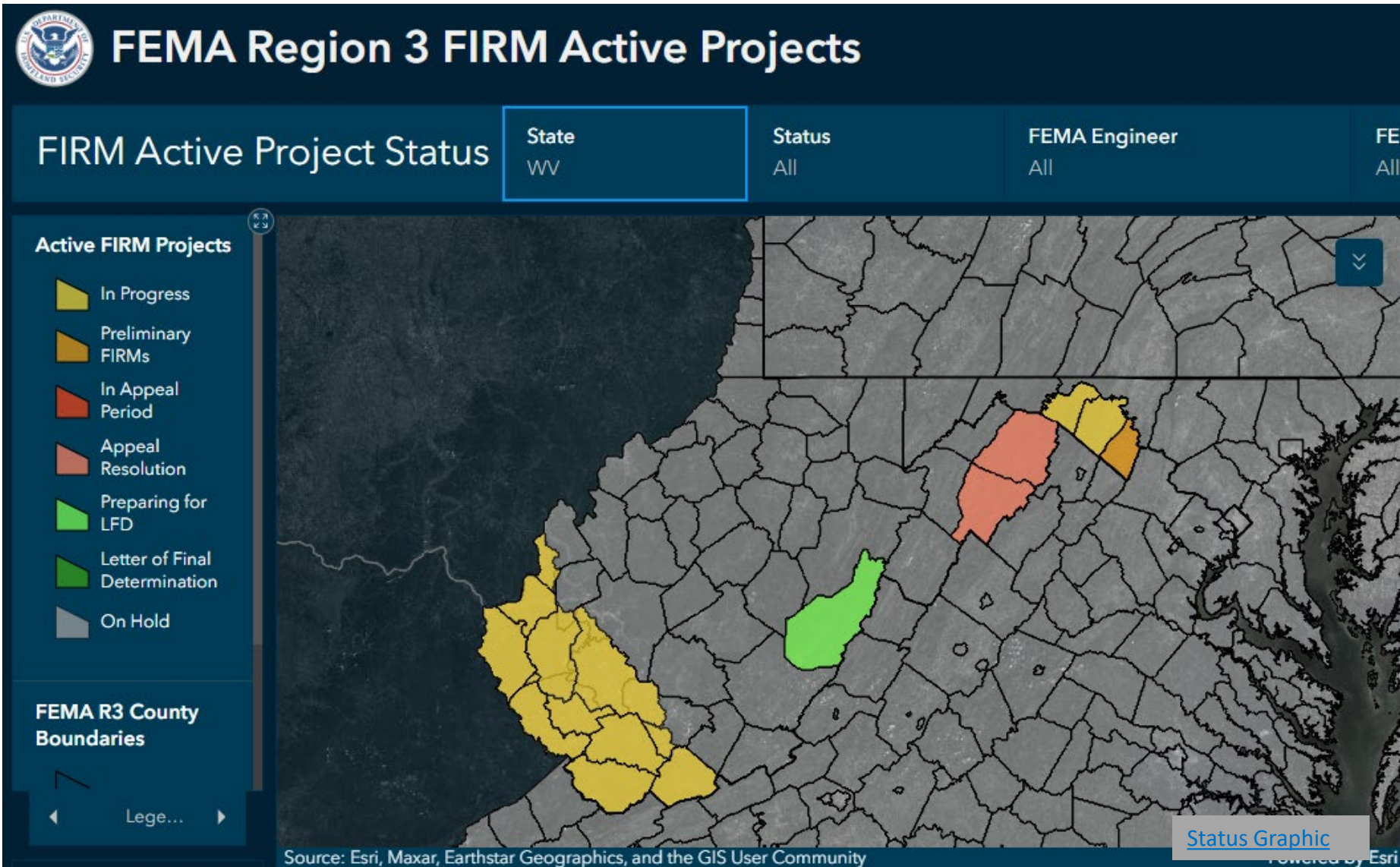
# Risk MAP Timeline



*A Risk MAP project, from start to finish, can take up to 5 or more years to complete*



# Risk MAP: In Progress



## In Progress

### Counties

- Berkeley
- **Cabell**
- *Lincoln* (Partial)
- *Logan* (Partial)
- **McDowell**
- **Mercer**
- **Mingo**
- Morgan
- Raleigh (Partial)
- **Wayne**
- **Wyoming**

### Watershed

- Coal

## Preliminary

- Hampshire
- Hardy
- Jefferson
- Pocahontas

New flood maps are currently being created for 27% of counties in state



# Risk MAP: In Progress & Recent Effective

## << Future Trends in Mapping >>

- Floodplain Mapping Resolution: Mapping at higher watershed drainage resolution (1-square mile watershed)
- Gridded Flood Risk Products Resolution: Higher spatial resolution of 1-meter grid cell size for flood risk products (e.g., Water Surface Elevation, Water Depth).
- Depth Grids for Multiple Flood Events: Depth Grids published for multiple flood events (10, 04, 02, 01, 01plus, 0.2 percent chance)
- X-Sections for A Zones: In addition to AE Zones, published BFE cross sections for all Approximate A Zones
- Area-based 2D HEC-RAS Models

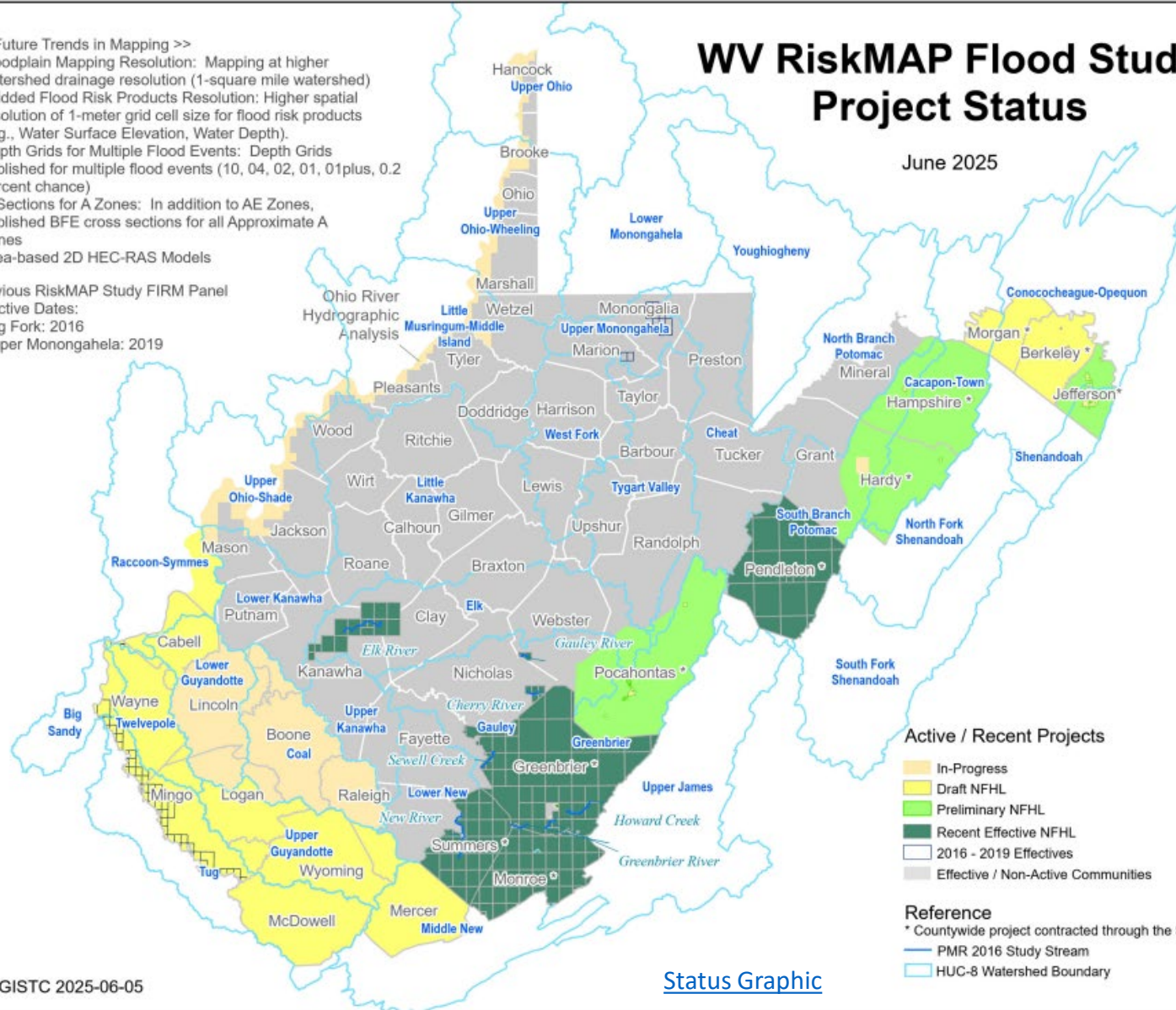
## Previous RiskMAP Study FIRM Panel

### Effective Dates:

- Tug Fork: 2016
- Upper Monongahela: 2019

## WV RiskMAP Flood Study Project Status

June 2025



### Active / Recent Projects

- In-Progress
- Draft NFHL
- Preliminary NFHL
- Recent Effective NFHL
- 2016 - 2019 Effective
- Effective / Non-Active Communities

### Reference

- \* Countywide project contracted through the State
- PMR 2016 Study Stream
- HUC-8 Watershed Boundary

## In Progress Counties

- Berkeley
- Cabell
- *Lincoln* (Partial)
- *Logan* (Partial)
- McDowell
- Mercer
- Mingo
- Morgan
- Raleigh (Partial)
- Wayne
- Wyoming

## Watershed

- Coal

## Preliminary

- Hampshire
- Hardy
- Jefferson
- Pocahontas

## 2021-25 Effective

- Greenbrier
- Kanawha (Elk River)
- Monroe
- Nicholas (Cherry R.)
- Pendleton
- Summers
- Webster (Gauley R.)



