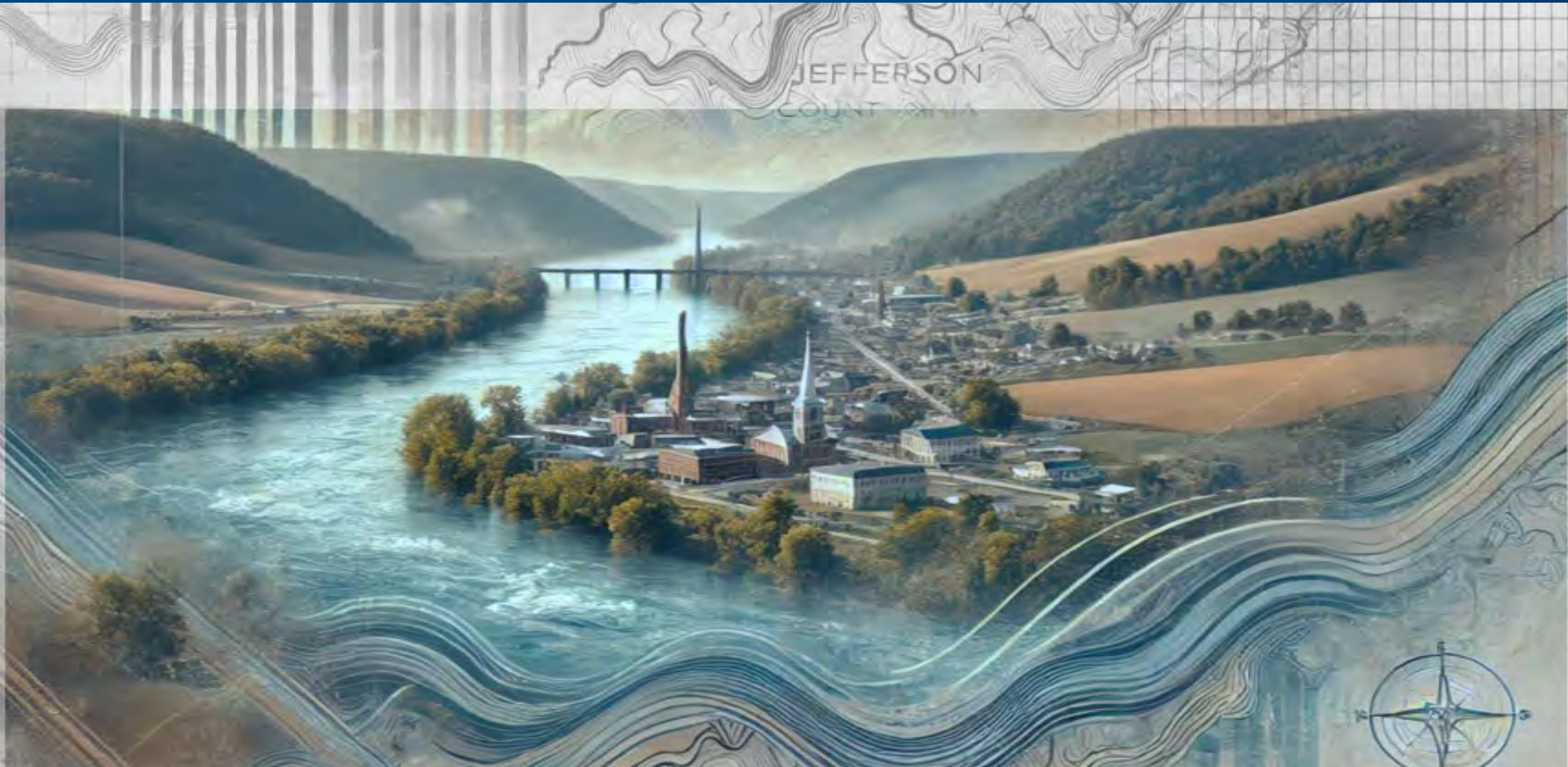


Supplemental Slides (Risk MAP Study)



Risk MAP (Jefferson Co. Preliminary Flood Maps)

Risk **M**apping (Review New Flood Risk Maps)

Map Changes

- BFE's (e.g., 24' BFE change at Harpers Ferry)
- Floodplain Width (e.g., Shepherdstown)

SFHA Building Changes

- Mapped-in/Mapped Out Bldgs.
- LOMAs (SFHA bldgs. mapped out)

Risk Communications

- Outreach Letters for building changes in SFHA/Floodway

Future Map Discovery

- Map [Zone AE Upgrades](#) for Potomac / Shenandoah Rivers?

Risk **A**ssessment (Quantify Flood Risk)

Statewide Risk Assessment

(aggregate level or summary reports)

- *River/Stream Scale*
- *County Scale*
- *Unincorporated Area Scale*
- *Incorporated Area Scale*
 - *Shepherdstown*
 - *Harpers Ferry*

Building Level Risk Assessments

- *Unmitigated Structures*
- *Mitigated Structure*

Risk **P**lanning (Build Flood Resiliency)

Pre-Disaster Planning

- Preload WV Flood Tool [Structures](#) into FEMA's SDE Software
- Update Emergency Response & Hazard Mitigation Plans using risk assessments for major storm event

Higher Standards - Municipalities

- Apply for CRS status
- Adopt higher Freeboard value of 3 ft. in floodplain mgmt. ordinance

Verify Risk Layers on WV Flood Tool

- Building-level assessments
- Open space properties
- Repetitive Loss Areas



WV Flood
Resiliency
Framework

Risk MAP: Reduce Loss of Life and Property

Web link to [Slide Deck](#)

RiskMAP
Increasing Resilience Together

Map Changes – Harpers Ferry

WV Flood Tool
Remember: When In Doubt, It's Not Out!

Public Expert **Risk MAP** Risk Reference Basemaps Address Harpers Ferry, WV

Flood Hazard Area: Location is **WITHIN** an updated FEMA 100-year flood hazard zone and floodway. The flood zone is preliminary and under review to become effective. Refer to FEMA's Flood Map Changes Viewer

Flood Zone: Preliminary Flood Zone (A)
Stream: Shenandoah River
Watershed (HUC8): Shenandoah (2070007)

FEMA's Flood Map: 54037C0175E [Download](#) [Download](#) NFHL
Map Effective Date: 12/18/2009
Contacts: Jefferson

Flood Height: About 302.5 ft (AFH) NAVD88 ⚠️
Water Depth: About 33.0 ft (Source: HEC-RAS)

HEC-RAS Model: Shenandoah2 [All Models](#)

Flood Profile: N/A

Community: **Town of Harpers Ferry**
Freeboard: 2 ft CRS Class: 10 CID: 540067

Location (lat, long): (39.322440, -77.730647) WGS84
Location (UTM 17N): (4357657, 781840) WGS84

External Viewers: [Google Earth](#) [ArcGIS](#) [YouTube](#) [Print](#)

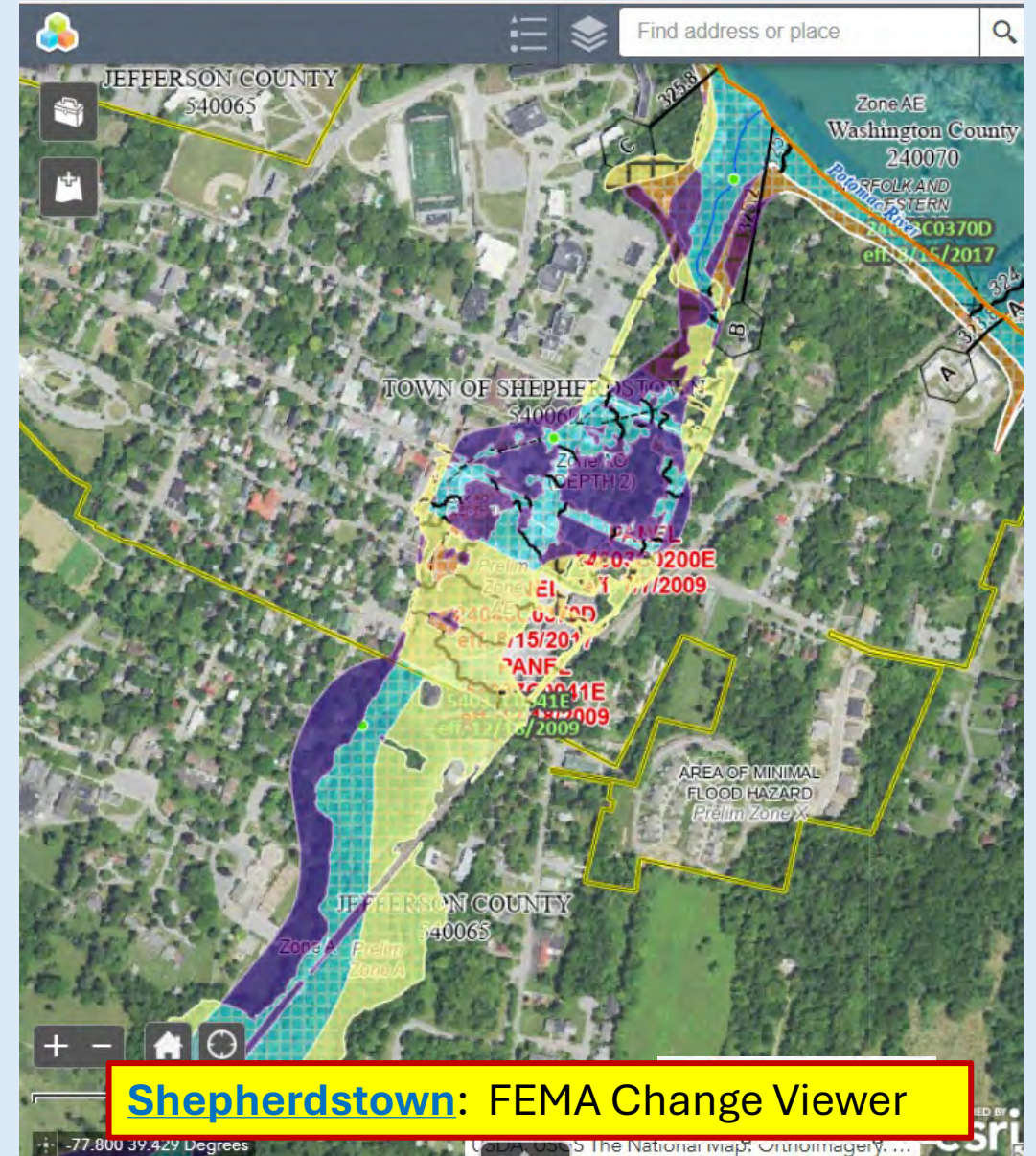
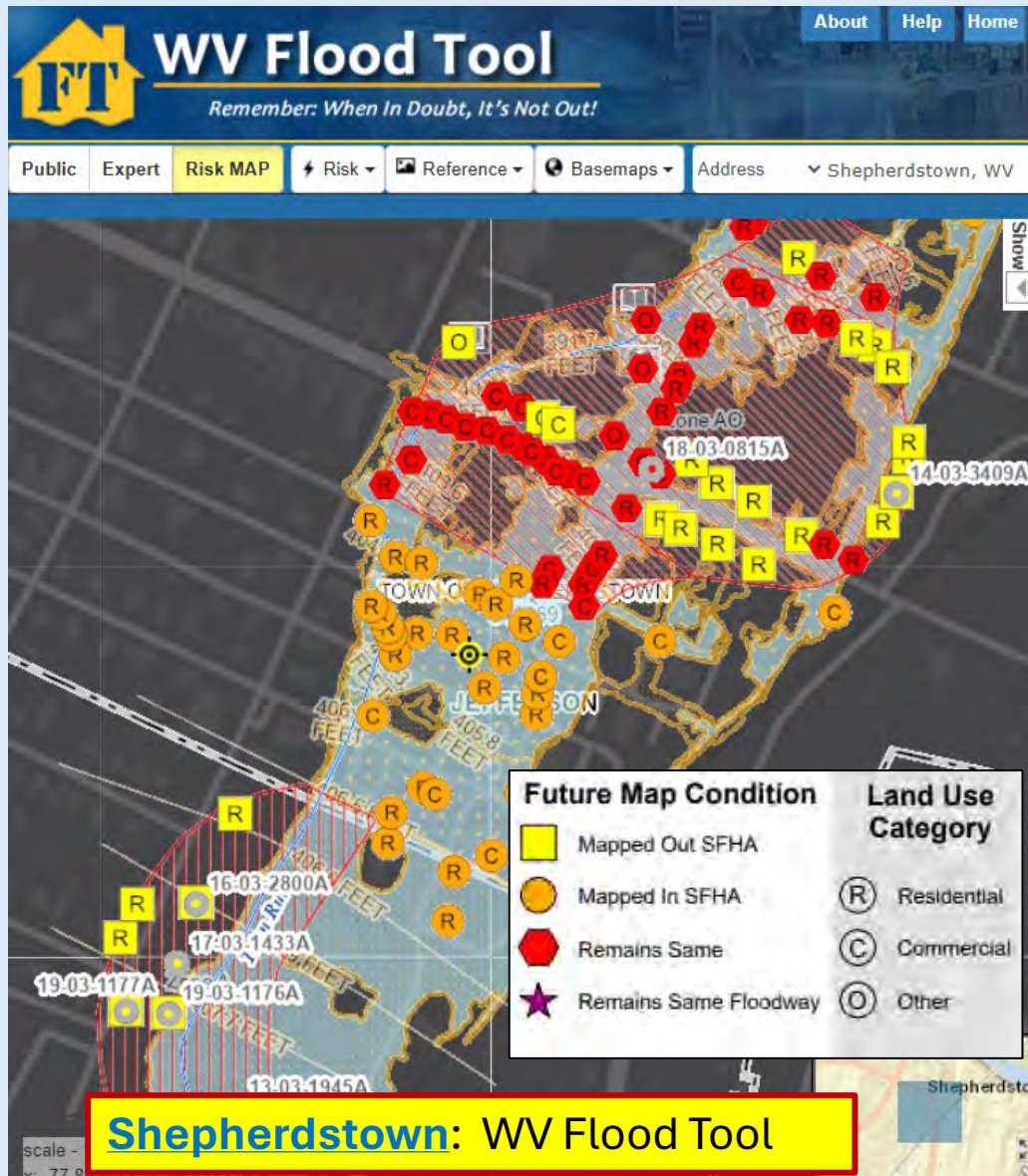
Elevation: 269.4 ft (Source: FEMA 2012) NAVD88

Address: : multiple addresses
Parcel: : 19-05-0004-0025-0000 | [Assessment](#) ⚠️

