

# 2019 Annual WVFMA Conference

## Statewide Multi-Hazard Risk Assessments

- **GIS Reference Data Development**
  - Aerial Imagery
  - Parcels
  - Addresses
- **Flood Risk ( and WV Flood Tool updates)**
- **Landslide Risk (not discussed in this talk)**

Kurt Donaldson, GISP, CFM  
Manager  
WV GIS Technical Center  
West Virginia University



# Hazard Mitigation Grant Project

## A Statewide Approach to Risk Studies

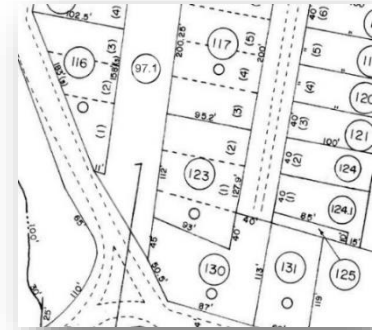
### Multi-Hazard Risk Assessments



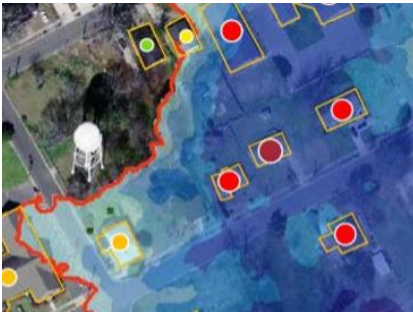
**Floods Risk (TEIF)**



**Landslide Risk (TEAL)**



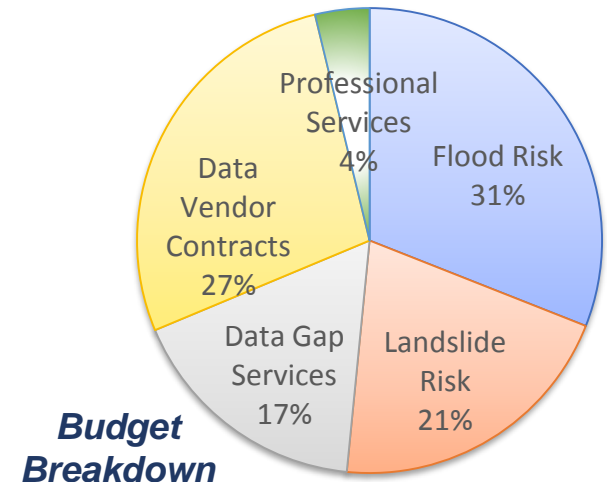
**Reference Data Development**



**Inventory Building-Level Flood-Risk Structures**



**Statewide**



# Hazard Mitigation Grant

## Multi-Agency Coordination

Federal Agencies

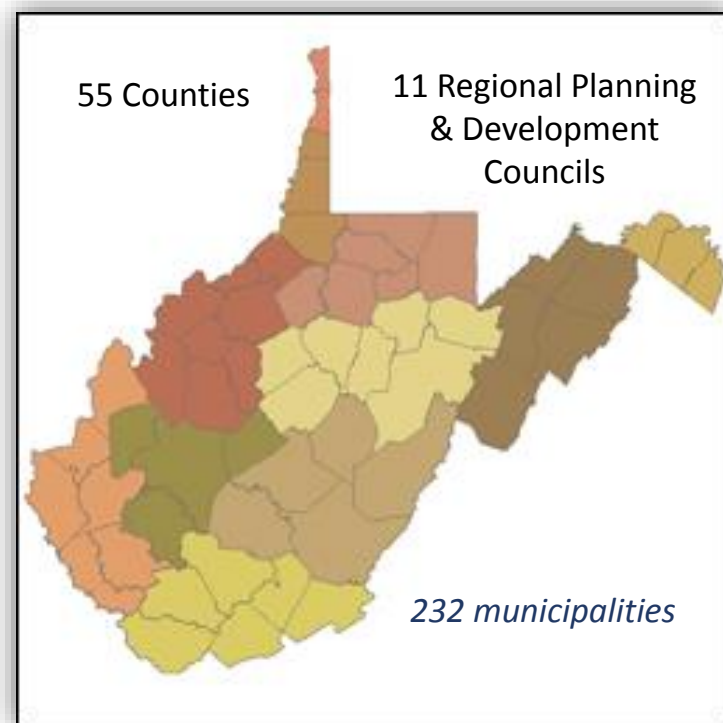
State Agencies

Universities

Regional Councils

Local Counties

Private Companies



FEMA



ISO



WOOD GROUP



WV State GIS Data Clearinghouse

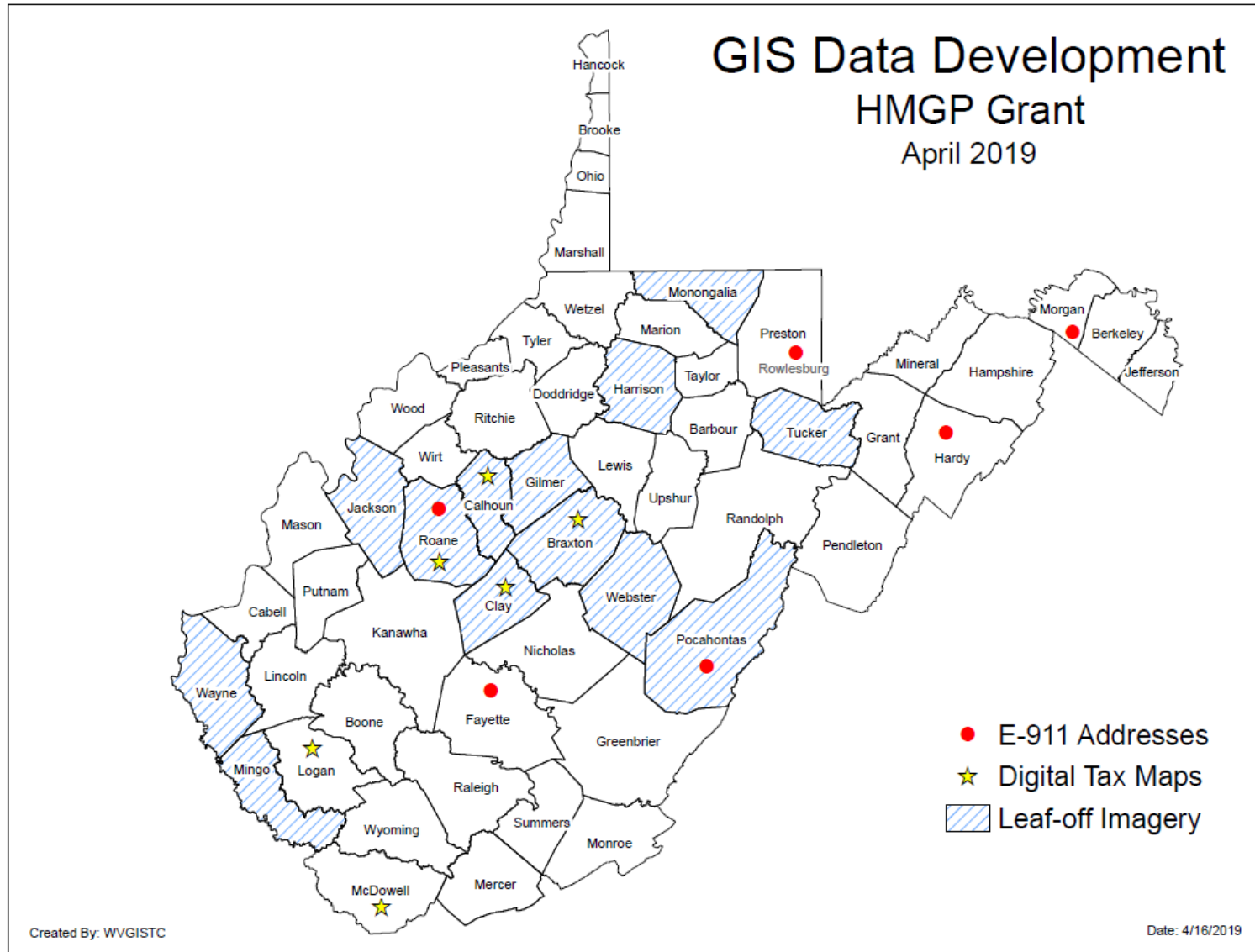


# GIS Reference Data Development

## Statewide Contracts

- **Tax Map Conversion / Parcel Re-Mapping**
- **E-911 Address Mapping**
- **Aerial Imagery**

# Counties benefiting from HMGP



# WV Statewide Aerial Imagery Contract

- **Statewide Contract:** A statewide contract was awarded to Blue Mountain / Thrasher Group in February 2019 for the acquisition of updated digital orthoimagery in West Virginia for the four-year time period 2019-2022. Spring flying season is from late February to Mid-April during leaf-out and no snow conditions.
- **Non-Exclusive Contract:** County offices still have the option to contract with other companies for the same services.
- **Unit Costs:** Aerial imagery can be purchased at four different pixel resolutions. Imagery is unit priced so that participants can budget for projects years in advance. It is recommended that counties acquire leaf-off imagery a minimum of once every five years. Counties with limited funding and resources may qualify for funding assistance.