# Mapping Advisory Flood Heights (AFH)

## WSEL and Depth Grid Resolution

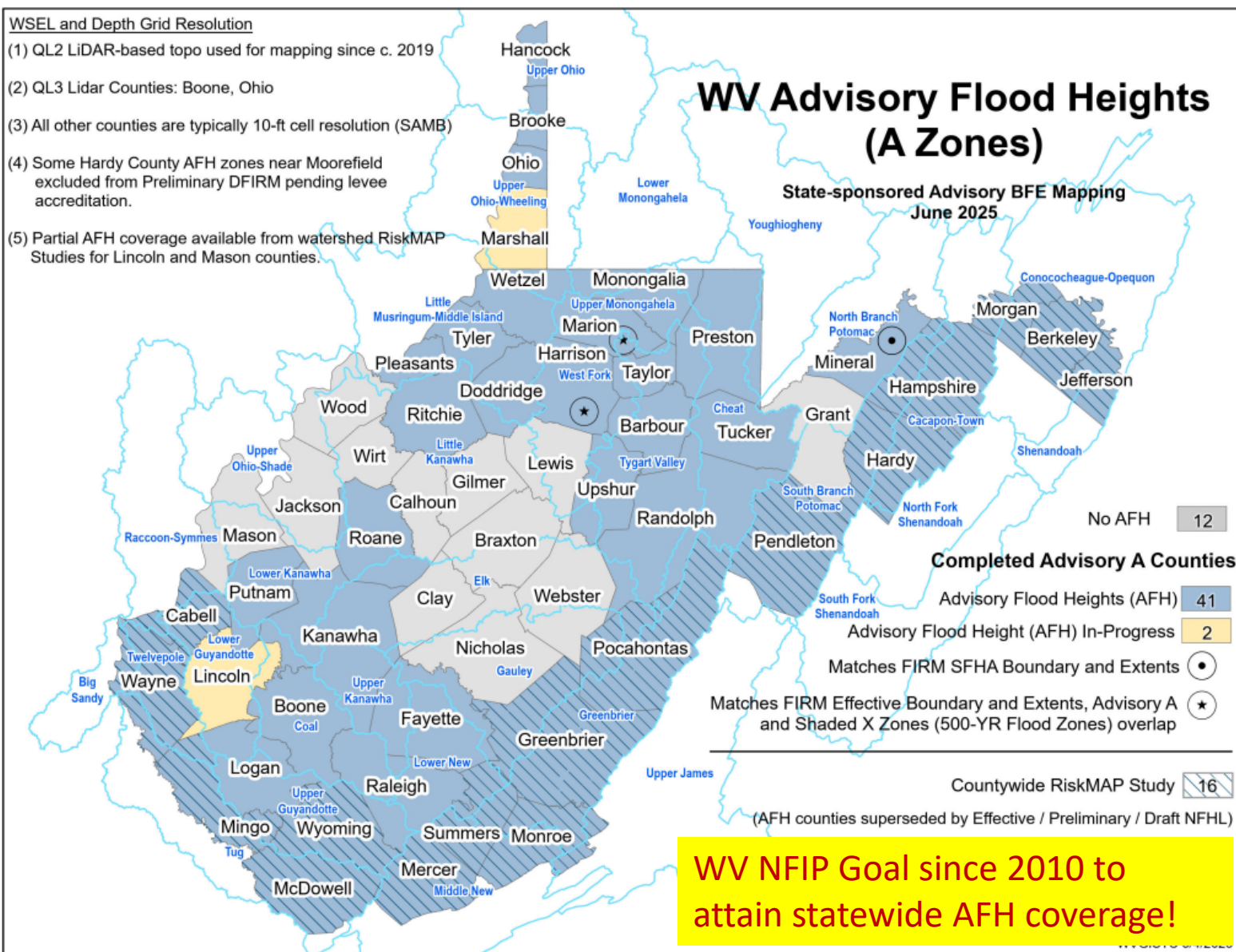
(1) QL2 LiDAR-based topo used for mapping since c. 2019

(2) QL3 Lidar Counties: Boone, Ohio

(3) All other counties are typically 10-ft cell resolution (SAMB)

(4) Some Hardy County AFH zones near Moorefield excluded from Preliminary DFIRM pending levee accreditation.

(5) Partial AFH coverage available from watershed RiskMAP Studies for Lincoln and Mason counties.



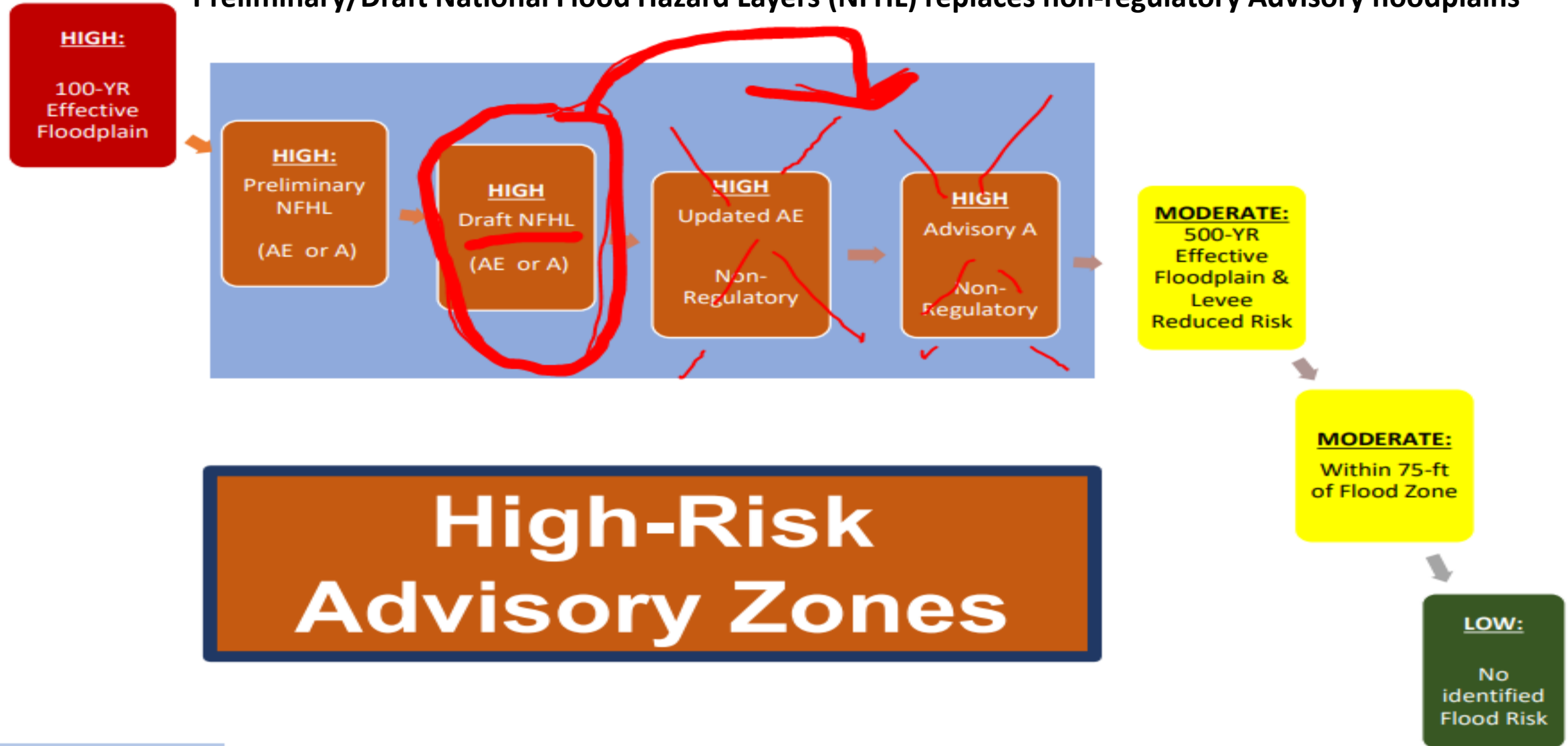
County	Stream Length (mi)-Zone A	Approx. Zone A %	MAS Funded	Target AFH Completion
BRAXTON	250	87%	Pending	2028
CALHOUN	111	79%	Pending	2028
CLAY	87	54%	Pending	2028
GILMER	146	69%	Pending	2028
GRANT	127	90%	Pending	2029
JACKSON	292	73%	Pending	2028
LEWIS	271	91%	Pending	2028
LINCOLN	273	71%	Yes	2027
MARSHALL	92	59%	Soon?	2025
MASON	85	29%	Pending	2028
NICHOLAS	387	94%	Pending	2028
WEBSTER	190	60%	Pending	2028
WIRT	179	98%	Pending	2028
WOOD	230	57%	Pending	2028
	2,720			