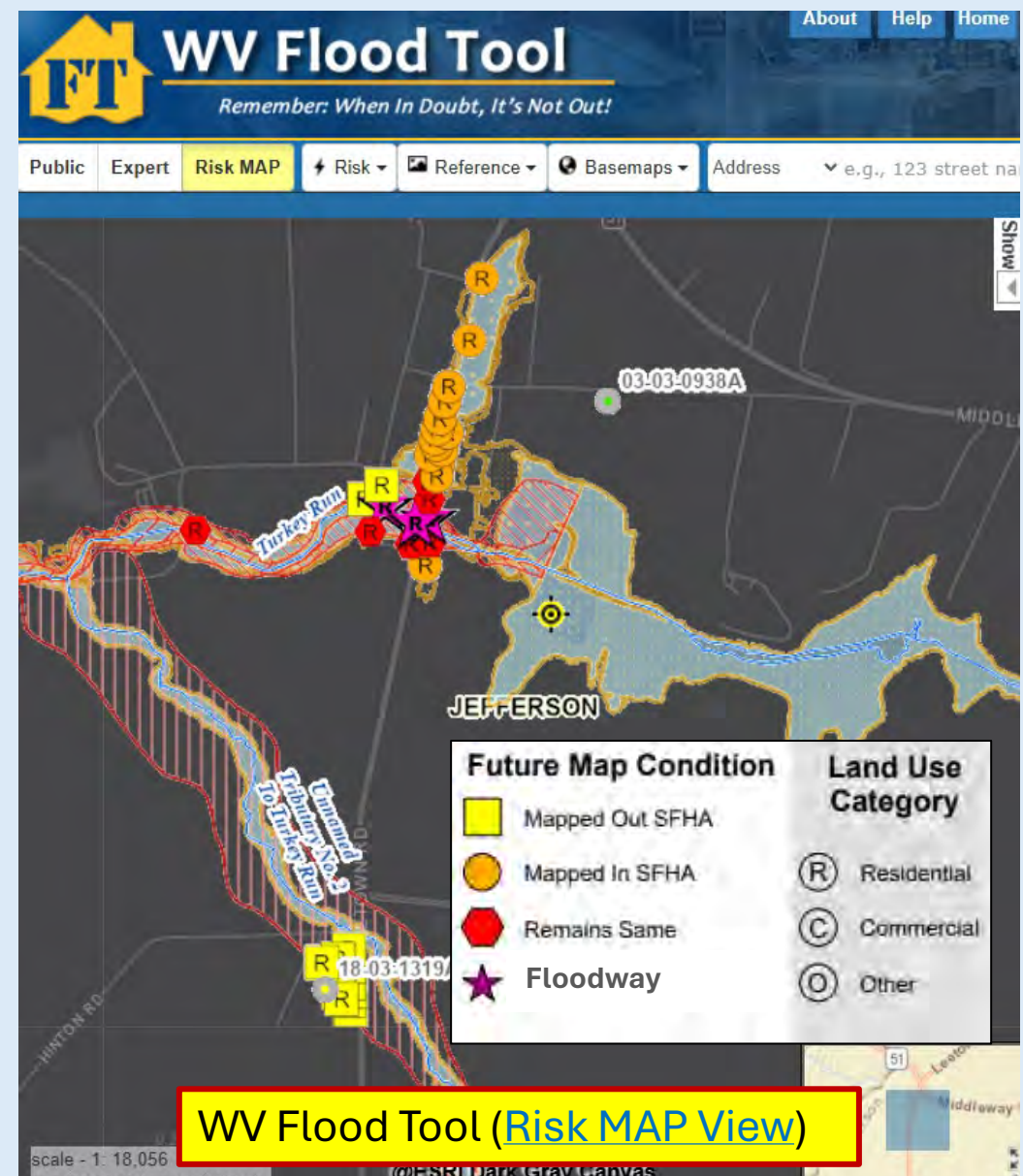
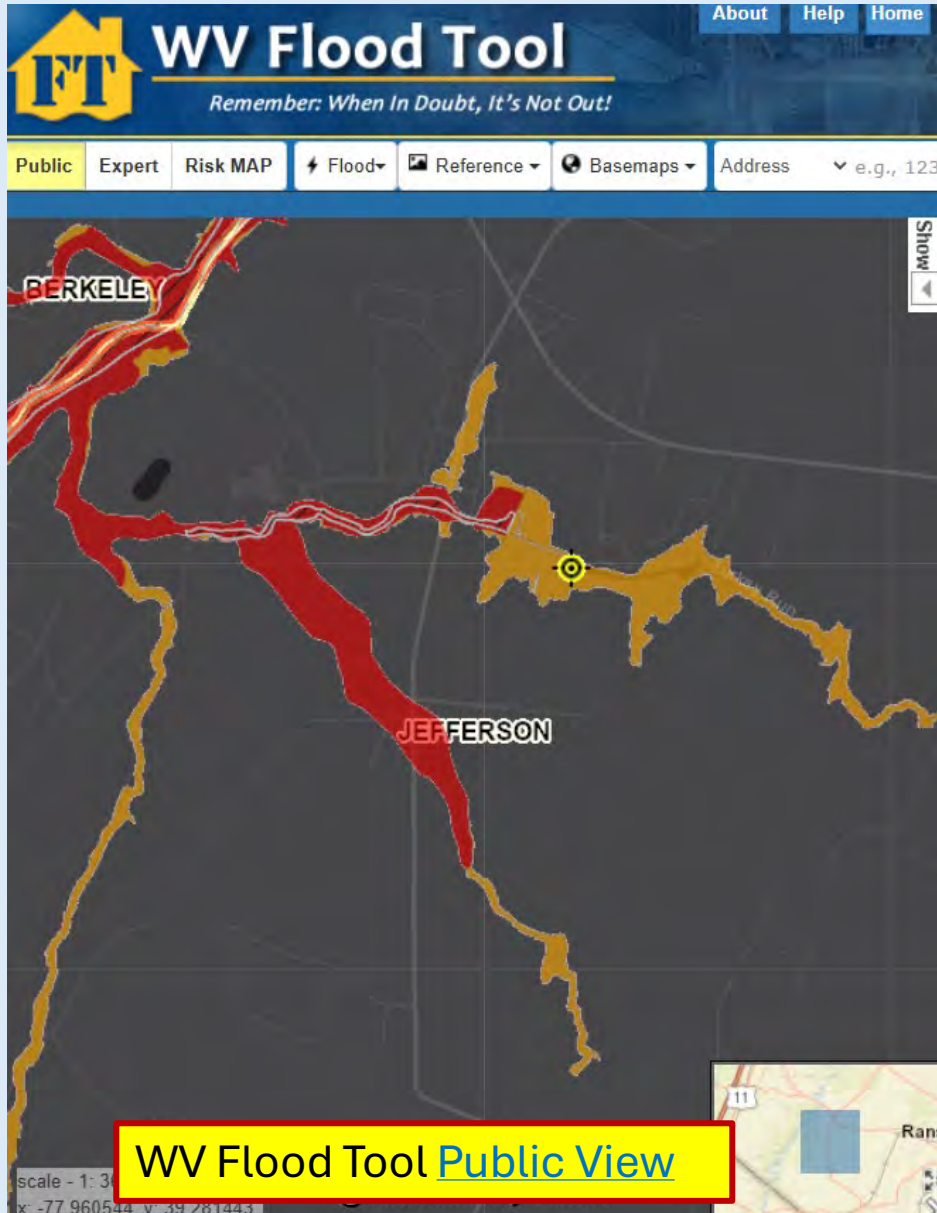
Flood Risk Information [Related Resources](#)

Harpers Ferry: BFE change minus 24 ft.

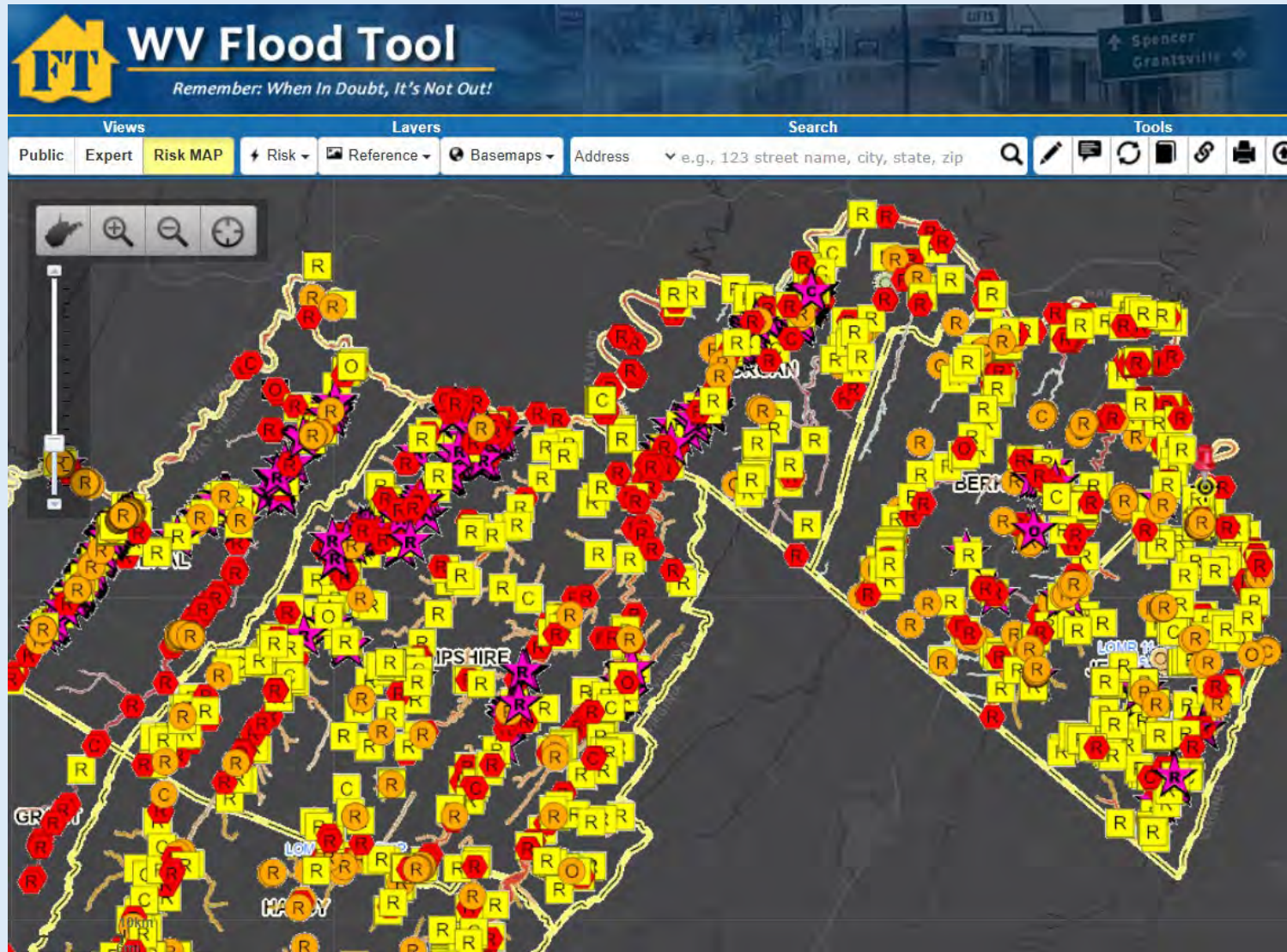
Map Changes - Shepherdstown



Map Changes – Jefferson County



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

SFHA Building Changes: Mapped-In/Out

COMMUNITY IDENTIFICATION		Estimated structures in the Community	Estimated structures in the preliminary flood high hazard area	Estimated structures newly mapped in	Estimated structures newly mapped out
Community Name	Community Type				
Jefferson County*	Unincorporated	20,397	317	55	220
Bolivar	Incorporated	616	4	4	0
Charles Town	Incorporated	3,670	21	4	8
Harpers Ferry	Incorporated	276	31	30	0
Ranson	Incorporated	2,918	50	1	28
Shepherdstown	Incorporated	735	76	29	20
JEFFERSON	County	28,612	499	123	276

* Unincorporated Area

County Net Change in structures: - 153

County Net Change in floodway structures: - 14

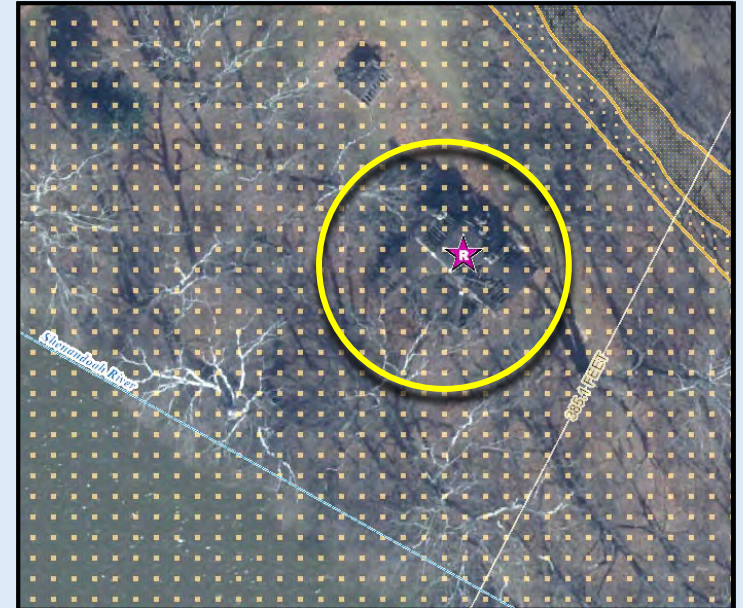
Buildings Mapped into Floodway



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*

-  FLOOD FRINGE TO FLOODWAY-Res.
-  FLOOD FRINGE TO FLOODWAY-Com.
-  FLOOD FRINGE TO FLOODWAY-Other

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.