Pixel Resolution (Detail Level)	3-inch	4-inch	6-inch	12-inch
Cost per square mile	\$62	\$45	\$36	\$25
Map Scale	1" = 50'	1" = 67'	1" = 100'	1" = 200'
Horizontal Accuracy (ASPRS 1)	0.5 feet	0.66 feet	1.0 feet	2.0 feet

Note: 4-band stacked imagery that includes color infrared can be added at 25% of the acquisition cost



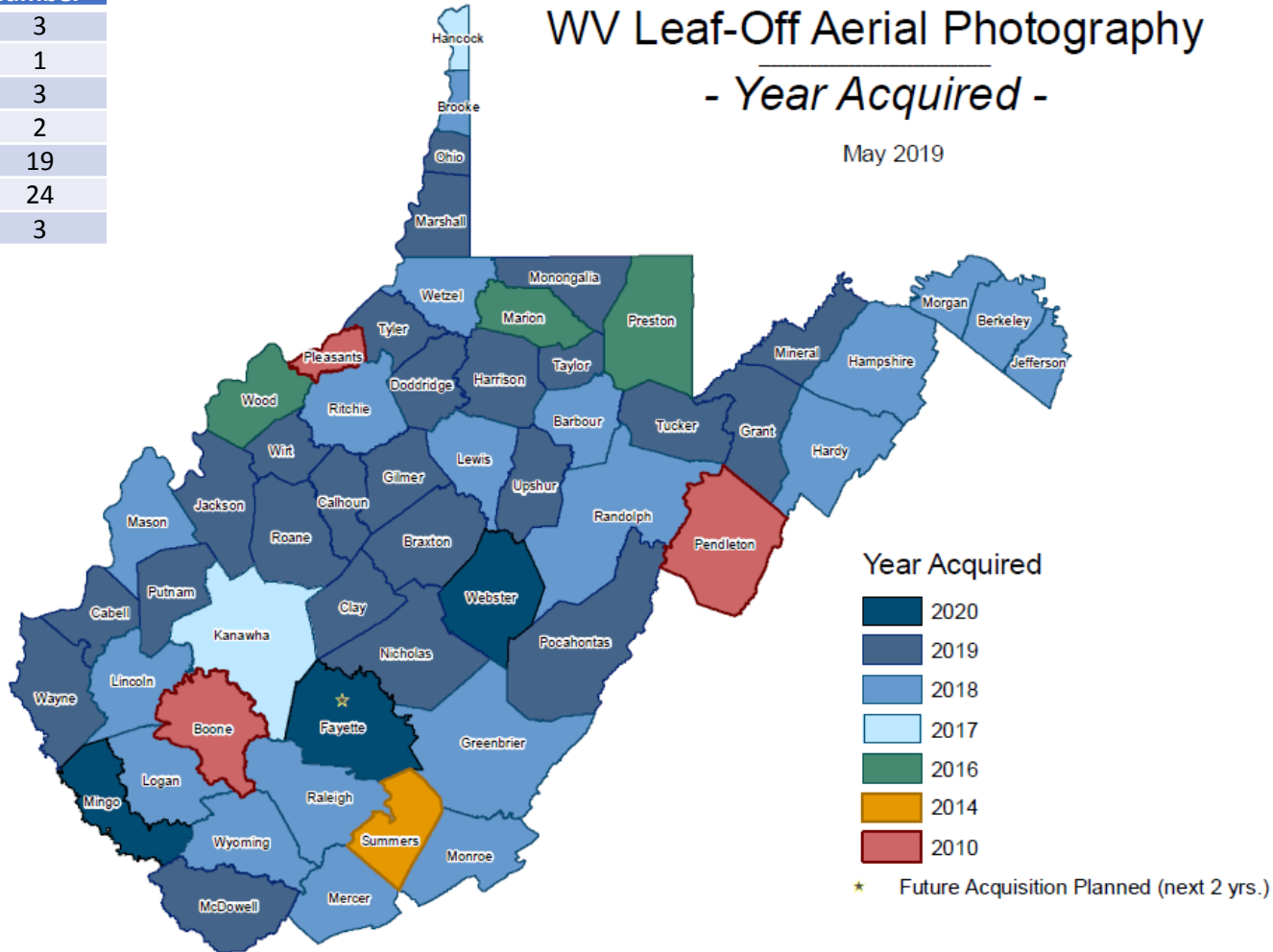


# County Aerial Imagery (2019)

Year	Number
2010	3
2014	1
2016	3
2017	2
2018	19
2019	24
2020	3

