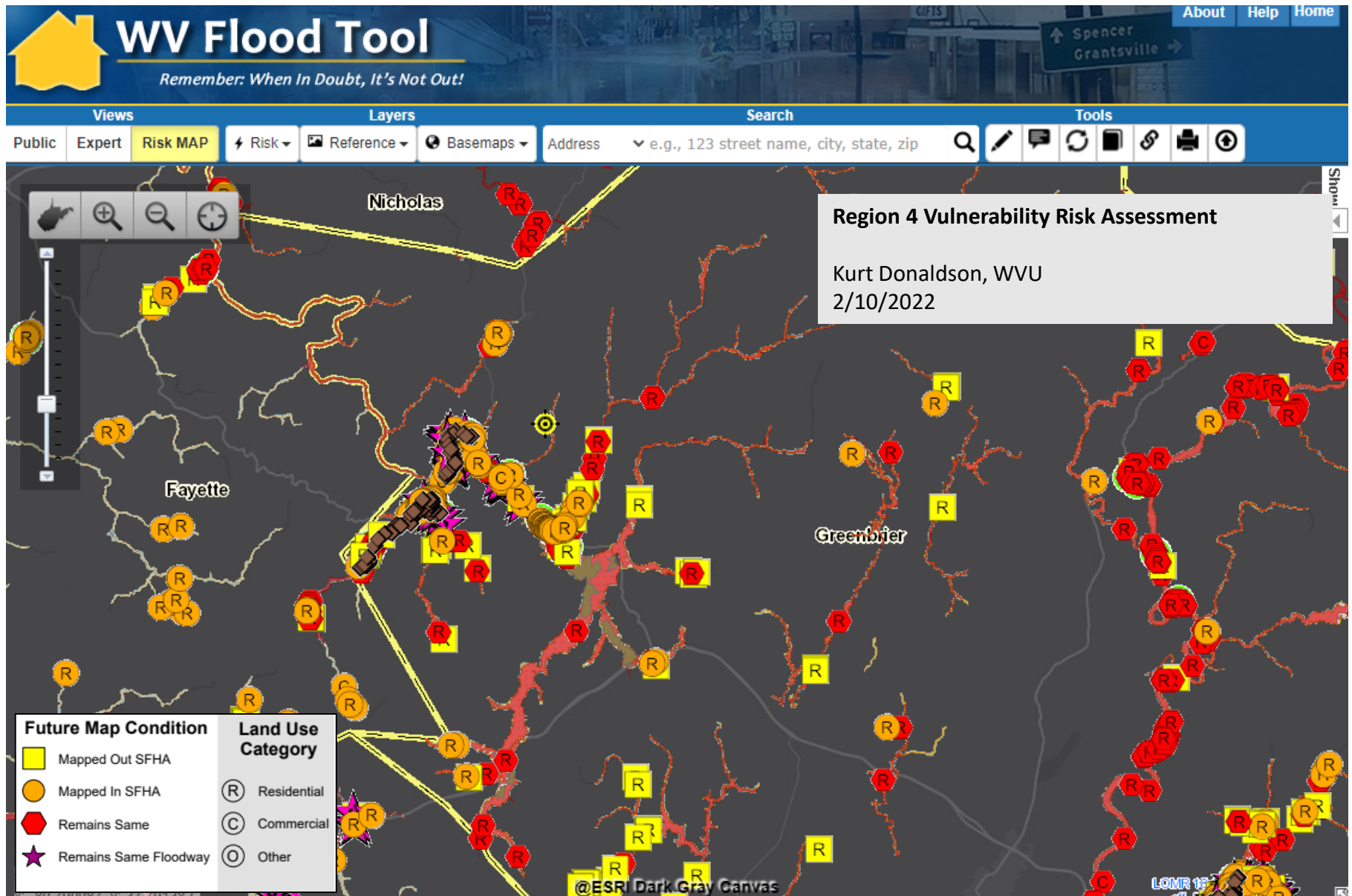# Region 4 Flood Risk Assessment

WV Statewide Risk Assessment

OVERVIEW

WV Building-Level Flood Risk Assessment

Building-Level Flood Risk Assessments support:

- Hazard Mitigation Plans
- Floodplain Management
- Community Assisted Visits
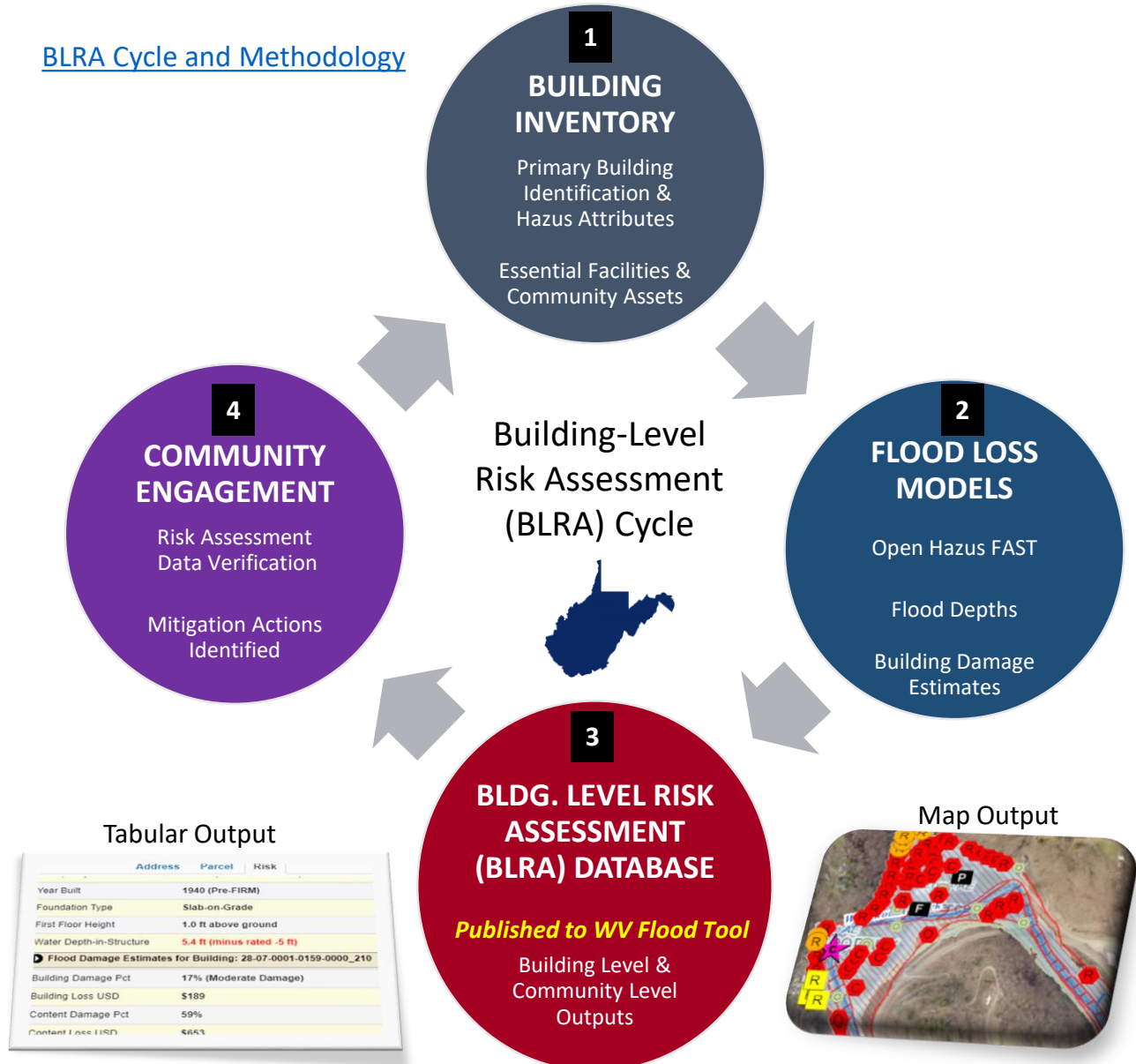- Community Rating System

Benefits

- More detailed and accurate assessments
- Automated scripts generate outputs quickly
- Cost savings through efficiencies
- Helps multiple stakeholders
- Comprehensive Building Risk Spatial Database

Methodology

- Consistent methodology statewide
- Semi-automated workflows
- Continuous cycle to improve and update assessments

BLRA Cycle and Methodology

Building-Level Risk Assessment (BLRA) Cycle

1 BUILDING INVENTORY

Primary Building Identification & Hazus Attributes

Essential Facilities & Community Assets

2 FLOOD LOSS MODELS

Open Hazus FAST

Flood Depths

Building Damage Estimates

3 BLDG. LEVEL RISK ASSESSMENT (BLRA) DATABASE

Published to WV Flood Tool

Building Level & Community Level Outputs

4 COMMUNITY ENGAGEMENT

Risk Assessment Data Verification

Mitigation Actions Identified

Tabular Output

	Address	Parcel	Risk
Year Built		1940 (Pre-FIRM)	
Foundation Type		Slab-on-Grade	
First Floor Height		1.0 ft above ground	
Water Depth-in-Structure		5.4 ft (minus rated -5 ft)	

▶ Flood Damage Estimates for Building: 28-07-0001-0159-0000_210

Building Damage Pct	17% (Moderate Damage)
Building Loss USD	$189
Content Damage Pct	59%
Content Loss USD	$653

Map Output

Access Risk Assessment Info

Use the Risk Information Index to access Data and Products

Risk Assessment Information Index
1/28/2022
Data Field Descriptions

Risk Assessment or Mitigation Layer	REPORT	Key Variable	Community Level (CL)		Building Level (BL) or Feature Level (FL)				
			Table	Graphic	Table	Community Extract	State Extract	Graphic	GIS
FLOOD ZONE MAPS & STUDIES									
Flood Zone Breakdown by Length and Area		Zone Length and Area	CL	Yes					GIS
Active Flood Studies and Mapping			CL	Yes	Yes				
Model-Backed A Zones		Info Sheet	CL	Yes					
FLOODPLAIN BUILDING INVENTORY AND FUTURE MAP CONDITIONS (What at-risk structures are in floodplain?)									
Primary Buildings in High-Risk Effective and Advisory Floodplains – Future Map Conditions		Flood Zone Type	CL	Yes	Yes	BLRA				GIS
Verified LOMA Properties Removal Status. Future SFHA Status.		SFHA Status	CL	Yes		BL				GIS
Buildings by Stream Name (Flood Source). Community and stream summaries.		Stream Name	CL	Yes		BLRA	FL	Top List	Yes	GIS
SIGNIFCANT STRUCTURES OF IMPORTANCE									
Essential Facilities (0.2% floodplain)	RPT	Facility Type	CL		Yes	BL EC				GIS
Community Assets	RPT	Facility Type	CL	Yes	Yes	BL CA				GIS
Historical Community Assets - National Register Areas	RPT	Register Area	CL			NRA				GIS
FLOODPLAIN BUILDING CHARACTERISTICS	RPT								
Building Exposure Dollar Value		Building Appraisal, Occupancy	CL	Yes	Yes	BLRA	High Value (Top 10%)	Top 100	Yes	GIS
Building Single Family (RES1)		Single Family RES1	CL	Yes	Yes	BLRA		Top 100	Yes	GIS
Building Manufactured Homes (RES2)		Mobile Home RES2	CL	Yes	Yes	BLRA		Top 100		GIS
Building Year and FIRM Status (Pre-FIRM/Post-FIRM)		Initial FIRM Date, Building Year	CL	Yes		BLRA				GIS
Building Median Value		Median Value	CL	Yes	Yes	BLRA				GIS
Building Median Year		Building Year	CL	Yes		BLRA				GIS
Foundation Type and Basement		Foundation Type				BLRA				GIS
FLOOD DAMAGE LOSS ESIMATES (1% FLOOD EVENT) (What is degree of Flood Risk?)									

Building Level Risk Assessment (BLRA) Products

- **GIS Files**
- **Tables** (Excel)
  - Community Level
  - Building (and Feature) Levels with links to online maps
    - Table Extracts
    - Top Lists
- **Maps**
  - Interactive Web Maps
  - Graphics and Maps

- **Reports** (Word Docs)
- **3D Flood Visualizations**

Most of the risk assessment data can be viewed on the **RiskMAP View** of the WV Flood Tool

Statewide Hazard Assessment

213 incorporated areas
+55 unincorporated areas
268 NFIP Communities
+18 no SFHA communities
286 WV Communities
+ 8 split communities
294 **Statistical Geographies**

294 Statistical Geographies form
286 Communities which form
55 Counties which form
11 PDC Regions which form
1 Statewide Flood Risk Assessment

94% of WV Communities have Special Flood Hazard Areas (SFHA)
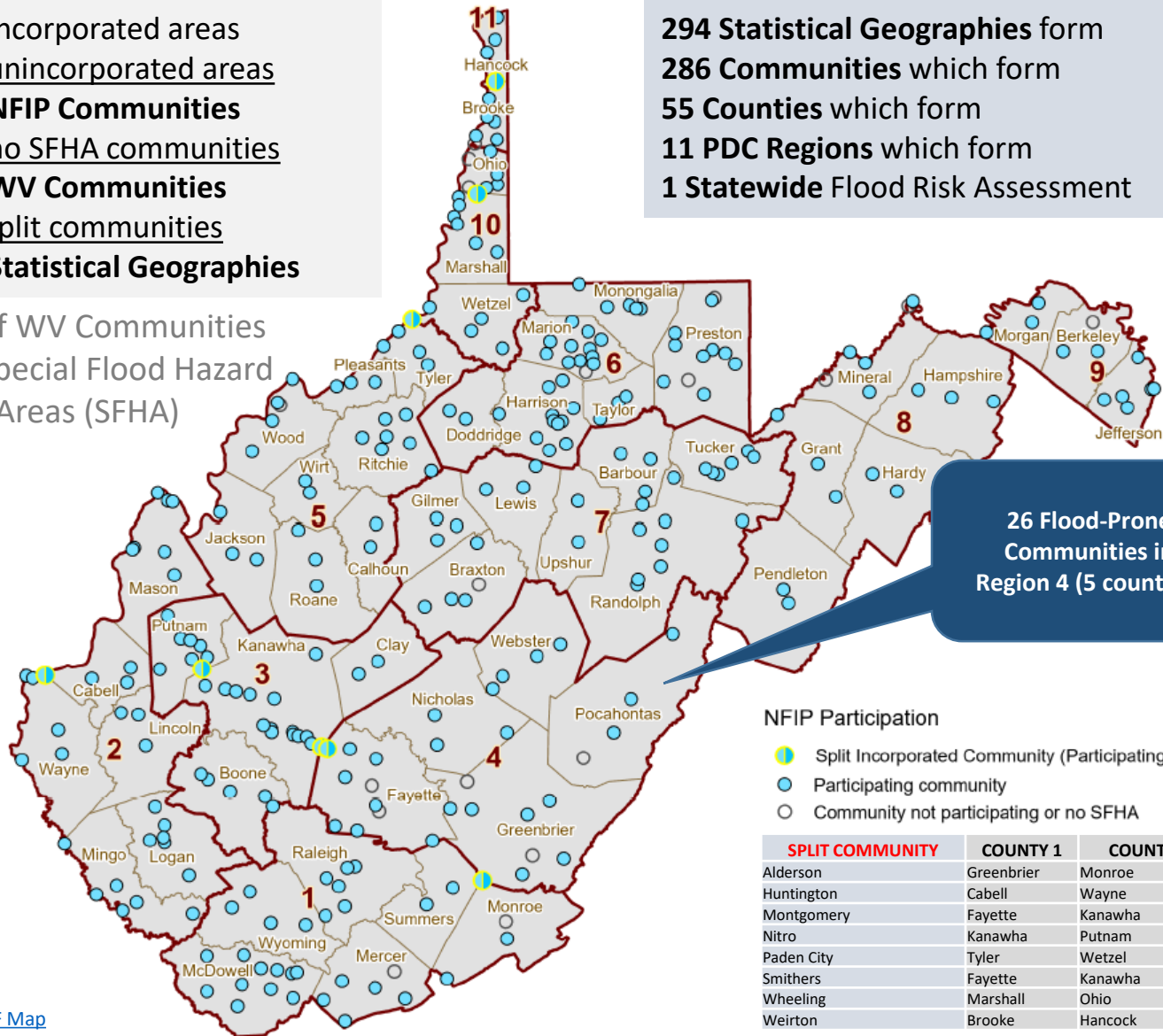
26 Flood-Prone Communities in Region 4 (5 counties)

NFIP Participation

- ◑ Split Incorporated Community (Participating)
- ● Participating community
- ○ Community not participating or no SFHA

SPLIT COMMUNITY	COUNTY 1	COUNTY 2
Alderson	Greenbrier	Monroe
Huntington	Cabell	Wayne
Montgomery	Fayette	Kanawha
Nitro	Kanawha	Putnam
Paden City	Tyler	Wetzel
Smithers	Fayette	Kanawha
Wheeling	Marshall	Ohio
Weirton	Brooke	Hancock

PDF Map

268 Flood-Prone Communities

11 Regional Planning & Development Councils (55 Counties)

Region 4 has 26 Flood-Prone Communities in the National Flood Insurance Program

Region	# Counties	# Communities	Split Communities across County Boundary	Communities not participating in NFIP or no SFHA	# NFIP Communities[1]
Region 1[2]	6	32		Athens, Union	30
Region 2	6	31	Huntington		31
Region 3	4	29	Nitro		29
Region 4	5	31	Alderson, Montgomery, Smithers	Fayetteville[3], Hillsboro, Lewisburg, Quinwood[3], Thurmond	26
Region 5	8	30	Paden City	North Hills	29
Region 6	6	45		Brandonville, Tunnelton, White Hall	42
Region 7	7	31		Flatwoods	30
Region 8	5	17		Carpendale, Elk Garden	15
Region 9	3	12		Hedgesville	11
Region 10	3	18	Wheeling	Bethlehem, Clearview	16
Region 11	2	10	Weirton	Windsor Heights	9
total	*55*	*286*	*8*	*18*	*268*

[1] Source: FEMA's Community Status Source Book
[2] Region 1 dissolved community of Rhodell (Raleigh County) included in NFIP count. Town of Matoaka (Mercer County) is not included.
[3] Communities include SFHA or non-regulatory floodplain

Split Communities **Alderson**, **Montgomery** and **Smithers** are members of **Region 4**
Split Community Paden City is a member of Region 5

Floodplain Building-Level Risk

Building Level Risk Assessment

White Sulphur Springs' *primary structures* viewable on the Risk MAP View of the WV Flood Tool.
Symbol letters indicate general occupancy (**R**esidential, **C**ommercial, **O**ther Non-Residential).

