

# Flood Risk Assessment in Rainelle: Exposure, Vulnerability, and Loss Indicators

WV GIS Technical Center  
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Renters clearing away their belongings after the 2016 flood



An inundated basement in the 2016 flood

## Building Exposure White Sulphur Springs and Rainelle

Category	Exposure Indicator	White Sulphur Springs	Rainelle	Ratio* in WV Incorporated Areas (2021)
Buildings by Flood Zone (Count & Value)	Total Primary Building Count in Floodplain	425 (Rank***: 12 <sup>th</sup> )	338 (Rank: 18 <sup>th</sup> )	59 (Median)
	Building Ratio b/w Floodplain & Community Total	26%	34%	9%
	Total Primary Building Value in Floodplain of Community	\$41.02M (Rank: 16 <sup>th</sup> )	\$16.89M	\$6.42M (Median)
	Median Building Value in Floodplain	\$49K	\$38K	\$42K
	Building Count in Floodway** (High Velocity)	105 (Rank: 6 <sup>th</sup> )	47 (Rank: 18 <sup>th</sup> )	12 (Avg.)
	Percent Building Count in Floodway** (High Velocity & Depth)	25%	14%	8%
	New Maps: Bldgs. "Mapped In" SFHA	75 (Rank: 11 <sup>th</sup> )	325 (Rank: 3 <sup>rd</sup> )	19 (Avg.)
	New Maps: Bldgs. % Count "Mapped In" SFHA	18%	96%	14%
	New Maps: Bldgs. "Mapped In" Floodway	14	38	97
New Maps: Bldgs. "Mapped Out" SFHA	117 (Rank: 8 <sup>th</sup> )	1	19 (Avg.)	
	New Maps: Bldgs. % Count "Mapped Out" SFHA	28%	0%	14%

## Building Exposure... White Sulphur Springs and Rainelle

Category	Exposure Indicator	White Sulphur Springs	Rainelle	Ratio* in WV Incorporated Areas (2021)
Building Ownership	Owner Occupied Residential Buildings in Floodplain	208	153	65%
	Percent Owner Occupied Residential Buildings in Floodplain	49%	45%	
Building Occupancy and Value	Residential Building Count in Floodplain	372 (Rank: 12 <sup>th</sup> )	250	44
	Percent Count Residential Building in Floodplain	88%	74%	81%
	Non-Residential Building Count in Floodplain	53	88 (Rank: 11 <sup>th</sup> )	12
	Percent Count Non-Residential Bldgs. in Floodplain	12%	26%	19%
	Residential Building Value in Floodplain	\$20.45M (Rank: 16 <sup>th</sup> )	\$9.29M	\$2.11M
	Percent Residential Value in Floodplain	50%	55%	31%
	Non-Residential Building Value in Floodplain	\$20.56M	\$7.60M	\$2.99M
	Percent Non-Residential Value in Floodplain	50%	45%	69%
	Mobile Homes in Floodplain	4	14	5
Percent Mobile Homes in Residential Buildings in Floodplain	1%	4%	11%	

## Building Exposure/Physical Vulnerability White Sulphur Springs and Rainelle

Category	Exposure Indicator	White Sulphur Springs	Rainelle	Median & Ratio in WV Incorporated Areas (2021)
Building Year Construction/ FIRM Status	Median Construction Year in Floodplain	1940	1950	1947
	% Pre-FIRM Structures (includes "unknown")	88%	77%	77%
	% Post-FIRM Structures (also "mapped-in SFHA" Post-FIRM structures regulated to Pre-FIRM)	12%	23%	13%
Physical Structural Vulnerability (Basements, Stories, & Value)	Primary Buildings with Basements in Floodplain	93	27	37%
	Percent Count Buildings with Basements in Floodplain	22%	8%	
	One-Story Residential Buildings in Floodplain	336	292	69%
	Percent Count One-Story Residential Buildings in Floodplain	79%	86%	
	Red Tag: Dilapidated/Vacant Residential & Commercial Buildings	20	56	6
	Percent Low Valued (Red Tag) Structures	5%	17%	4%