14 counties with no AFH



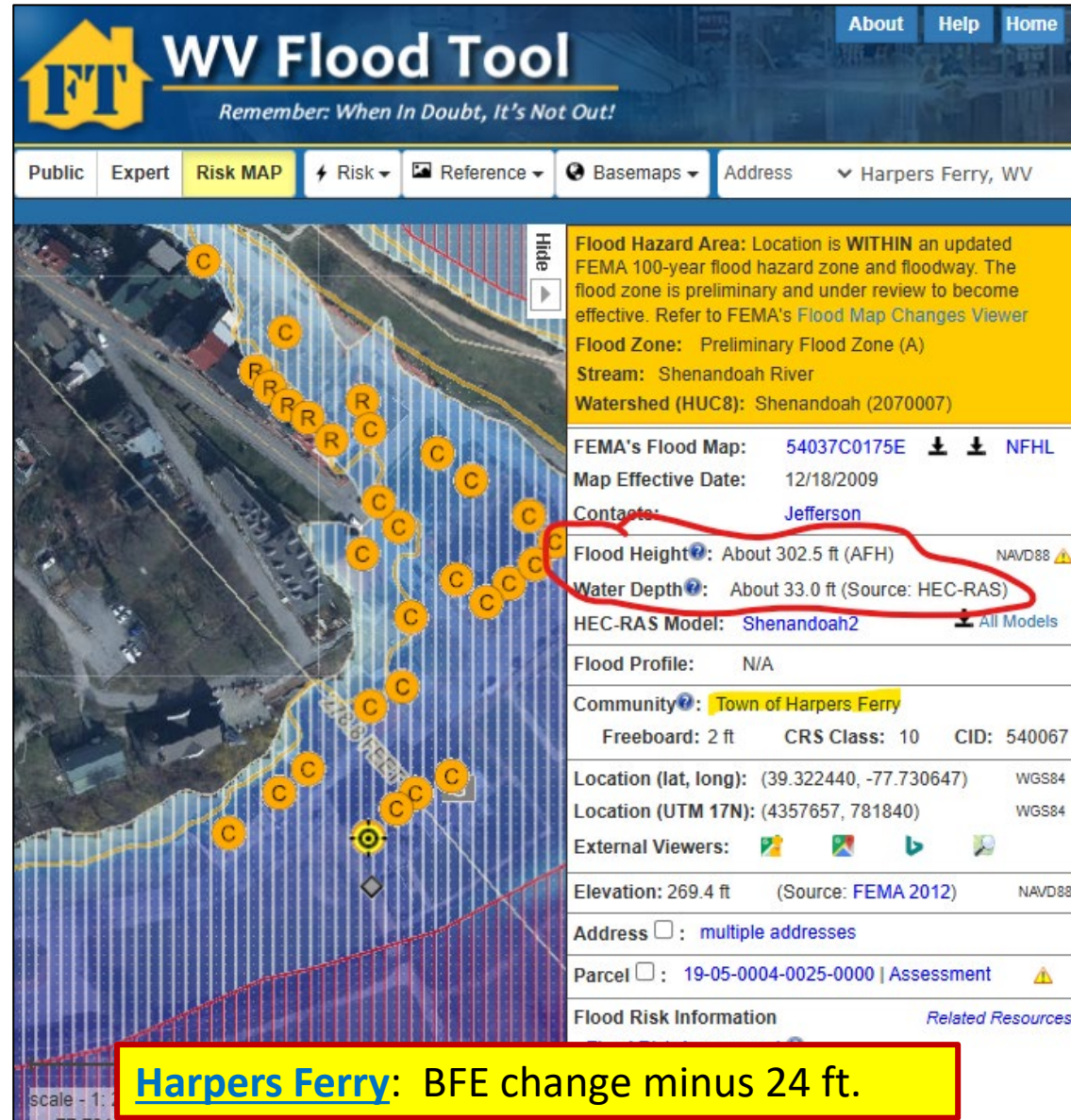
# Flood Zone Determination Sequence

Preliminary/Draft National Flood Hazard Layers (NFHL) replaces non-regulatory Advisory floodplains



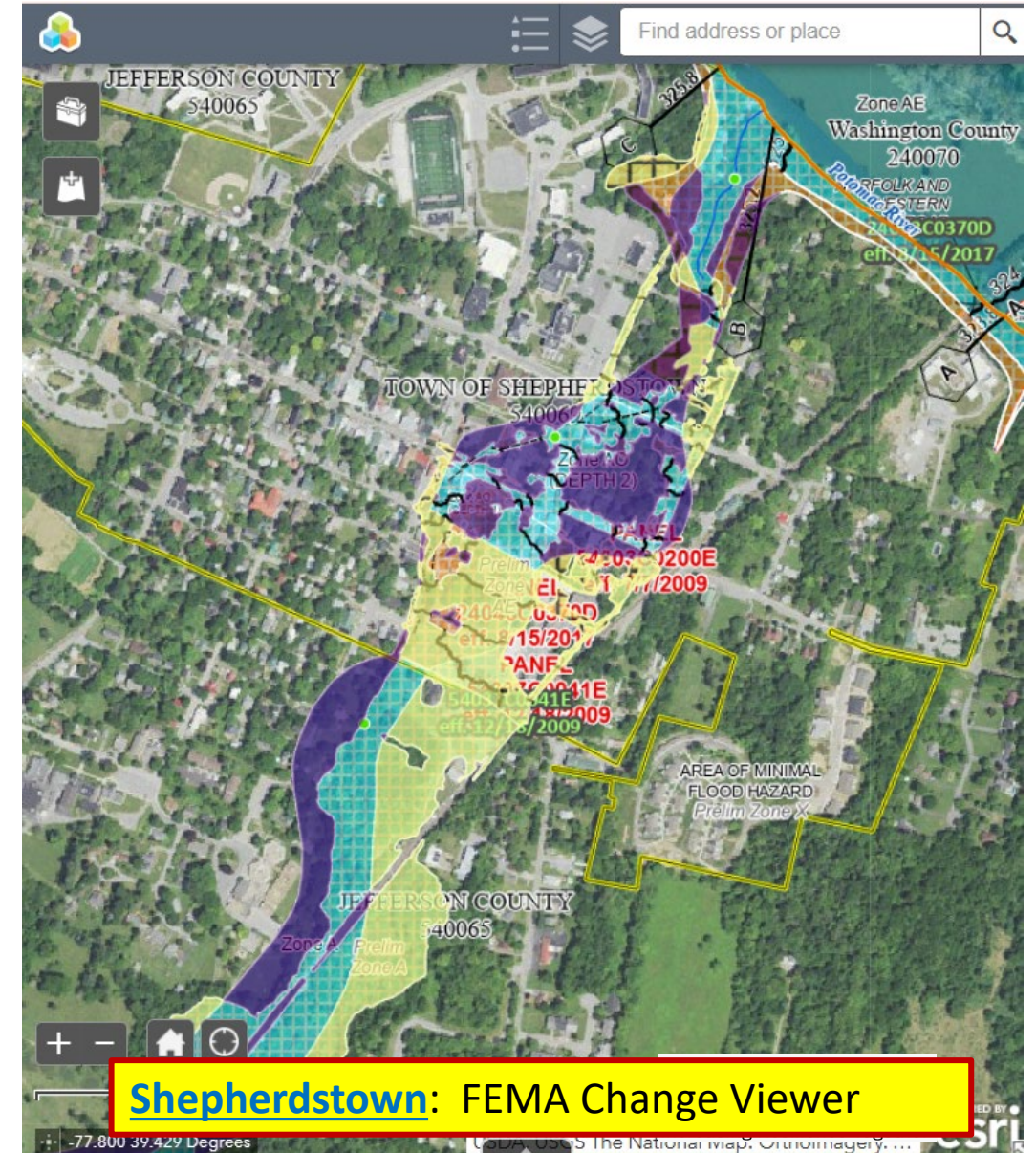
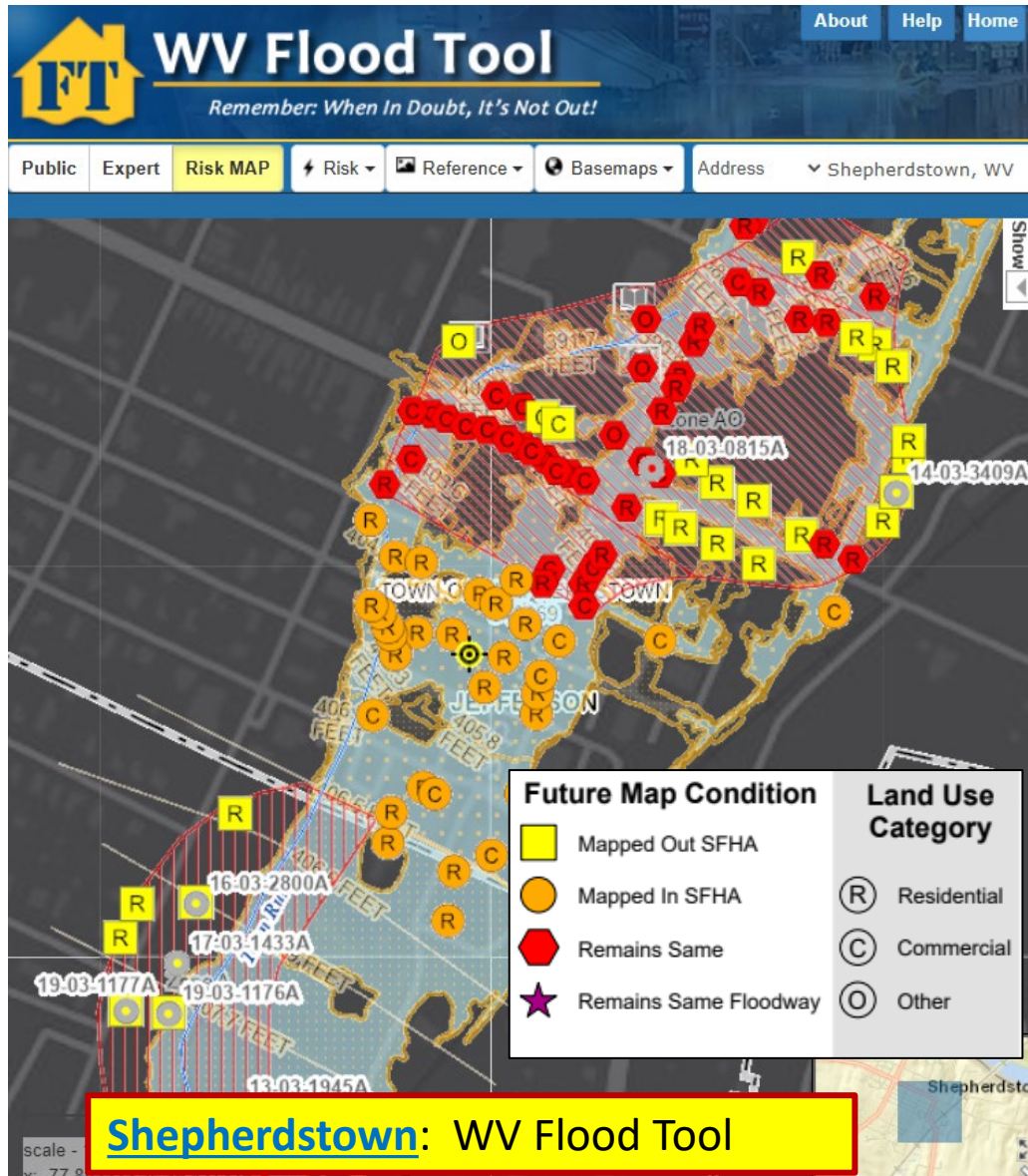