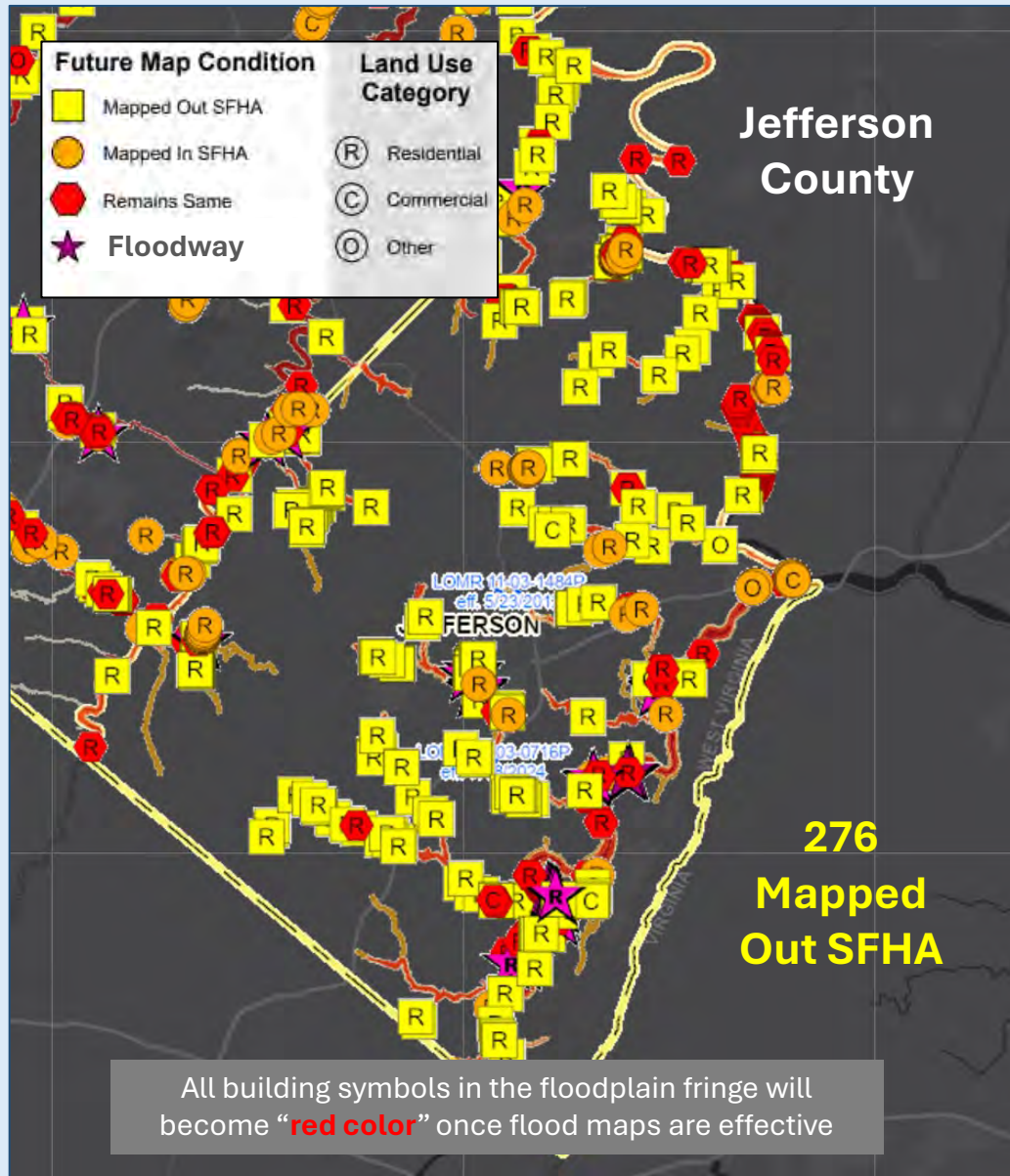
Mail Merge Template for SFHA Mapped-in Structures

Counties which recently sent outreach letters to homeowners:

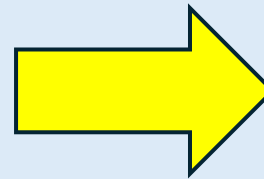
- Hardy County Risk MAP
- Kanawha County - Elk River PMR
- Greenbrier County Risk MAP

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

SFHA Buildings Changes: LOMAs for Mapped Out



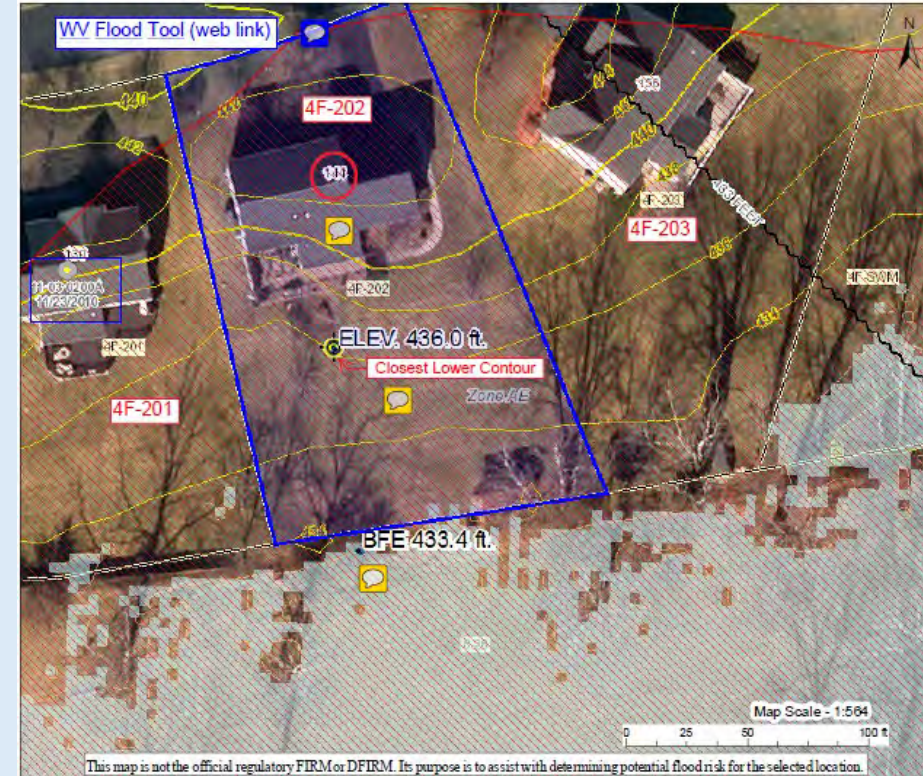
Mapped-out structures of the SFHA may qualify for LOMAs



WV Flood Tool
LiDAR LOMA:

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

LOMA Map: 144 APPALOOSA WAY, Charles Town, WV



H I G H S K	<p>Zone AE 1-Percent-Annual-Chance Flood Hazard Area With Base Flood Elevation (BFE)</p> <p>Floodway Regulatory Floodway in AE Zone</p> <p>Zone A 1-Percent-Annual-Chance Flood Hazard Area Without BFE (may have Advisory Flood Heights)</p> <p>Advisory 1-Percent-Annual-Chance High Risk Advisory</p>	<p>Map created by Kurt Donaldson, WVU on 11/9/2020</p> <p>User Closest Lowest Contour 436 ft. - 1 ft. = 435.0 ft. (LAG). The LAG Notes 435.0 ft. => BFE 433.4 ft.</p>
	<p>Flood Hazard Area Location is WITHIN the FEMA 100-year floodplain.</p> <p>Flood Zone AE</p> <p>Stream Flowing Springs Run</p> <p>Watershed (HUC8) Shenandoah (2070007)</p> <p>Flood Height 433.4 ft. (Source: User Defined) (NAVD88)</p> <p>Water Depth 436.1 ft. (Source: FEMA 2012) (NAVD88)</p> <p>Elevation 436.1 ft. (Source: FEMA 2012) (NAVD88)</p> <p>Community & ID Jefferson County (ID: 540065)</p> <p>FEMA Map & Date 54037C0130E; Effective Date: 12/18/2009</p> <p>Location (lat, long) (39.313144, -77.824168) (WGS84)</p> <p>Parcel ID 19-02-004F-0202-0000</p> <p>E-911 Address 144 APPALOOSA WAY, Charles Town, WV, 25414</p>	

Download the Full Legend for all Flood tool symbols
http://www.mapwv.gov/flood/map/docs/wv_flood_tool_legend.pdf

WEB LINKS:

- [WV Flood Tool](#)
- [LiDAR Metadata](#)
- [Assessment Record 4F-202](#)
- [Building Sketch](#)

River/Stream Building Risk Assessment



MEDIAN BUILDING VALUE: **Town Run** and **Shenandoah River** rank first and fourth, respectively, of 156 major rivers/streams in the state with the highest median value of structures in high-risk flood areas.

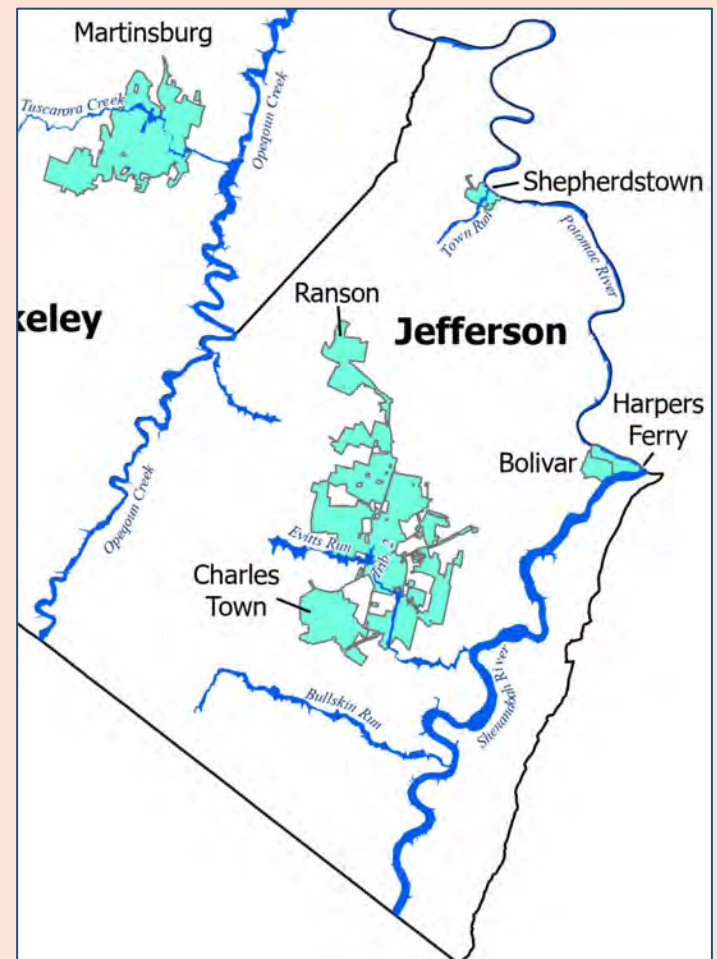
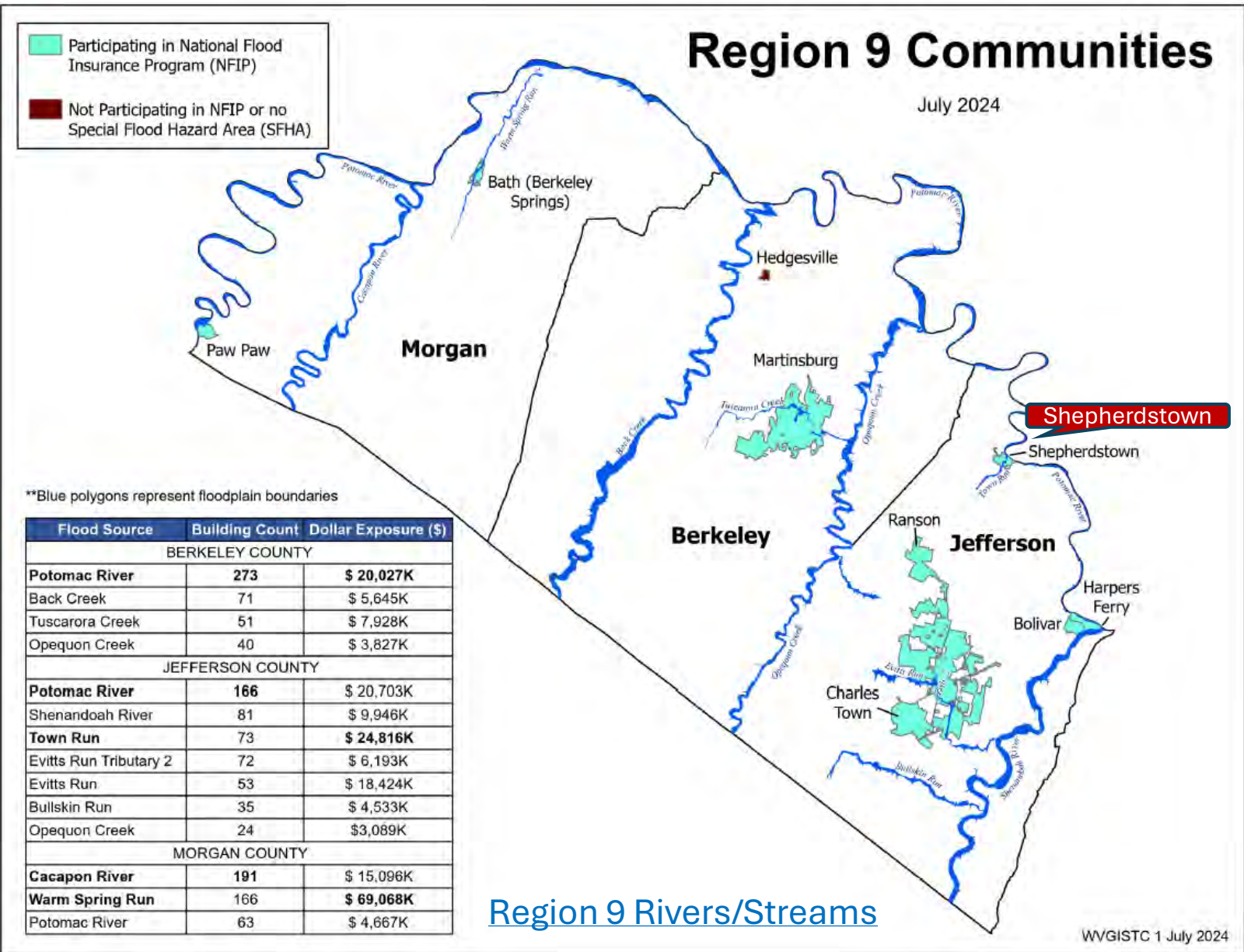
#	STATE CATEGORY RANK	River/Stream Floodplain	Building Characteristics		CATEGORY SCORE
			Building Median Value		
1	1	Town Run	\$247,700		100.0%
2	4	Shenandoah River	\$95,100		98.0%
3	24	Potomac River	\$57,300		85.1%



FLOOD DEPTH MEDIAN: Floodplain structures along the **Shenandoah River** have high flood depths compared to 156 other major rivers/streams in the state.