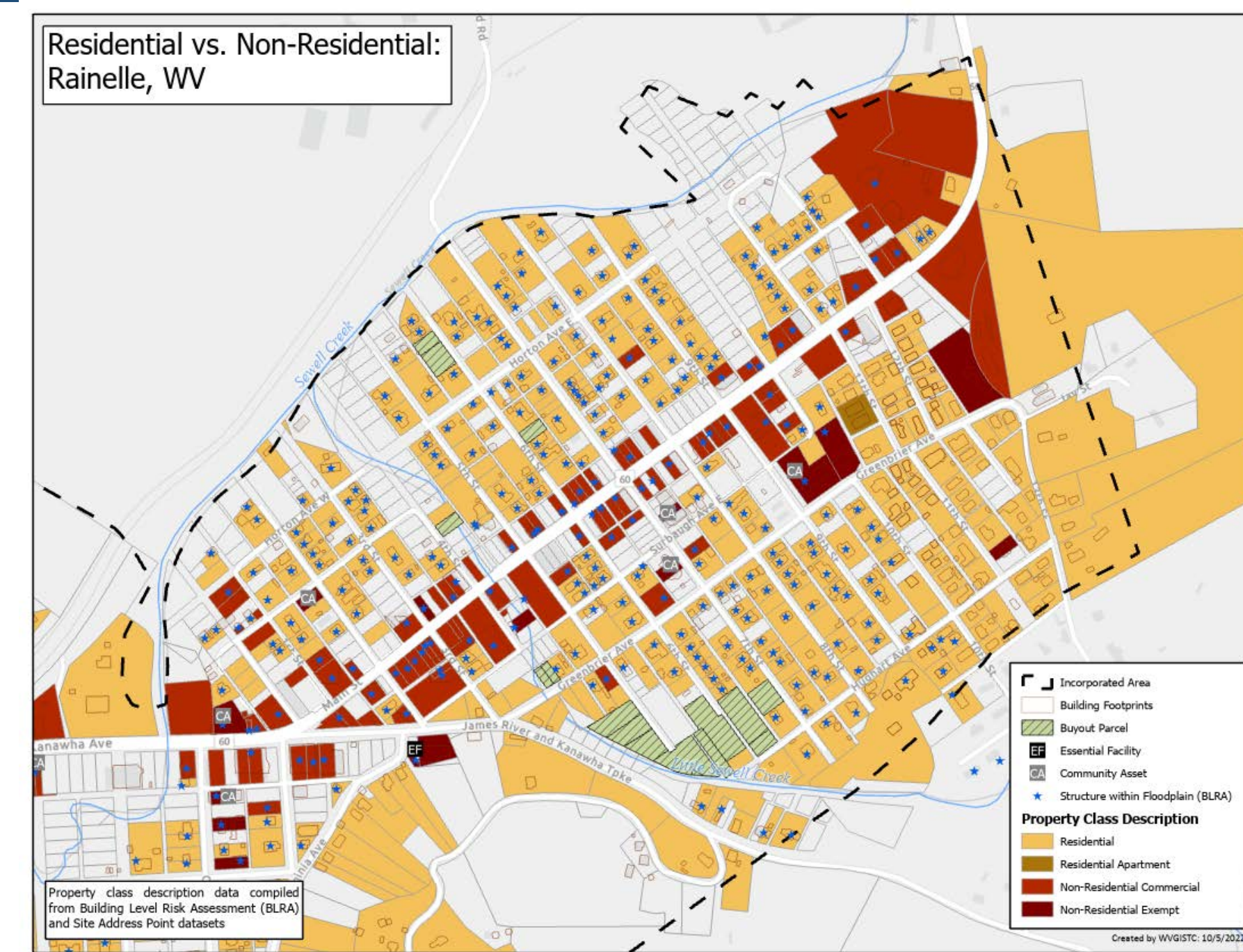
\* For numbers and dollar values, used median, or average where the median was zero or too low, in the state's 213 incorporated areas  
\*\* Floodway includes both the effective and advisory floodways (2012 & 2022 checked manually)  
\*\*\* Ranks mentioned based on the BLRA data of April 2022 where the community is among the top 20 incorporated areas in WV  
The red texts show large difference, to the risk side, from the state ratios.  
The green texts show large difference, to the resilience side, from the state ratios.