## WV Leaf-Off Aerial Photography - Year Acquired -

May 2019



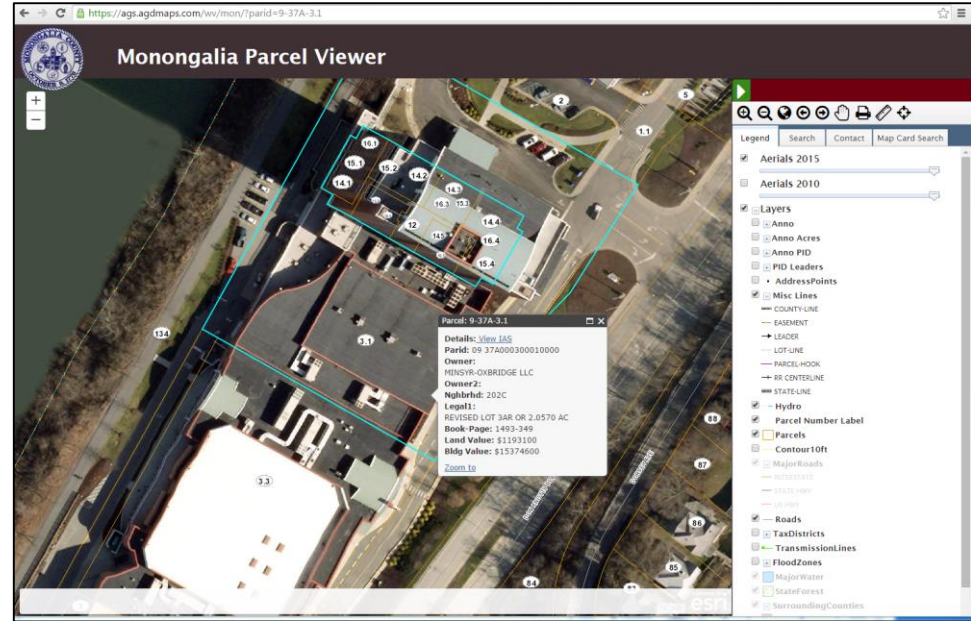
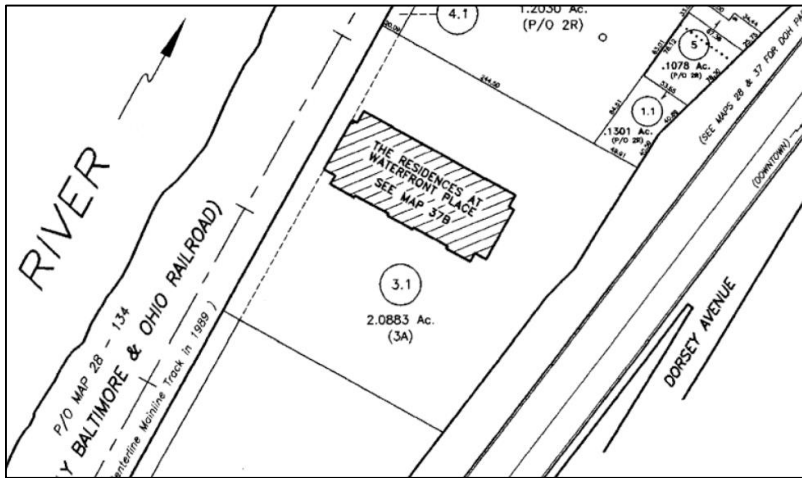
*Ideally, leaf-off imagery should not be older than 5 years. Imagery is important for identifying at-risk structures and accurate disaster mapping.*

# Statewide E-911 Addresses

## Missing Address Site Numbers



# All Counties – Digital Tax Maps



PAPER TAX MAP  
(old way)

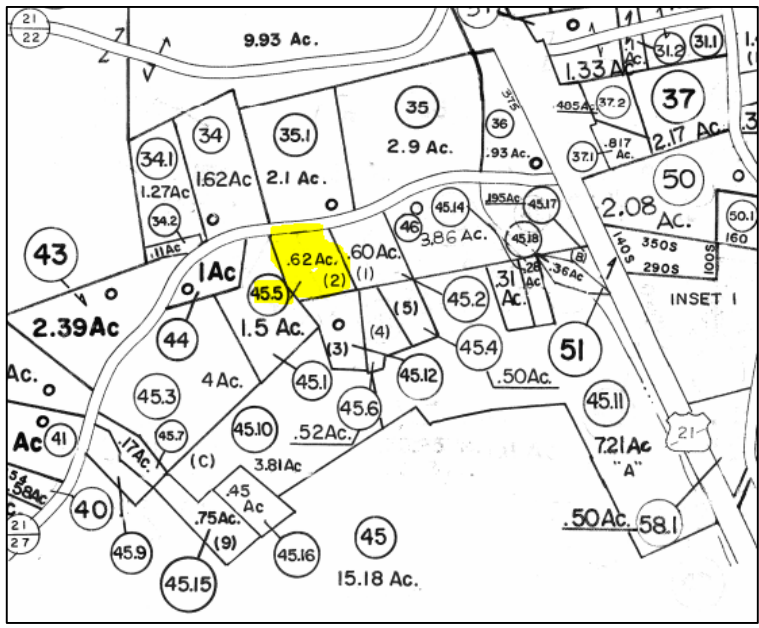


DIGITAL TAX MAP  
(better way)