#	STATE CATEGORY RANK	River/Stream Floodplain	Floodplain Characteristics		CATEGORY SCORE
			Floodplain Length	Flood Depth Median	
1	12	Shenandoah River	30.2 Miles	7.4 Ft	92.9%
2	2	Potomac River	143.8 Miles	4.5 Ft	99.3%
3	147	Town Run	2.1 Miles	0.2 Ft	5.8%

River/Stream Building Risk Assessment



Top rivers with high building counts in SFHA are **Potomac River** (166), **Shenandoah River** (81) and **Town Run** (73). Town Run has highest building dollar exposure.

Jefferson County Risk Assessment

Statewide Rank among the Top 5

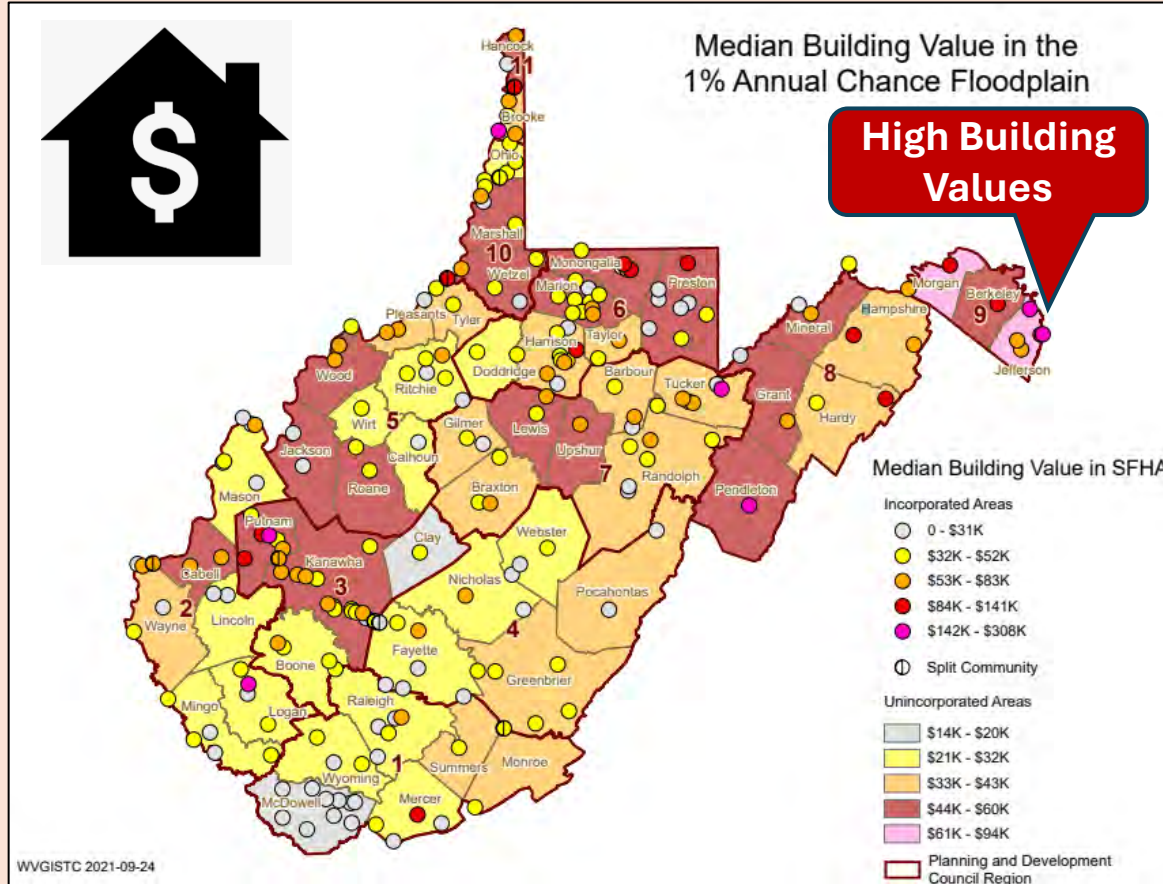
JEFFERSON COUNTY ranks “very high” or in the **top 20%** of all 55 counties in the state for the five risk indicators below. View [Top 20% Risk Indicators Report](#) for county. Click on Risk Factor links for rationales/recommendations.

Category	Flood Risk Indicator		Value for Jefferson	Indicator Score (0 - 100%)	Indicator Rating
Building Characteristics	Building Median Value	1	\$97,450 (Median \$42,200)	100.0%	VERY HIGH
	Bldg. Subgrade Basements Ratio	4	49.5%	94.4%	VERY HIGH
	Bldg. Year Minus Rated Post-FIRM Ratio		9.4%	81.4%	Very High
Community Assets	Community Assets Historical	4	120	94.4%	VERY HIGH
Building Damage Loss	Bldg. Substantial Damage Ratio		24.0%	90.7%	VERY HIGH

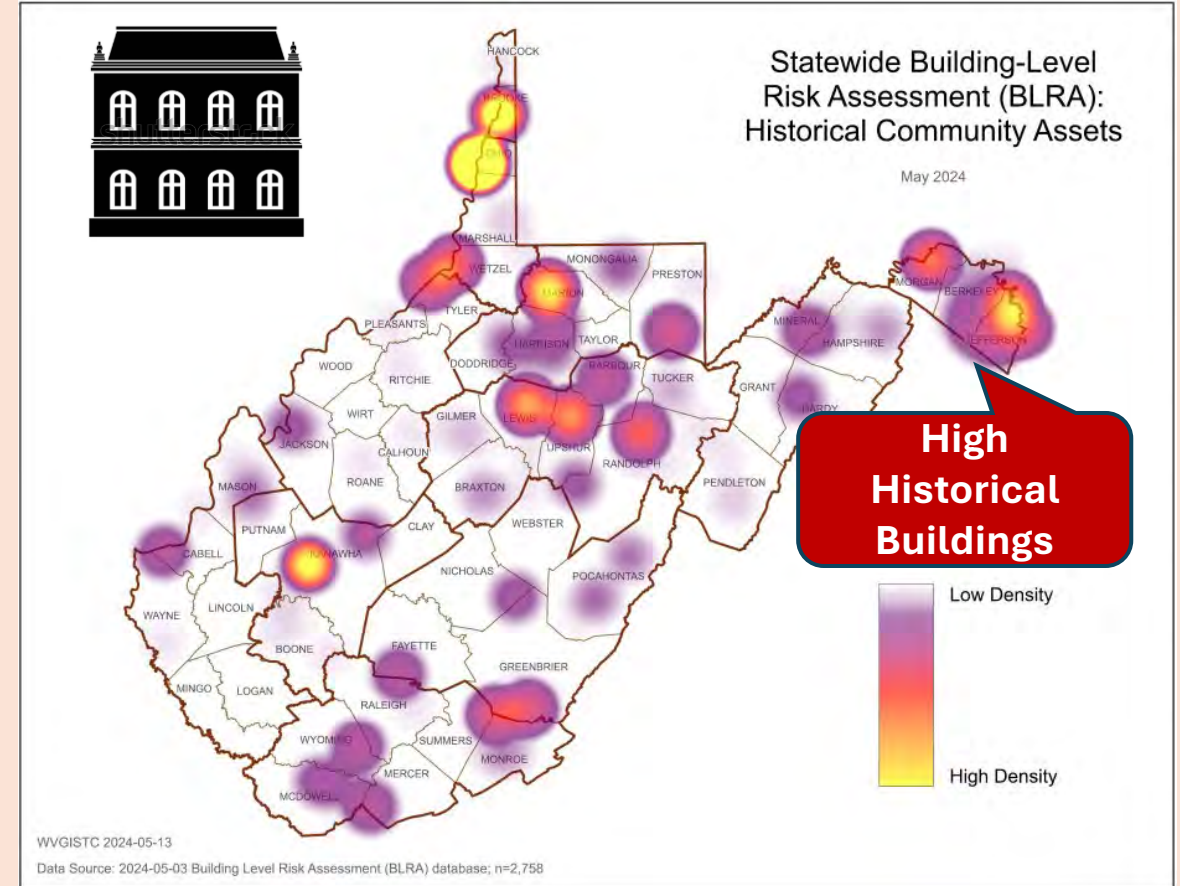
JEFFERSON COUNTY UNINCORPORATED* ranks “very high” or in the **top 20%** of all 55 unincorporated areas in the state for the six risk indicators below. View [Top 20% Risk Indicators Report](#) for incorporated area.

Category	Flood Risk Indicator		Value for Jefferson County* - Unincorporated	Indicator Score (0 - 100%)	Indicator Rating
Floodplain Characteristics	Flood Depth Median	4	4.7 Ft	94.4%	VERY HIGH
Building Characteristics	Building Median Value	1	\$93,150 (Median \$37,350)	100.0%	VERY HIGH
	Bldg. Subgrade Basements Ratio	2	48.9%	98.1%	VERY HIGH
	Bldg. Year Minus Rated Post-FIRM Ratio		14.5%	90.7%	VERY HIGH
Community Assets	Community Assets Historical	1	26	100.0%	VERY HIGH
Building Damage Loss	Bldg. Substantial Damage Ratio		29.7%	90.7%	VERY HIGH

Jefferson County Building Risk Assessment



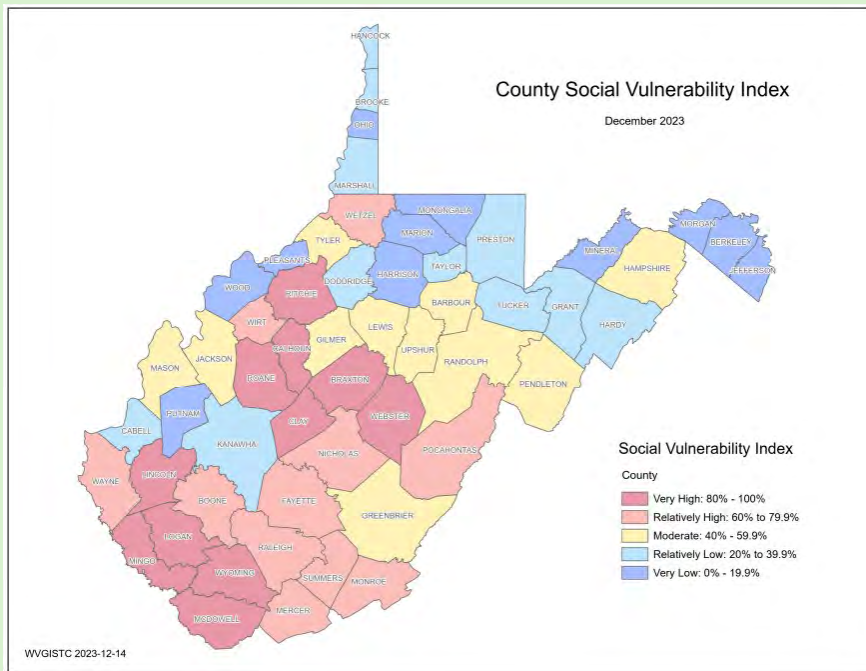
Jefferson County has very high [Building Values](#), or more than double the statewide median value.



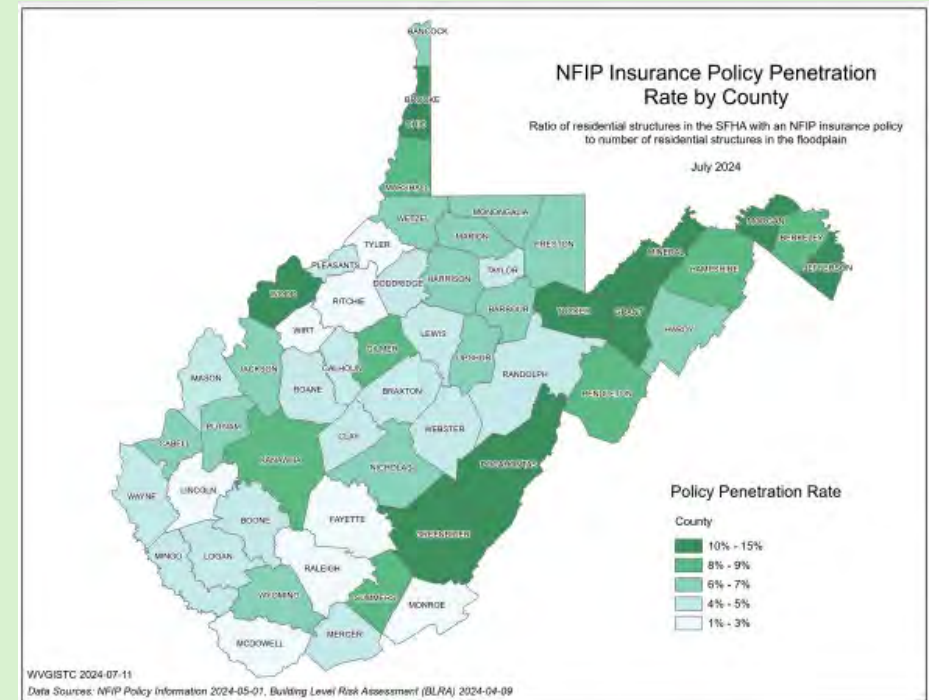
Jefferson County has a high number of [Historical Community Assets](#) on the National Register.