## Social Vulnerability Indicators White Sulphur Springs and Rainelle

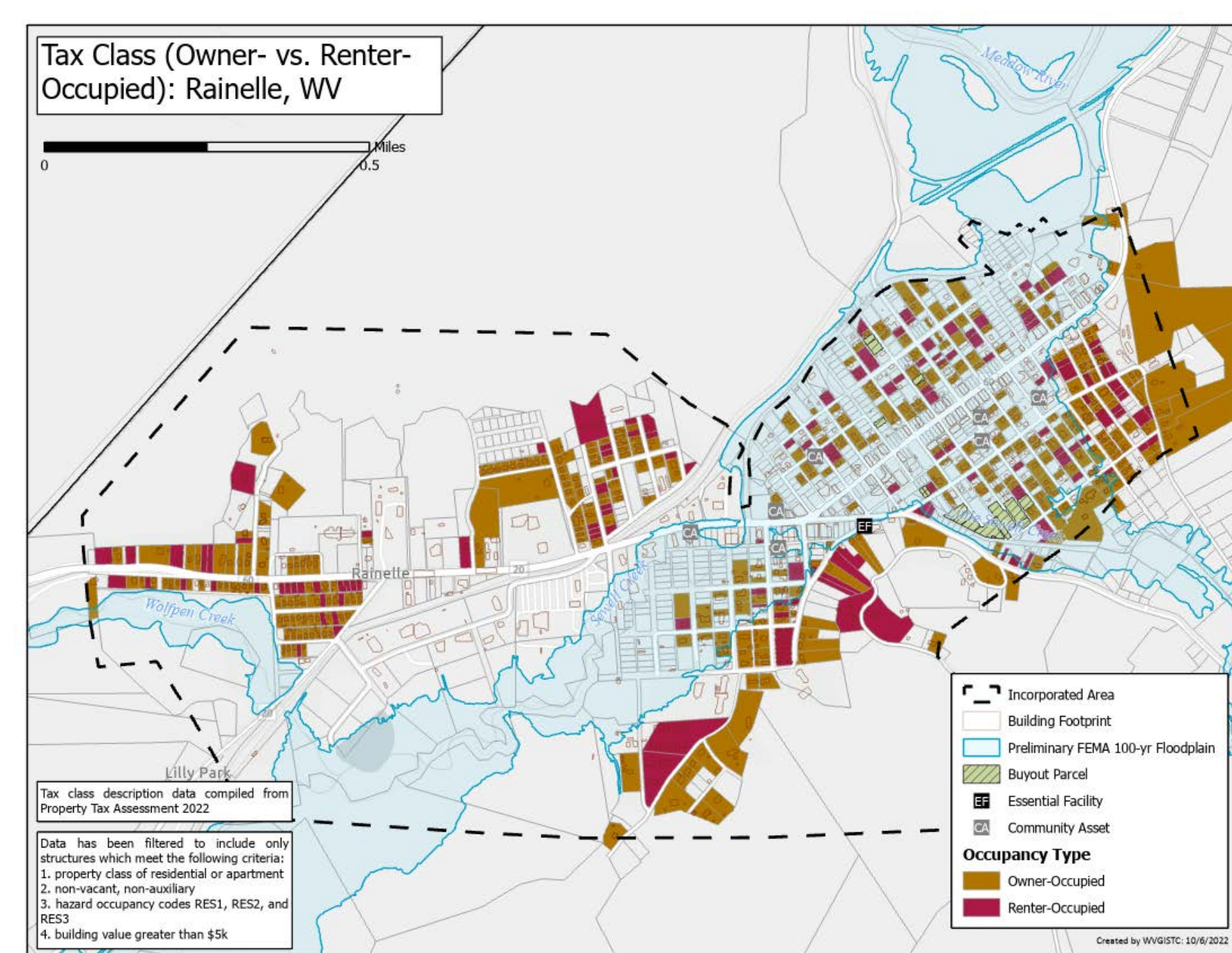
Vulnerability Indicators	White Sulphur Springs	Rainelle	State Ratio	National Ratio
Poverty Rate	14.4%	37.0%	17.3%	12.9%
Unemployment Rate	21.4%	33.6%	23.8%	14.7%
Vulnerable Ages Ratio	41.7%	39.8%	30.8%	28.3%
Disability Ratio	17.8%	26.9%	18.7%	13.0%
Population Growth Ratio	-9.1%	-20.9%	-3.2%	7.4%
Renter-Occupied Ratio	42.8%	43.0%	26.8%	36.0%
Housing Values Less than \$50K	3.9%	37.5%	16.9%	6.6%
Housing Median Value	\$125,700	\$59,400	\$119,600	\$229,800