# Map Changes – Harpers Ferry



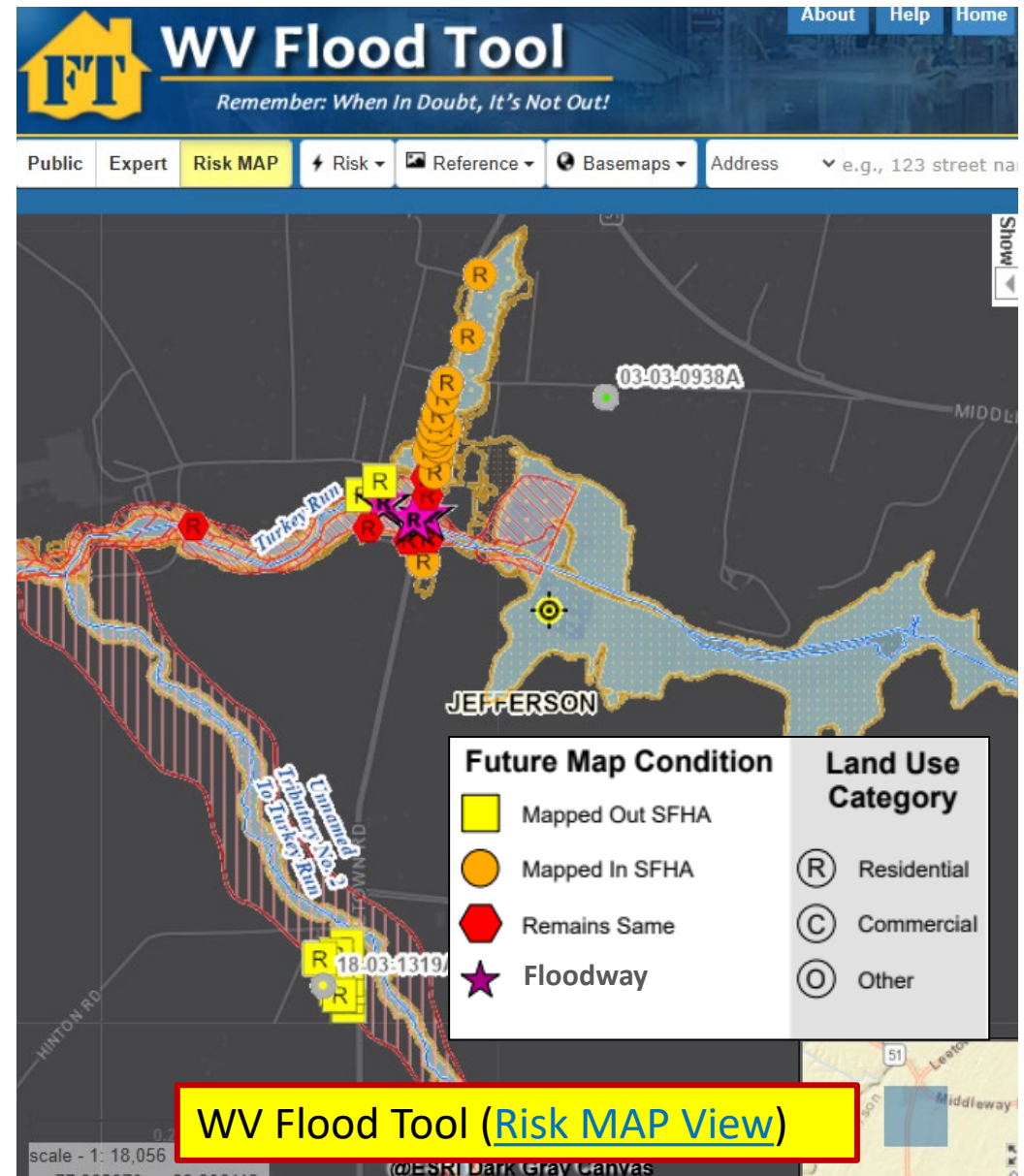
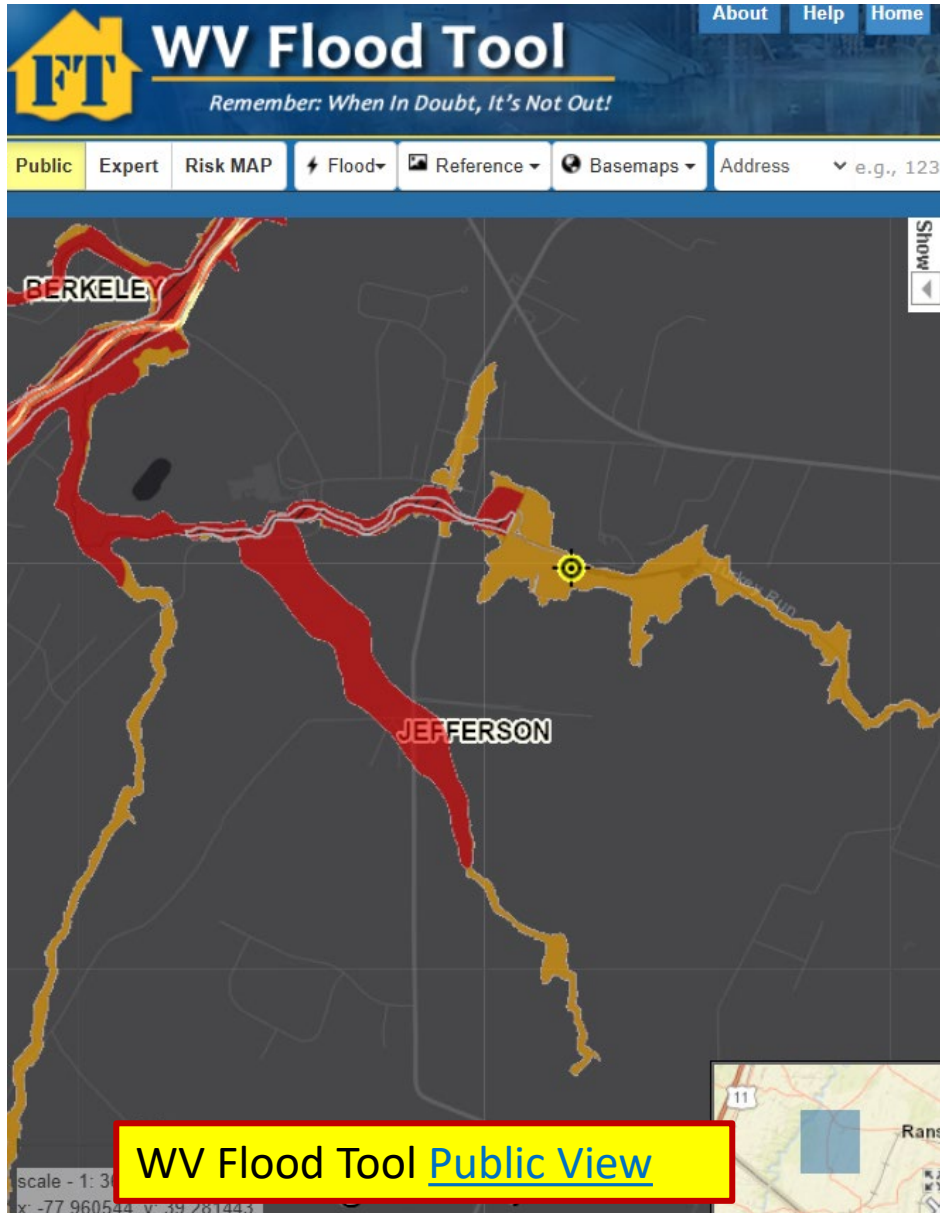