Jefferson County Resiliency

(1) Jefferson County has no [Essential Facilities](#) in the high or moderate risk floodplains

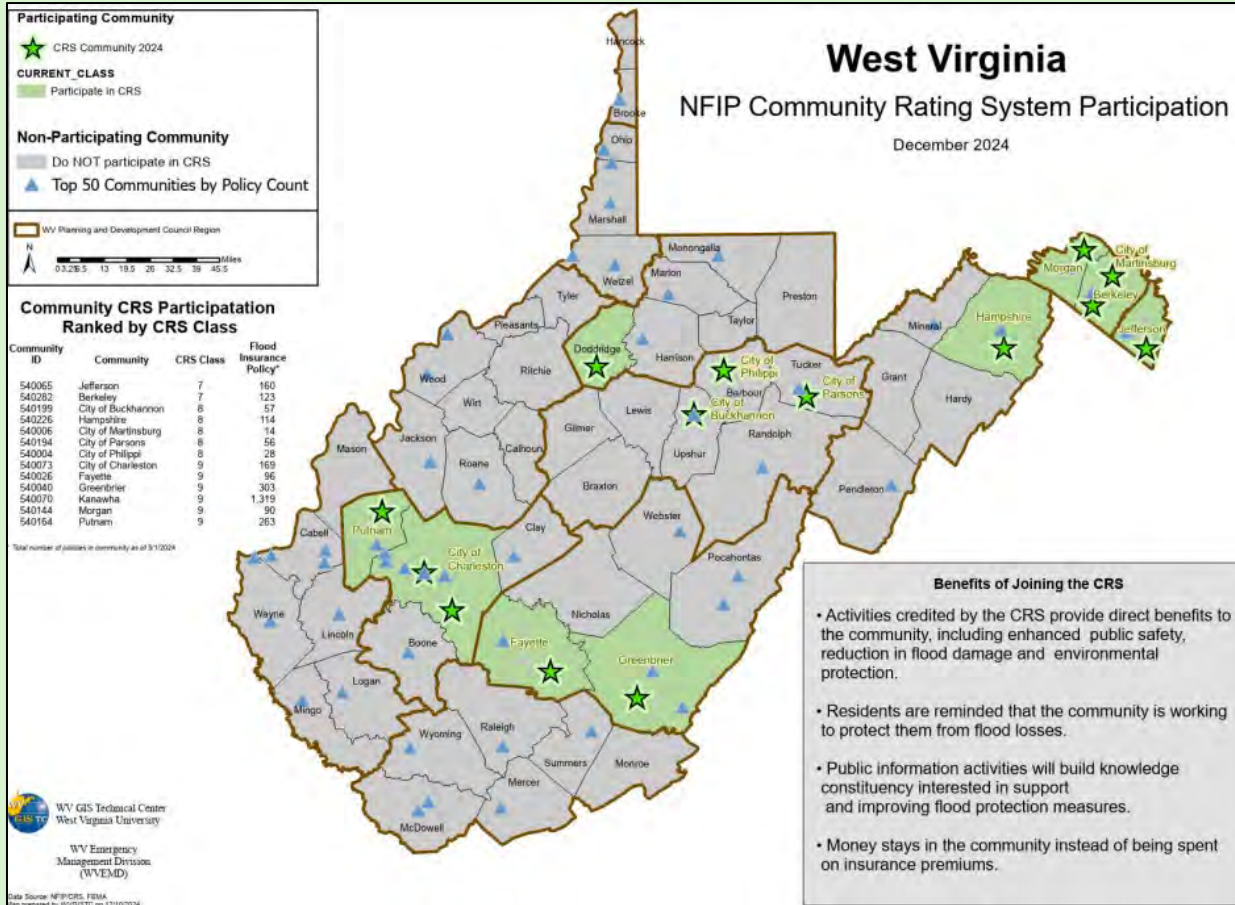


(2) Jefferson County has the lowest [Social Vulnerability Index](#) in the State

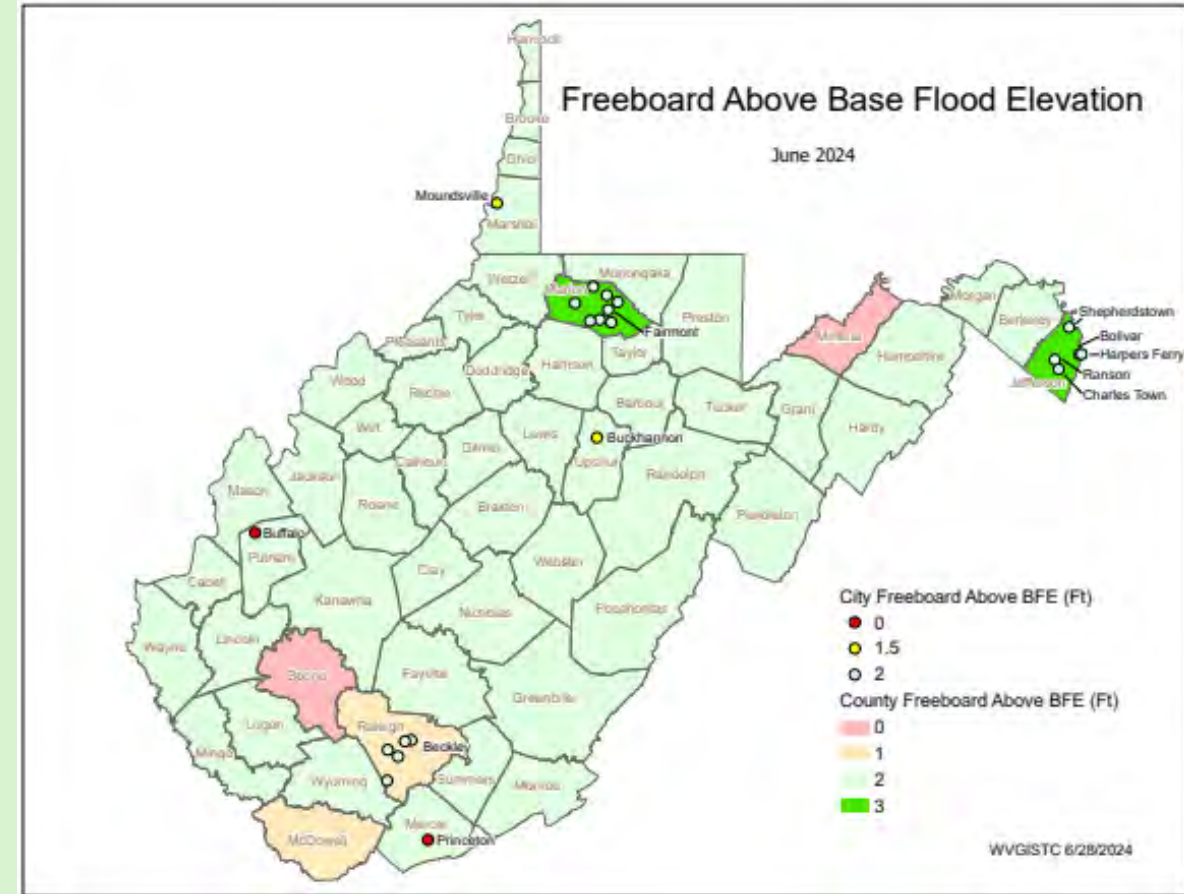


(3) Jefferson County has higher [NFIP Insurance Penetration Rate](#) than other counties

Jefferson County Unincorporated* Resiliency

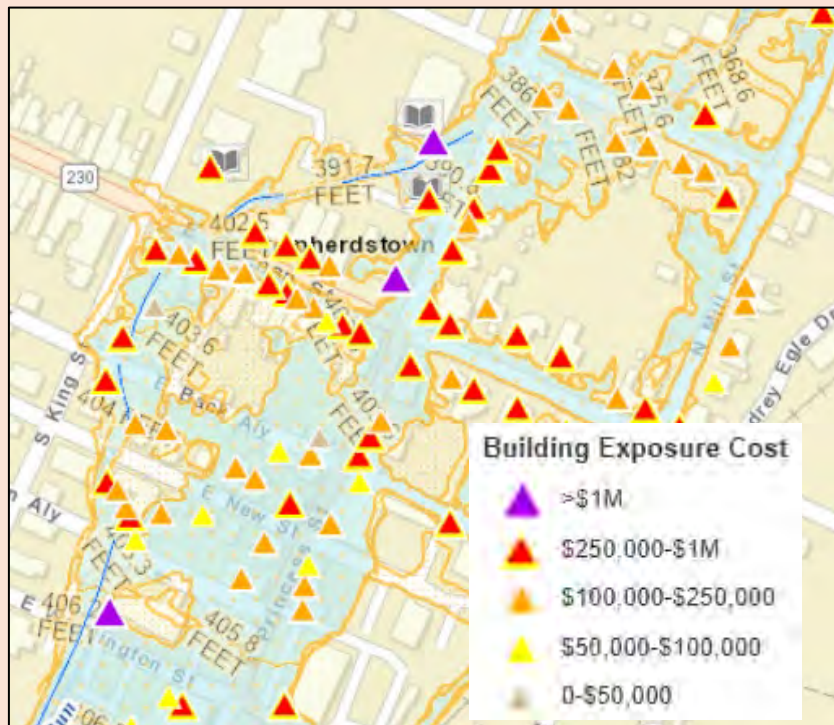


Jefferson County Unincorporated has a high [CRS](#) Rating of Class 7



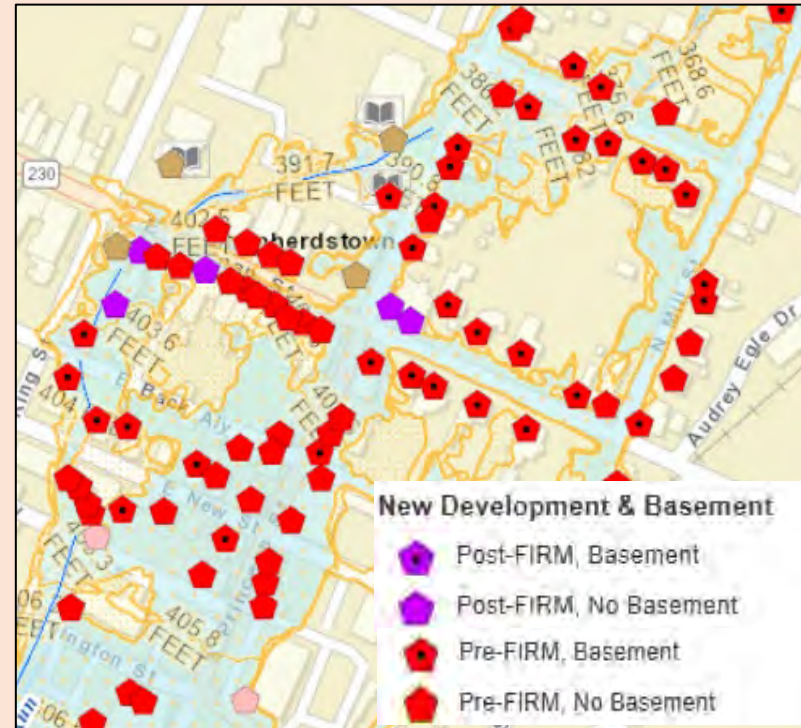
Jefferson County Unincorporated has a high [Freeboard](#) safety factor of 3 feet

Shepherdstown Risk Assessment



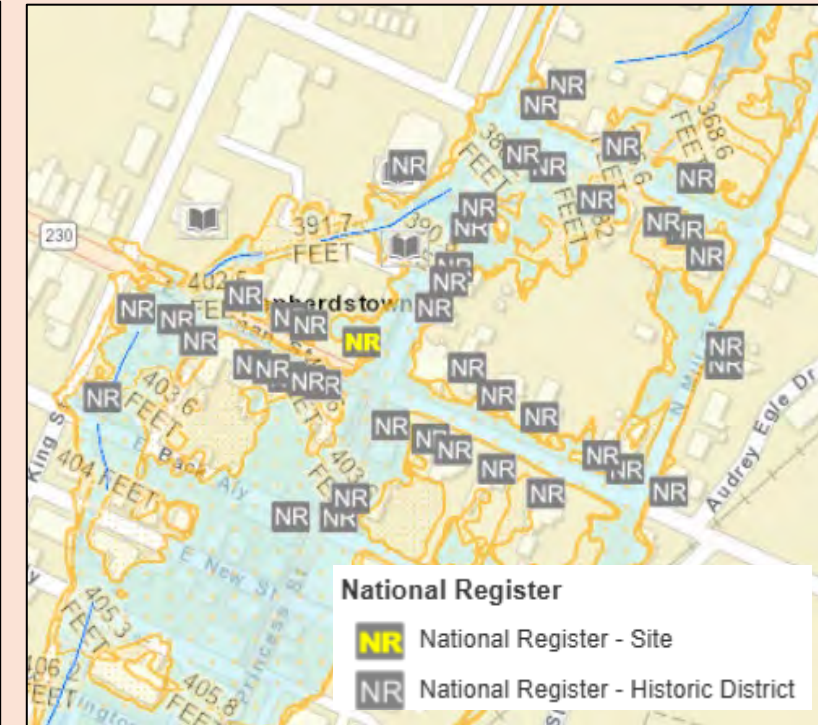
Building Value and Density.

Median Building Value ranks first of 229 incorporated places in the state. High density of buildings in small area.



Pre-FIRM and Basements.

Nearly 90% of structures are Pre-FIRM and nearly half have basements.



Historical Buildings.

Most building are in the National Historic District.

Refer to online [All Risk Indicators Report](#)

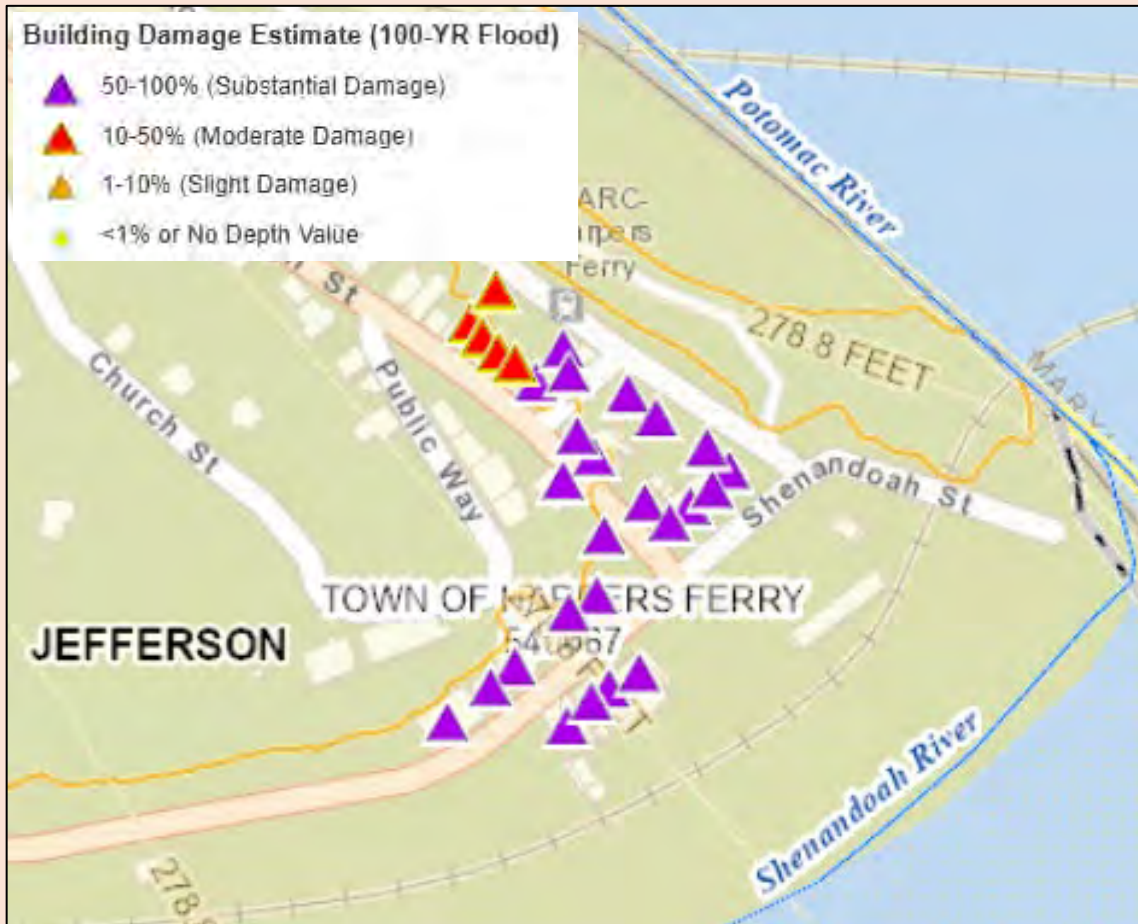
Sources: [WV Flood Tool's Risk Map View](#) & Statewide Building-Level Risk Assessment