Risk Assessment

FLOOD ZONE MAP INFORMATOIN

What flood zone map information is available now or in the future?

Historical Flood Information

STORY MAPS:
- [Flood Risk in West Virginia: What We Learned from the June 2016 Flood](#)
- [WV Flooded Towns, June 2016. The Historic Flooding of Southern West Virginia on June 23, 2016](#)

High Water Marks
December 2020

[High-Water Marks Graphic](#)

> **Historical flood information including high water marks of past flooding events should be reviewed.**
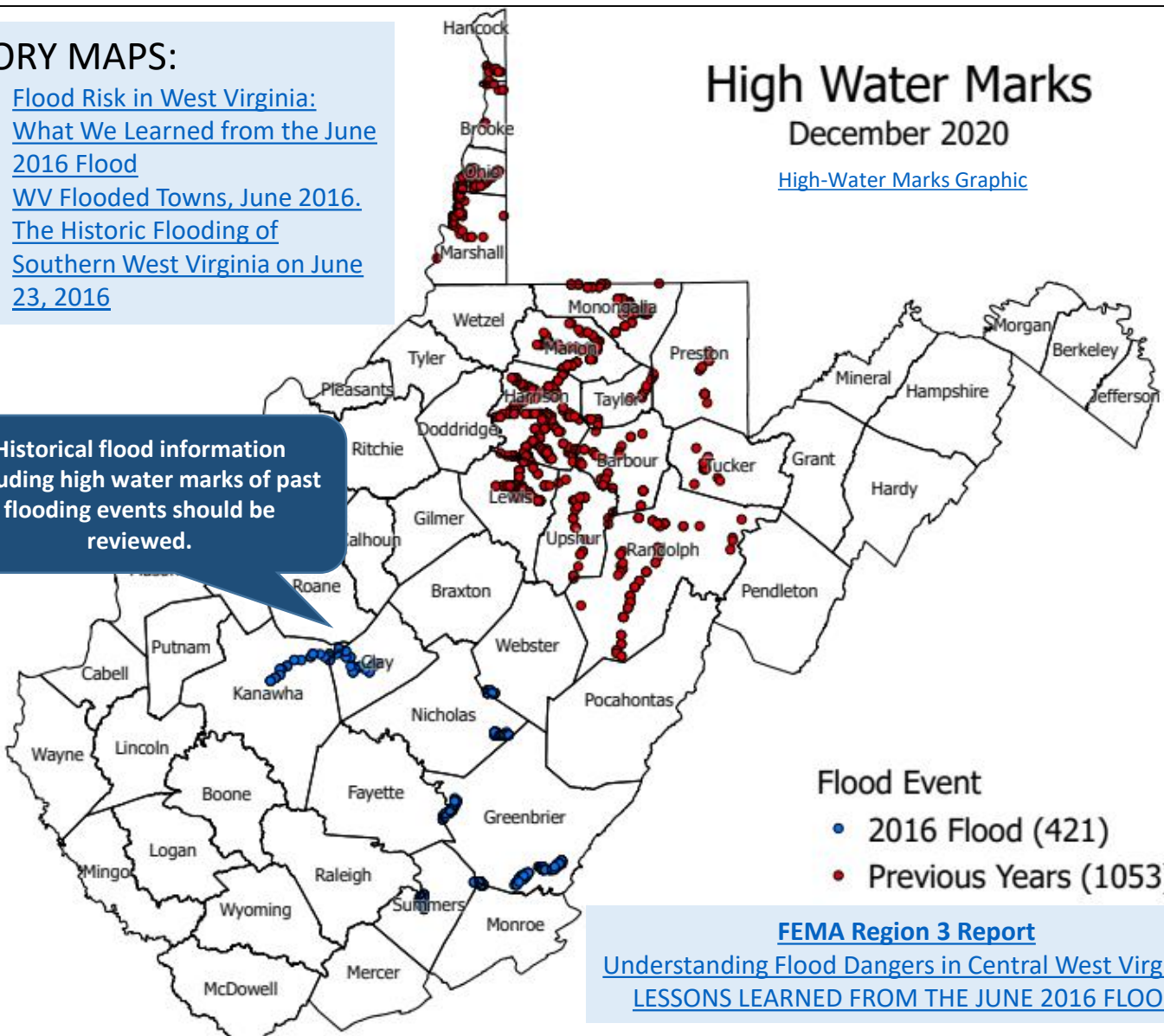
Flood Event
- • 2016 Flood (421)
- • Previous Years (1053)

[FEMA Region 3 Report](#)
[Understanding Flood Dangers in Central West Virginia: LESSONS LEARNED FROM THE JUNE 2016 FLOOD](#)

Active Flood Studies

<< 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, 0.2 percent chance)
- X-Sections for A Zones: In addition to AE Zones, published BFE cross sections for all Approximate A Zones

https://data.wvgis.wvu.edu/pub/RA/_resources/status/DepthWSEL_1meterResolution.pdf

Previous RiskMAP Study FIRM Panel Effective Dates:
- Tug Fork: 2016
- Upper Monongahela: 2019

WV Flood Study Project Status

October 2021
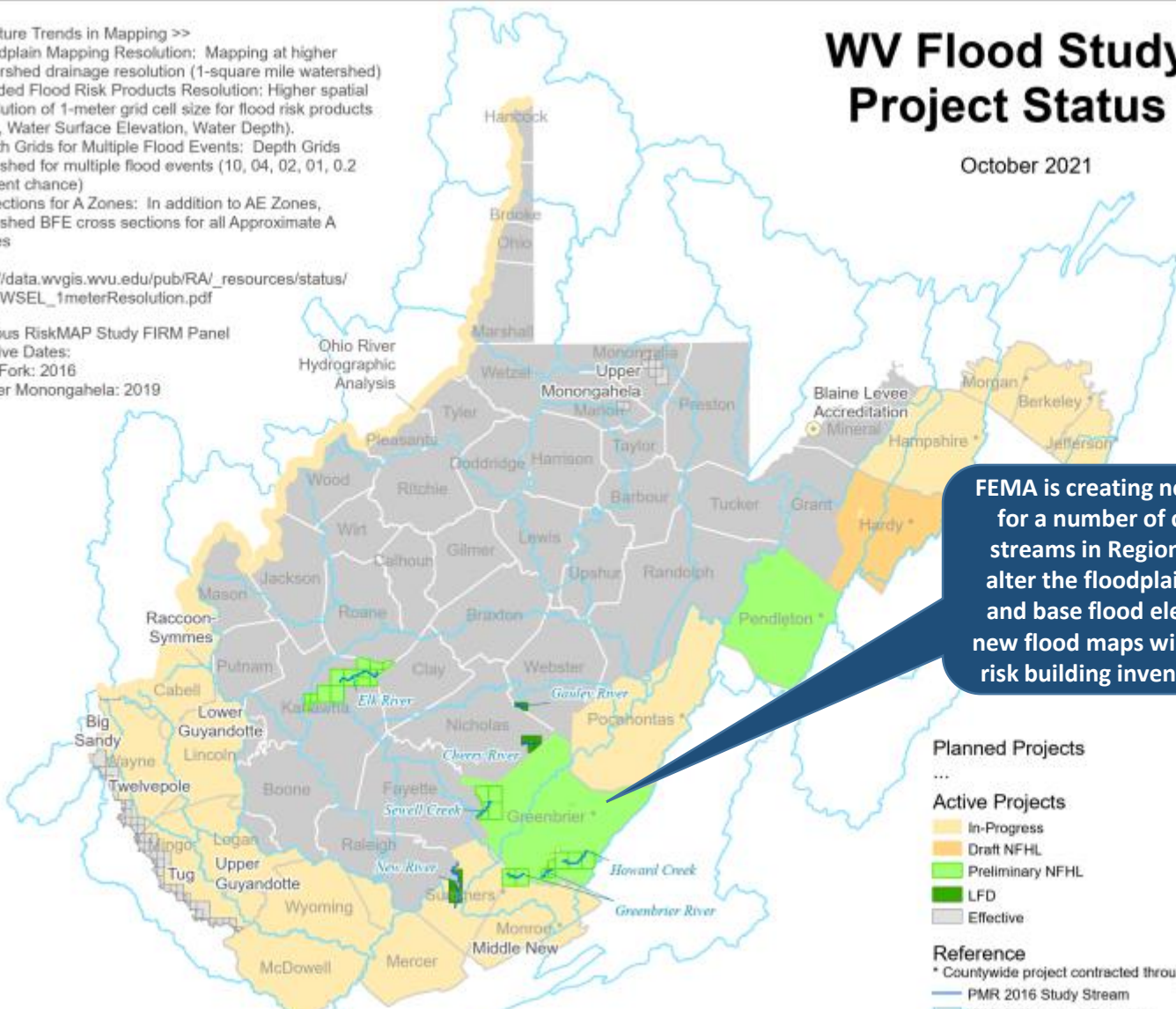
FEMA is creating new flood maps for a number of counties and streams in Region 4 which will alter the floodplain boundaries and base flood elevations. The new flood maps will affect the at-risk building inventories as well.

Planned Projects
...

Active Projects
In-Progress	
Draft NFHL	
Preliminary NFHL	
LFD	
Effective	

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

Flood Study Project Status Map PDF

WVGISTC 2021-10-05

Floodplain Measurements (Area)

Region 4 **Unincorporated Areas**: Acreage in Effective SFHA

Unincorporated Area*	Total Community Area (acres)	Total SFHA Area (acres)	Modified Total SFHA Area (acres)[1]	Ratio of aSFHA to Community Area
GREENBRIER COUNTY*	648,250	21,594	19,278	3%
NICHOLAS COUNTY*	414,533	13,865	8,579	2%
WEBSTER COUNTY *	354,803	8,905	6,759	2%
POCAHONTAS COUNTY *	600,184	12,584	8,050	1%
FAYETTE COUNTY*	412,491	5,757	3,393	1%

1 Areas excluded from Total aSFHA: Open water lakes > 10 acres; Large river bank-to-bank > 500 ft.; Federal lands > 10 acres
2 Source Table: https://data.wvgis.wvu.edu/pub/RA/State/CL/Flood_Zone_Type-Length-aSFHA/
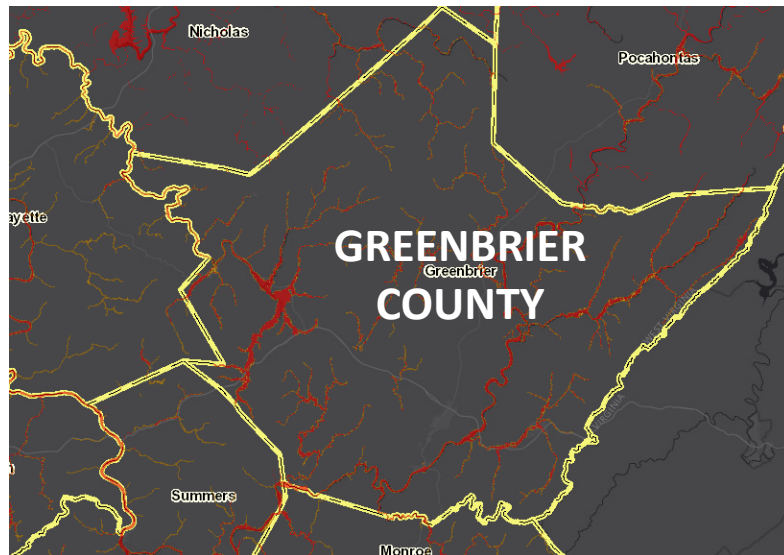
Risk Assessment: *Greenbrier County (4th largest in the State) and Greenbrier Unincorporated (ranked 4th) have the largest acreage in the Special Flood Hazard Area (SFHA), the effective 1%-annual-chance floodplain*

Note: The SFHA (red) will increase for a number of communities in Greenbrier County when the Preliminary flood zones (orange) become effective. The town of **Rainelle** will have the largest SFHA increase. See Rainelle map link.

New Flood Maps

Floodplain Measurements (Area)

Region 4 **Incorporated Areas**: Acreage in Effective SFHA

Municipality Name	County	Total Community Area (acres)	Modified Total SFHA Area (acres)[1]	Ratio of aSFHA to Community Area
RUPERT, TOWN OF	GREENBRIER COUNTY	501	**114**	23%
MARLINTON, TOWN OF	POCAHONTAS COUNTY	1,566	**330**	21%
ALDERSON, TOWN OF	GREENBRIER COUNTY & MONROE COUNTY	611	**126**	21%
MEADOW BRIDGE, TOWN OF	FAYETTE COUNTY	260	**50**	19%
WHITE SULPHUR SPRINGS, CITY OF	GREENBRIER COUNTY	1,214	**189**	16%

1   Areas excluded from Total aSFHA: Open water lakes > 10 acres; Large river bank-to-bank > 500 ft.; Federal lands > 10 acres
2   Source Table: https://data.wvgis.wvu.edu/pub/RA/State/CL/Flood_Zone_Type-Length-aSFHA/

RUPERT

TOWN OF RUPERT
540044

Greenbrier

Rupert web map link
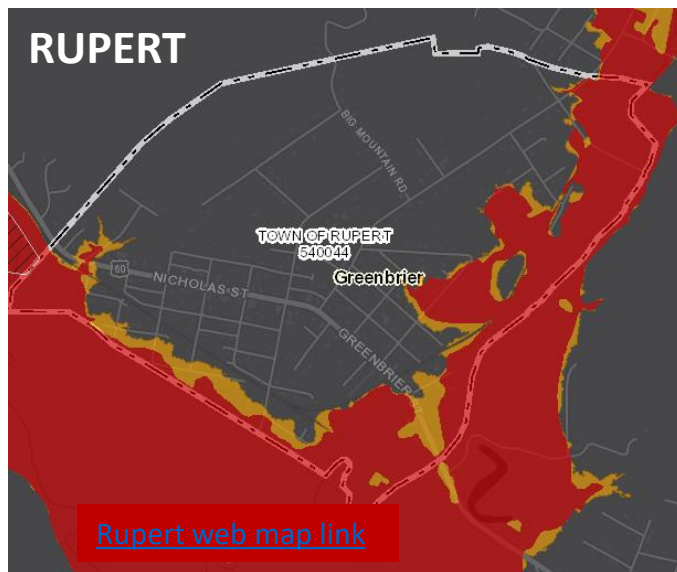
Risk Assessment: *About 20% of the total incorporated land of Rupert, Marlinton, Alderson, and Meadow Bridge are in the Special Flood Hazard Area (SFHA) and thus have a higher 1%-annual-chance (100-yr) floodplain exposure than other communities.*

Mitigation Note: The acreage in the SFHA (aSFHA) is an important programming variable for FEMA's Community Rating System (CRS). Both Greenbrier and Fayette Unincorporated are West Virginia CRS Class 9 communities.

Floodplain Measurements (Length)

Floodplain Length (miles): High-Risk Effective & Advisory Flood Zones

Community Name	Stream Length(mi) - Zones: AE,AH,AO	Stream Length (mi) - Effective A	Stream Length (mi) – Advisory A	Total Length (mi)	Detailed Zone %	Approx. A Zone %	Advisory Zone %	Total Flood Zone Rank in State
GREENBRIER	55	508	43	606	9%	84%	7%	2
NICHOLAS	26	371	2	399	7%	93%	0%	9
POCAHONTAS	87	290	6	382	23%	76%	2%	12
FAYETTE	29	124	187	340	8%	37%	55%	16
WEBSTER	131	183	2	316	41%	58%	1%	22

FAYETTE COUNTY

Flood Hazard Area: Location is WITHIN an advisory floodplain but NOT a FEMA 100-year effective floodplain.
Flood Zone: Advisory A (Advisory Flood Heights available)
Stream: Manns Creek
Watershed (HUC8): Lower New (5050004)

FEMA's Flood Map: N/A
Map Effective Date: 9/3/2010
Contacts: Fayette
Community ⓘ: Fayette County
Freeboard: 2 ft   CRS Class: 9   CID: 540026
Location (lat, long): (38.003402, -80.944199)
Location (UTM 17N): (4206193, 504899)
External Viewers:
Elevation: 2289.1 ft   (Source: FEMA 2018-20)
Address ☐ : N/A
Parcel ☐ : 10-01-0046-0028-0000 | Assessment ⚠
Flood Risk Information   Related Resources
Flood Risk Assessment ❓ N/A
3D Flood Visualization ❓

View web Map of Advisory Floodplains (orange colored zones)

Risk Assessment
Greenbrier County *is ranked 2nd in the State in flood zone stream miles.*

Note: If the Advisory Floodplains (orange color) for **Fayette County** become effective (red color) upon completion of new flood studies, then most likely the flood zone miles will more than double (55%) with an increase of 187 miles of effective A Zones. Refer to High-Risk Advisory Floodplains for more information.

New flood map for Fayette County will most likely double the effective flood zone stream miles

R4 Risk Assessment

FLOODPLAIN BUIDLING INVENTORY &
FUTURE MAP CONDITIONS
What buildings are at risk?