The red texts show more than 5% of difference, to the vulnerability side, from the state ratios.

## Residential vs. Non-Residential Parcels Rainelle



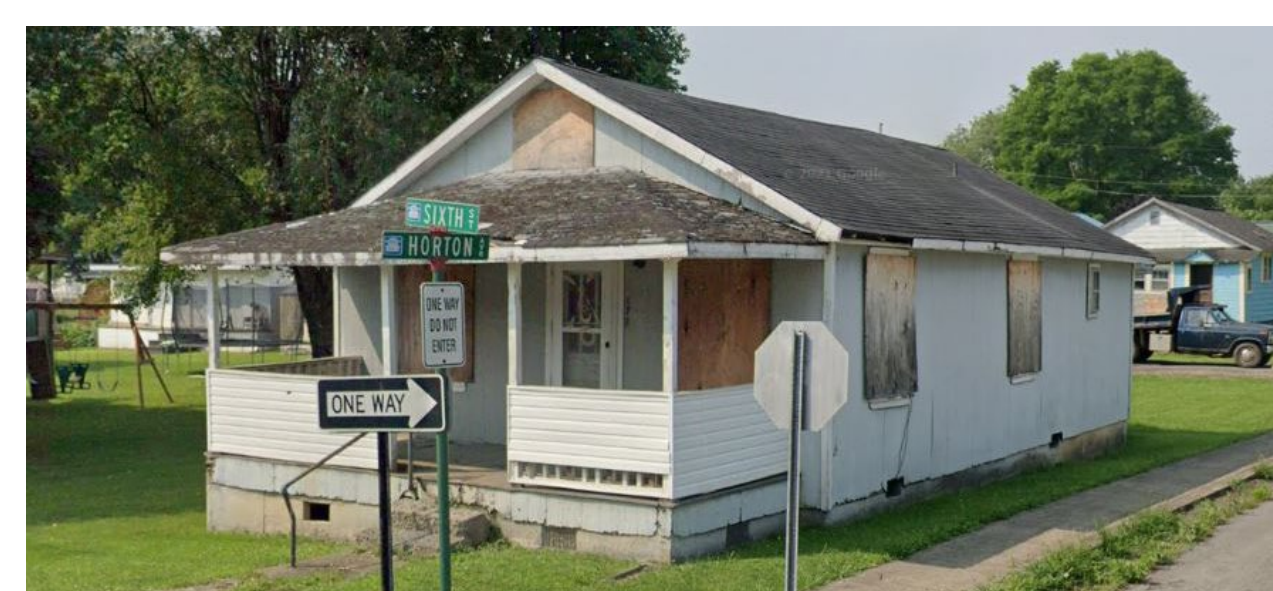
## Tax Class, Owner- vs. Renter-Occupied Parcels Rainelle