Example Urban Flooding



View [Videos](#) of 2021 Morgantown Flooding along *Popenoe Run* on Pattleson Drive near WVU stadium that may occur similarly on *Town Run* in Shepherdstown

Harpers Ferry Risk Assessment



Building Substantial Damage Ratio highest of all 229 incorporated places in the state



Pre-FIRM Building Ratio highest of all 229 incorporated places in the state

Refer to online [All Risk Indicators Report](#)

Sources: [WV Flood Tool's Risk Map View](#) & Statewide Building-Level Risk Assessment

Harpers Ferry Risk Assessment

744 Shenandoah St, Harpers Ferry, WV, 25425

Building ID: [19-05-0004-0025-0000 801A](#)

Historical structure built in 1845

14' (1936 High Water Mark)

8' (1996 High Water Mark)

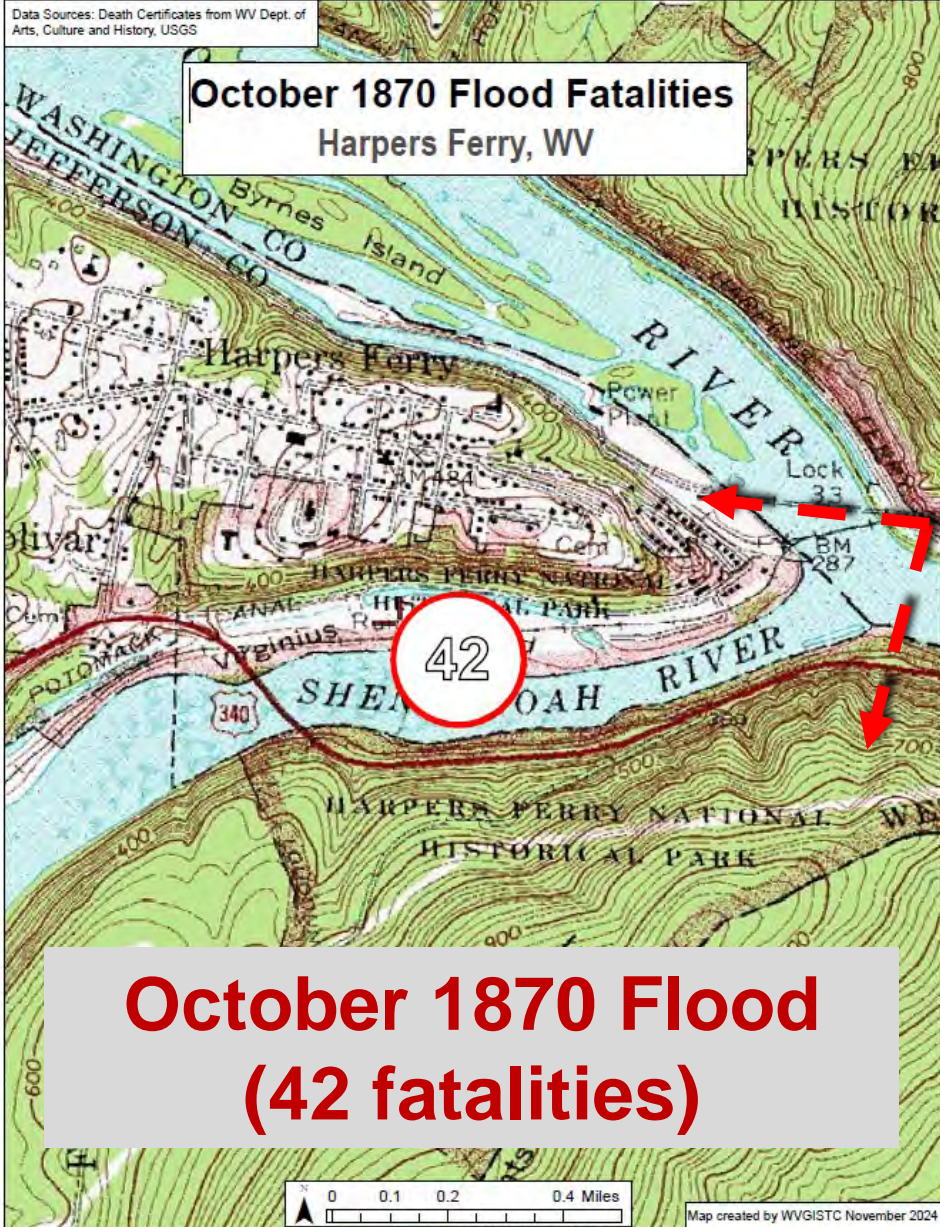
1936 Flood of Record



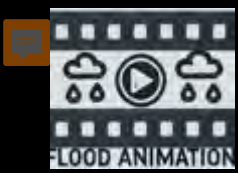
High Water Marks



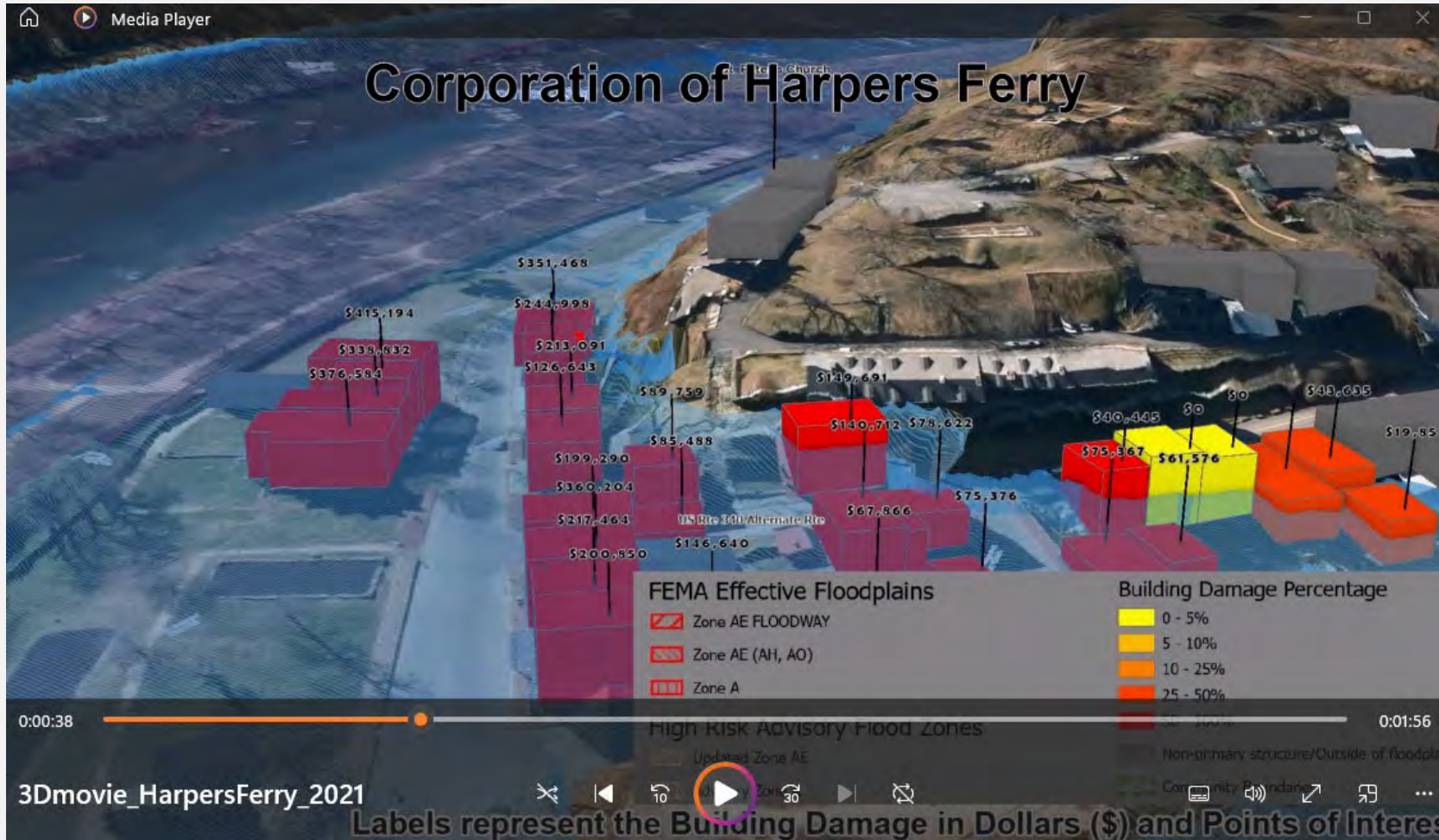
Historical Flood Research (Harpers Ferry, WV)



Link to [WV Flood Fatality Dashboard](#)



Harpers Ferry 3D Flood Movie



Click [here](#) to view 3D Flood Movie of Harpers Ferry

Utilities in Floodplain (High \$ Exposure)



City of Charles Town Wastewater Treatment Plant (FD: 1 ft)
Highest CA Value (\$6.8M) in Jefferson County
(Building ID: [19-03-0008-0001-0000_842](#))
[Value source](#) inflation adjusted to 2021



Shepherdstown Water Works Water Treatment Plant (FD: 3 ft)
(Building ID: [19-10-0001-0052-0000_309](#)) (\$3.1M)
[Value source](#) inflation adjusted to 2021



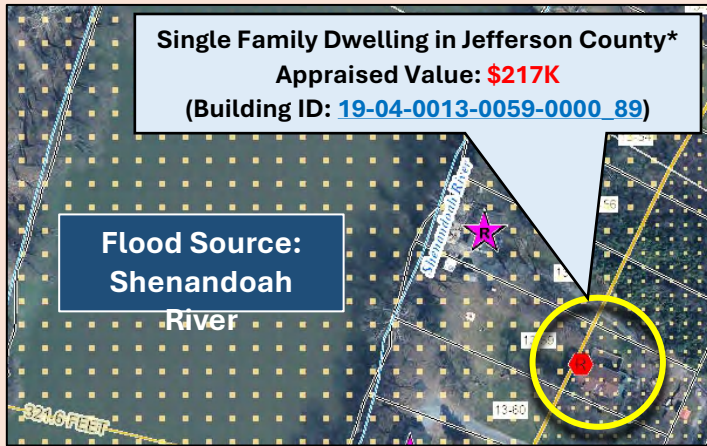
Harpers Ferry Bolivar PSD Wastewater Treatment Plant (FD: 1 ft)
(Building ID: [19-05-0004-0025-0000_192](#)) (\$462K)
[Value source](#) inflation adjusted to 2021

Online Mitigation Resources:

- [EPA FLOOD RESILIENCE: Guide for Water/Wastewater Utilities](#)
- [Tips for Flood-Proofing Wastewater Treatment Plants](#)
- [Flood-Resistant Wastewater Treatment Plant Upgrades](#)



Building Flood Profile - Unmitigated



Rivermist Lane, Harpers Ferry

Repetitive Loss Area / Area of Mitigation Interest

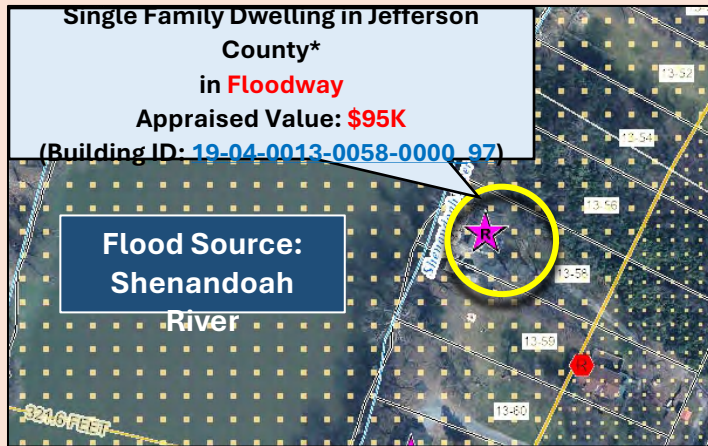
BUILDING INFORMATION	
Property Class Type	R - Residential
Land Use	101 - Residential 1 Family
Year Built	1985 Post-FIRM

	HEIGHT (ft.)
BUILDING	
Freeboard (FBD)	3
FLOOD DEPTH	
FEMA 1% (100-Yr)	13.6
FEMA 100-Yr	16.6
FEMA 0.2% (500-Yr)	19.6





Building Flood Profile - Unmitigated



Rivermist Lane, Harpers Ferry

Repetitive Loss Area / Area of Mitigation Interest

BUILDING INFORMATION	
Property Class Type	R - Residential
Land Use	101 - Residential 1 Family
Year Built	1971 Pre-FIRM

	HEIGHT (ft.)
BUILDING	
Freeboard (FBD)	3
FLOOD DEPTH	
FEMA 1% (100-Yr)	13.7
FEMA 100-Yr +	16.7
FEMA 0.2% (500-Yr)	19.7



19.7' (FEMA 0.2% / 500-Yr)