Building Risk by Flood Source

Building Counts and Building Exposure $ Values by *Stream Name*

Flood Sources	Building Count	Dollar Exposure ($)
FAYETTE COUNTY		
Armstrong Creek	**275**	$13,334K
Kanawha River	242	**$46,459K**
GREENBRIER COUNTY		
Greenbrier River*	**528**	$60,728K
Howard Creek*	364	**$94,870K**
Sewell Creek*	333	$14,716K
Dry Creek	197	$19,183K
NICHOLAS COUNTY		
Cherry River*	**374**	**$15,719K**
POCAHONTAS COUNTY		
Greenbrier River**	**418**	**$29,097K**
Knapp Creek	110	$13,882K
WEBSTER COUNTY		
Elk River	**312**	**$16,938K**
Gauley River**	106	$8,420K

Computed for 1% (100-yr) floodplain
* 2016 Disaster Restudy

RA Tables: Buildings by River/Stream Name

Greenbrier River totals for Greenbrier and Pocahontas counties:
946 buildings in 1% floodplain, **$90M dollar exposure**

Greenbrier River in Region 4 has the most structures in the 1%-annual-chance floodplain

Howard Creek in Greenbrier County has the highest building dollar exposure of all communities in Region 4

Region 4 PDF Map Primary Flood Sources
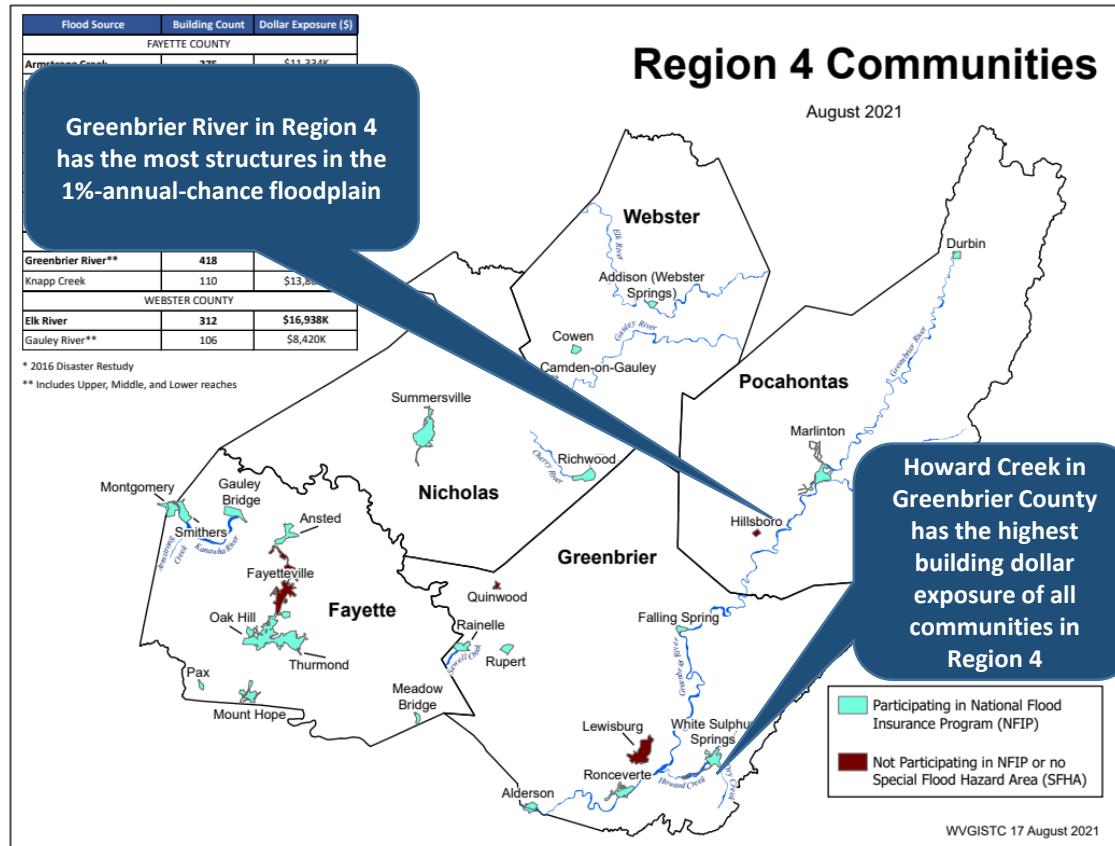
Buildings in 1% Floodplain

County-Wide

Primary structures located in high-risk *effective* and *advisory* 1%-annual-chance (100 year) floodplains

County Total Buildings in the 1% Annual Chance Floodplain

September 2021

Building Counts

County Totals
- 315 – 948
- 949 – 1819
- 1820 – 3265
- 3266 – 5531
- 5532 – 14848

Planning and Development Council Region

Greenbrier County (Region 4) has the most buildings in the 1% Annual Chance Floodplain

WVGISTC 2021-09-03
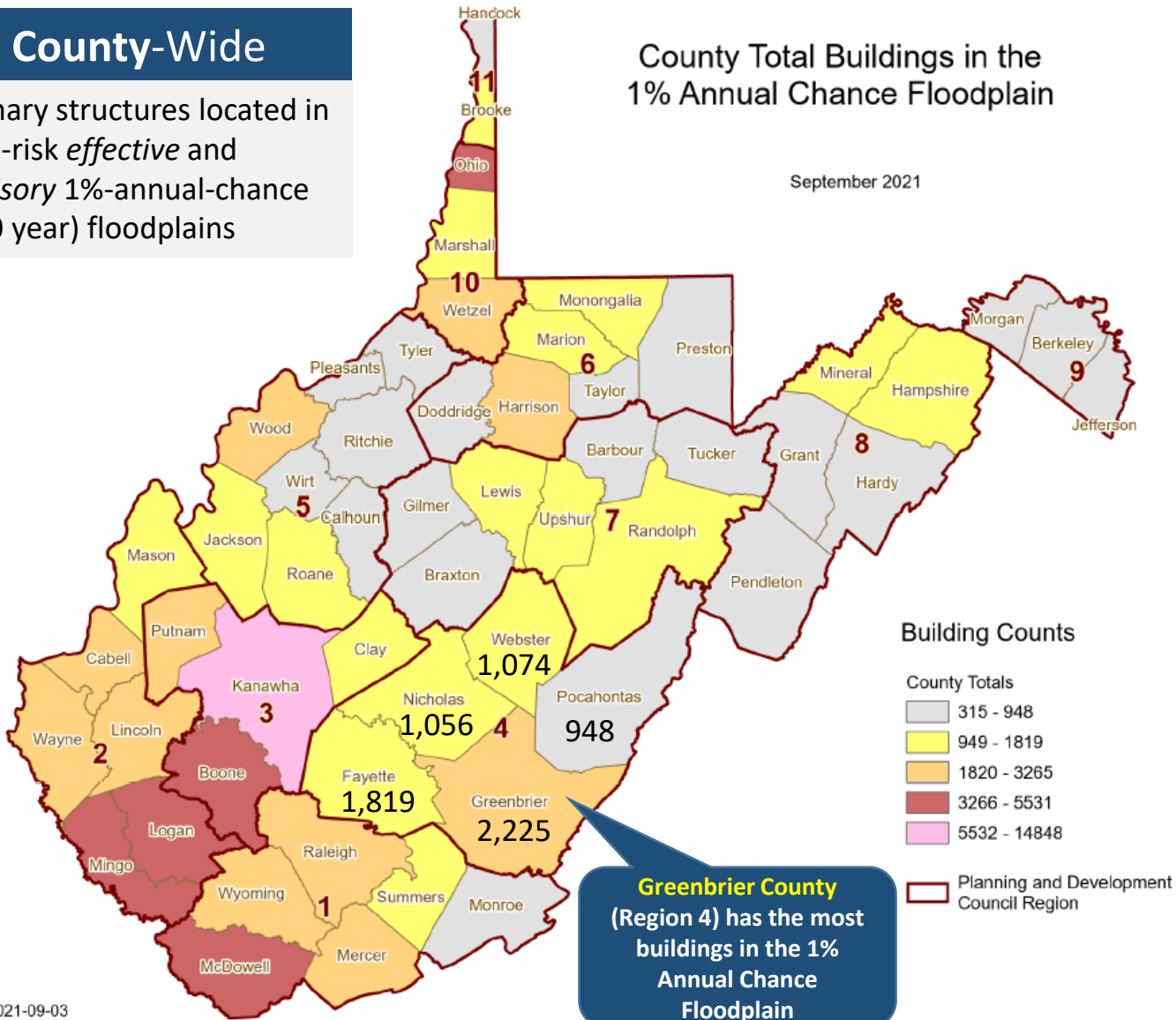
Buildings in 1% Floodplain

Community-Wide

Region 4 has a total of 7,123 structures in the high-risk effective and advisory 1%-annual-chance (100 yr.) floodplains valued at $525,285 million. **Greenbrier County** (ranked 15th in the State) has the highest countywide building count in the region.

Buildings in the 1% Annual Chance Floodplain

Primary structures located in high-risk *effective* and *advisory* 1%-annual-chance (100 year) floodplains

White Sulphur Springs

White Sulphur Springs (Region 4) has the most buildings in the 1% Annual Chance Floodplain

Building Counts

Incorporated Area
- ○ 0 - 49
- ○ 50 - 200
- ○ 201 - 400
- ○ 401 - 1,500
- ○ 1,501 - 2,836
- ◑ Split Community

Unincorporated Area
- 154 - 644
- 645 - 1,266
- 1,267 - 2,563
- 2,564 - 5,247
- 5,248 - 8,889
- ▭ Planning and Development Council Region

WVGISTC 2021-09-03
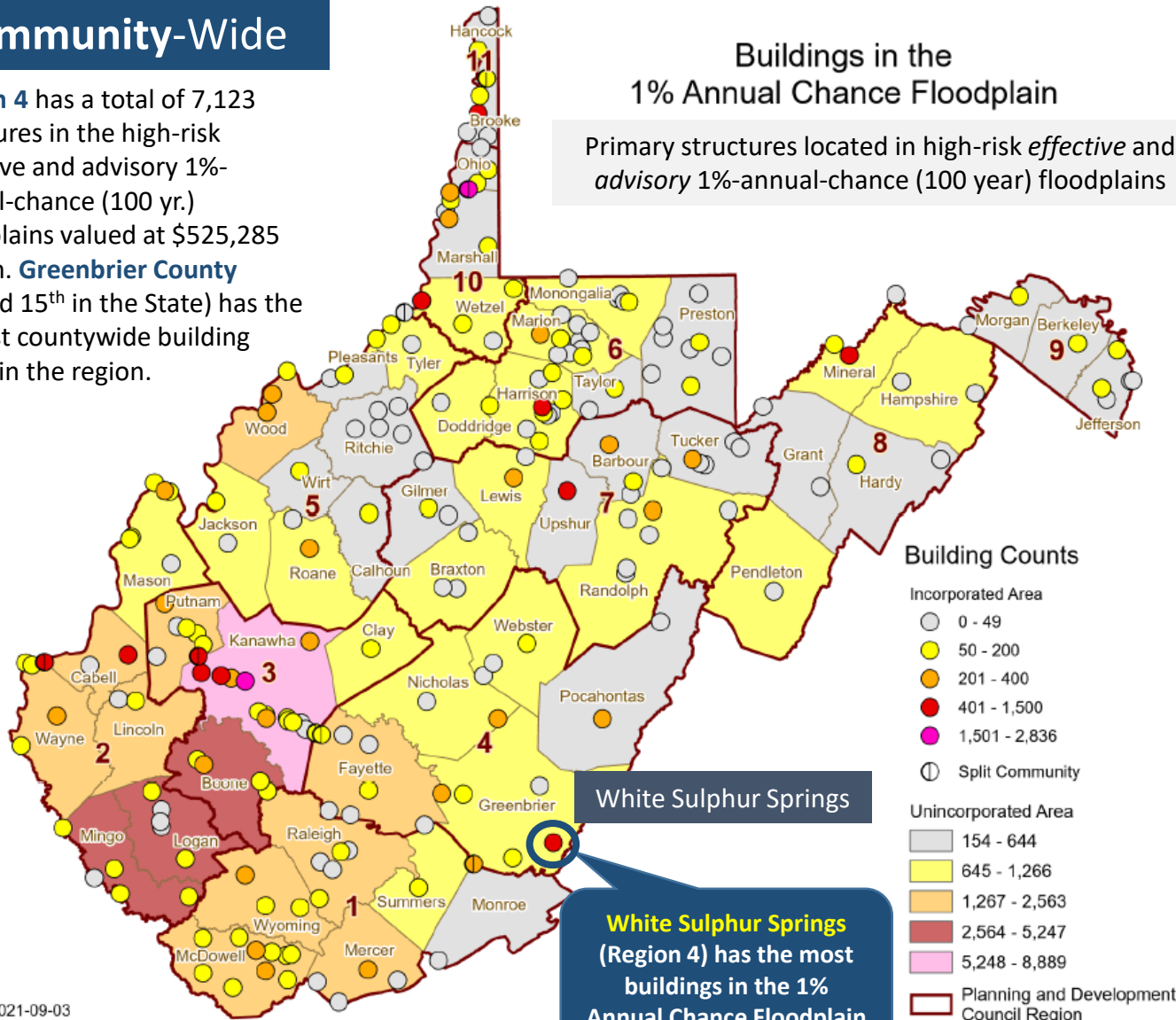
Building Risk by Flood Zone

Community Identification		SFHA - FUTURE MAP CONDITIONS				HIGH-RISK FLOOD ZONES		
		Flood way	No Change SFHA	Mapped in SFHA	Mapped Out SFHA	Effective	Advisory	Total
Ansted	FAYETTE	0	0	0	1	1	0	1
Fayette County*	FAYETTE	35	699	547	248	982	547	1529
Gauley Bridge	FAYETTE	2	20	23	0	22	23	45
Meadow Bridge	FAYETTE	0	18	3	2	20	3	23
Montgomery**	FAYETTE	0	12	1	2	14	1	15
Mount Hope	FAYETTE	0	30	0	8	38	0	38
Oak Hill	FAYETTE	0	23	4	28	51	4	55
Pax	FAYETTE	7	30	0	2	39	0	39
Smithers**	FAYETTE	14	44	12	4	62	12	74
	FAYETTE	**58**	**876**	**590**	**295**	**1229**	**590**	**1819**
Alderson**	GREENBRIER	19	111	7	6	136	7	143
Falling Springs	GREENBRIER	0	3	0	0	3	0	3
Greenbrier County*	GREENBRIER	60	652	293	177	889	293	1182
Rainelle	GREENBRIER	9	0	331	0	9	331	340
Ronceverte	GREENBRIER	0	47	0	20	67	0	67
Rupert	GREENBRIER	0	22	36	4	26	36	62
White Sulphur Springs	GREENBRIER	67	175	68	118	360	68	428
	GREENBRIER	**155**	**1010**	**735**	**325**	**1490**	**735**	**2225**
Nicholas County*	NICHOLAS	30	587	25	50	667	25	692
Richwood	NICHOLAS	109	153	30	37	299	30	329
Summersville	NICHOLAS	0	33	0	2	35	0	35
	NICHOLAS	**139**	**773**	**55**	**89**	**1001**	**55**	**1056**
Durbin	POCAHONTAS	1	6	20	0	7	20	27
Marlinton	POCAHONTAS	13	343	20	5	361	20	381
Pocahontas County*	POCAHONTAS	61	318	127	34	413	127	540
	POCAHONTAS	**75**	**667**	**167**	**39**	**781**	**167**	**948**
Addison	WEBSTER	23	79	4	20	122	4	126
Camden-On-Gauley	WEBSTER	0	18	3	0	18	3	21
Cowen	WEBSTER	0	35	0	0	35	0	35
Webster County*	WEBSTER	119	634	55	84	837	55	892
	WEBSTER	**142**	**766**	**62**	**104**	**1012**	**62**	**1074**

Region 4 Table

[Community-Level Flood Zone Breakdown](#)

Risk Assessment:
According to future flood maps, **Fayette**, **Greenbrier**, and **Pocahontas** counties have many structures being mapped into the higher risk 1%-annual-chance floodplain.

Webster Unincorporated and **Richwood Incorporated** have the most structures in the floodway. Buildings in the main channel of the river or stream, or close to the flood source, will be subject to the greatest flood depths, highest velocities, and greatest debris potential.

Region 4 Flood Zone Buildings Counts

High-Risk Effective and Advisory 1%-Annual Chance (100-Yr) Floodplains

High-Risk Effective Floodplains (Special Flood Hazard Areas)	
SFHA (Effective only)	**5,486**
Approximate A	2,598
Detailed AE	2,306
Detailed AE Floodway	582

High-Risk Effective and Advisory Floodplains	
SFHA	**5,486**
Mapped in Advisory A / AE	1,636
Total High-Risk (Effective & Advisory) 1% Floodplains	**7,122**

Building counts from August 2021 Building Level Risk Assessment

Building Risk by Community Type

BUILDING COUNT RANKING

Community	Region	State
INCORPORATED		
White Sulphur Springs	1	12
Marlinton	2	15
Rainelle	3	18
Richwood	4	21
Alderson**	5	36
Addison (Webster Springs)	6	63
UNINCORPORATED		
Fayette	1	14
Greenbrier	2	16
Webster	3	25
Nicholas	4	41
Pocahontas	5	42
COUNTY		
Greenbrier	1	15
Fayette	2	18
Webster	3	30
Nicholas	4	31
Pocahontas	5	35

Risk Assessment:

White Sulphur Springs INCORPORATED AREA has the highest 1% flood zone building counts and dollar exposure

Fayette and Greenbrier UNINCORPORATED AREAS have the highest building counts and dollar exposure, respectively.