## Exposure, Examples of Low Valued Structures in Floodplain Rainelle



Building ID: 13-13-0001-0176-0000\_214



Building ID: 13-13-0001-0127-0000\_178

## Significant Structures Exposure White Sulphur Springs and Rainelle

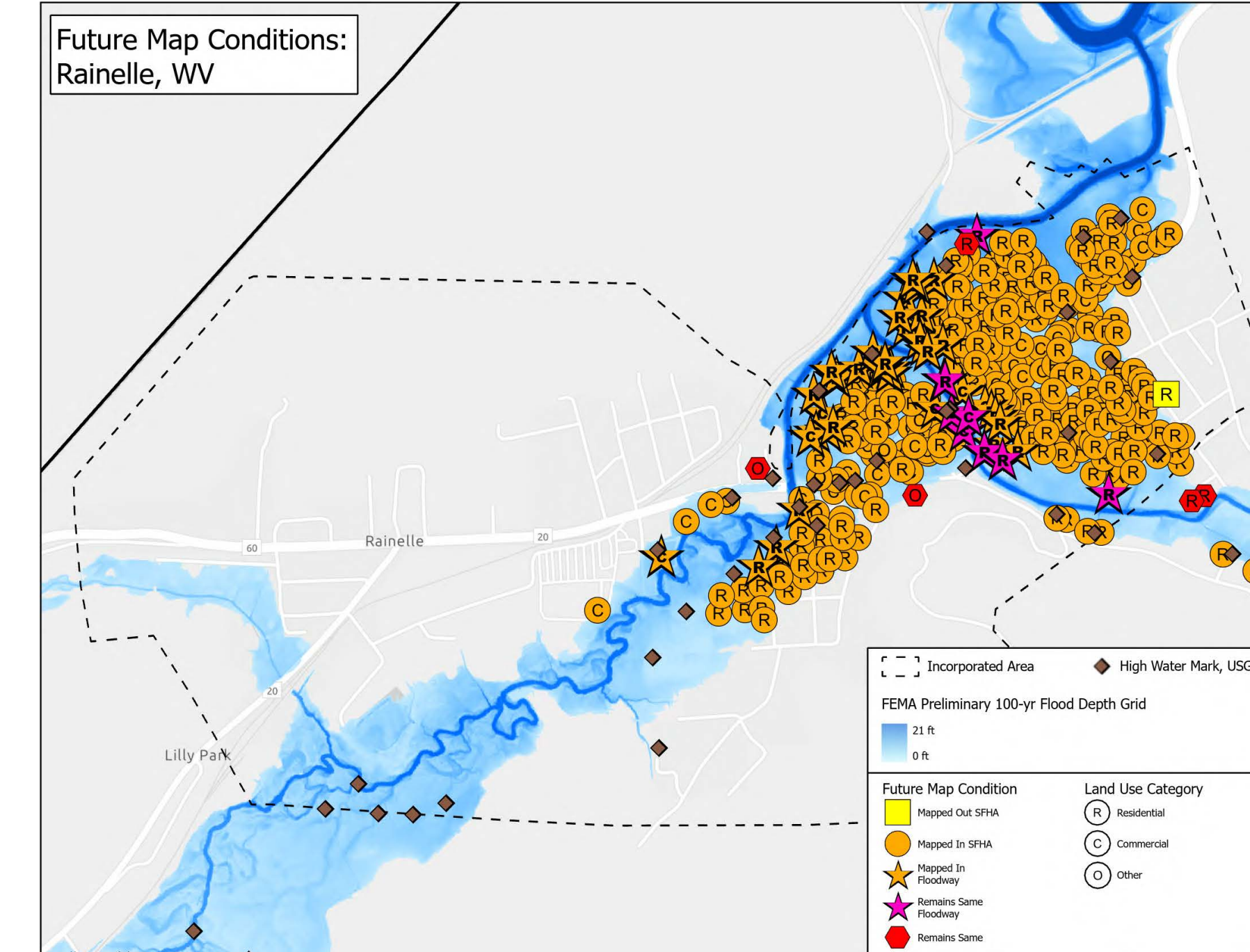
Category	Exposure Indicator	White Sulphur Springs	Rainelle	Average in WV Incorporated Areas (2021)
Significant Structures Count	Number of Essential Facilities in the Moderate Risk 0.2%-Annual-Chance Floodplain	2	2	2
	Number of Community Assets (Non-Historical) in the High-Risk 1%-Annual-Chance Floodplain	8	7	3

The red texts show large difference, to the risk side, from the state ratios.