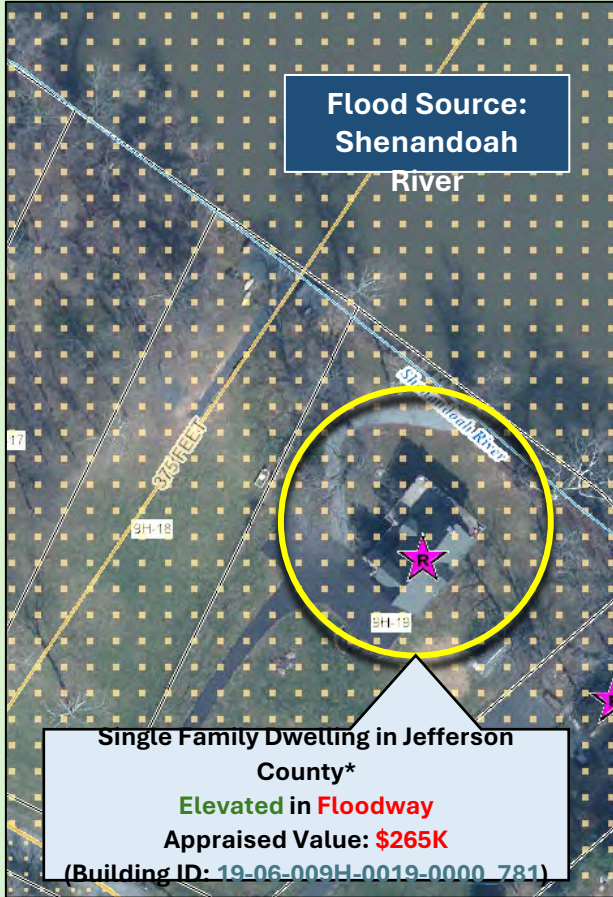
16.7' (FEMA 1% + / 100-Yr +)

13.7' (FEMA 1% / 100-Yr)

Ground Level



Building Flood Profile – Mitigated to DFE



BUILDING INFORMATION	
Property Class Type	R - Residential
Land Use	101 - Residential 1 Family
Year Built	2011 Post-FIRM

	HEIGHT (ft.)
BUILDING	
Freeboard (FBD)	3
FLOOD DEPTH	
FEMA 1% (100-Yr)	9.9
FEMA 100-Yr +	12.9
FEMA 0.2% (500-Yr)	18.9



Contact Persons:

- **Kurt Donaldson**
kurt.donaldson@mail.wvu.edu
- **Behrang Bidadian**
behrang.bidadian@mail.wvu.edu
- **Annie Mahmoudi**
anm0050@mail.wvu.edu





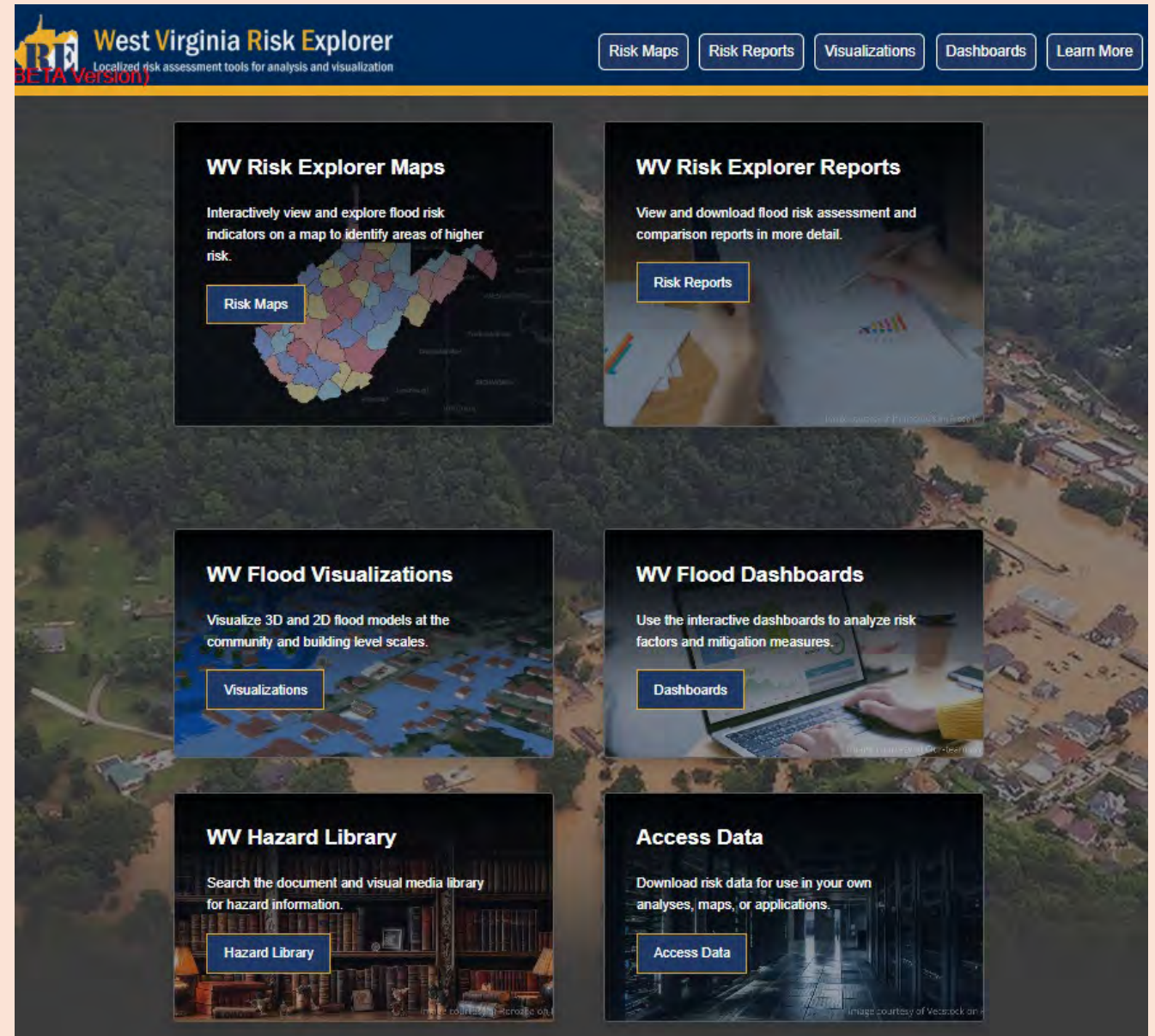
APPENDIX SLIDES

Jefferson County Risk Assessment

Study Source:

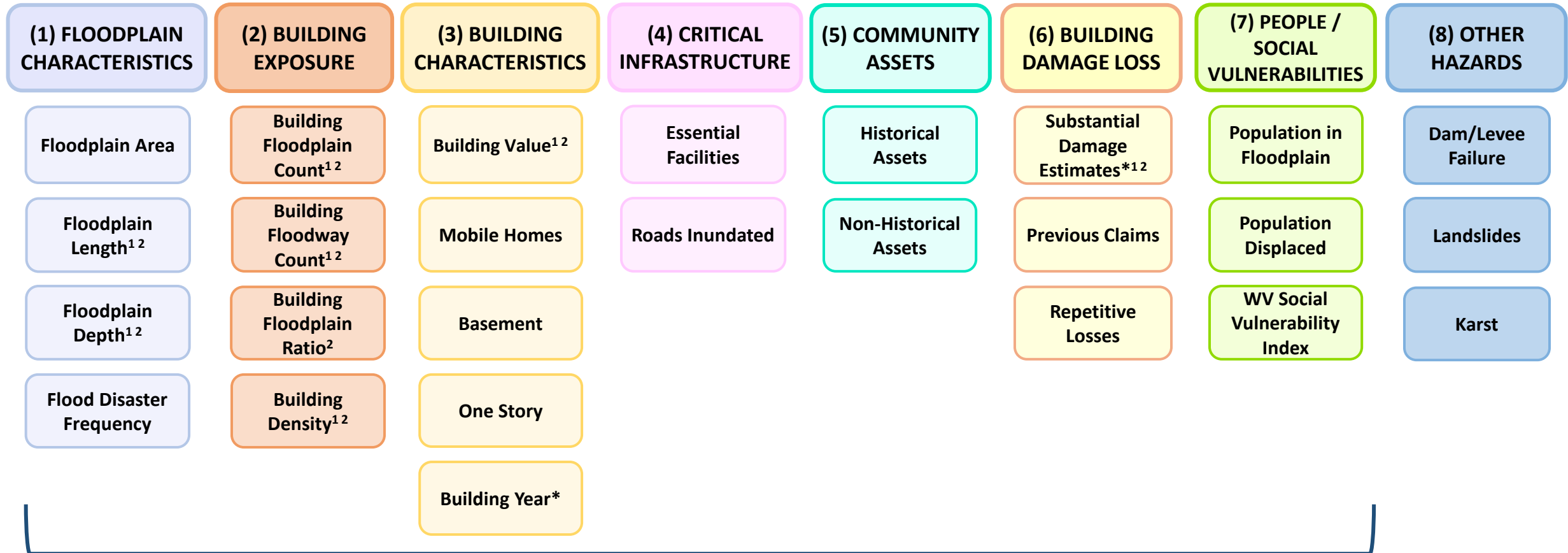
WV Risk Explorer Tool

<https://wvfrf.org/wvre/>





Overall Flood Risk



Cumulative Flood Risk Index

* Multiple Indicators

¹ River/Stream Indicator

² Watershed Indicator



Flood Risk Assessment

Jefferson County

Link to Flood Risk Comparison Report on WVRE:

<https://wvfrf.org/wvre/report/?scaleid=3&entityid=19&type=hierarchy>

Cumulative Flood Risk Index:

Table 1a: County Total

STATE INDEX RANK	COUNTY	CUMULATIVE FLOOD RISK INDEX	
		INDEX SCORE	INDEX RATING
48	Jefferson	12.9%	Very Low

Table 1b: Incorporated Places

#	STATE INDEX RANK	INCORPORATED PLACE	COUNTY	CUMULATIVE FLOOD RISK INDEX	
				INDEX SCORE	INDEX RATING
1	100	Harpers Ferry - Incorporated	Jefferson	56.5%	Moderate
2	126	Shepherdstown - Incorporated	Jefferson	45.1%	Moderate
3	173	Ranson - Incorporated	Jefferson	24.5%	Relatively Low
4	183	Charles Town - Incorporated	Jefferson	20.1%	Relatively Low
5	189	Bolivar - Incorporated	Jefferson	17.5%	Very Low

Table 1c: Unincorporated Area

#	STATE INDEX RANK	UNINCORPORATED AREA	CUMULATIVE FLOOD RISK INDEX	
			INDEX SCORE	INDEX RATING
1	40	Jefferson County* - Unincorporated	27.7%	Relatively Low

Risk Index Legend

VERY HIGH: 90% - 100%

Moderate: 40% - 59.9%

Very High: 80% - 100%

Relatively Low: 20% - 39.9%

Relatively High: 60% - 79.9%

Very Low: 0% - 19.9%



Flood Risk Assessment

Jefferson County

(1) Floodplain Characteristics:

Table 2a: County Total

STATE CATEGORY RANK	COUNTY	FLOODPLAIN CHARACTERISTICS				CATEGORY SCORE
		FLOODPLAIN AREA	FLOODPLAIN LENGTH	FLOOD DECLARED DISASTERS	FLOOD DEPTH MEDIAN	
39	Jefferson	9,010 Acres	162.5 Miles	12	2.4 Ft	29.6%

Table 2b: Incorporated Places

#	STATE CATEGORY RANK	INCORPORATED PLACE	FLOODPLAIN CHARACTERISTICS				CATEGORY SCORE
			FLOODPLAIN AREA RATIO	FLOODPLAIN LENGTH RATIO	FLOOD DECLARED DISASTERS	FLOOD DEPTH MEDIAN	
1	55	Harpers Ferry - Incorporated	18.5%	0.00762 Miles/Acre	12	26.4 Ft	75.8%
2	174	Shepherdstown - Incorporated	8.5%	0.00291 Miles/Acre	12	2.0 Ft	24.1%
3	180	Bolivar - Incorporated	0.4%	0.00151 Miles/Acre	12	17.6 Ft	21.4%
4	205	Charles Town - Incorporated	5.3%	0.00159 Miles/Acre	12	0.8 Ft	10.0%
5	219	Ranson - Incorporated	3.5%	0.00060 Miles/Acre	12	0.4 Ft	4.3%

State Median: 1.8 Ft

Table 2c: Unincorporated Area

#	STATE CATEGORY RANK	UNINCORPORATED AREA	FLOODPLAIN CHARACTERISTICS				CATEGORY SCORE
			FLOODPLAIN AREA	FLOODPLAIN LENGTH	FLOOD DECLARED DISASTERS	FLOOD DEPTH MEDIAN	
1	26	Jefferson County* - Unincorporated	8,535 Acres	152.0 Miles	12	4.7 Ft	50.0%

State Median: 2.0 Ft

Statewide Rank among the Top 5

Rankings done separately for counties, unincorporated areas, and 229 incorporated places

Notes:

- Floodplain Area:** Modified Floodplain Area (mSFHA) = Total Special Flood Hazard Area (aSFHA) – [Open water lakes > 10 acres] – [Large rivers bank-to-bank > 500 ft] – [Federal lands > 10 acres]
- Floodplain Length:** Total length of the Effective and Advisory Special Flood Hazard floodplains in miles
- Floodplain Length Breakdown:**
 - Jefferson County → Detailed: 34.1%, Approximate: 52.3%, Advisory: 13.6%
 - Harpers Ferry → Detailed: 0%, Approximate: 68.5%, Advisory: 31.5%
 - Shepherdstown → Detailed: 50.7%, Approximate: 8.0%, Advisory: 41.3%
 - Bolivar → Detailed: 0%, Approximate: 100%, Advisory: 0%
 - Charles Town → Detailed: 54.9%, Approximate: 43.7%, Advisory: 1.3%
 - Ranson → Detailed: 93.6%, Approximate: 5.8%, Advisory: 0.6%
 - Jefferson Unincorporated Area → Detailed: 34.2%, Approximate: 54.6%, Advisory: 11.2%
- Floodplain Area Ratio:** Ratio of the Modified Special Flood Hazard Area (mSFHA) to total incorporated place area
- Floodplain Length Ratio:** Ratio of Special Flood Hazard length (Effective and Advisory) to total incorporated place area
- Flood Declared Disasters:** Number of federally-declared flood disasters in the county since 1953
- Flood Depth Median:** Median value of flood depths of all primary structures inventoried in the High-Risk* flood zones from FEMA's models

* High-Risk 100-year floodplain may include both Effective or Advisory Floodplains



Flood Risk Assessment

Jefferson County

(2) Building Exposure:

Statewide Rank among the Top 5

Rankings done separately for counties, unincorporated areas, and 229 incorporated places

Table 3a: County Total

STATE CATEGORY RANK	COUNTY	BUILDING EXPOSURE				CATEGORY SCORE
		BUILDING FLOODPLAIN COUNT	BUILDING FLOODWAY COUNT	BUILDING FLOODPLAIN RATIO	BUILDING DENSITY	
48	Jefferson	499	33	1.7%	0.06 /Acre	12.9%