Greenbrier COUNTY has the highest building counts and dollar exposure

BUILDING $ VALUE RANKING

Community	Region	State
INCORPORATED		
White Sulphur Springs	1	28
Marlinton	2	29
Rainelle	3	51
Alderson**	4	52
Richwood	5	58
Addison (Webster Springs)	6	59
UNINCORPORATED		
Greenbrier	1	14
Fayette	2	25
Webster	3	33
Nicholas	4	41
Pocahontas	5	42
COUNTY		
Greenbrier	1	17
Fayette	2	31
Pocahontas	3	37
Webster	4	38
Nicholas	5	45

Highest number of primary structures in the 1% floodplain:
- White Sulphur Springs (incorporated)
- Fayette County Unincorporated (unincorporated area)
- Greenbrier County (countywide)

** Split Community
Source: Region 4 Community-Level Building Exposure Table

Highest building dollar exposure in the 1% floodplain:
- White Sulphur Springs (incorporated)
- Greenbrier County Unincorporated (unincorporated)
- Greenbrier County (countywide)

Building Future Map Conditions
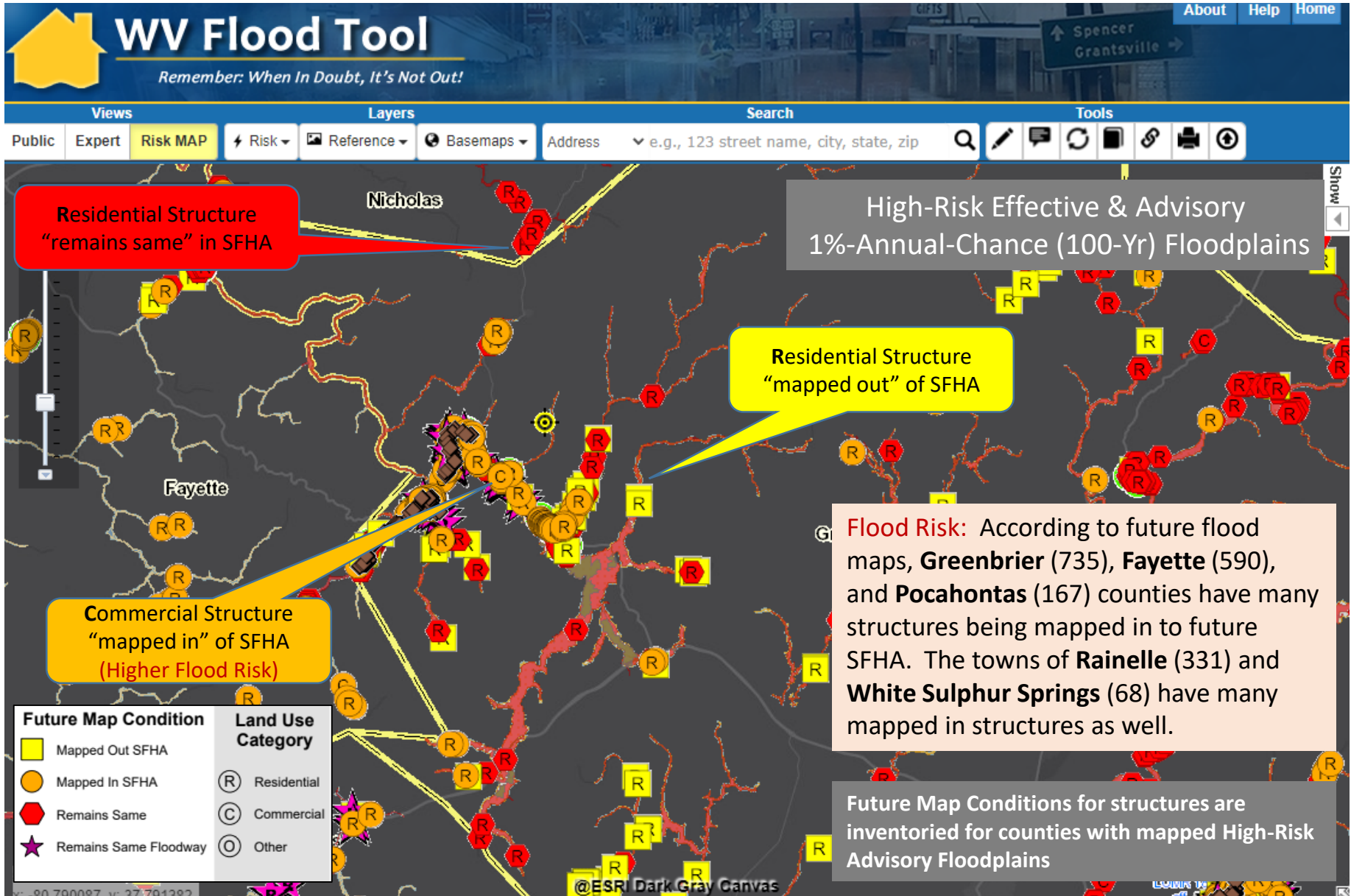
Future Building Map Conditions

SFHA AND FUTURE MAP CONDITIONS	Select counties have non-regulatory, advisory flood zones (orange zones on WV Flood Tool) that indicate future map conditions of the Special Flood Hazard Area (SFHA).
Floodway	**Floodways** cans be dangerous because water may flow very fast. Development is not allowed unless there is "no rise" in flood elevations, floodway elevations, and floodway widths are certified. Structures in floodways may require special consideration for mitigation measures.
No Change SFHA	**No Change in SFHA** designation where High-Risk Effective and Advisory Floodplains overlap. When future map restudies are completed and new FIRMs become effective, it is predicted that structures with this designation are neither "mapped in" nor "mapped out" of the SFHA.
Mapped In SFHA	Risk Assessment: Structures potentially **"mapped-in" the SFHA** according to mapped High-Risk Advisory Floodplains based on more accurate topography and model-backed A Zones. The "mapped-in" structures most likely will be included in the SFHA when future FEMA Restudies are done and new FIRMS become effective. Communities should review all "mapped-in" structures. Homeowners are at higher risk to flooding and should be contacted about Flood Insurance Preferred Risk Policies and other potential mitigation measures.
Mapped Out SFHA	Structures potentially **"mapped-out" the SFHA** according to mapped Advisory Floodplains and most likely will NOT be included in the SFHA when the new FIRMs become effective from future Restudies. Communities should review all "mapped-out" structures for LiDAR LOMAs. Although these structures may be mapped to a lesser flood risk designation, property owners should be encouraged to purchase Flood Insurance Preferred Risk Policies at lower premiums. Fayette County example| Monroe County example

Building Risk Reports

Incorporate information from Risk Assessment Reports into local hazard mitigation planning

Residential Home | Residential Manufactured Home | Residential Apartment | Non-Residential Commercial | Non-Residential Industrial | Non-Residential Other

Region 4 Building Types & Exposure

Police Station | Fire Station | E-911 Dispatch | School | Hospital | Nursing Home

Region 4 Essential Facilities Report

Religious Organization | Educational Building | Emergency Medical Services | Government Building | Utility | National Register Historical Structure

Region 4 Community Assets Report

Building Exposure and Type

Risk Assessment: What is at risk?

Floodplain Building Counts: *Which communities have the most buildings in high-risk effective and advisory floodplains?* **Greenbrier County** (ranked 15th in the State) has the highest countywide building counts in the region. **Fayette County Unincorporated** (ranked 14th for unincorporated areas) and the towns of **White Sulphur Springs** (ranked 12th for incorporated areas) and **Marlinton** (ranked 15th) also have high building counts.

Building Dollar Exposure: **Greenbrier County** (ranked 9th in the State) and the incorporated city of **White Sulphur Springs** (ranked 20th for incorporated areas) have the *highest building dollar values* exposed to a 1%-annual-chance flood event. *Higher building values increase substantial damage thresholds and mitigation reconstruction costs.*

Residential/Non-Residential Occupancy Type: Most of the primary buildings in the floodplain are *residential*: **Webster County** (92%), **Fayette County** (91%), **Greenbrier County** (87%), **Nicholas County** (86%), and **Pocahontas County** (85%). Municipalities typically have a higher percentage of *non-residential* structures, such as the towns of **Gauley Bridge** (53%) and **Ronceverte** (49%), in which half the structures are non-residential. *The occupancy type (residential versus non-residential) impacts requirements for flood insurance, mitigation construction, substantial damage calculations, flood model estimates, etc.*

Residential Structure Type: The majority of the residential structures (<= 4 units) valued at more than $1 million dollars for both **Region 4** and the **State** are located along *Howard Creek* in **Greenbrier County**. In fact, 74% of million-dollar structures in State are located along *Howard Creek*. It is expected that some of these structures will be removed from the 1%-annual-chance floodplain when the preliminary study flood maps become effective.

Non-Residential Structure Type: The top non-residential structures in the 1%-annual-chance floodplain with the highest building value are the **Ronceverte Wastewater Treatment Plant** ($24M) and **White Sulphur Springs (Caldwell) Wastewater Treatment Plant** ($17M) in Greenbrier County, **Summersville Wastewater Treatment Plant** ($10M) in Nicholas County, and **Hacker Valley School** ($9M) in Webster County

Building Exposure and Type

Median Building Replacement Value: **Greenbrier** ($43K) and **Pocahontas** ($34K) **counties** rank 32nd and 43rd, respectively, in the State for countywide median single-family dwelling (RES 1 Occupancy Class) replacement value. The value for Greenbrier County is close to the statewide median single family dwelling value of $44,000.

Owner Occupied: Of the residential buildings, most of the building stock is *owner-occupied*: **Nicholas** (82%), **Fayette** (79%), **Pocahontas** (72%), **Webster** (70%), and **Greenbrier** (66%). *Renters may not have flood insurance and be at higher risk.*

Manufactured Homes: **Webster County Unincorporated** (ranked 28th in the State) has the highest percentage (28%) of *manufactured homes* for *single family dwelling* building stock. The town of **Cowen** (ranked 10th for incorporated areas) also has a high percentage (54%). *Lighter-weight manufactured homes are more vulnerable to flood damage.*

Building Year and FIRM Status: **Webster County** ranks 27th in the State for the highest percentage of *Post-FIRM structures* or new development. The cities of **Mount Hope** and **Ronceverte** are two of the oldest communities in the region with *building year median values* of 1920.

Residential versus Non-Residential

Community	RESIDENTIAL				COMMERCIAL NON-RESIDENTIAL		OTHER NON-RESIDENTIAL		TOTAL BUILDING VALUE		
Community Name	#	% Count	Value ($)	% Value	#	Value ($)	#	Value ($)	#	Value ($)	Rank[1]
Ansted	1	100.0%	$66K	100.0%	0	$0K	0	$0K	1	$66K	19
Fayette County*	1425	93.2%	$50,385K	66.9%	57	$6,523K	47	$18,398K	1529	$75,307K	2
Gauley Bridge	21	46.7%	$869K	27.4%	24	$2,302K	0	$0K	45	$3,171K	11
Meadow Bridge	21	91.3%	$695K	96.8%	2	$23K	0	$0K	23	$718K	16
Montgomery**	13	86.7%	$1,083K	25.2%	1	$1,000K	1	$2,215K	15	$4,298K	
Mount Hope	32	84.2%	$787K	65.1%	4	$101K	2	$322K	38	$1,210K	14
Oak Hill	50	90.9%	$2,262K	95.3%	5	$111K	0	$0K	55	$2,373K	12
Pax	32	82.1%	$925K	67.9%	3	$98K	4	$340K	39	$1,362K	13
Smithers**	63	85.1%	$2,064K	55.8%	8	$837K	3	$796K	74	$3,698K	
FAYETTE	**1658**	**91.1%**	**$59,136K**	**64.1%**	**104**	**$10,994K**	**57**	**$22,071K**	**1819**	**$92,201K**	**2**
Alderson**	121	84.6%	$6,485K	56.7%	17	$1,028K	5	$3,931K	143	$11,443K	5**
Falling Springs	3	100.0%	$157K	100.0%	0	$0K	0	$0K	3	$157K	18
Greenbrier County*	1101	93.1%	$103,297K	77.7%	68	$6,511K	13	$23,065K	1182	$132,873K	1
Rainelle	253	74.4%	$8,392K	55.4%	78	$5,751K	9	$1,006K	340	$15,149K	4
Ronceverte	34	50.7%	$1,354K	4.5%	32	$4,436K	1	$24,000K	67	$29,790K	3
Rupert	58	93.5%	$2,321K	73.2%	2	$291K	2	$561K	62	$3,173K	10
White Sulphur Springs	375	87.6%	$18,910K	36.4%	42	$5,144K	11	$27,940K	428	$51,994K	1
GREENBRIER	**1945**	**87.4%**	**$140,916K**	**57.6%**	**239**	**$23,161K**	**41**	**$80,503K**	**2225**	**$244,580K**	**1**
Nicholas County*	624	90.2%	$21,060K	68.1%	42	$6,646K	26	$3,230K	692	$30,936K	4
Richwood	265	80.5%	$7,518K	55.8%	47	$1,399K	17	$4,556K	329	$13,473K	6
Summersville	23	63.9%	$1,497K	11.3%	11	$1,657K	2	$10,109K	36	$13,263K	7
NICHOLAS	**912**	**86.3%**	**$30,075K**	**52.1%**	**100**	**$9,703K**	**45**	**$17,895K**	**1057**	**$57,672K**	**5**
Durbin	23	85.2%	$645K	72.4%	2	$157K	2	$89K	27	$891K	15
Marlinton	286	75.1%	$15,309K	44.3%	82	$9,635K	13	$9,586K	381	$34,529K	2
Pocahontas County*	502	93.0%	$23,166K	84.7%	23	$2,460K	15	$1,731K	540	$27,358K	5
POCAHONTAS	**811**	**85.5%**	**$39,120K**	**62.3%**	**107**	**$12,252K**	**30**	**$11,406K**	**948**	**$62,779K**	**4**
Addison	107	84.9%	$3,855K	32.7%	15	$3,053K	4	$4,892K	126	$11,799K	8
Camden-On-Gauley	13	61.9%	$263K	45.9%	4	$32K	4	$279K	21	$573K	17
Cowen	28	80.0%	$814K	15.4%	4	$92K	3	$4,375K	35	$5,281K	9
Webster County*	839	94.1%	$25,759K	51.1%	27	$2,685K	26	$21,957K	892	$50,400K	3
WEBSTER	**987**	**91.9%**	**$30,690K**	**45.1%**	**50**	**$5,861K**	**37**	**$31,502K**	**1074**	**$68,053K**	**3**
SUMMARY	**6,313**	**88.5%**	**$299,937K**	**56.3%**	**600**	**$61,971K**	**210**	**$163,376K**	**7,123**	**$525,285K**	
Alderson (Greenbrier/Monroe) Split Community Total:											
Alderson**	175	0.0%	$8,869K	60.4%	24	$1,482K	10	$4,332K	209	$14,683K	5

[1] Group Rank on Community Type: County, Unincorporated, Incorporated. Table ranking by Region and not Statewide.

Residential Home

Residential Manufactured Home

Residential Apartment

Non-Residential Commercial

Non-Residential Industrial

Non-Residential Other

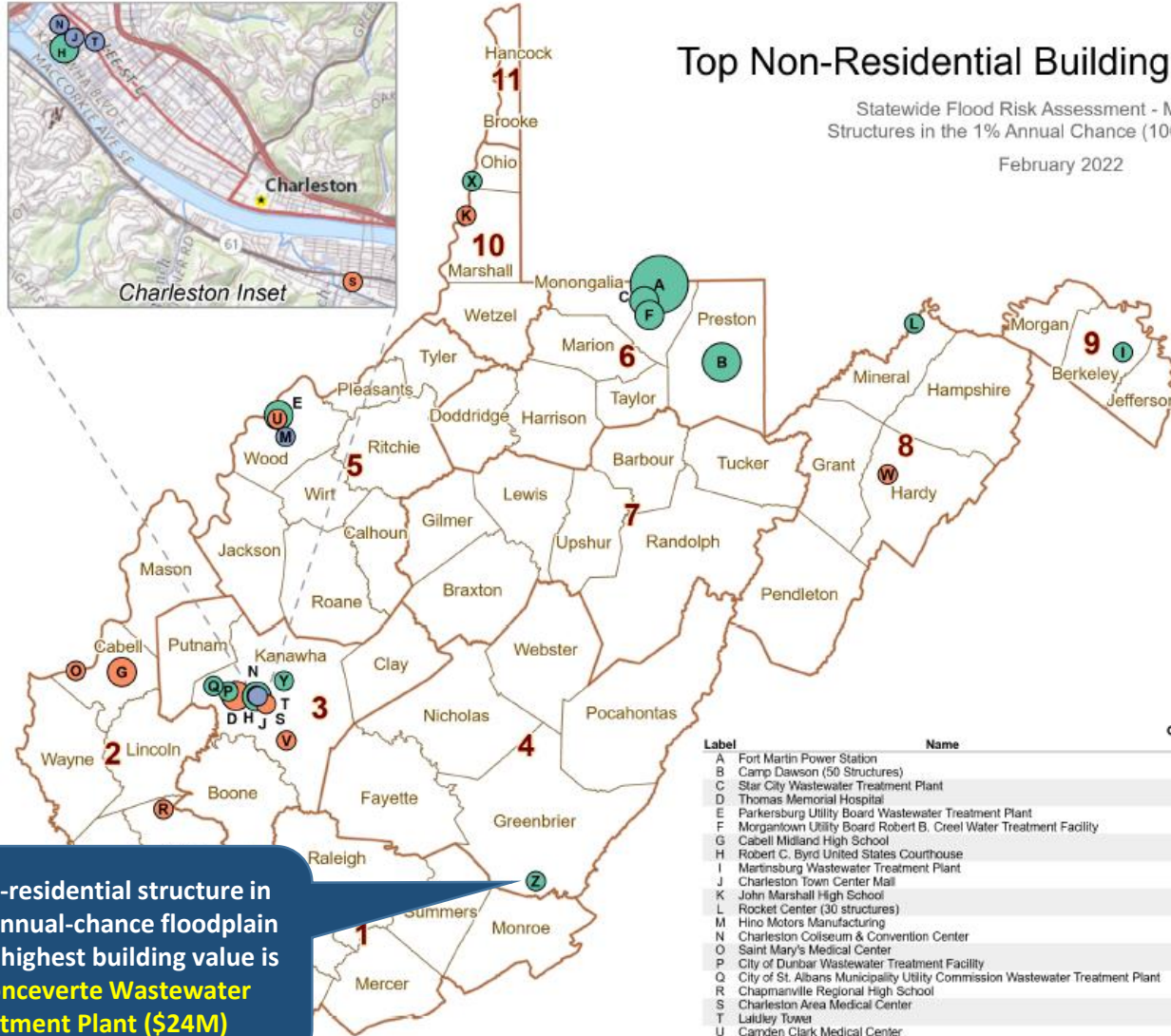Building Dollar Exposure Report:
Residential versus Non-Residential

Non-Residential Building Exposure

Top Non-Residential Building Dollar Exposure

Statewide Flood Risk Assessment - Multimillion $
Structures in the 1% Annual Chance (100-yr) Floodplain

February 2022

Building $ Exposure

Building Type
- Essential Facility — *High schools, Hospitals*
- Community Asset — *Utilities, Government*
- Other — *Commercial, Industry*

Exposure Magnitude
- ≥ $24M
- ≥ $53M
- ≥ $103M
- $800M

Label	Name	Occupancy Class	County	Value	Source
A	Fort Martin Power Station	COM4	MONONGALIA	$800M	Other
B	Camp Dawson (50 Structures)	GOV1	PRESTON	$276M	Tax
C	Star City Wastewater Treatment Plant	GOV1	MONONGALIA	$102M	Other
D	Thomas Memorial Hospital	COM6	KANAWHA	$97M	Tax
E	Parkersburg Utility Board Wastewater Treatment Plant	GOV1	WOOD	$69M	Other
F	Morgantown Utility Board Robert B. Creel Water Treatment Facility	GOV1	MONONGALIA	$64M	Other
G	Cabell Midland High School	EDU1	CABELL	$61M	BRIM
H	Robert C. Byrd United States Courthouse	GOV1	KANAWHA	$58M	Tax
I	Martinsburg Wastewater Treatment Plant	COM4	BERKELEY	$52M	Tax
J	Charleston Town Center Mall	COM1	KANAWHA	$44M	Tax
K	John Marshall High School	EDU1	MARSHALL	$41M	BRIM
L	Rocket Center (30 structures)	IND2	MINERAL	$40M	Tax
M	Hino Motors Manufacturing	IND2	WOOD	$38M	Tax
N	Charleston Coliseum & Convention Center	COM8	KANAWHA	$30M	Tax Modified
O	Saint Mary's Medical Center	COM6	CABELL	$30M	Tax
P	City of Dunbar Wastewater Treatment Facility	GOV1	KANAWHA	$29M	Other
Q	City of St. Albans Municipality Utility Commission Wastewater Treatment Plant	GOV1	KANAWHA	$28M	Other
R	Chapmanville Regional High School	EDU1	LOGAN	$28M	BRIM
S	Charleston Area Medical Center	COM7	KANAWHA	$27M	Tax
T	Laidley Tower	COM4	KANAWHA	$26M	Tax Modified
U	Camden Clark Medical Center	COM6	WOOD	$25M	Tax
V	Riverside High School	EDU1	KANAWHA	$25M	Tax
W	Moorefield High School	EDU1	HARDY	$24M	Tax
X	Wheeling Water Pollution Control Plant	GOV1	OHIO	$24M	Other
Y	Elk Valley Public Service District Wastewater Treatment Plant	GOV1	KANAWHA	$24M	Other
Z	Ronceverte Wastewater Treatment Plant	GOV1	GREENBRIER	$24M	Other

Top non-residential structure in the 1%-annual-chance floodplain with the highest building value is the Ronceverte Wastewater Treatment Plant ($24M)

WVGISTC 2022-2-8

[Source Graphic]

Non-Residential: High Bldg. Values

Highly valued buildings in 1% Floodplain for **Fayette County**. Which high-valued-structures are vulnerable to riverine flooding?