- Manual drafting of tax maps is becoming obsolete!!!
- There are no schools that teach manual drafting skills
- Manual drafting supplies are becoming scarce
- Tax Division is removing itself from drafting contract services

# Paper to Digital tax Map Conversion

## PAPER TAX MAP (static map)

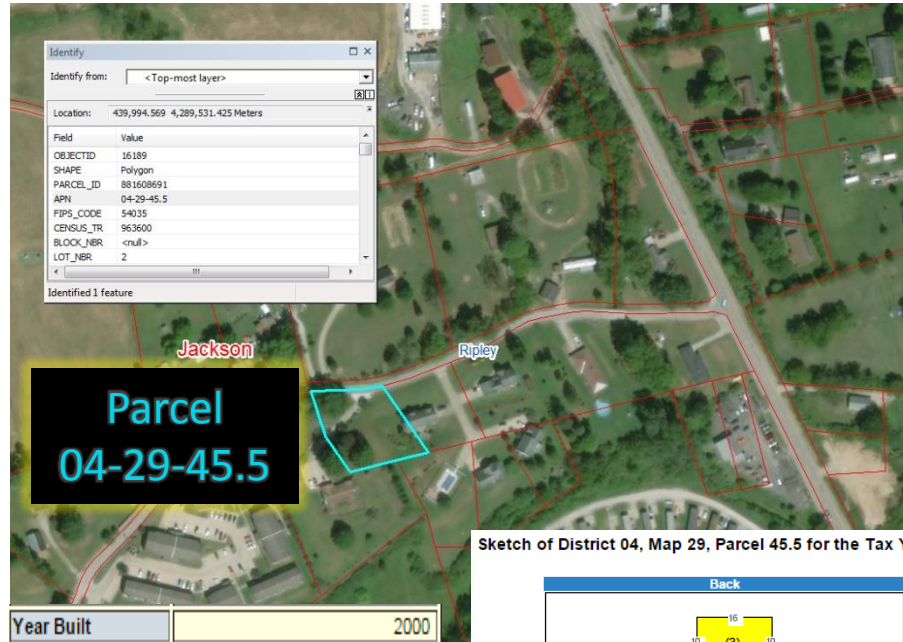


Parcel 04-29-45.5



## DIGITAL TAX MAP

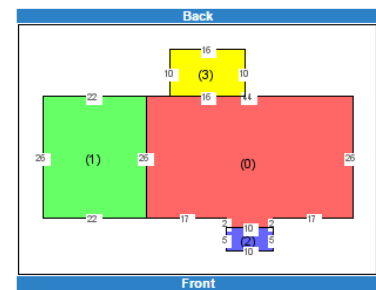
(interactive, seamless, aerial photo reference, map link to attributes (property info) and graphics (building sketch))



Parcel  
04-29-45.5

Year Built	2000
Total Rooms	6
Bed Rooms	3
Full Baths	2
Half Baths	1
Additional Fixtures	2
Total Fixtures	10
Heating	Central A/C
Heating Fuel Type	Gas
Living Area (SF)	2328

Sketch of District 04, Map 29, Parcel 45.5 for the Tax Year 2017



Addition List

Line #	Lower	First	Second	Third	Area
0					1164
1		Frame Garage			572
2		Masonry Stoop or Terrace			50
3		Wood Deck			160

Search criteria: 'Parcel ID (Account)'='04 29004500050000', 'Tax Year'='2017'



# Data Privacy at State Level

## The Privacy Act: Working with local data

Local Government



Data with Names and/or Addresses

- Permits
- Substantial Damage



Public

States



Data with Names and/or Addresses

- Varying State Laws



Public

FEMA



Data with Names and/or Addresses

- The Privacy Act of 1974



Public

# Communities benefiting from HMGP

GIS Data Development Contracts	# Local Govt. Projects	# Signed MOUs	Vendor	Local Govt. Cost Share	Cost Share Type	FEMA Grant Dollars Obligated	TOTAL COST
E-911 Addresses	6	5	Atlas Geographic Data	\$73,504	In-Kind (field validation)	\$84,895	\$158,399
Digital Tax Maps/Parcels	7	6	Atlas Geographic Data	\$27,474	In-Kind (imagery)	\$235,533	\$263,007
Leaf-Off Imagery	13	13	Blue Mountaion / Thrasher	\$205,536	Dollars (\$)	\$56,958	\$262,494
<b>TOTAL</b>	<b>26</b>	<b>23</b>		<b>\$306,514</b>		<b>\$377,386</b>	<b>\$683,900</b>