Table 3b: Incorporated Places

#	STATE CATEGORY RANK	INCORPORATED PLACE	BUILDING EXPOSURE				CATEGORY SCORE
			BUILDING FLOODPLAIN COUNT	BUILDING FLOODWAY COUNT	BUILDING FLOODPLAIN RATIO	BUILDING DENSITY	
1	90	Shepherdstown - Incorporated	76	0	10.3%	3.45 /Acre 3	60.9%
2	129	Ranson - Incorporated	50	2	1.7%	0.28 /Acre	43.4%
3	147	Harpers Ferry - Incorporated	31	0	11.2%	0.42 /Acre	35.9%
4	152	Charles Town - Incorporated	21	4	0.6%	0.11 /Acre	33.7%
5	154	Bolivar - Incorporated	4	0	0.6%	4.00 /Acre 2	32.8%

State Median: 0.75 /Acre

Table 3c: Unincorporated Area

#	STATE CATEGORY RANK	UNINCORPORATED AREA	BUILDING EXPOSURE				CATEGORY SCORE
			BUILDING FLOODPLAIN COUNT	BUILDING FLOODWAY COUNT	BUILDING FLOODPLAIN RATIO	BUILDING DENSITY	
1	47	Jefferson County* - Unincorporated	317	27	1.6%	0.04 /Acre	14.8%

Notes :

Building Floodplain Count: Building count in Special Flood Hazard Area including Effective, New Preliminary, and Draft floodplains (excluding mapped-out structures)

Buildings in Floodplain Breakdown:

Jefferson County → in Effective: 376, in Advisory: 123

Shepherdstown → in Effective: 47, in Advisory: 29

Ranson → in Effective: 49, in Advisory: 1

Harpers Ferry → in Effective: 1, in Advisory: 30

Charles Town → in Effective: 17, in Advisory: 4

Bolivar → in Effective: 0, in Advisory: 4

Jefferson Unincorporated Area → in Effective: 262, in Advisory: 55

Building Floodway Count: Building count in Regulatory Floodway

Building Floodplain Ratio: Percentage of floodplain buildings (in High-Risk* (100-yr) Effective or Advisory Floodplains) to total buildings

Building Density: Density of buildings in High-Risk* flood areas to total floodplain acres

* High-Risk 100-year floodplain may include both Effective or Advisory Floodplains



Flood Risk Assessment

Jefferson County

Statewide Rank among the Top 5

Rankings done separately for counties, unincorporated areas, and 229 incorporated places

Table 4a: County Total

STATE CATEGORY RANK	COUNTY	BUILDING CHARACTERISTICS						CATEGORY SCORE
		BUILDING MEDIAN VALUE	BLDG. MOBILE HOMES RATIO	BLDG. SUBGRADE BASEMENTS RATIO	BUILDING 1-STORY RATIO	BLDG. YEAR PRE-FIRM RATIO	BLDG. YEAR MINUS RATED POST-FIRM RATIO	
24	Jefferson	\$97,450 ¹	13.6%	49.5% ⁴	64.0%	71.1%	9.4%	57.4%
		State Median: \$42,200		State Median: 21.6%				

Table 4b: Incorporated Places

#	STATE CATEGORY RANK	INCORPORATED PLACE	BUILDING CHARACTERISTICS						CATEGORY SCORE
			BUILDING MEDIAN VALUE	BLDG. MOBILE HOMES RATIO	BLDG. SUBGRADE BASEMENTS RATIO	BUILDING 1-STORY RATIO	BLDG. YEAR PRE-FIRM RATIO	BLDG. YEAR MINUS RATED POST-FIRM RATIO	
1	116	Shepherdstown - Incorporated	\$213,800 ¹	0.0%	45.5%	16.7%	92.4%	1.3%	49.5%
2	125	Ranson - Incorporated	\$63,350	13.3%	37.5%	90.0%	67.5%	0.0%	45.6%
3	136	Harpers Ferry - Incorporated	\$188,000 ²	0.0%	90.3% ¹	3.2%	100.0% ¹	0.0%	40.7%
4	172	Charles Town - Incorporated	\$67,500	0.0%	63.0%	37.0%	77.8%	0.0%	25.0%
5	187	Bolivar - Incorporated	\$0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			State Median: \$41,500		State Median: 25.5%		State Median: 86.6%		

Table 4c: Unincorporated Area

#	STATE CATEGORY RANK	UNINCORPORATED AREA	BUILDING CHARACTERISTICS						CATEGORY SCORE
			BUILDING MEDIAN VALUE	BLDG. MOBILE HOMES RATIO	BLDG. SUBGRADE BASEMENTS RATIO	BUILDING 1-STORY RATIO	BLDG. YEAR PRE-FIRM RATIO	BLDG. YEAR MINUS RATED POST-FIRM RATIO	
1	20	Jefferson County* - Unincorporated	\$93,150 ¹	15.5%	48.9% ²	71.5%	66.7%	14.5%	62.9%
			State Median: \$37,350		State Median: 19.5%				

Notes:

- Building Median Value:** Median of appraised values of all primary structures in the High-Risk* 100-year floodplain from the most recent tax assessment data or other building value data sources for tax-exempt structures
- Bldg. Mobile Homes Ratio:** Percentage of manufactured buildings (occupancy class code RES2) among all single-family structures (RES1 & RES2) in the High-Risk* 100-year floodplain
- Bldg. Subgrade Basements Ratio:** Percentage of structures with subgrade basements among all primary structures in the High-Risk* 100-year floodplain (may also include walkout basement enclosures)
- Building 1-Story Ratio:** Percentage of one-story structures among all primary buildings in the High-Risk* 100-year floodplain
- Bldg. Year Pre-FIRM Ratio:** Percentage of buildings constructed or substantially improved on or before December 31, 1974, or before the effective date of the initial Flood Insurance Rate Map of the community, whichever is late (also including Post-FIRM construction regulated to Pre-FIRM and Unknown FIRM status) among all primary structures in the High-Risk* 100-year floodplain
- Bldg. Year Minus Rated Post-FIRM Ratio:** Percentage of structures constructed after the FIRM date of which their first floor is more than one foot below the Base Flood Elevation (BFE) among all primary structures in the High-Risk* 100-year floodplain



Flood Risk Assessment

Jefferson County

(4) Critical Infrastructure:

Table 5a: County Total

STATE CATEGORY RANK	COUNTY	CRITICAL INFRASTRUCTURE		CATEGORY SCORE
		ESSENTIAL FACILITIES ?	ROADS INUNDATED RATIO ?	
51	Jefferson ?	0	4.4%	7.4%

Table 5b: Incorporated Places

#	STATE CATEGORY RANK	INCORPORATED PLACE	CRITICAL INFRASTRUCTURE		CATEGORY SCORE
			ESSENTIAL FACILITIES ?	ROADS INUNDATED RATIO ?	
1	115	Harpers Ferry - Incorporated ?	0	31.6%	50.0%
2	160	Shepherdstown - Incorporated ?	0	7.5%	29.8%
3	168	Bolivar - Incorporated ?	0	5.9%	26.7%
4	197	Ranson - Incorporated ?	0	0.9%	14.0%
5	206	Charles Town - Incorporated ?	0	0.1%	10.0%

Table 5c: Unincorporated Area

#	STATE CATEGORY RANK	UNINCORPORATED AREA	CRITICAL INFRASTRUCTURE		CATEGORY SCORE
			ESSENTIAL FACILITIES ?	ROADS INUNDATED RATIO ?	
1	47	Jefferson County* - Unincorporated ?	0	4.6%	14.8%

Notes

Essential Facilities: Number of essential facilities (including schools, hospitals, nursing homes, police stations, fire department buildings, & E-911 emergency operations centers) which provide critical services to the community in the high (100-year), moderate (500-year), and reduced risk flood zones

Roads Inundated Ratio: Percentage of roads inundated by flood waters of 1 foot or more by a high-risk 1% annual chance (100-year) flood event



Flood Risk Assessment

Jefferson County

(5) Community Assets:

Statewide Rank among the Top 5

Rankings done separately for counties, unincorporated areas, and 229 incorporated places

Table 6a: County Total

STATE CATEGORY RANK	COUNTY	COMMUNITY ASSETS		CATEGORY SCORE
		COMMUNITY ASSETS HISTORICAL	COMMUNITY ASSETS NON-HISTORICAL	
22	Jefferson	120	12	59.2%
State Median: 7				

Table 6b: Incorporated Places

#	STATE CATEGORY RANK	INCORPORATED PLACE	COMMUNITY ASSETS		CATEGORY SCORE
			COMMUNITY ASSETS HISTORICAL	COMMUNITY ASSETS NON-HISTORICAL	
1	24	Shepherdstown - Incorporated	48	4	89.4%
2	45	Harpers Ferry - Incorporated	29	1	80.7%
3	47	Charles Town - Incorporated	14	1	79.8%
4	49	Bolivar - Incorporated	3	1	78.9%
5	120	Ranson - Incorporated	0	1	25.8%

Table 6c: Unincorporated Area

#	STATE CATEGORY RANK	UNINCORPORATED AREA	COMMUNITY ASSETS		CATEGORY SCORE
			COMMUNITY ASSETS HISTORICAL	COMMUNITY ASSETS NON-HISTORICAL	
1	22	Jefferson County* - Unincorporated	26	4	61.1%
State Median: 1					

Notes

Community Assets Historical: Number of historical community assets listed on the National Register of Historic Places or buildings within the Historic Districts constructed before 1930 in the High-Risk* 100-year floodplain

Community Assets Non-Historical: Number of non-historical community assets including utilities, post-secondary educational facilities, EMS, government buildings providing public services, and religious buildings in the High-Risk* 100-year floodplain

* High-Risk 100-year floodplain may include both Effective or Advisory Floodplains



Flood Risk Assessment

Jefferson County

(6) Building Damage Loss:

Statewide Rank among the Top 5

Rankings done separately for counties, unincorporated areas, and 229 incorporated places

Table 7a: County Total

STATE CATEGORY RANK	COUNTY	BUILDING DAMAGE LOSS				CATEGORY SCORE
		BLDG. SUBSTANTIAL DAMAGE COUNT	BLDG. SUBSTANTIAL DAMAGE RATIO	BLDG. PREVIOUS DAMAGE CLAIMS	BLDG. REPETITIVE LOSS STRUCTURES	
26	Jefferson	120	24.0%	163	66	53.7%

Table 7b: Incorporated Places

#	STATE CATEGORY RANK	INCORPORATED PLACE	BUILDING DAMAGE LOSS				CATEGORY SCORE
			BLDG. SUBSTANTIAL DAMAGE COUNT	BLDG. SUBSTANTIAL DAMAGE RATIO	BLDG. PREVIOUS DAMAGE CLAIMS	BLDG. REPETITIVE LOSS STRUCTURES	
1	54	Harpers Ferry - Incorporated	24	77.4%	11	2	76.7%
2	112	Bolivar - Incorporated	1	0.0%	0	0	51.3%
3	125	Shepherdstown - Incorporated	1	1.3%	2	0	45.6%
4	134	Ranson - Incorporated	0	0.0%	20	6	41.6%
5	181	Charles Town - Incorporated	0	0.0%	3	0	20.1%

State Median: 0.9%

Table 7c: Unincorporated Area

#	STATE CATEGORY RANK	UNINCORPORATED AREA	BUILDING DAMAGE LOSS				CATEGORY SCORE
			BLDG. SUBSTANTIAL DAMAGE COUNT	BLDG. SUBSTANTIAL DAMAGE RATIO	BLDG. PREVIOUS DAMAGE CLAIMS	BLDG. REPETITIVE LOSS STRUCTURES	
1	16	Jefferson County* - Unincorporated	94	29.7%	127	58	72.2%

Notes

- Bldg. Substantial Damage Count:** Estimated number of primary structures substantially damaged from a 1% annual chance (100-year) flood for which the estimated flood loss is 50% or greater of the building appraised value
- Bldg. Substantial Damage Ratio:** Percentage of substantially damaged structures to total floodplain structures
- Bldg. Previous Damage Claims:** Number of previous flood-related insurance claims
- Bldg. Repetitive Loss Structures:** Number of NFIP-insured structures that have had at least 2 paid flood losses of more than \$1,000 each in any 10-year period since 1978



Flood Risk Assessment

Jefferson County

(7) People / Social Vulnerabilities:

Table 8a: County Total

STATE CATEGORY RANK ↕	COUNTY ↕	PEOPLE / SOCIAL VULNERABILITIES			CATEGORY SCORE ↕
		POPULATION IN FLOODPLAIN RATIO ⓘ ↕	POPULATION DISPLACED RATIO ⓘ ↕	WV SOCIAL VULNERABILITY INDEX ⓘ ↕	
54	Jefferson ⓘ	2.1%	1.4%	0.0%	1.8%

Table 8b: Incorporated Places

#	STATE CATEGORY RANK ↕	INCORPORATED PLACE ↕	PEOPLE / SOCIAL VULNERABILITIES			CATEGORY SCORE ↕
			POPULATION IN FLOODPLAIN RATIO ⓘ ↕	POPULATION DISPLACED RATIO ⓘ ↕	WV SOCIAL VULNERABILITY INDEX ⓘ ↕	
1	168	Shepherdstown - Incorporated ⓘ	11.2%	3.4%	1.8%	26.7%
2	175	Harpers Ferry - Incorporated ⓘ	4.8%	4.8%	3.1%	23.6%
3	187	Ranson - Incorporated ⓘ	2.7%	1.7%	7.0%	18.4%
4	202	Charles Town - Incorporated ⓘ	0.9%	0.5%	0.9%	11.8%
5	207	Bolivar - Incorporated ⓘ	0.5%	0.2%	0.4%	9.6%

Table 8c: Unincorporated Area

#	STATE CATEGORY RANK ↕	UNINCORPORATED AREA ↕	PEOPLE / SOCIAL VULNERABILITIES			CATEGORY SCORE ↕
			POPULATION IN FLOODPLAIN RATIO ⓘ ↕	POPULATION DISPLACED RATIO ⓘ ↕	WV SOCIAL VULNERABILITY INDEX ⓘ ↕	
1	54	Jefferson County* - Unincorporated ⓘ	2.0%	1.4%	1.8%	1.8%

Notes

Population in Floodplain Ratio: Percentage of population residing in the High-Risk* Special Flood Hazard Area to total population
Population Displaced Ratio: Estimated percentage of population displaced by a major storm of a 1% annual chance (100-year) probability to total population
WV Social Vulnerability Index: Social vulnerability index developed for West Virginia based on the eight following socioeconomic and demographic indicators: Poverty Rate, Unemployment Rate, No High School Diploma Ratio, Vulnerable Ages Ratio, Disability Ratio, Population Change Ratio, Median Housing Value, and Mobile Homes Ratio in Total Area

* High-Risk 100-year floodplain may include both Effective or Advisory Floodplains