FAYETTE COUNTY Community Name	WV Flood Tool Link	FAYETTE COUNTY Owner Name or Building ID	Hazard Occupancy Code	General Occupancy	Building Appraisal
Smithers**	FT	BOARD OF EDUCATION FAY CO	EDU1	Other	$ 17,343,724
Montgomery**	FT	LAIRD FOUNDATION INC	COM6	Commercial	$ 5,254,600
Smithers**	FT	BOARD OF EDUCATION FAY CO	EDU1	Other	$ 4,213,763
Fayette County*	FT	WHITE OAK PUBLIC SERVICE DIST	COM4	Commercial	$ 4,000,000
Fayette County*	FT	CITY OF MT HOPE	COM4	Commercial	$ 3,000,000
Montgomery**	FT	LIVING WATERS CHRISTIAN FELLOWSHIP (TRUSTEES)	REL1	Other	$ 2,214,940
Fayette County*	FT	ARMSTRONG PUB SERV DIST	COM4	Commercial	$ 2,000,000
Fayette County*	FT	CLONCH INDUSTRIES INC	IND1	Commercial	$ 1,285,200

* Unincorporated   ** Split Community
Region 4: Tabular Building-Level Report Link: data.wvgis.wvu.edu - /pub/RA/State/BL/BLRA/R4_BLRA_Full_List/
Region 4: Top 10% Data Extract of High Building Dollar Exposure: https://data.wvgis.wvu.edu/pub/RA/State/BL/Extract/HighBldgValue/
State Top 100: Building Exposure: https://data.wvgis.wvu.edu/pub/RA/State/BL/Top-List/Top100/

Community Engagement and Verification: Region 4 has a total of 7,123 structures in the 1%-annual-chance floodplain valued at $525,285 million

Building-Level Verification: Verify the highly valued buildings using the building-level risk assessment (BLRA) table, Top 10% data extract high-building dollar exposure, statewide top building exposure listing, and Risk MAP View of the WV Flood Tool. For buildings inventoried in the 1% floodplains, review the most expensive residential and non-residential buildings located in the high-risk flood zones sorted on building appraisal value from largest to smallest value. Identify building-level mitigation and outreach strategies.

Non-Residential: High Bldg. Values

Highly valued buildings in 1% Floodplain for **Greenbrier County**. Which high-valued-structures are vulnerable to riverine flooding?

GREENBRIER COUNTY Community Name	WV Flood Tool Link	GREENBRIER COUNTY Owner Name or Building ID	Hazard Occupancy Code	General Occupancy	Building Appraisal
Ronceverte	FT	THE CITY OF RONCEVERTE WWP	GOV1	Other	$24,000,000
White Sulphur Springs	FT	GREENBRIER CO BD OF ED	EDU1	Other	$ 8,542,982
Greenbrier County*	FT	W V DEPARTMENT OF CORRECTION	GOV1	Other	$ 4,067,092
Alderson**	FT	BOARD OF EDUCATION	EDU1	Other	$ 3,508,927
Ronceverte	FT	B A MULLICAN LUMBER & MANUFACTURING CO L P	IND1	Commercial	$ 2,043,400
Rainelle	FT	PARK CENTER INC	COM1	Commercial	$ 1,443,900
White Sulphur Springs	FT	BANK OF WHITE SULPHUR SPRINGS	COM5	Commercial	$ 1,186,700
Greenbrier County*	FT	WHATCOAT UNITED METHODIST CHURCH	REL1	Other	$ 768,240

* Unincorporated   ** Split Community
Region 4: Tabular Building-Level Report Link: data.wvgis.wvu.edu - /pub/RA/State/BL/BLRA/R4_BLRA_Full_List/
Region 4: Top 10% Data Extract of High Building Dollar Exposure: https://data.wvgis.wvu.edu/pub/RA/State/BL/Extract/HighBldgValue/
State Top 100: Building Exposure: https://data.wvgis.wvu.edu/pub/RA/State/BL/Top-List/Top100/

Residential % of Building Stock

Building Stock mostly RESIDENTIAL

Most of the primary buildings in the floodplain are *residential*: **Webster County** (92%), **Fayette County** (91%), **Greenbrier County** (87%), **Nicholas County** (86%), and **Pocahontas County** (85%).

Top Towns high NON-RESIDENTIAL %

- Gauley Bridge (53% Non-Residential)
- Ronceverte(49%)
- Camden-on-Gauley (38%)
- Summersville (34%)
- Marlinton(25%)

Countywide Percent of Residential Properties in the 1% Annual Chance Floodplain

September 2021

Percent of Properties in SFHA that are Residential

- 75 - 78%
- 79 - 85%
- 86 - 88%
- 89 - 92%
- 93 - 95%

Planning and Development Council Region

WVGISTC 2021-09-29
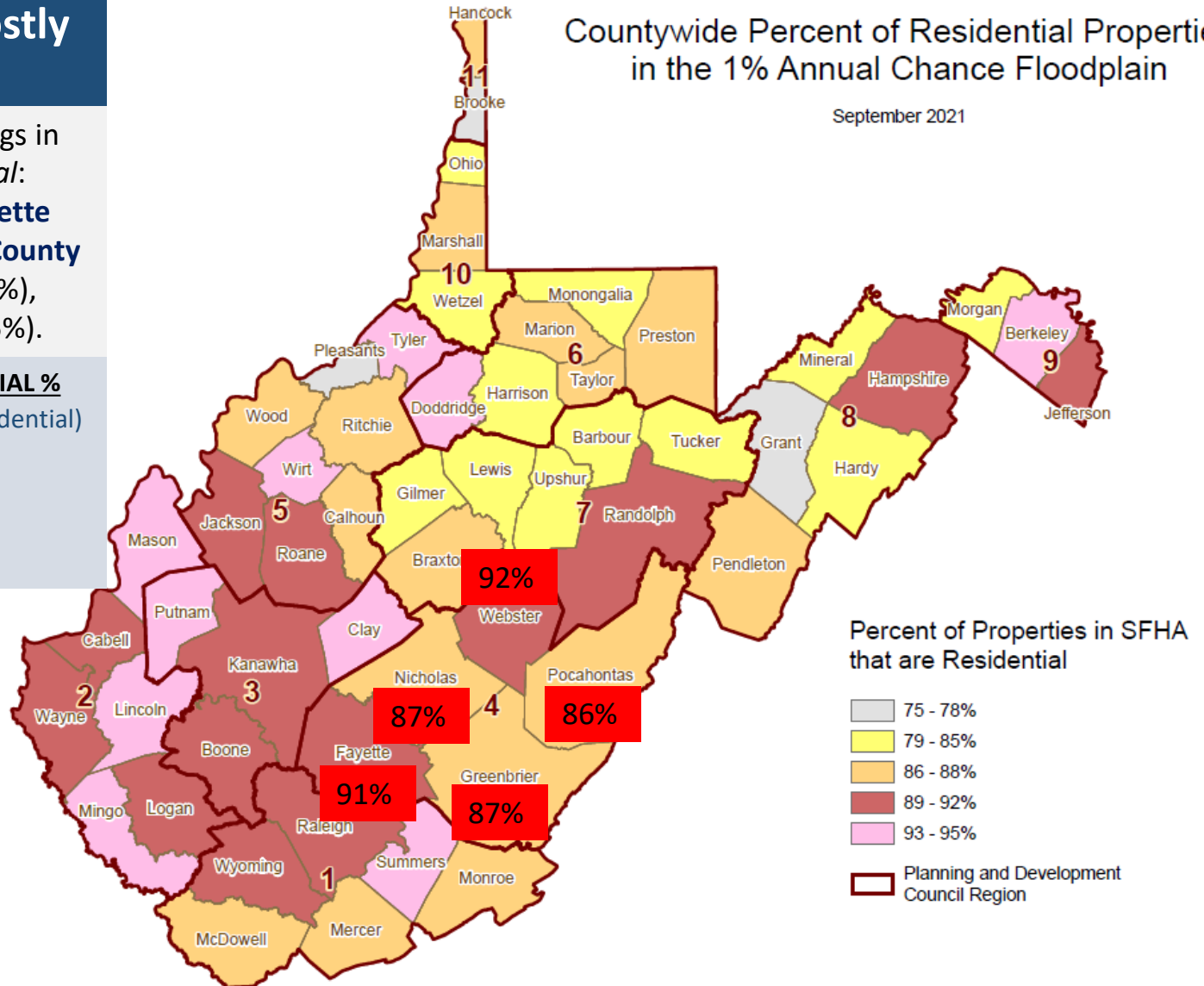
Residential: Single Family Dwellings

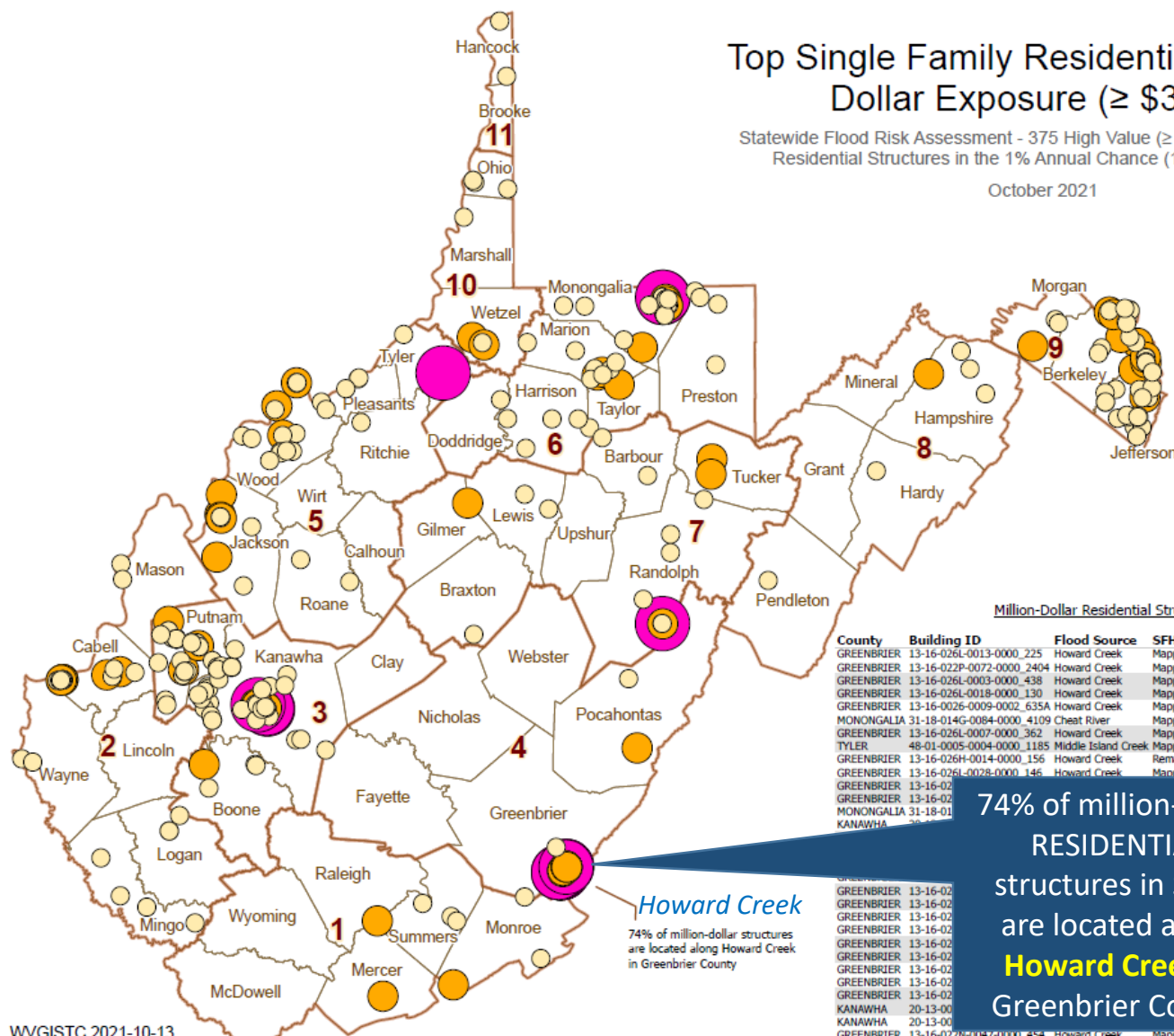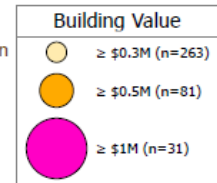| Community		SINGLE FAMILY HOME		MANUFACTURED (MOBILE) HOME			SINGLE FAMILY TOTAL		
Community Name	County	Count	Value ($)	Count	% Count	Value ($)	Count	Value ($)	Group Rank[1]
Ansted	FAYETTE	1	$66K	0	0.0%	$0K	1	$66K	18
Fayette County*	FAYETTE	1165	$44,640K	239	17.0%	$4,131K	1404	$48,771K	2
Gauley Bridge	FAYETTE	17	$619K	1	5.6%	$10K	18	$629K	15
Meadow Bridge	FAYETTE	13	$551K	7	35.0%	$113K	20	$664K	13
Montgomery**	FAYETTE	11	$931K	1	8.3%	$15K	12	$945K	3
Mount Hope	FAYETTE	31	$771K	1	3.1%	$16K	32	$787K	12
Oak Hill	FAYETTE	47	$2,173K	2	4.1%	$39K	49	$2,212K	7
Pax	FAYETTE	28	$827K	4	12.5%	$97K	32	$925K	10
Smithers**	FAYETTE	54	$1,802K	6	10.0%	$77K	60	$1,879K	2
	FAYETTE	**1367**	**$52,379K**	**261**	**16.0%**	**$4,499K**	**1628**	**$56,877K**	**2**
Alderson**	GREENBRIER	107	$5,786K	10	8.5%	$248K	117	$6,034K	1
Falling Springs	GREENBRIER	2	$137K	1	33.3%	$20K	3	$157K	17
Greenbrier County*	GREENBRIER	822	$96,262K	264	24.3%	$6,626K	1086	$102,888K	1
Rainelle	GREENBRIER	229	$7,621K	16	6.5%	$579K	245	$8,200K	3
Ronceverte	GREENBRIER	29	$1,138K	0	0.0%	$0K	29	$1,138K	9
Rupert	GREENBRIER	45	$1,974K	11	19.6%	$329K	56	$2,302K	6
White Sulphur Springs	GREENBRIER	338	$15,856K	4	1.2%	$125K	342	$15,981K	1
	GREENBRIER	**1572**	**$128,774K**	**306**	**16.3%**	**$7,926K**	**1878**	**$136,699K**	**1**
Nicholas County*	NICHOLAS	455	$17,833K	165	26.6%	$2,939K	620	$20,772K	5
Richwood	NICHOLAS	217	$6,725K	42	16.2%	$630K	259	$7,356K	4
Summersville	NICHOLAS	19	$1,423K	3	13.6%	$55K	22	$1,478K	8
	NICHOLAS	**691**	**$25,981K**	**210**	**23.3%**	**$3,624K**	**901**	**$29,605K**	**5**
Durbin	POCAHONTAS	15	$499K	7	31.8%	$130K	22	$629K	14
Marlinton	POCAHONTAS	244	$8,263K	22	8.3%	$354K	266	$8,617K	2
Pocahontas County*	POCAHONTAS	400	$21,017K	90	18.4%	$1,504K	490	$22,521K	4
	POCAHONTAS	**659**	**$29,779K**	**119**	**15.3%**	**$1,988K**	**778**	**$31,767K**	**3**
Addison	WEBSTER	95	$3,434K	11	10.4%	$211K	106	$3,645K	5
Camden-On-Gauley	WEBSTER	9	$171K	4	30.8%	$92K	13	$263K	16
Cowen	WEBSTER	13	$423K	15	53.6%	$391K	28	$814K	11
Webster County*	WEBSTER	598	$20,815K	238	28.5%	$4,885K	836	$25,700K	3
	WEBSTER	**715**	**$24,842K**	**268**	**27.3%**	**$5,580K**	**983**	**$30,422K**	**4**
SUMMARY		**5,004**	**$261,756K**	**1,164**	**19.6%**	**$23,616K**	**6,168**	**$285,371K**	

Residential Home

Residential Manufactured Home

Building Dollar Exposure Report:
Single Family Dwellings

Residential: Top Single-Family $ Exposure

Top Single Family Residential Structure Dollar Exposure (≥ $300K)