*GIS Data Development Costs associated with Statewide Multi-Hazards Project*

# State Hazard Mitigation Grant

- **FEMA Hazard Mitigation Grant Program (HMGP)**
  - Recipient: WV DHSEM, State Hazard Mitigation Office
  - Sub-Recipient: West Virginia University



# Building-Level Flood Risk Assessments

## Building-Level Flood Risk Assessments support:

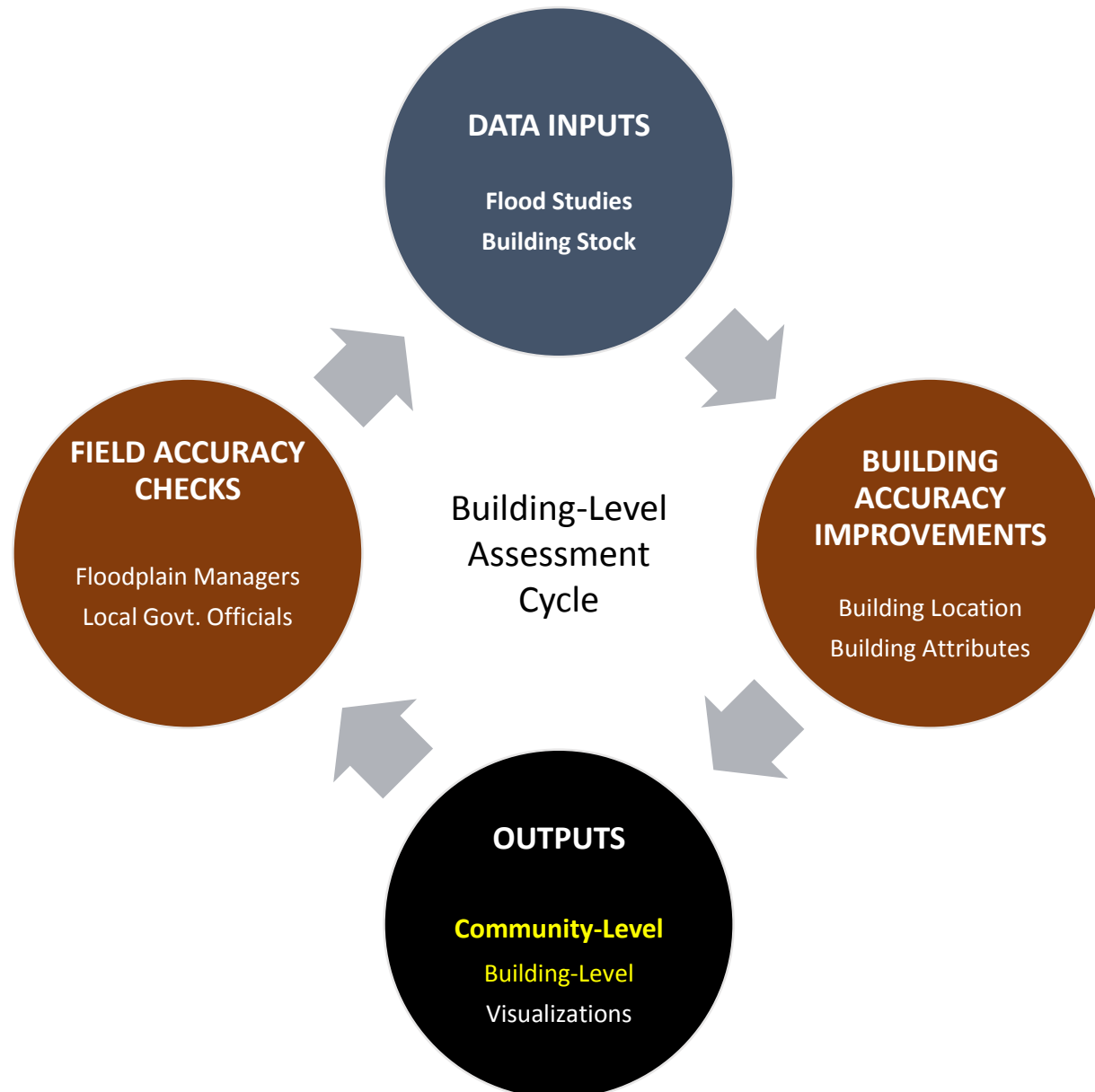
- Hazard Mitigation Plans
- Floodplain Management
- Community Assisted Visits
- Community Rating System

## Benefits

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

## Methodology

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





# Floodplain Managers and the Mitigation Strategy

- Responsible development and meaningful flood mitigation are crucial for a safe, resilient community
- Floodplain Managers are key stakeholders in this effort
- Floodplain Manager outreach and inclusion are extremely important and beneficial



# Statewide Flood Risk Assessment

## **Community-Level Summary Reports**

# Building Stock in Flood Zones

Although only 30% of the State has mapped **Detailed Flood Zones** (AE / AO / AH), the **Detailed Flood Zones** contain 63% of the Building Stock Located in SFHA. A majority of the buildings are located in mapped **Detailed Flood Zones**.