Church of God in Rainelle:  
Building ID: 13-13-0005-0366-0000\_373  
Hazard occupancy Class: REL1 (Religious)  
FIRM Status: Post-FIRM regulated to Pre-FIRM  
Appraised Value: \$435,000 (Highest in significant structures)

## Building Exposure, Future Map Conditions Rainelle



## Physical Flood Loss White Sulphur Springs and Rainelle

Category	Loss Indicator	White Sulphur Springs	Rainelle	Rate* in WV Incorporated Areas (2021)
Physical (Building) Loss By 1%-Annual-Chance Flood Event	TEIF Building Dollar Loss Estimates	\$1,225K	\$994K	\$1,246K (Avg.)
	TEIF Building Loss Ratio	3%	6%	10%
	Median Individual Building Damage	\$3K	\$2K	\$7K (Mdn.)
	Substantial Damage (>50%) Estimates	0 89 in 2016 Flood	1	7 (Avg.)
	Percent Substantial Damage Estimates	0%	0%	6% (Avg.)
	Moderate Damage (10-50%) Estimates	78 98 in 2016 Flood	106	47 (Avg.)
	Percent Moderate Damage Estimates	18%	31%	34% (Avg.)
	Building Debris Removal Estimates	450 ton	809 ton	165 ton (Mdn.)
	Number of Previous Paid Losses	89	152 (Rank**: 20 <sup>th</sup> )	63 (Avg.)
	Dollar Amount of Previous Insurance Claims	\$2,975K (Rank: 15 <sup>th</sup> )	\$3,720K (Rank: 10 <sup>th</sup> )	\$845K (Avg.)
Number of Repetitive Loss Structures	2	23	3 (Mdn.)	

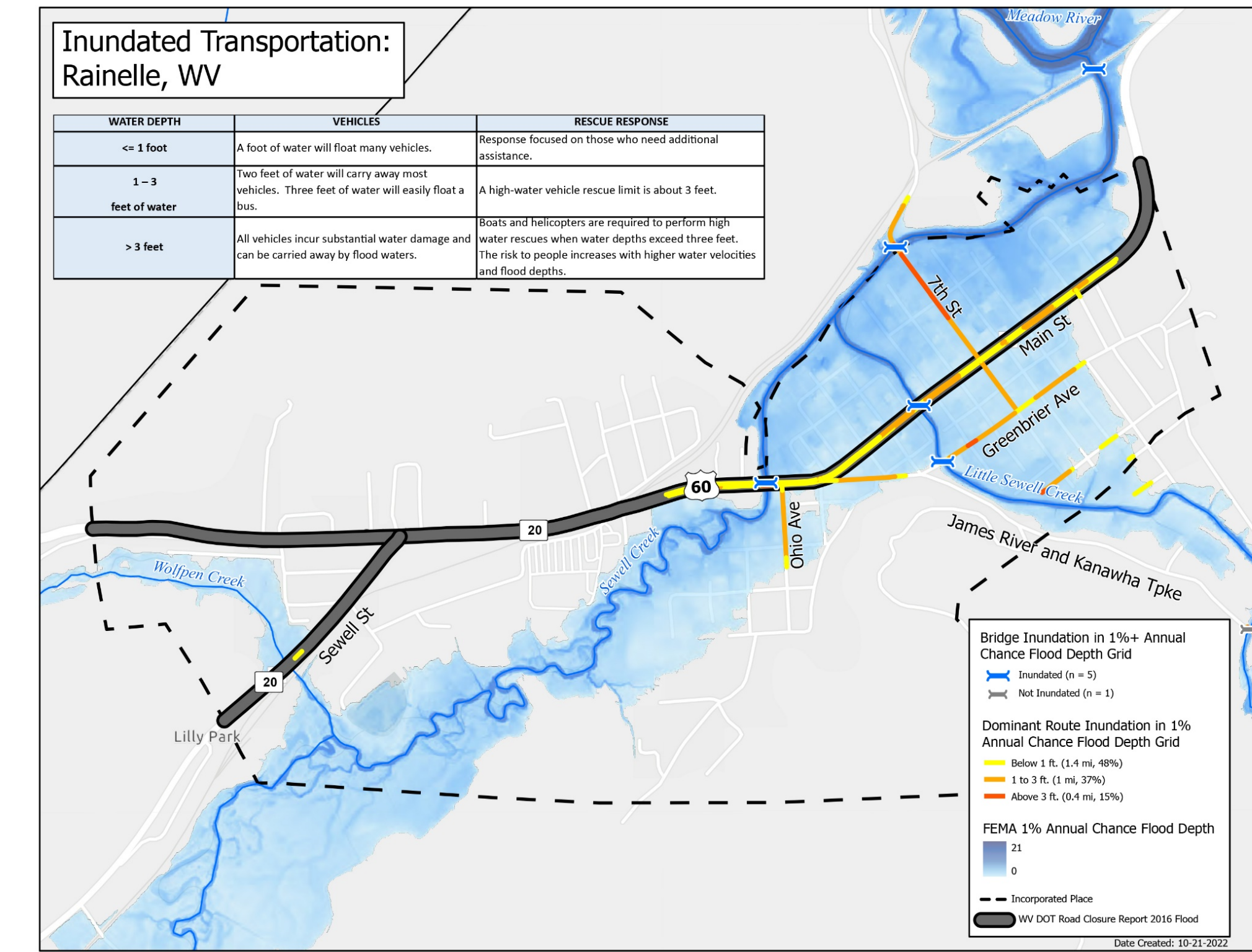
## Human Exposure/Loss White Sulphur Springs and Rainelle