Statewide Flood Risk Assessment - 375 High Value (≥ $300K) Single Family Residential Structures in the 1% Annual Chance (100-yr) Floodplain

October 2021

Building Value
- ○ ≥ $0.3M (n=263)
- ● ≥ $0.5M (n=81)
- ● ≥ $1M (n=31)

Howard Creek

74% of million-dollar structures are located along Howard Creek in Greenbrier County

74% of million-dollar RESIDENTIAL structures in State are located along Howard Creek in Greenbrier County

Million-Dollar Residential Structures

County	Building ID	Flood Source	SFHA Status	Value	Loss %	Loss $
GREENBRIER	13-16-026L-0013-0000_225	Howard Creek	Mapped In	$4.7M	0.0%	$0
GREENBRIER	13-16-022P-0072-0000_2404	Howard Creek	Mapped Out	$3.0M	0.0%	$0
GREENBRIER	13-16-026L-0003-0000_438	Howard Creek	Mapped Out	$1.8M	0.0%	$0
GREENBRIER	13-16-026L-0018-0000_130	Howard Creek	Mapped Out	$1.8M	0.0%	$0
GREENBRIER	13-16-0026-0009-0002_635A	Howard Creek	Mapped In	$1.8M	9.0%	$163K
MONONGALIA	31-18-014G-0084-0000_4109	Cheat River	Mapped Out	$1.7M	0.0%	$0
GREENBRIER	13-16-026L-0007-0000_362	Howard Creek	Mapped Out	$1.6M	0.0%	$0
TYLER	48-01-0005-0004-0000_1185	Middle Island Creek	Mapped Out	$1.6M	0.0%	$0
GREENBRIER	13-16-026H-0014-0000_156	Howard Creek	Remains Same	$1.5M	0.0%	$0
GREENBRIER	13-16-026L-0028-0000_146	Howard Creek	Mapped Out	$1.4M	0.0%	$0
GREENBRIER	13-16-02				0.0%	$0
GREENBRIER	13-16-02				0.0%	$0
MONONGALIA	31-18-01				0.0%	$0
KANAWHA	20-13-00				2.4%	$427K
					0.0%	$0
					4.0%	$183K
GREENBRIER	13-16-02				0.0%	$0
GREENBRIER	13-16-02				0.0%	$0
GREENBRIER	13-16-02				0.0%	$0
GREENBRIER	13-16-02				0.0%	$0
GREENBRIER	13-16-02				0.0%	$0
GREENBRIER	13-16-02				0.0%	$0
GREENBRIER	13-16-02				4.0%	$44K
GREENBRIER	13-16-02				0.0%	$0
GREENBRIER	13-16-02				0.0%	$0
KANAWHA	20-13-00				0.0%	$0
KANAWHA	20-13-00				7.0%	$74K
GREENBRIER	13-16-022N-0047-0000_454	Howard Creek	Mapped In	$1.0M	0.0%	$0
KANAWHA	20-13-0002-0027-0000_100	Kanawha River	Remains Same	$1.0M	0.9%	$9K

WVGISTC 2021-10-13

Residential: Mobile Home %

Webster County
- **Cowen (54%)**
- **Camden-On-Gauley (31%)**
- **Webster Unincorporated (29%)**

Manufactured homes are of lightweight construction and more vulnerable to flood damage

Mobile Home Percentage in the 1% Annual Chance Floodplain
September 2021

Residential Properties that are Mobile Homes in SFHA, %

Incorporated Areas
- 0 - 7%
- 8 - 22%
- 23 - 41%
- 42 - 71%
- 72 - 100%

Split Community

Unincorporated Areas
- 15 - 22%
- 23 - 28%
- 29 - 34%
- 35 - 41%
- 42 - 56%

Planning and Development Council Region

Cowen

The town of **Cowen** and **Webster County** have the highest percentage of manufactured homes

WVGISTC 2021-09-29
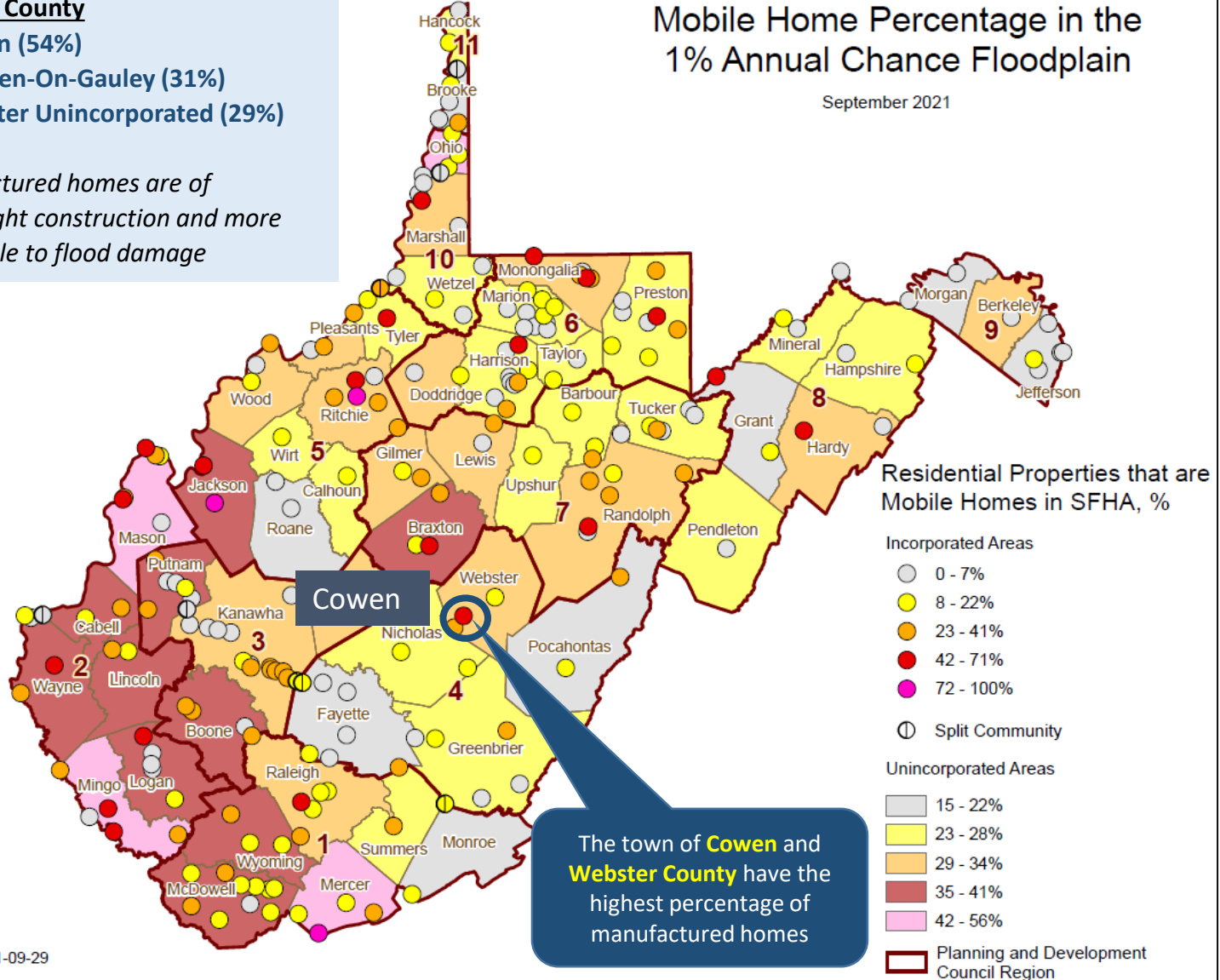
Residential: High Building $ Exposure

Four Homes along *Howard Creek* with Total Building Value of **$8.2 million** mapped into new *Draft Floodplain*. Building status changed when newer *Preliminary Floodplain* published in 2021.

https://www.mapwv.gov/flood/map/?wkid=102100&x=-8942775&y=4547402&l=11&v=2
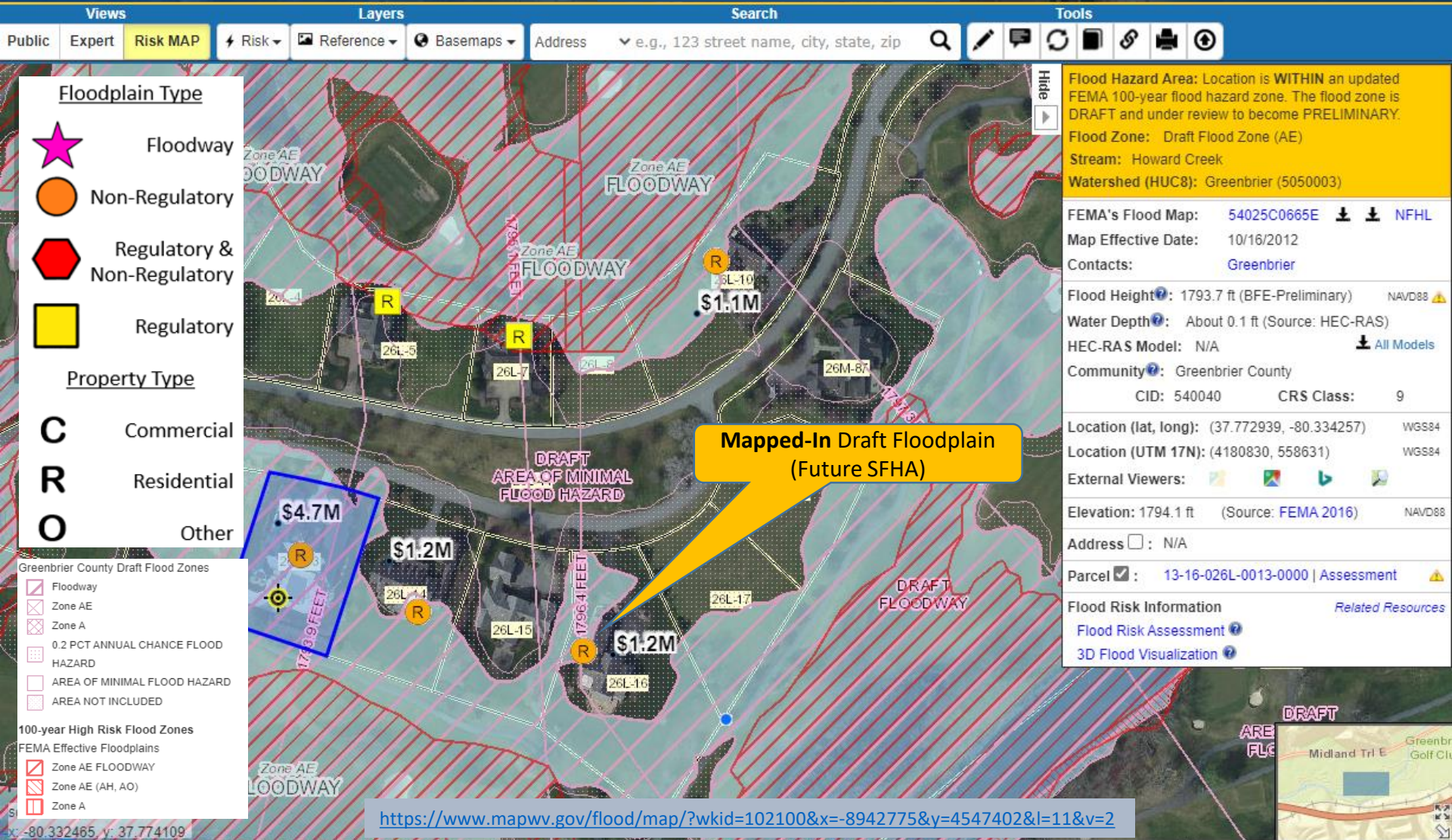
R4 Risk Assessment

SIGNIFICANT STRUCTURES OF IMPORTANCE
What critical facilities are at risk?

Essential Facilities

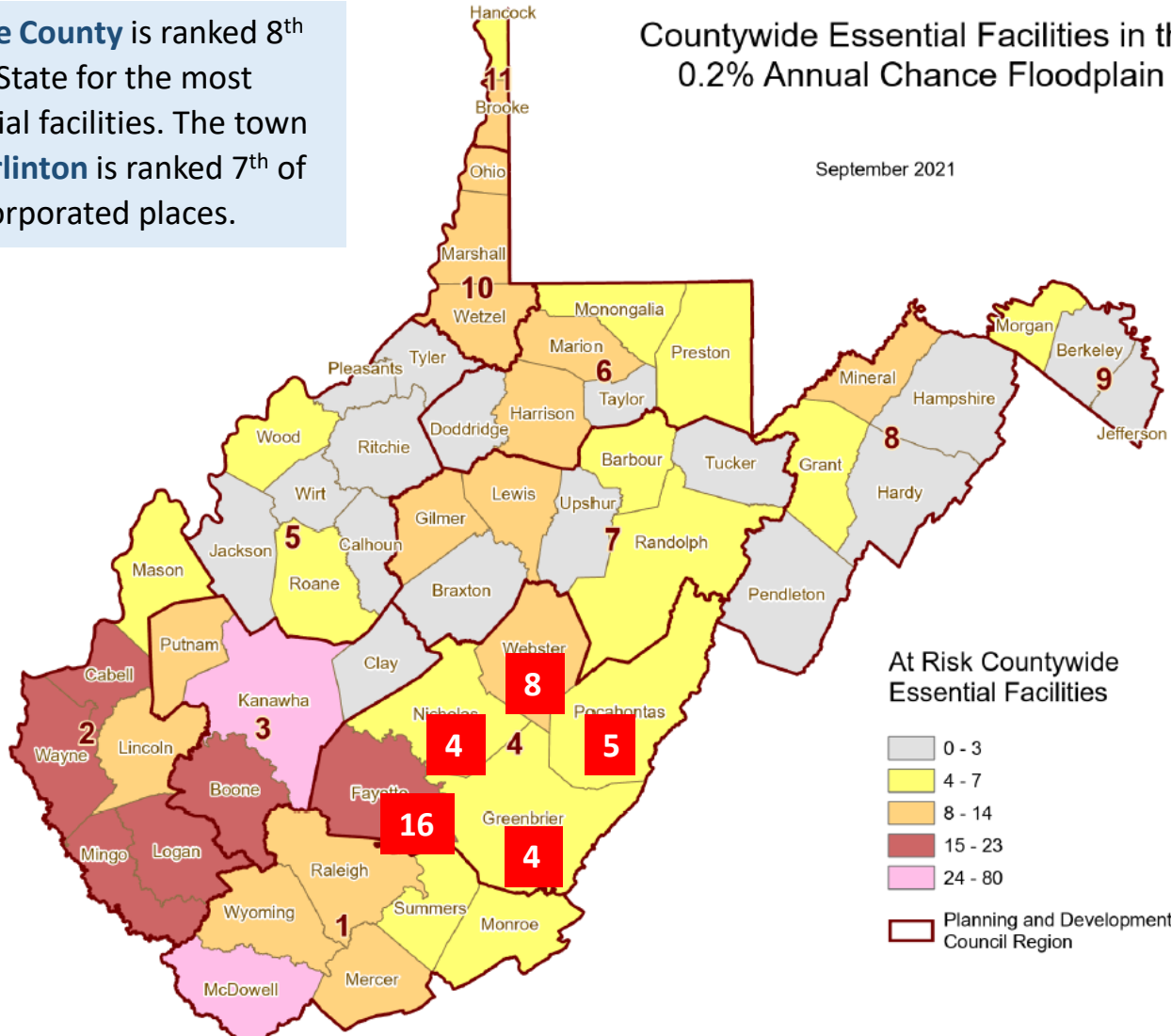| COMMUNITY IDENTIFICATION			ESSENTIAL FACILITIES						
CID	Community Name	County	Police Station	Fire Station	911 Center	School	Hospital	Nursing Home	TOTAL
540027	Ansted	FAYETTE	0	0	0	0	0	0	0
540026	Fayette County*	FAYETTE	0	3	0	2	0	0	5
540294	Gauley Bridge	FAYETTE	1	1	0	0	0	0	2
540028	Meadow Bridge	FAYETTE	0	0	0	0	0	0	0
540029	Montgomery**	FAYETTE	1	0	0	0	1	1	3
540280	Mount Hope	FAYETTE	0	0	0	0	0	0	0
540031	Oak Hill	FAYETTE	0	0	0	0	0	0	0
540032	Pax	FAYETTE	0	1	0	0	0	0	1
540033	Smithers**	FAYETTE	2	1	0	2	0	0	5
SUM	Ranked 8th in State	FAYETTE	4	6	0	4	1	1	16
540041	Alderson**	GREENBRIER	0	0	0	1	0	0	1
540243	Falling Springs	GREENBRIER	0	0	0	0	0	0	0
540040	Greenbrier County*	GREENBRIER	0	0	0	0	0	0	0
540228	Rainelle	GREENBRIER	0	1	0	0	0	0	1
540043	Ronceverte	GREENBRIER	0	0	0	0	0	0	0
540044	Rupert	GREENBRIER	0	0	0	0	0	0	0
540045	White Sulphur Springs	GREENBRIER	1	0	0	1	0	0	2
SUM		GREENBRIER	1	1	0	2	0	0	4
540146	Nicholas County*	NICHOLAS	0	1	0	0	0	0	1
540147	Richwood	NICHOLAS	2	1	0	0	0	0	3
540148	Summersville	NICHOLAS	0	0	0	0	0	0	0
SUM		NICHOLAS	2	2	0	0	0	0	4
540158	Durbin	POCAHONTAS	0	0	0	0	0	0	0
540159	Marlinton (Ranked 7th for all municipalities in State)	POCAHONTAS	2	1	0	1	0	1	5
540283	Pocahontas County*	POCAHONTAS	0	0	0	0	0	0	0
SUM		POCAHONTAS	2	1	0	1	0	1	5
540204	Addison (Berkeley Springs)	WEBSTER	0	1	1	1	0	0	3
540205	Camden-On-Gauley	WEBSTER	1	0	0	0	0	0	1
540206	Cowen	WEBSTER	0	0	0	1	0	0	1
540203	Webster County*	WEBSTER	0	2	0	1	0	0	3
SUM		WEBSTER	1	3	1	3	0	0	8

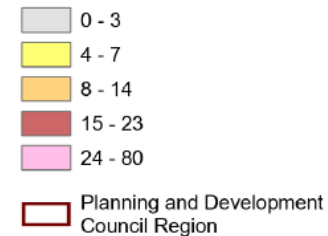37 essential facilities

Essential Facilities 0.2% Floodplain

Fayette County is ranked 8th in the State for the most essential facilities. The town of Marlinton is ranked 7th of all incorporated places.