## FLOOD HAZARD ZONES

- Stream Miles Length
- 70% Approximate A
- 30% Detailed Zones

## BUILDINGS IN SFHA

- Estimate 100,000
- 37% buildings in Approximate A
- 63% buildings in Detailed Zones

## BUILDINGS IN NON-REGULATORY ZONES

- 7,000 Structures mapped in High Risk Zones

## BUILDINGS IN SHADED X

- Moderate Risk
- 44,415 structures in 500-YR floodplains
- 9,718 structures in Levee Protected Zones

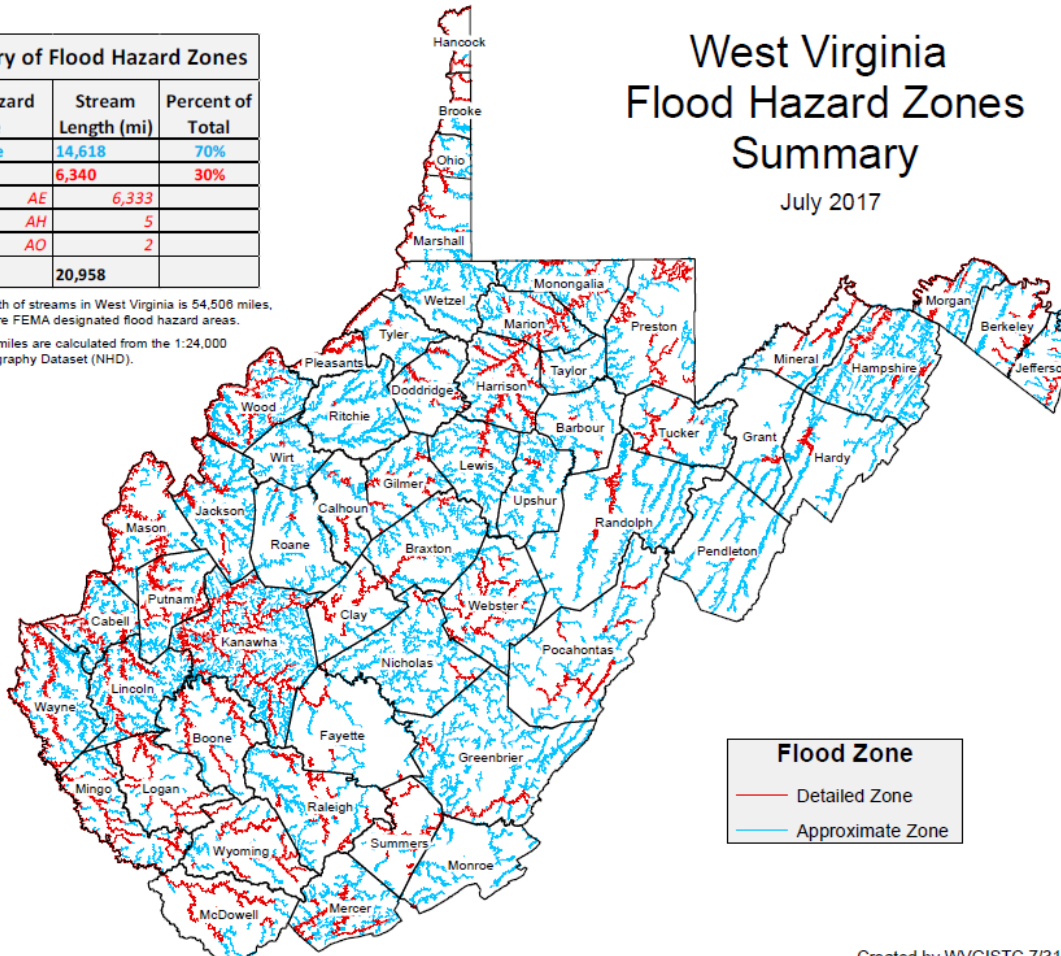
Summary of Flood Hazard Zones		
Flood Hazard Zone	Stream Length (mi)	Percent of Total
Approximate	14,618	70%
Detailed	6,340	30%
AE	6,333	
AH	5	
AO	2	
<b>Total</b>	<b>20,958</b>	

† The total length of streams in West Virginia is 54,508 miles, of which 38% are FEMA designated flood hazard areas.