# Map Changes - Shepherdstown





# Map Changes – Jefferson County

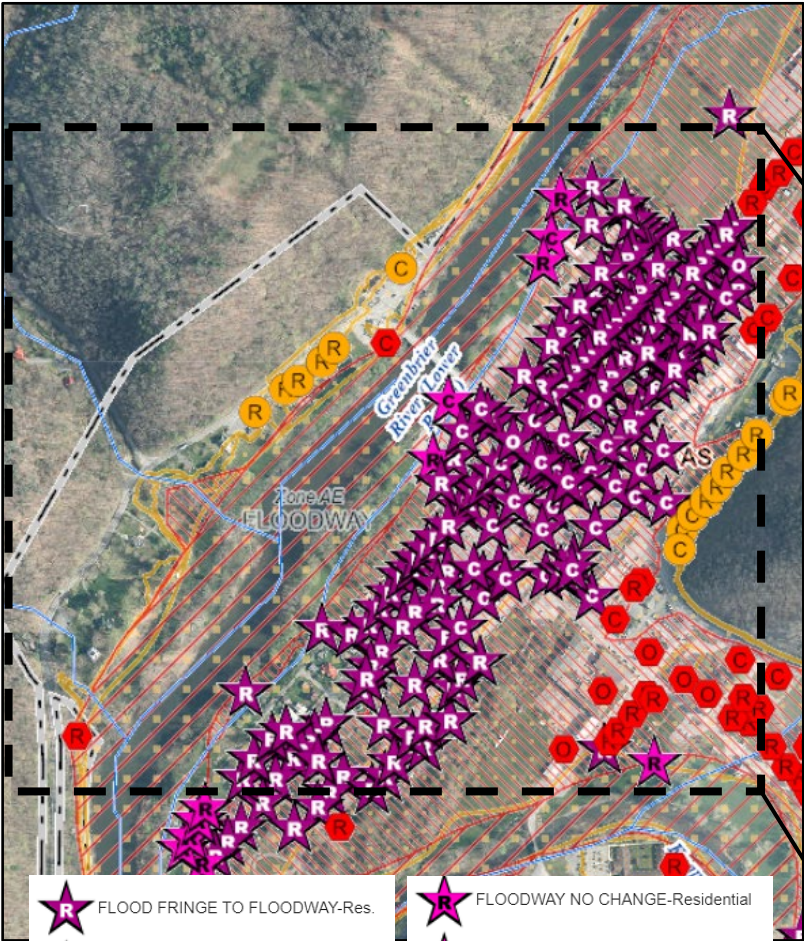




# Buildings in Preliminary Floodway

## Floodway Increase in Marlinton

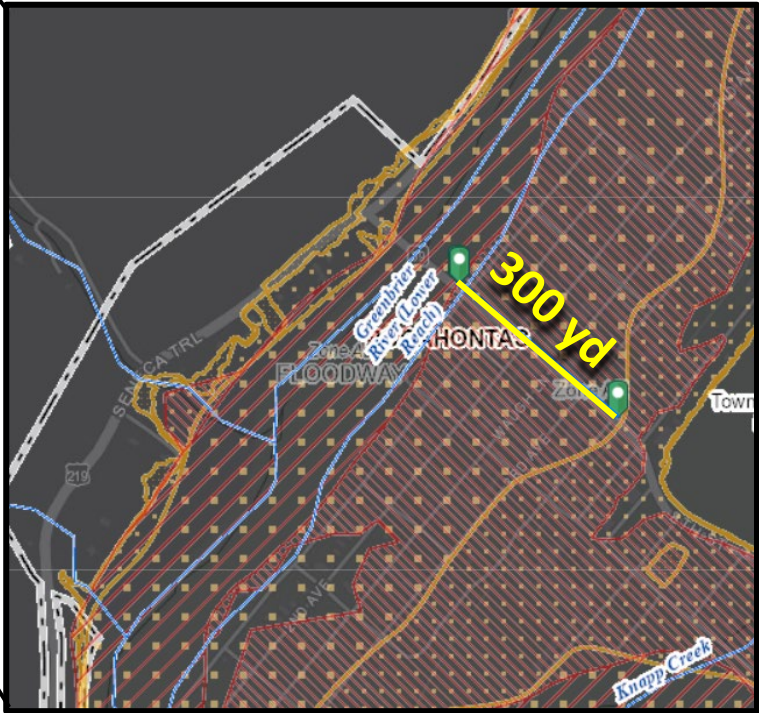
Buildings in the floodway channel of a stream or close to the flood source, will be subject to the greatest flood depths, highest velocities, and greatest debris potential.



- FLOOD FRINGE TO FLOODWAY-Res.
- FLOOD FRINGE TO FLOODWAY-Com.
- FLOOD FRINGE TO FLOODWAY-Other
- FLOODWAY NO CHANGE-Residential
- FLOODWAY NO CHANGE-Commercial
- FLOODWAY NO CHANGE-Other

Community	Buildings in Preliminary Floodway	Buildings in Effective Floodway	Net Change in Floodway
Marlinton	190	14	+ 176

Floodway width expanded significantly up to 300 yards (900 ft)



Base Flood Elevation increased to about 2 feet



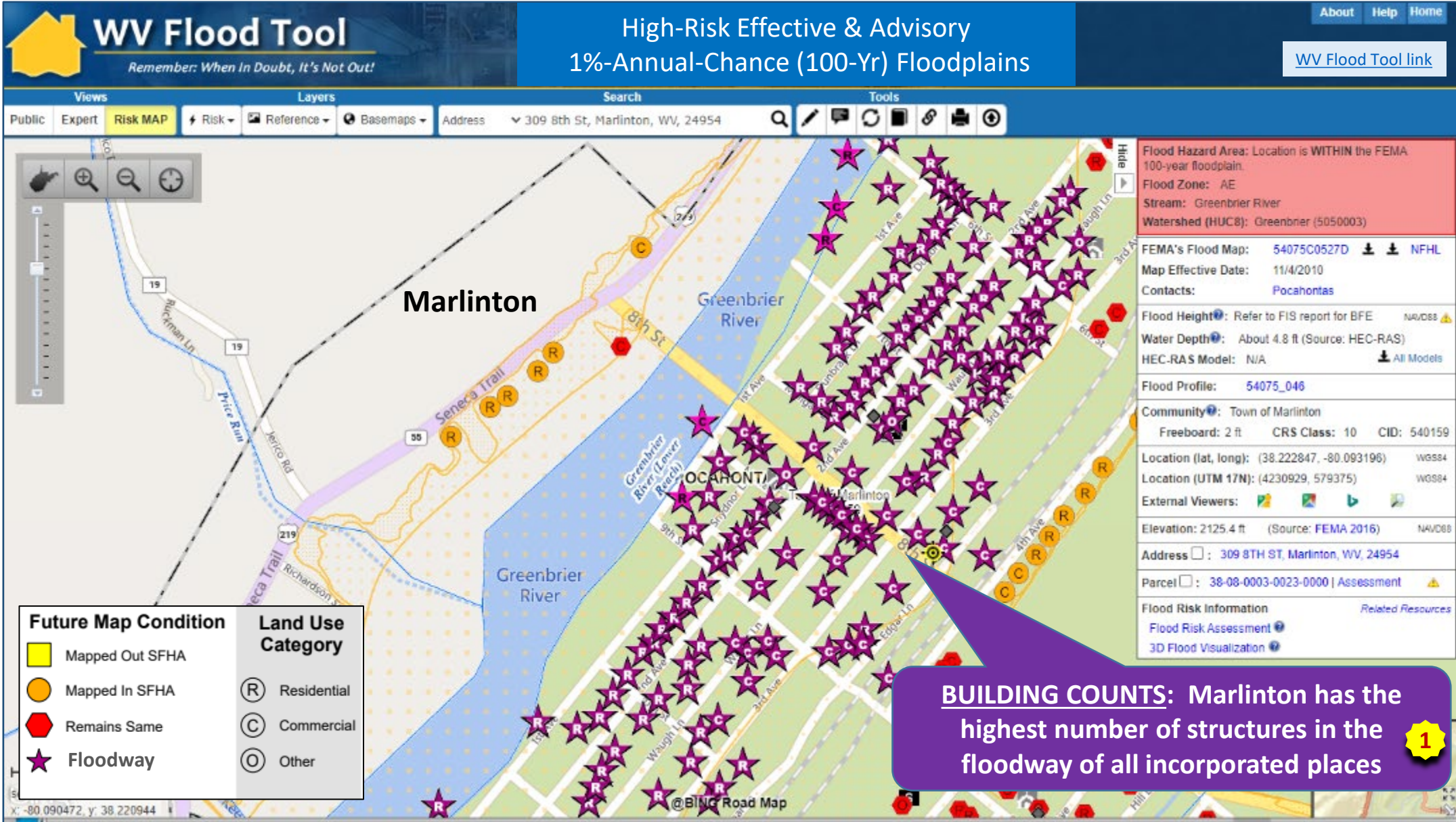
[Flood Tool Link](#)