Countywide Essential Facilities in the 0.2% Annual Chance Floodplain

September 2021

At Risk Countywide Essential Facilities

- 0 - 3
- 4 - 7
- 8 - 14
- 15 - 23
- 24 - 80

Planning and Development Council Region

WVGISTC 2021-09-20

Essential Facilities

Police Station   Fire Station   E-911 Dispatch   School   Hospital   Nursing Home

Community Name	County	Facility Name	Facility Type	Flood Tool Link	Flood Depth	Building Damage Percent
Alderson**	GREENBRIER	Alderson Elementary School	School	FT	3.5	8.0
Marlinton	POCAHONTAS	Marlinton Police Department	Police Station	FT	2.2	7.6
Marlinton	POCAHONTAS	Marlinton Volunteer Fire Department	Fire Station	FT	2.2	7.7
Fayette County*	FAYETTE	Loup Creek Volunteer Fire Department - Robson	Fire Station	FT	1.1	0.9

* Unincorporated Area
** Split Community

Community Engagement and Verification: There are 25 facilities in the high risk *effective* and *advisory* 1%-annual-chance (100-yr) flood level and 12 facilities in the moderate risk 0.2%-annual-chance (500-yr) flood level. No essential facilities exist in the Regulatory Floodway.

Review the accuracy and completeness of all *active* **essential facilities**. Report any facilities that are missing. Verify the facilities and location using the CL Report / Tables, BL Tables, and RiskMAP View of the WV Flood Tool.

More Essential Facilities

Community Name	County	Facility Name	Facility Type	Flood Tool Link	Flood Depth	Building Damage Percent
Alderson**	GREENBRIER	Alderson Elementary School	**School**	FT	3.5	8.0
Marlinton	POCAHONTAS	Marlinton Police Department	**Police Station**	FT	2.2	7.6
Marlinton	POCAHONTAS	Marlinton Volunteer Fire Department	**Fire Station**	FT	2.2	7.7
Fayette County*	FAYETTE	Loup Creek Volunteer Fire Department - Robson	**Fire Station**	FT	1.1	0.9
Webster County*	WEBSTER	Erbacon Volunteer Fire Department	**Fire Station**	FT	1.0	0.0
Marlinton	POCAHONTAS	Pocahontas County 911 Center	**Police Station**	FT	1.0	0.0
Marlinton	POCAHONTAS	Marlinton Elementary School	**School**	FT	0.8	0.0
Fayette County*	FAYETTE	Armstrong Creek Volunteer Fire Department	**Fire Station**	FT	0.8	0.0
Fayette County*	FAYETTE	Covenant Promise Christian Academy	**School**	FT	0.5	0.0
Webster County*	WEBSTER	Hacker Valley Elementary School	**School**	FT	0.4	0.0
White Sulphur Springs	GREENBRIER	White Sulphur Springs Police Department	**Police Station**	FT	0.2	0.0
Webster County*	WEBSTER	Hacker Valley Volunteer Fire Department	**Fire Station**	FT	0.1	0.0
Addison	WEBSTER	Webster County Office of Emergency Services/ E-911	**911 Center**	FT	0.1	0.0
Richwood	NICHOLAS	Richwood Police Department	**Police Station**	FT	0.1	0.0
Rainelle	GREENBRIER	Rainelle Volunteer Fire Department	**Fire Station**	FT	0.1	0.0
Pax	FAYETTE	Pax Volunteer Fire Department	**Fire Station**	FT	0.1	0.0

* Unincorporated Community
** Split Community

Building-Level Report

Degree of Risk?

Essential Facilities

Police Station

Fire Station

E-911 Dispatch

School

Hospital

Nursing Home

Marlinton

Essential Facility
- **911** 911 Center
- **F** Fire Department
- **H** Hospital
- **NH** Nursing Home
- **P** Police Department
- **S** School

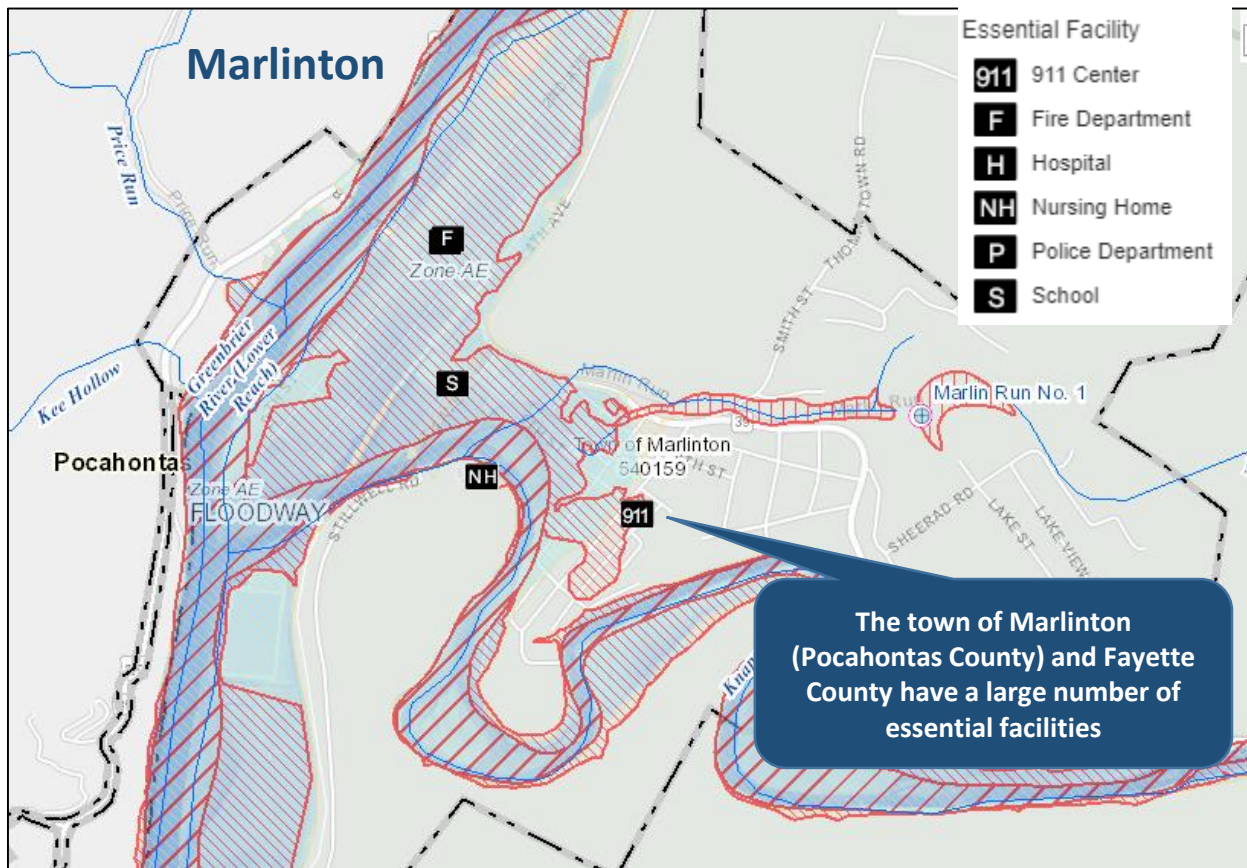The town of Marlinton (Pocahontas County) and Fayette County have a large number of essential facilities

Risk Assessment

58% or 15 of the 26 flood-prone communities in **Region 4** have essential facilities vulnerable to flooding. The county with the most essential facilities is **Fayette County** (ranked 8th for all counties), while the incorporated town with the highest number of facilities is **Marlinton** (ranked 7th for all municipalities in State) in Pocahontas County. Hospitals and nursing homes with immobile patients or residents are particularly vulnerable to a flood disaster. Small towns situated mostly in the floodplain are more challenged than unincorporated areas or larger cities to identify suitable sites that provide a high level of protection from flooding.

WV Flood Tool Map Link: https://www.mapwv.gov/flood/map/?wkid=102100&x=-8915613&y=4610416&l=8&v=2

R4 Essential Facilities Report

Community Assets

Religious Organization · Educational Building · Emergency Medical Services · Government Building · Utility · National Register Historical Structure

Non-Historical Community Assets: **Fayette County** has the largest number of inventoried community resources (n=53) and ranked 12th in the State of which the majority are *religious* buildings. **Fayette Unincorporated** is ranked 10th of all unincorporated areas. The town of **Marlinton** is ranked 8th of all incorporated areas in the State with the most community assets.

Historical Community Assets: **Greenbrier County** is ranked 7th in the State as having the most historical buildings (n=56) in the high-risk floodplain of which the majority are in the city of **Ronceverte** (ranked 14th of all incorporated areas). The split community of **Alderson** and the city of **Mount Hope** also have significant numbers of historical buildings in the high-risk floodplain (18 and 16 respectively).

Mitigation: A designated historic structure can obtain the benefit of subsidized flood insurance through the NFIP even if it has been substantially improved or substantially damaged so long as the building maintains its historic designation.
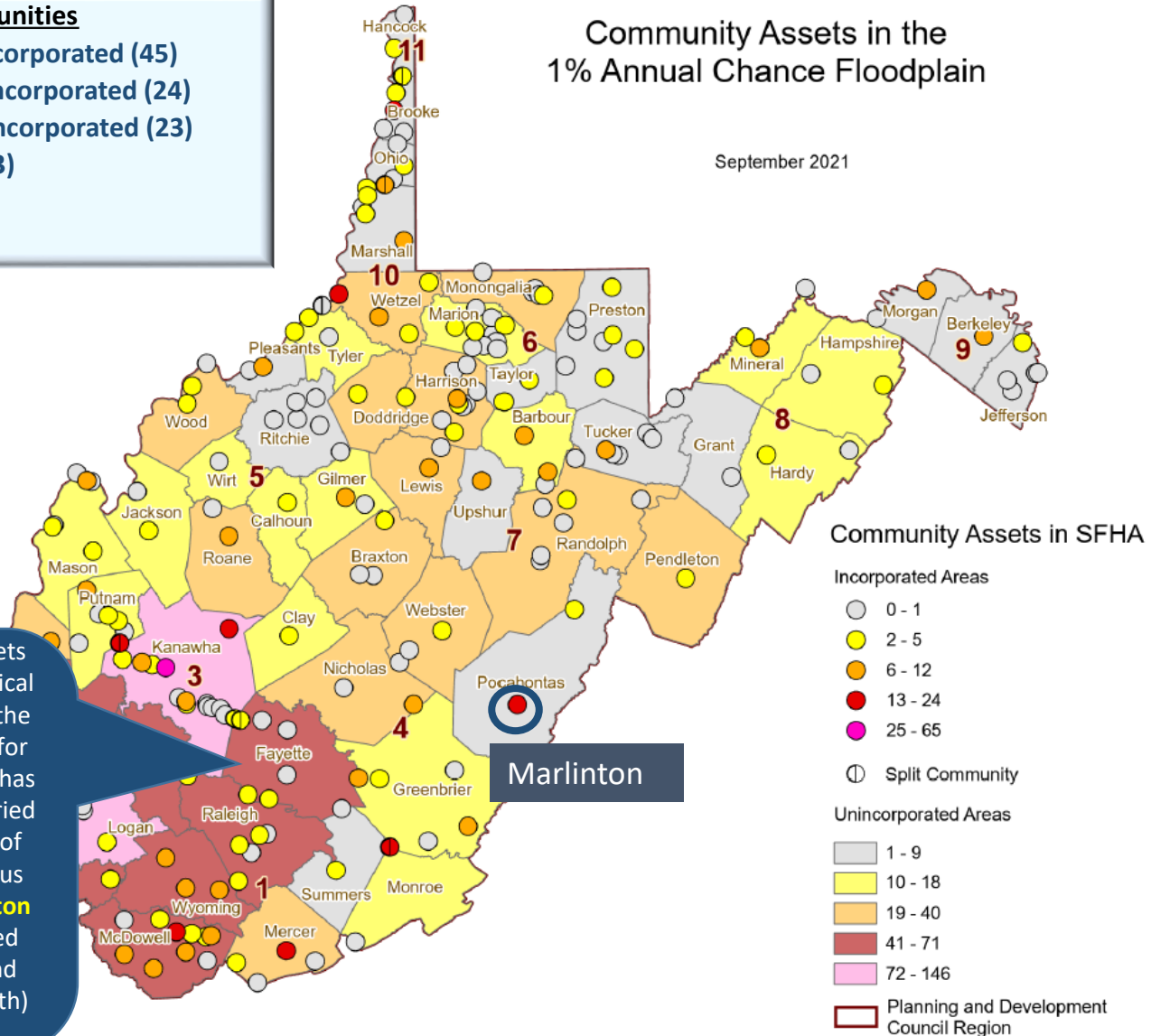
Community Assets (Non-Historical)

Region 4 Communities
- **Fayette Unincorporated (45)**
- **Webster Unincorporated (24)**
- **Nicholas Unincorporated (23)**
- **Marlinton (13)**
- **Alderson (8)**
- **Richwood (8)**

Community Assets in the
1% Annual Chance Floodplain

September 2021

Marlinton

Community Assets in SFHA

Incorporated Areas
- ○ 0 - 1
- ● 2 - 5
- ● 6 - 12
- ● 13 - 24
- ● 25 - 65
- ◐ Split Community

Unincorporated Areas
- 1 - 9
- 10 - 18
- 19 - 40
- 41 - 71
- 72 - 146
- ▭ Planning and Development Council Region

A total of 170 community assets (non-historical) and 102 historical buildings were inventoried in the 1%-annual-chance floodplain for the Region 4. **Fayette County** has the largest number of inventoried community resources (n=53) of which the majority are religious buildings. The town of **Marlinton** (ranked 3rd of all incorporated areas) has six government and two utility buildings (ranked 5th) located in the floodplain.

Community Assets

Religious Organization | Educational Building | Emergency Medical Services | Government Building | Utility

Community Name	County	Historical Place	Facility Type	Flood Tool Link	Flood Depth	Building Damage Percent
Ronceverte	GREENBRIER	Ronceverte Water Treatment Plant	**Utilities**	FT	9.6	21%
Fayette County*	FAYETTE	United States Postal Service Office	**Government**	FT	7.0	15%
Webster County*	WEBSTER	United States Postal Service	**Government**	FT	5.5	7%
Webster County*	WEBSTER	Craigsville Public Service District	**Utilities**	FT	5.1	29%
Fayette County*	FAYETTE	New River Gorge Visitor Contact Center	**Government**	FT	4.8	14%

* Unincorporated Area
** Split Community

Community Engagement and Verification: A total of 170 community assets (non-historical) and 102 historical buildings were inventoried in the 1%-annual-chance floodplain for the **Region 4**

Review the accuracy and completeness of all *active* **community assets**. Report any structures that are missing. Verify the buildings and location using the CL Report / Tables, BL Tables, and Risk MAP View of the WV Flood Tool. Review and identify mitigation strategies for the community assets vulnerable to flooding.

Community Assets

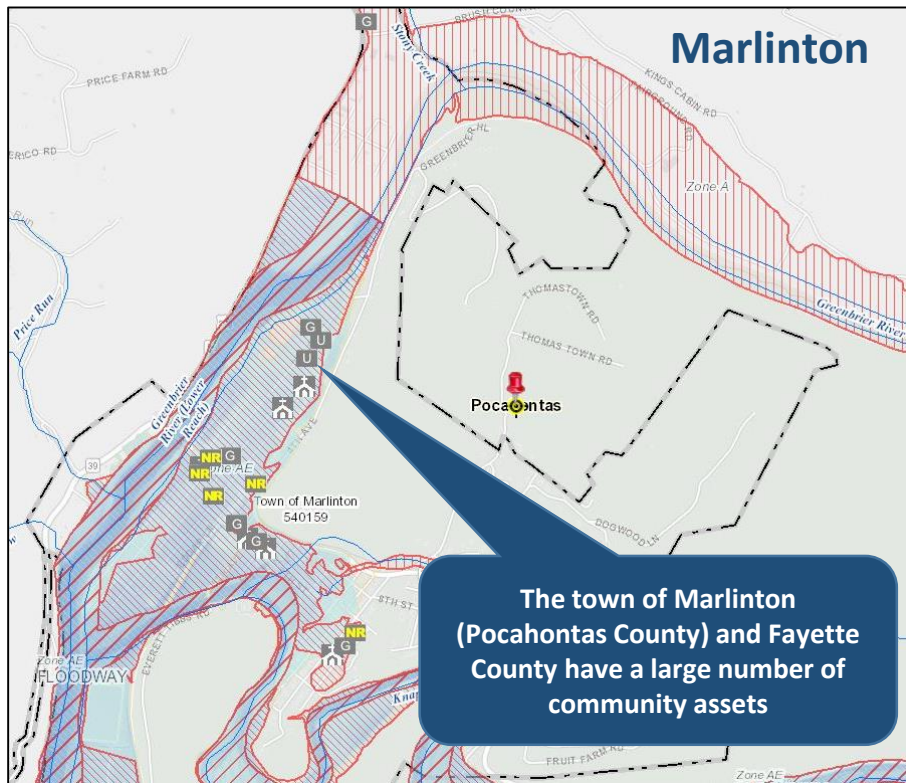Religious Organization

Educational Building

Emergency Medical Services

Government Building

Utility

Marlinton

The town of Marlinton (Pocahontas County) and Fayette County have a large number of community assets