Category	Exposure Indicator	White Sulphur Springs	Rainelle	Median & Ratio in WV Incorporated Areas (2021)
Human Exposure	Estimated Population Residing in High-Risk Flood Zones	1026	582	114
	Percentage of Population Residing in High-Risk Flood Zones	39%	43%	10%
Human Loss By 1%-Annual-Chance Flood Event	Displaced Population Estimates	462 (Rank: 17 <sup>th</sup> )	487 (Rank: 16 <sup>th</sup> )	173 (Avg.)
	Percent of Community Population Displaced	17%	36%	13%
	Estimated Population in Need of Short-Term Shelter	104 (Rank: 18 <sup>th</sup> )	123 (Rank: 14 <sup>th</sup> )	37 (Avg.)

\* For numbers and dollar values, used median, or average where the median was zero or too low, in the state's 213 incorporated areas  
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For Greenbrier County, Red Cross sheltering data from the 2016 flood was compared to the shelter model estimates. According to the Red Cross shelter data, a total of 114 people stayed at six designated Red Cross shelters during the flood event. However, many displaced residents also stayed at unregistered shelters, including the 300 people at the Greenbrier Resort and 129 people at the Baptist Church gymnasium in Rainelle. If the registered persons of the Red Cross Shelters requiring shelter are summed together at 543 people, then this estimate is close to the shelter need model estimate of 603 people for Greenbrier County.