# Risk Indicators: (Marlinton)

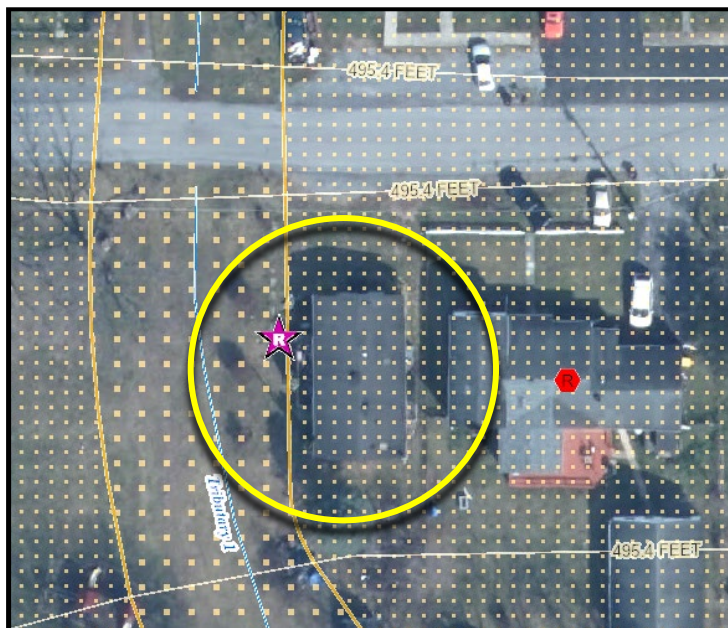
TOP 10%

Top 10% rankings among 229 incorporated places

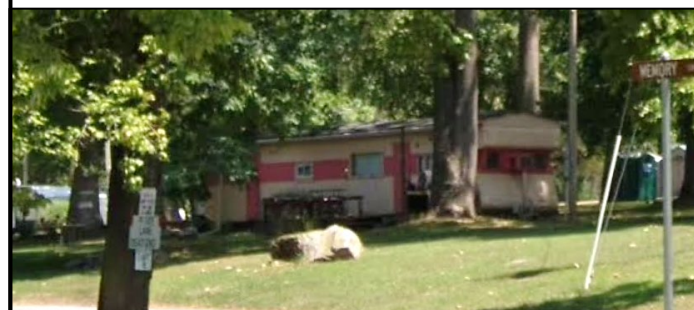




# Buildings Mapped into Floodway



Double-wide Mobile Home in Ranson (FD: 2.2 ft)  
\$33K; Year Built: 1993 (Post-FIRM)  
(Building ID: [19-08-0006-0019-0001\\_407](#))



Single-wide Mobile Home in Jefferson County\* (FD: 7.0 ft)  
\$25K; **Minus Rated: 3.5 ft**; Year Built: Unknown  
(Building ID: [19-02-0020-0031-0000\\_30](#))



Single Family Dwelling in Jefferson County\* (FD: 14.0 ft)  
\$8K; **Minus Rated: 10.3 ft**; Year Built: 1979 (Pre-FIRM)  
(Building ID: [19-06-008F-0007-0000\\_457](#))

*Structures mapped from  
Floodplain Fringe into Floodway*





# Risk Communications: SFHA Map Change Letters

Incorporate 1% Floodplain Building Risk Assessment Inventory into **Mitigation** and **NFIP/CRS Management** Activities



[FEMA Region 3 Toolkit for New Flood Studies](#)

## City of White Sulphur Springs

Date: 10/14/2021

Dear **SMITH JOHN**:

This letter is a test to show the use of mail merge and the data we can retrieve for it. I copied the first two paragraphs from the Local Officials Toolkit template and added the last two paragraphs for demonstration purposes.

A multi-year project to re-examine **City of White Sulphur Springs's** flood zones and develop detailed digital flood hazard maps has been completed. The new maps, also known as Flood Insurance Rate Maps (FIRMs), were just released for public view. The new maps reflect current flood risk based on the latest data and a more accurate understanding of our area's topography. As a result, you and other property owners throughout **GREENBRIER COUNTY** will have up-to-date, Internet-accessible information about flood risk to your property.

### How will these changes affect you?

Based on the new maps, your property is being mapped into a higher risk flood zone, known as the Special Flood Hazard Area (SFHA). If you have a mortgage from a federally regulated lender and your property is in the SFHA, you are required by Federal law to carry flood insurance when these flood maps are put into effect. We recommend that you use this time to contact your insurance agent to get the most favorable rate and learn about options offered by the National Flood Insurance Program (NFIP) for properties being mapped into higher risk areas for the first time.

You can find your property on the WV Flood tool in one of two ways: first, you can go to the following link in a web browser: <https://mapwv.gov/flood/map/?wkid=102100&x=-8939196.678447664&y=4550352.316266677&l=13&v=2>. Or, you can go to <https://mapwv.gov/> map and enter your address, **177 PATTERSON ST, WHITE SULPHUR SPRINGS, WV, 24986**, in the search bar.

Your property is within the **Howard Creek** flood zone and has a flood depth of **1.0 feet**. Its FIRM status is **Pre-FIRM**.

[Mail Merge Template for SFHA Mapped-in Structures](#)

Counties which recently sent outreach letters to homeowners:

- Hardy County Risk MAP
- Kanawha County - Elk River PMR
- Greenbrier County Risk MAP

**Jefferson County and Shepherdstown** have 55 and 29 buildings, respectfully, mapped into the SFHA




# West Virginia Risk Explorer

New Building-Level Risk Tools enable further exploration of impacted buildings:

[Morgan Mapped-In Structures](#)

[Morgan Mapped-Out Structures](#)

[Morgan Risk Index \(incl. Top 20% Risk Indicators Report\)](#)

**West Virginia Risk Explorer**  
Localized risk assessment tools for analysis and visualization  
(BETA Version)

Risk MapsRisk ReportsDashboardsBL RiskVisualizationsLearn More

Mapped into SFHA

Select Geographic ScaleStateSelect Geographic EntityWest Virginia

COLUMNSAdvanced SearchPRIMARY STRUCTURES TABLEReport Date: March 2025Metadata

SQL Filter: County = MorganSQL Filter: Symbol\_FloodRiskZone IN (Mapped in Floodway-Commercial,Mapped In Floodway-Residential,MAPPED IN-Commercial,MAPPED IN-Other,MAPPED IN-Residential)Clear all Filters

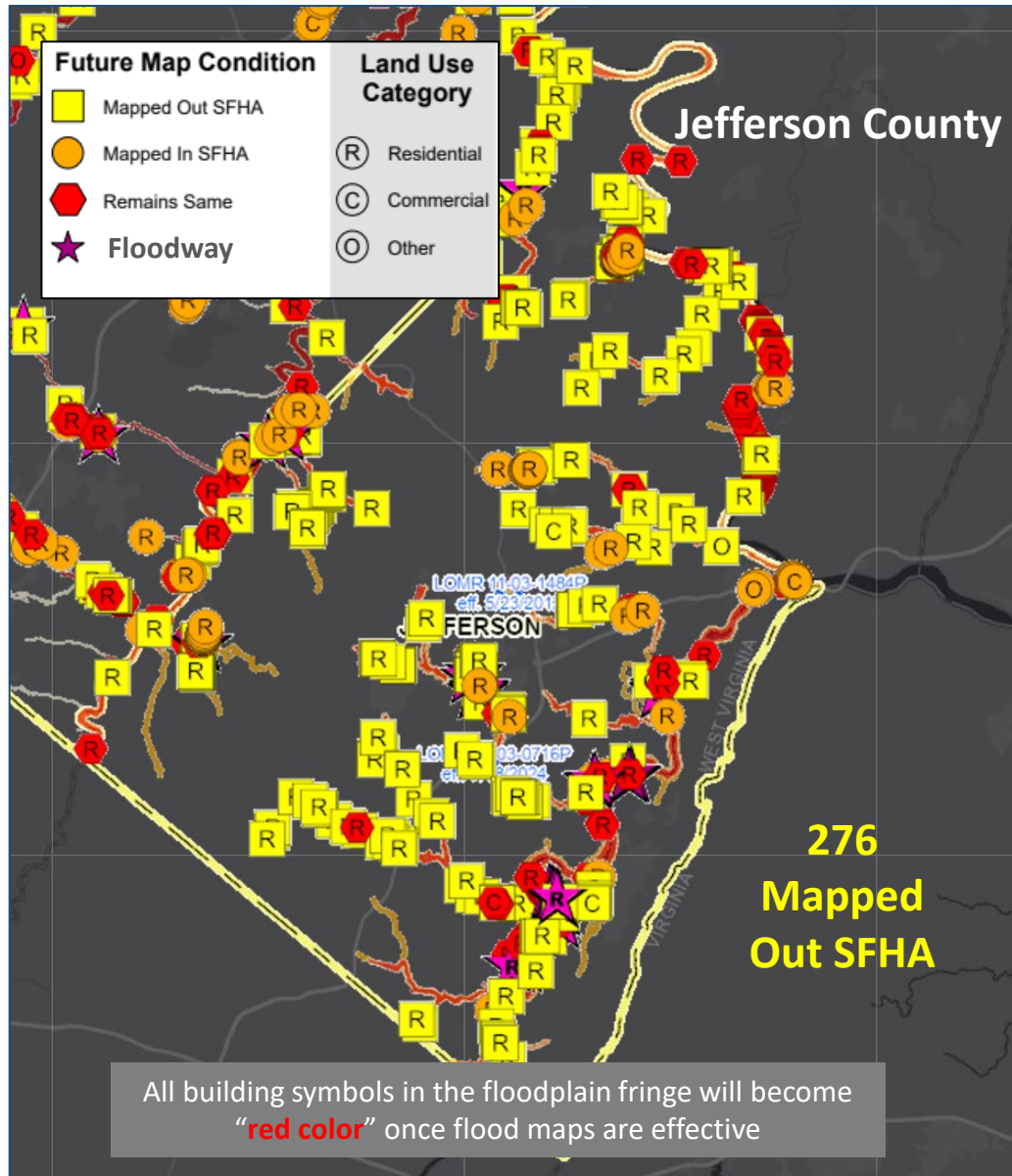
48 Records Selected. Export to CSV (2000 record limit)