Risk Assessment

Community Assets: A total of 170 community assets (non-historical) were inventoried in the 1%-annual-chance floodplain for the **Region 4** Planning and Development Council. **Fayette County** has the largest number of inventoried community resources (n=53) of which the majority are *religious* buildings. The town of **Marlinton** (ranked 3rd of all incorporated areas) has six *government* and two *utility* buildings (ranked 5th) located in the floodplain.
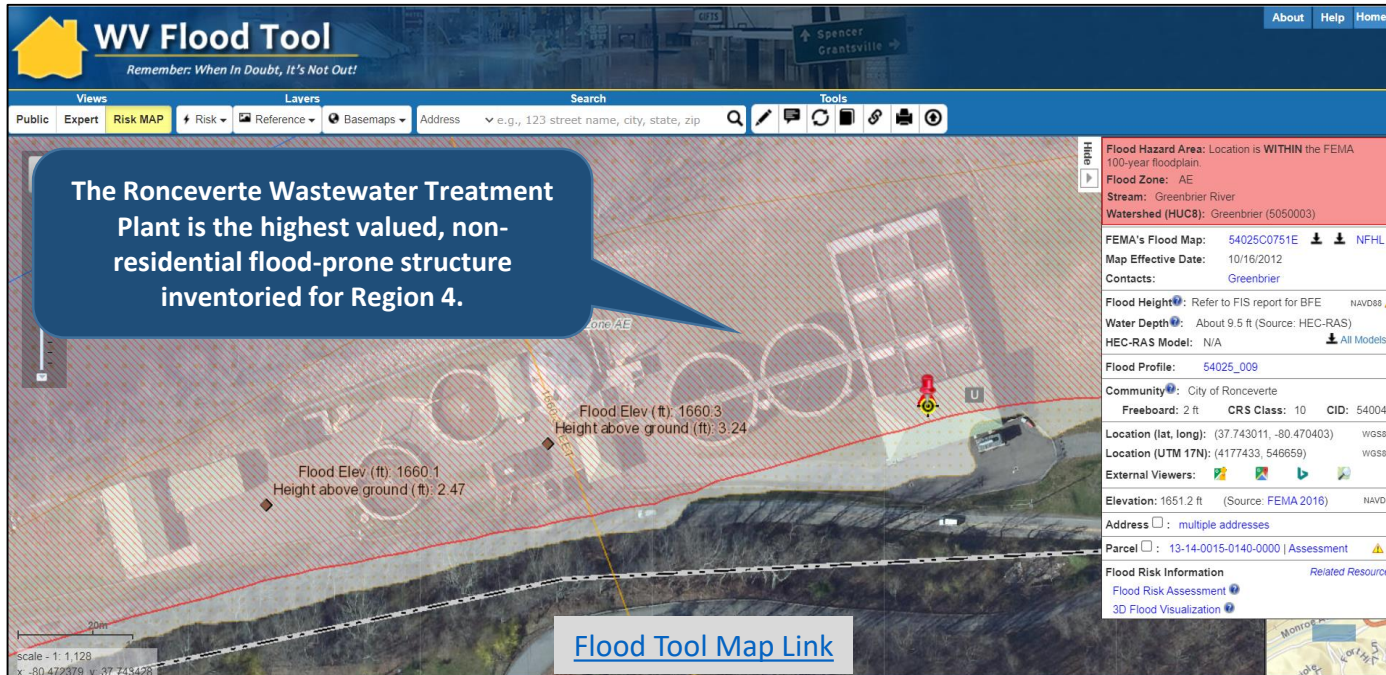
R4 Community Assets Report

Highly Valued ($) Utility

$24M Ronceverte Wastewater Treatment Plant (on the State's Top 100 List)

The Ronceverte Wastewater Treatment Plant is the highest valued, non-residential flood-prone structure inventoried for Region 4.

Flood Tool Map Link

Mitigation: Examples of mitigation measures for *utilities* include:

- Emergency response plan
- Barriers around key assets
- Elevated electrical equipment
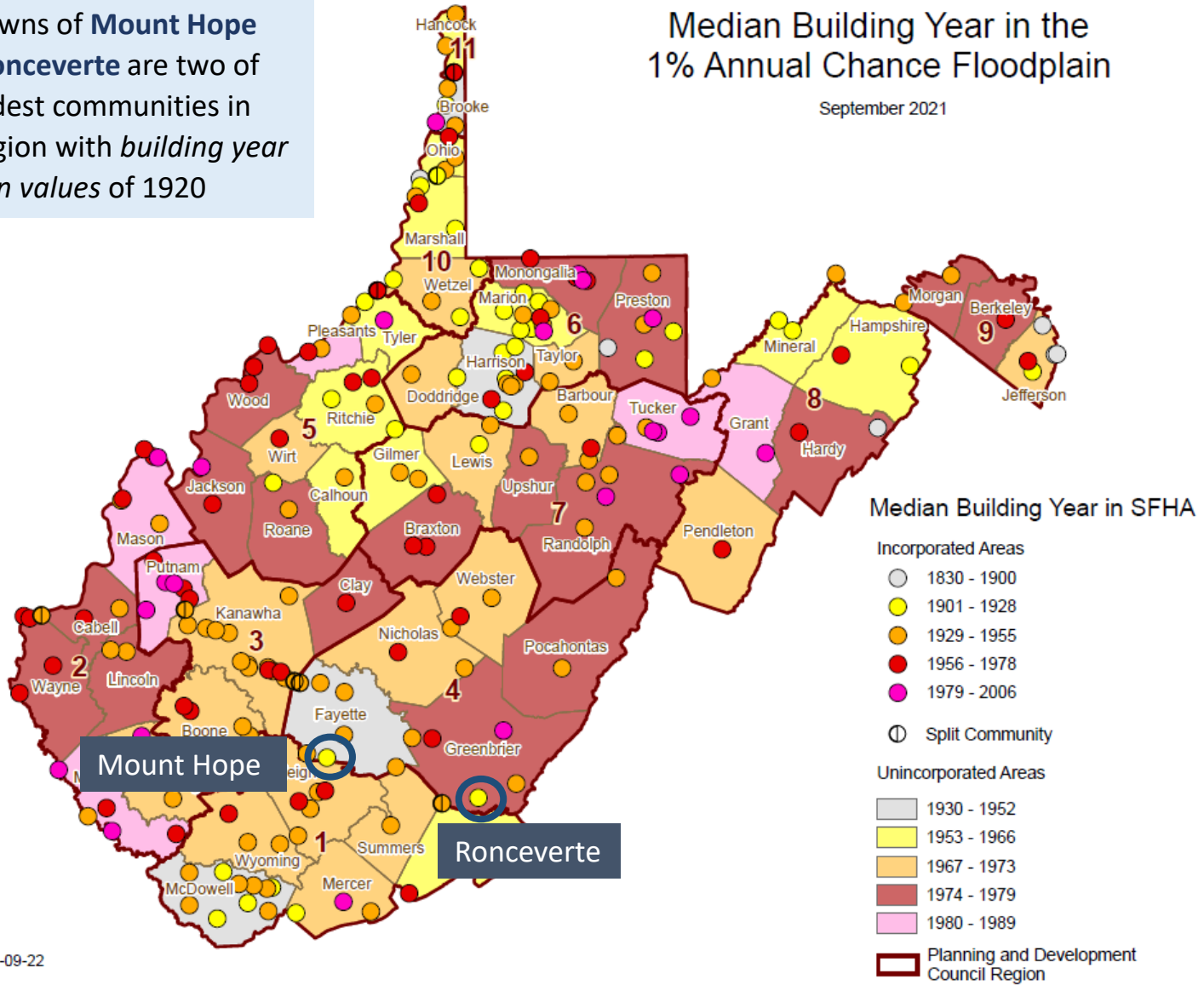- Emergency generators
- Bolted down chemical tanks

Risk Assessment: In 2018, the new **Ronceverte's wastewater treatment plant** was constructed at a cost of $24 million. All structures of the wastewater treatment plant are in the effective high-risk floodplain at a 1% (100-year) estimated flood inundation depth of 9.5 feet. At the treatment plant location, the 0.2% (500-year) estimated flood inundation depth is about two feet higher than that of the 1% floodplain. The USGS high water marks show the maximum inundation of 3.24 feet above the ground at the facility site for the 2016 flood event. The structures are also located in a preliminary floodplain at a 1% (100-year) estimated inundation depth of 6.5 feet. The preliminary floodplain delineated based on the new flood study is under review to become effective.

Historical Structures (Building Year)

The towns of **Mount Hope** and **Ronceverte** are two of the oldest communities in the region with *building year median values* of 1920

Median Building Year in the 1% Annual Chance Floodplain

September 2021

Median Building Year in SFHA

Incorporated Areas
- 1830 - 1900
- 1901 - 1928
- 1929 - 1955
- 1956 - 1978
- 1979 - 2006
- Split Community

Unincorporated Areas
- 1930 - 1952
- 1953 - 1966
- 1967 - 1973
- 1974 - 1979
- 1974 - 1979
- 1980 - 1989
- Planning and Development Council Region

WVGISTC 2021-09-22

Historical Community Assets

Historical Buildings (Region 4)

Community Name	County	Facility Name	Facility Type	Flood Tool Link	Flood Depth	Building Damage Percent
Mount Hope	FAYETTE	Mount Hope Historic District	**National Register**	FT	6.8	46%
Fayette County*	FAYETTE	Bank of Glen Jean	**National Register**	FT	4.8	14%
Alderson**	GREENBRIER	Alderson Historic District	**National Register**	FT	4.8	14%
Ronceverte	GREENBRIER	Ronceverte Historic District	**National Register**	FT	4.4	43%
Mount Hope	FAYETTE	Mount Hope Historic District	**National Register**	FT	4.3	13%
Alderson**	GREENBRIER	Alderson Historic District	**National Register**	FT	4.2	27%

Source Data: https://data.wvgis.wvu.edu/pub/RA/State/BL/CommunityAsset/
* Unincorporated Area
** Split Community

Risk Assessment: Buildings identified within National Register Areas or registered historic districts are older than 1930. **Greenbrier County** is ranked 7th in the State as having the most historical buildings (n=56) in the high-risk floodplain of which the majority are located in the city of **Ronceverte** (ranked 14th of all incorporated areas). The split community of **Alderson** and the city of **Mount Hope** also have significant numbers of historical buildings in the high-risk floodplain (18 and 16 rank respectively).

National Register Historical Structure

Mitigation: A designated historic structure can obtain the benefit of subsidized flood insurance through the NFIP even if it has been substantially improved or substantially damaged so long as the building maintains its historic designation.

National Register Areas

National Register Areas (Region 4)

Community Name	County	Historic Name	# Bldg. Points in NR Area (estimate)	Flood Tool Link
Alderson**	GREENBRIER	Alderson Historic District	45	FT
Ronceverte	GREENBRIER	Ronceverte Historic District	35	FT
Mount Hope	FAYETTE	Mount Hope Historic District	18	FT
Richwood	NICHOLAS	Downtown Richwood Historic District	10	FT

Risk Assessment: For communities with the most National Register Areas in the State that intersect the 1% floodplain, **Greenbrier County** (12 NR Areas) is ranked 4th and **Fayette County** (7 NR Areas) ranked 7th

Alderson Historic District

Ronceverte Historic District

Risk Assessment

COMMUNITY ENGAGMENT &
DATA VERIFICATION
What mitigation actions can be identified
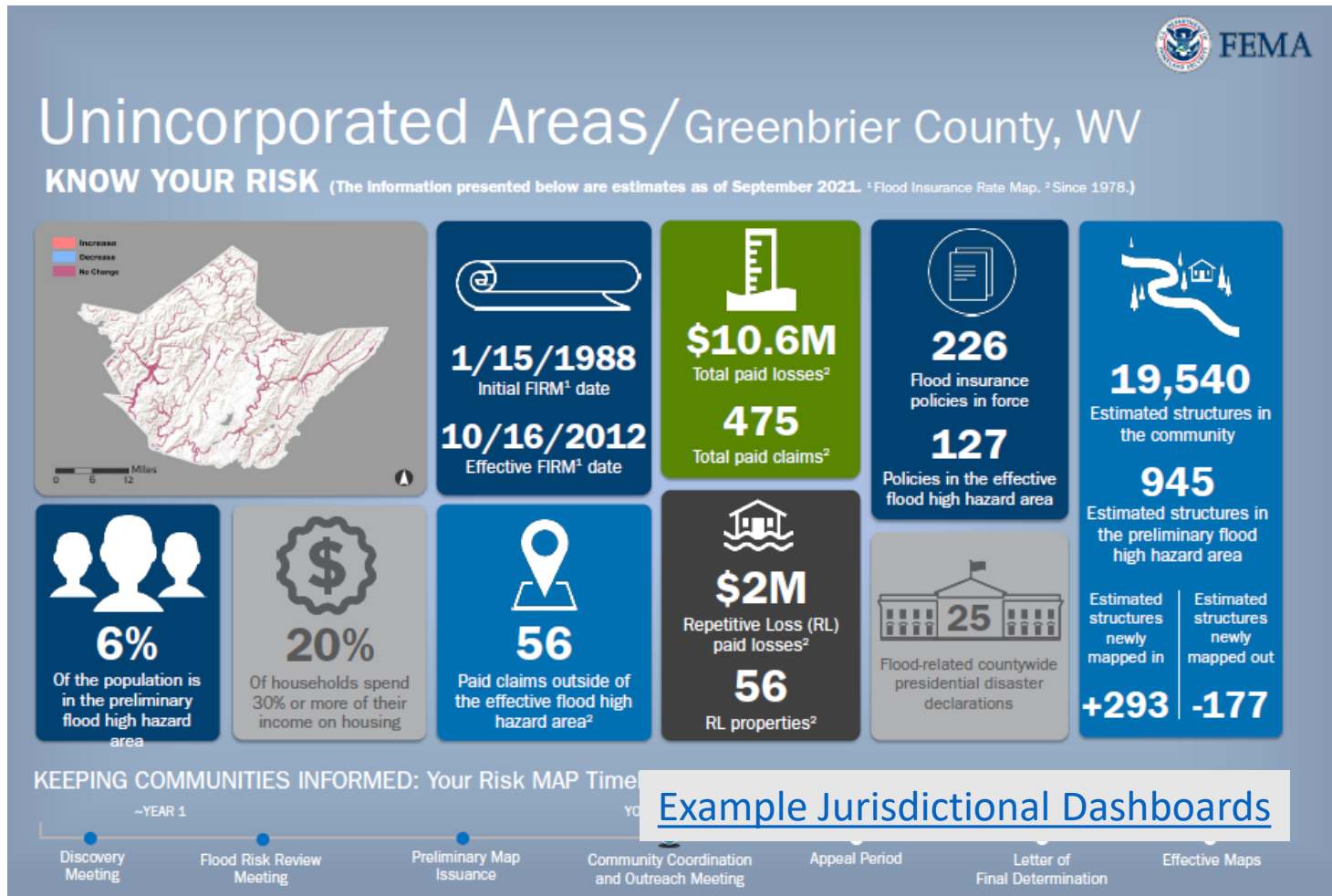
Data Verification

Use **Building-Level (BL) Tables** to identify **Most Vulnerable Structures**

- Statewide BLRA (GIS)
- BLRA County Tables organized by region
- BLRA Data Extract Tables: High Building Value, High Damage Loss, High Minus Ratings
- BLRA Statewide Top Lists: Building Value, Flood Depth, Damage Loss $, Damage Loss %, Minus Rated, Mitigated Structures
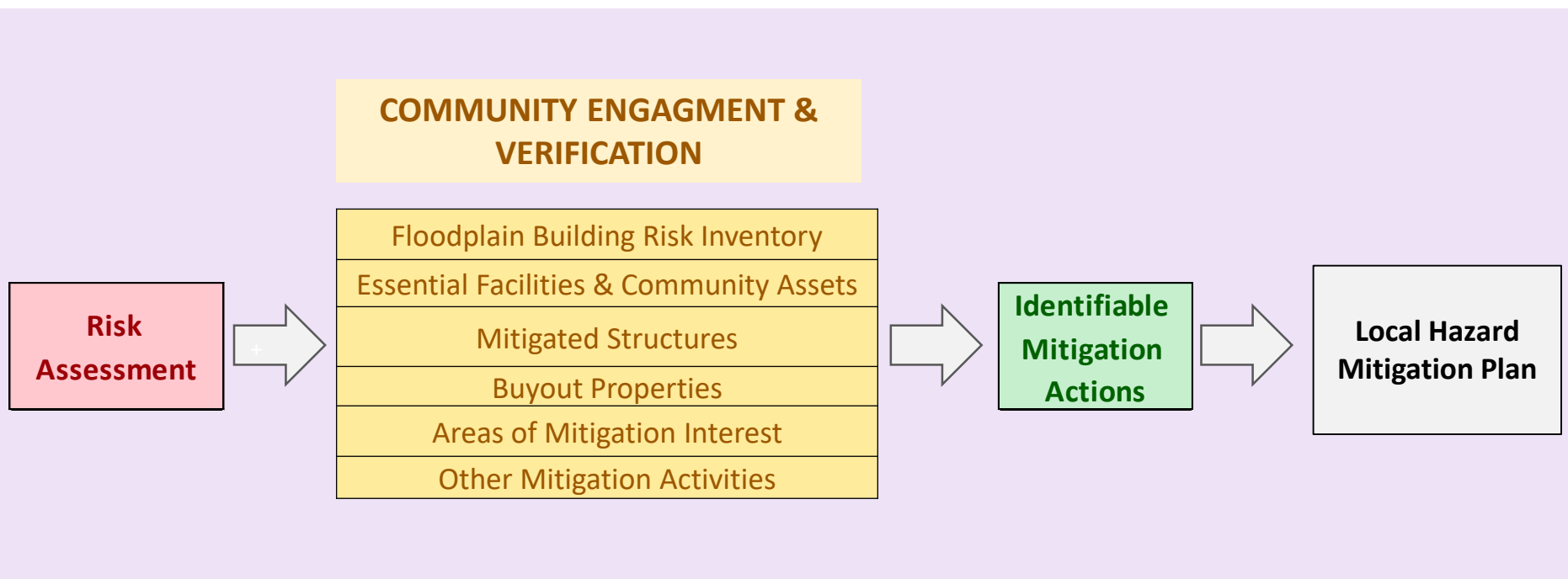
Community Level Risk Profiles

Use **Community-Level (CL) Tables**
to supplement FEMA's Jurisdictional Flood Risk Dashboards

Example Jurisdictional Dashboards

Refer to the Risk Matrices EXPOSURE and DAMAGE LOSS to develop community risk profiles

Local Community Engagement

COMMUNITY ENGAGMENT & VERIFICATION

Floodplain Building Risk Inventory
Essential Facilities & Community Assets
Mitigated Structures
Buyout Properties
Areas of Mitigation Interest
Other Mitigation Activities

Risk Assessment

Identifiable Mitigation Actions

Local Hazard Mitigation Plan

Risk Assessment Data for Community Engagement, Verification, and Identifiable Mitigation Actions incorporated into Local Hazard Plans

Primary Objective: Incorporating Mitigation Actions in Local Hazard Mitigation Planning