## Infrastructure Exposure, Inundated Transportation Rainelle



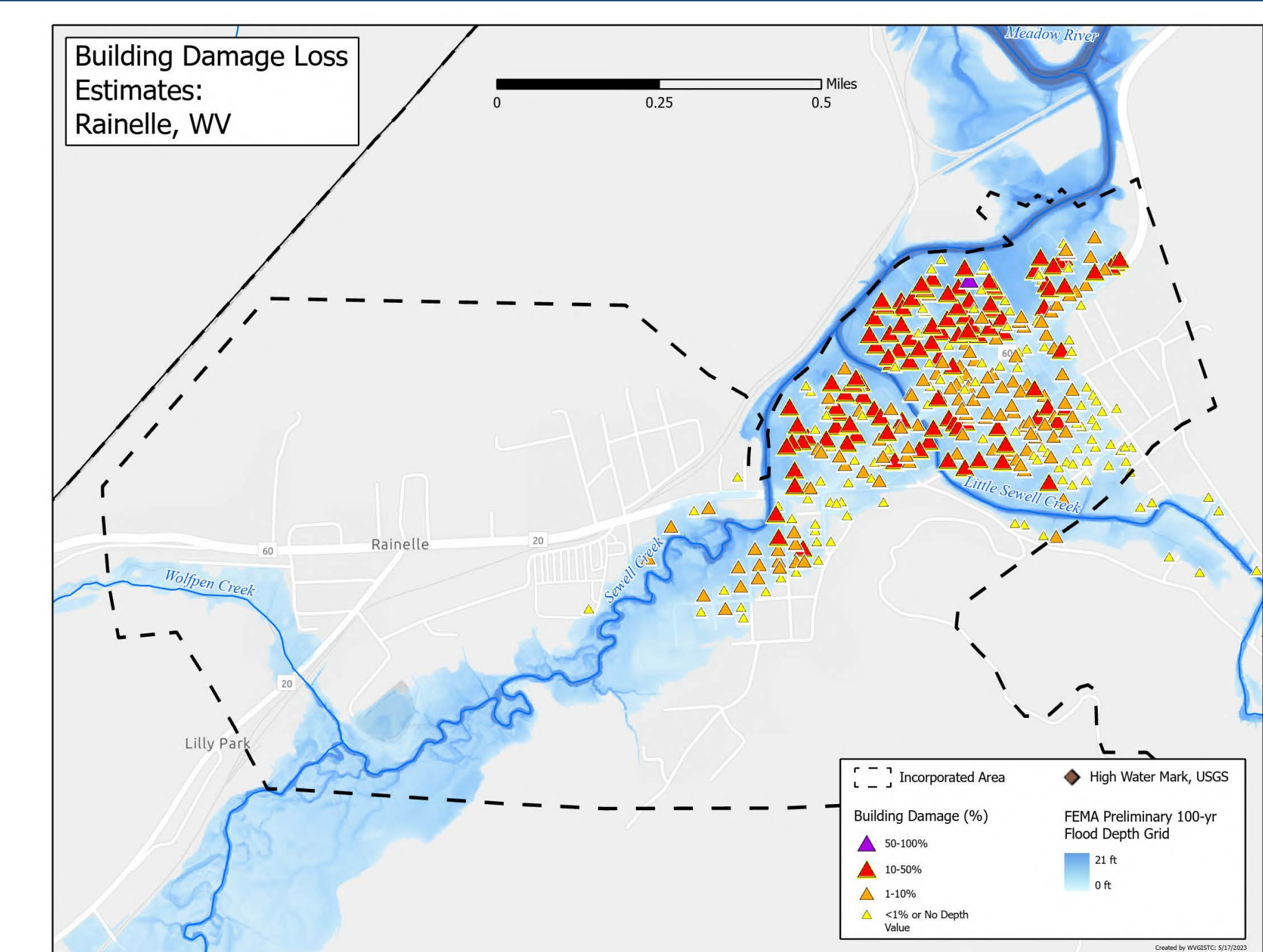
## Building Exposure, High-Value Structures Rainelle

**Highest Value:**  
Building ID: 13-13-0004-0194-0000\_506  
Hazard Occupancy Class:  
FIRM Status: Post-FIRM (1994)  
Appraised Value: \$1,443,900  
(New flood study mapped-in SFHA)

**Highest Residential (RESx) Value:**  
Building ID: 13-13-0009-0011-0000\_242  
Hazard Occupancy Class: RES1 (Residential 1 Family)  
FIRM Status: Pre-FIRM (1967)  
Appraised Value: \$107,400  
(New flood study mapped-in SFHA)

**Highest Apartment Building Value:**  
Building ID: 13-13-0005-0341-0000\_249  
Hazard Occupancy Class: RESB (Multi-Family 3-4 Units)  
FIRM Status: Pre-FIRM (1960)  
Appraised Value: \$63,900  
(New flood study mapped-in SFHA)

## Building Damage Loss Estimates Rainelle



## Structures with High Building Loss (Estimated) Rainelle

**Highest Building Loss (USD) in Rainelle:**  
Building ID: 13-13-0001-0077-0000\_144  
Hazard Occupancy Class: RES1 (Residential 1 Family)  
FIRM Status: Post-FIRM regulated to Pre-FIRM (2005)  
Water Depth in Structure: 3.7 ft (minus rated -4 ft)  
Appraised Value: \$92,800  
Estimated Building Loss: \$41,667  
Building Damage Percentage: 45%

**Highest Building Damage Percentage in Rainelle:**  
Building ID: 13-13-0001-0091-0000\_435  
Hazard Occupancy Class: RES2 (Mobile Home)  
FIRM Status: Pre-FIRM (1973)  
Water Depth in Structure: 2.7 ft (minus rated -3 ft)  
Appraised Value: \$11,600  
Estimated Building Loss: \$8,120  
Building Damage Percentage: 70%