SPATIAL IDENTIFIERS			GEOGRAPHIC UNITS		FLOOD ZONE		BUILDING CHARACTERISTICS	BUILDING DAMAGE ESTIMATE	
Building ID	E-911 Address	Flood Tool	Community	Stream	Flood Zone	SFHA Status	General Occupancy	Flood Depth	Bldg. Damage %
<a href="#">33-01-0017-0014-0006_37</a>	37 SHADE LN, BERKELEY SPRINGS, WV, 25411	FT	Morgan County* - Unincorporated	Sleepy Creek	Draft A	MAPPED IN-Residential	Residential	2.3 Ft	3%
<a href="#">33-06-0012-0017-0002_1162</a>	1162 LUTHER MICHAEL RD, Berkeley Springs, WV, 25411	FT	Morgan County* - Unincorporated	Sleepy Creek Tributary No.3	Draft A	MAPPED IN-Residential	Residential	2.3 Ft	0%
<a href="#">33-01-0011-0031-0000_1426</a>	1426 ECKERD LN, Berkeley Springs, WV, 25411	FT	Morgan County* - Unincorporated	Sleepy Creek	Draft A	MAPPED IN-Residential	Residential	2.1 Ft	14%
<a href="#">33-04-041A-0011-0001_44</a>	44 ALPINE DR, GREAT CACAPON, WV, 25422	FT	Morgan County* - Unincorporated	Cacapon River	Draft AE	MAPPED IN-Residential	Residential	2.1 Ft	1%
<a href="#">33-01-0010-0020-0006_9999</a>	9999 MARTINSBURG RD, BERKELEY SPRINGS, WV, 25411	FT	Morgan County* - Unincorporated	Sleepy Creek	Draft A	MAPPED IN-Residential	Residential	2.0 Ft	0%
<a href="#">33-04-0016-0003-0018_336</a>	336 YOUNGBLOOD RD, GREAT CACAPON, WV, 25422	FT	Morgan County* - Unincorporated	Long Hollow Run	Draft A	MAPPED IN-Residential	Residential	1.9 Ft	0%
<a href="#">33-06-0010-0005-0002_15</a>	15 ROCK GAP RD, BERKELEY SPRINGS, WV, 25411	FT	Morgan County* - Unincorporated	Rock Gap Run	Draft A	MAPPED IN-Residential	Residential	1.8 Ft	2%
<a href="#">33-08-0003-0008-0001_3607</a>	3607 VIRGINIA LINE RD, Berkeley Springs, WV, 25411	FT	Morgan County* - Unincorporated	Middle Fork Sleepy Creek	Draft A	MAPPED IN-Residential	Residential	1.6 Ft	0%
<a href="#">33-07-0006-0024-0001_7648</a>	7648 MARTINSBURG RD, BERKELEY SPRINGS, WV, 25411	FT	Morgan County* - Unincorporated	Meadow Branch	Draft A	MAPPED IN-Residential	Residential	1.5 Ft	18%
<a href="#">33-04-0024-0001-0001_5560</a>	5560 ROCKFORD RD, GREAT CACAPON, WV, 25422	FT	Morgan County* - Unincorporated	Cacapon River	Draft A	MAPPED IN-Residential	Residential	1.4 Ft	17%

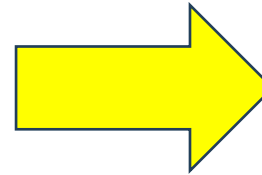
Rows per page: 10<< First< Previous1-10 of 48Next >>Last >>



# SFHA Buildings Changes: LOMAs for Mapped Out



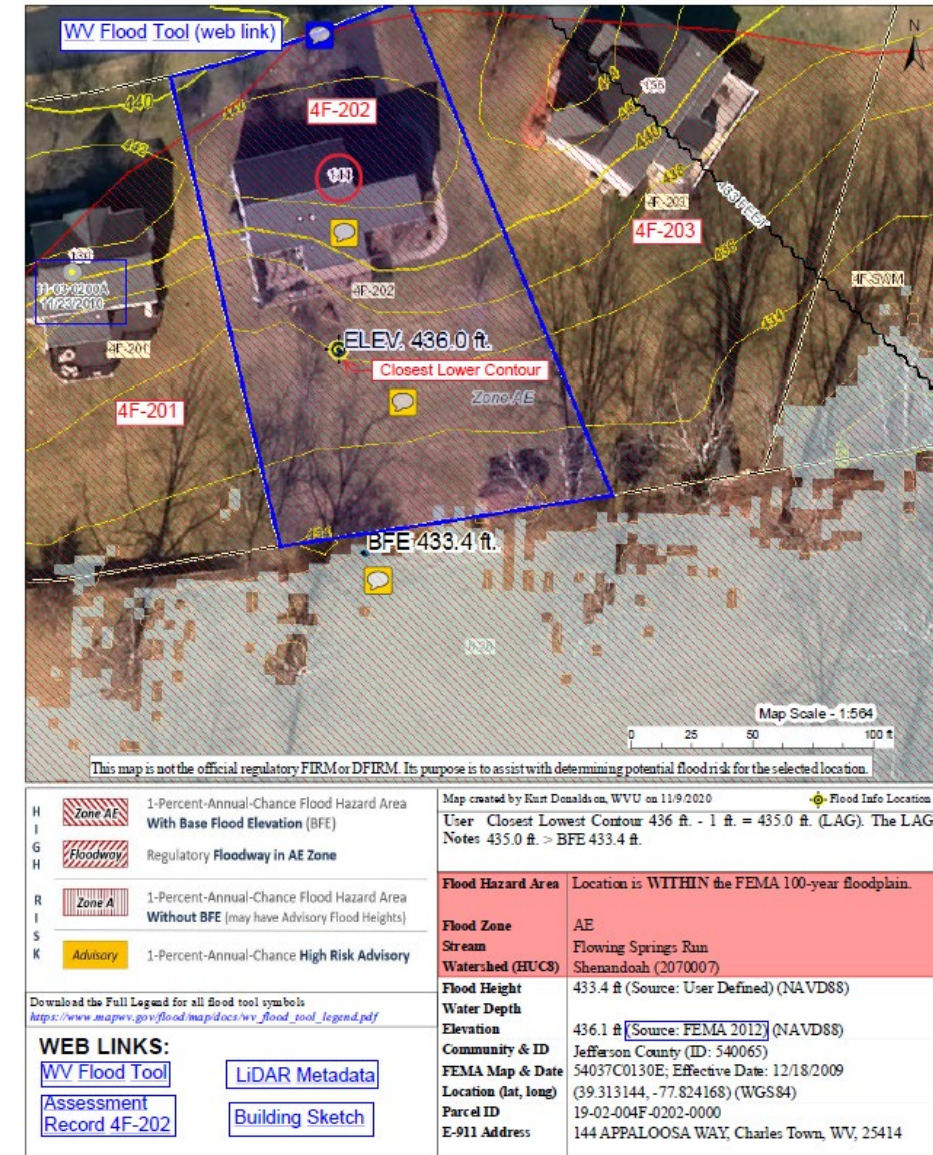
Mapped-out structures of the SFHA may qualify for LOMAs



WV Flood Tool  
LiDAR LOMA:

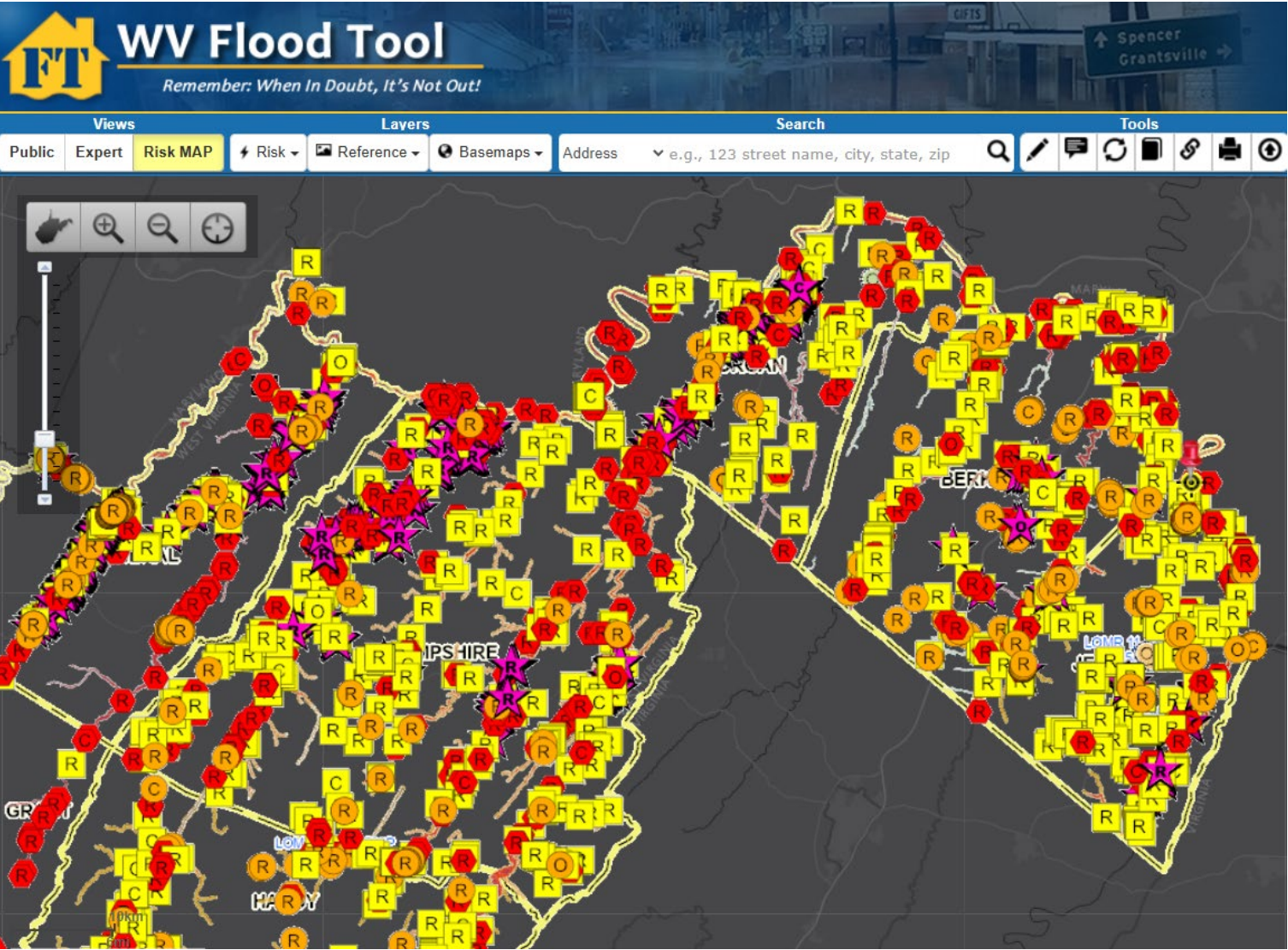
[Instructions](#) | [Guide](#)

## LOMA Map: 144 APPALOOSA WAY, Charles Town, WV





# Buildings Mapped-In / Out of Preliminary SFHA



Future Map Condition		Land Use Category	
	Mapped Out SFHA		Residential
	Mapped In SFHA		Commercial
	Remains Same		Other
	Floodway		

*Difference between FEMA’s 2009 and 2024 flood studies*



Views

Layers

Search

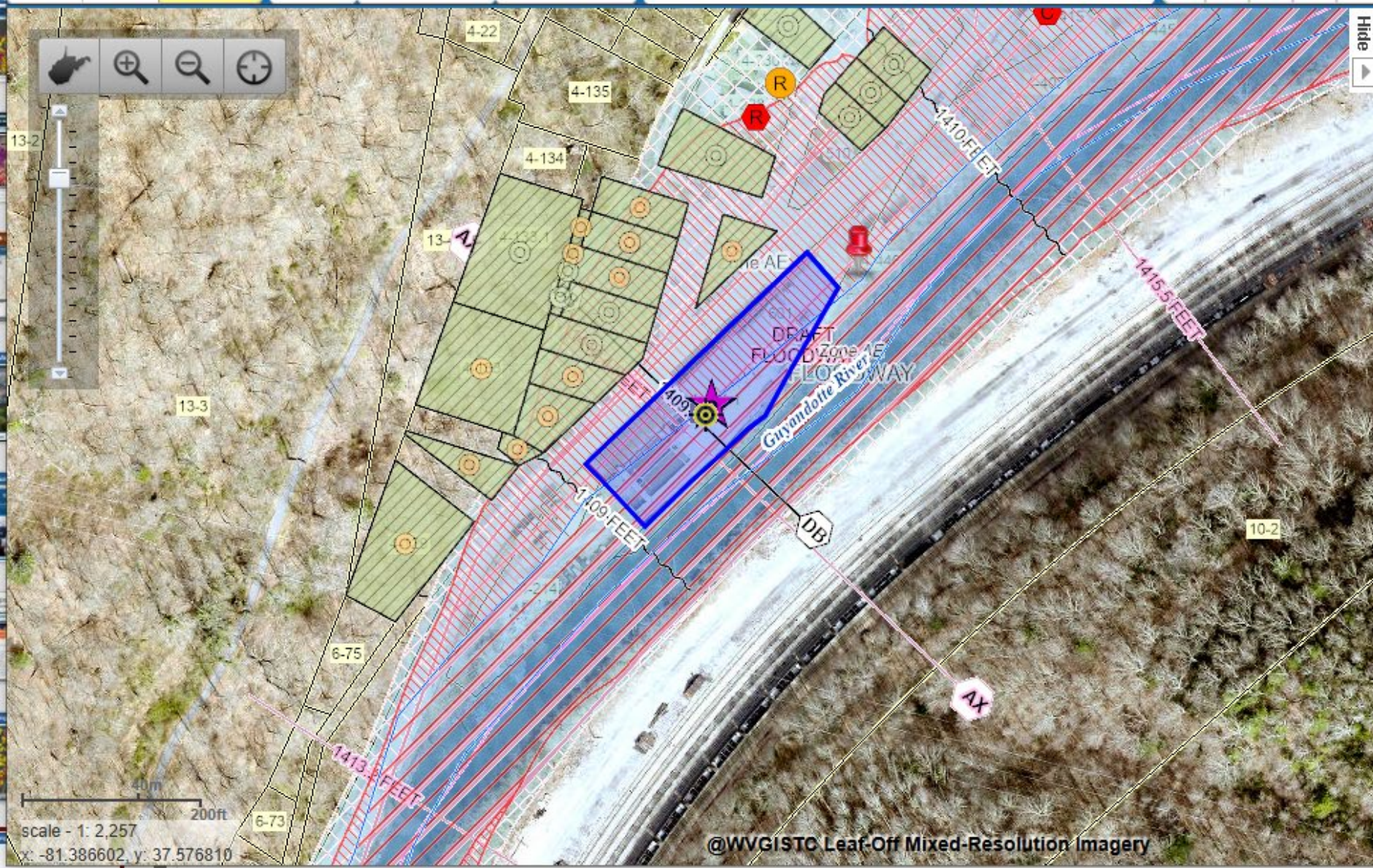
Tools

Public Expert Risk MAP

Risk Reference Basemaps

Address 601 GUYANDOTTE AVE, MULLENS, WV, 2

Map Tools



Flood Hazard Area: Location is **WITHIN** the FEMA 100-year floodplain and floodway.

Flood Zone: AE (Floodway)

Stream: Guyandotte River

Watershed (HUC8): Upper Guyandotte (5070101)

FEMA's Flood Map: 54109C0309D [Download](#) [Share](#) [NFHL](#)

Map Effective Date: 5/16/2006

Contacts: Wyoming

Flood Height: Refer to FIS report for BFE [Info](#) [NAVD88](#)

Water Depth: About 4.6 ft (Source: HEC-RAS)

HEC-RAS Model: N/A [All Models](#)

Flood Profile: 54109\_032

Community: City of Mullens

Freeboard: 2 ft CRS Class: 10 CID: 540218

Location (lat, long): (37.578164, -81.388453) [WGS84](#)

Location (UTM 17N): (4159083, 465701) [WGS84](#)

External Viewers: [Map](#) [Image](#) [Video](#) [3D](#)

Elevation: 1409.9 ft (Source: FEMA 2018-20) [NAVD88](#)

Address: 601 GUYANDOTTE AVE, MULLENS, WV, 24870

Parcel: 55-06-0004-0214-0001 | Assessment [Info](#)

Flood Risk Information [Related Resources](#)

Flood Risk Assessment [Info](#)

3D Flood Visualization [Info](#)

Link to WV Risk Explorer

Flood Tool Link



# Thank you!

## Questions?



Framework website: [www.wvfrf.org](http://www.wvfrf.org)

WV Risk Explorer web tools: [www.wvfrf.org/wvre](http://www.wvfrf.org/wvre)

Email:

[kurt.donaldson@mail.wvu.edu](mailto:kurt.donaldson@mail.wvu.edu)

[behrang.bidadian@mail.wvu.edu](mailto:behrang.bidadian@mail.wvu.edu)