†† The stream miles are calculated from the 1:24,000 National Hydrography Dataset (NHD).

## West Virginia Flood Hazard Zones Summary

July 2017



**Flood Zone**  
 — Detailed Zone  
 — Approximate Zone

Created by WVGISTC 7/31/2017

# Reports: Buildings in Flood Zones

## Buildings in SFHA (bSF)

Data Sources: E-991 Addresses and Microsoft Building Footprints

287 communities; 8 communities split over 2 counties (295 records)

#	CID	Community Name	County	Incorporated / Unincorporated	E-911 Address Count	Building Footprint Count	Average Count (bSF)
1	540001	BARBOUR COUNTY*	BARBOUR COUNTY	Unincorporated	393	316	354.5
2	540002	BELINGTON, TOWN OF	BARBOUR COUNTY	Incorporated	120	93	106.5
3	540003	JUNIOR, TOWN OF	BARBOUR COUNTY	Incorporated	12	18	15.0
4	540004	PHILIPPI, CITY OF	BARBOUR COUNTY	Incorporated	264	223	243.5
5	540282	BERKELEY COUNTY *	BERKELEY COUNTY	Unincorporated	570	858	714.0
6	545550	HEDGESVILLE, TOWN OF	BERKELEY COUNTY	Incorporated	0	0	0.0
7	540006	MARTINSBURG, CITY OF	BERKELEY COUNTY	Incorporated	87	82	84.5
8	540007	BOONE COUNTY *	BOONE COUNTY	Unincorporated	2,932	3,093	3,012.5
9	540230	DANVILLE, TOWN OF	BOONE COUNTY	Incorporated	155	125	140.0
10	540008	MADISON, TOWN OF	BOONE COUNTY	Incorporated	324	251	287.5
11	540238	SYLVESTER, TOWN OF	BOONE COUNTY	Incorporated	69	90	79.5
12	540229	WHITESVILLE, TOWN OF	BOONE COUNTY	Incorporated	85	110	97.5
13	540009	BRAXTON COUNTY *	BRAXTON COUNTY	Unincorporated	1,290	955	1,122.5
14	540010	BURNSVILLE, TOWN OF	BRAXTON COUNTY	Incorporated	35	26	30.5
15	540235	FLATWOODS, TOWN OF	BRAXTON COUNTY	Incorporated	0	0	0.0
16	540237	GASSAWAY, TOWN OF	BRAXTON COUNTY	Incorporated	57	42	49.5
17	540236	SUTTON, TOWN OF	BRAXTON COUNTY	Incorporated	41	38	39.5
18	540011	BROOKE COUNTY *	BROOKE COUNTY	Unincorporated	307	205	256.0
19	540093	BEECH BOTTOM, VILLAGE OF	BROOKE COUNTY	Incorporated	36	30	33.0
20	540012	BETHANY, TOWN OF	BROOKE COUNTY	Incorporated	15	10	12.5

Preliminary Estimates reveal **100,000** structures in Special Flood Hazard Area

# Preliminary Building Statistics

## Building Estimates

- **100,00 structures in SFHA**
- **7,000 structures in “High=Risk” Non-Regulatory Zones (Orange Zones)**
- **119 Essential Facilities in SFHA** (Schools, 911 Centers, Police Depts., Hospitals, Nursing Homes)
- **6 Essential Facilities in Floodway**

## Buildings Pre-FIRM/Post-FIRM

- **49% are Pre-FIRM (majority)**
- 13% are Post-FIRM
- 38% are unknown


*Based on **Building Year** of assessment data*

**PRELIMINARY FLOOD RISK DATA RESULTS WILL BECOME MORE ACCURATE AFTER BUILDING ACCURACY AND FIELD CHECKS**

Community	Buildings in SFHA
KANAWHA COUNTY *	9,199
LOGAN COUNTY *	5,166
MINGO COUNTY *	3,041
BOONE COUNTY *	3,013
WAYNE COUNTY*	2,834
LINCOLN COUNTY*	2,581
WHEELING, CITY OF	2,513
RALEIGH COUNTY *	2,293
WYOMING COUNTY *	2,233
MCDOWELL COUNTY *	2,163
MERCER COUNTY*	2,137
WOOD COUNTY *	2,089
PUTNAM COUNTY*	1,969
CABELL COUNTY*	1,923
CHARLESTON, CITY OF	1,704
RANDOLPH COUNTY *	1,467
HAMPSHIRE COUNTY*	1,440
LEWIS COUNTY*	1,356
MASON COUNTY *	1,310
MARION COUNTY*	1,258

Top 20 Communities

# Essential Facilities - School



## WV Flood Tool


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

Views: Public | **Expert** | Risk MAP

Layers: Flood | Reference | Basemaps

Search: Address keyser, wv

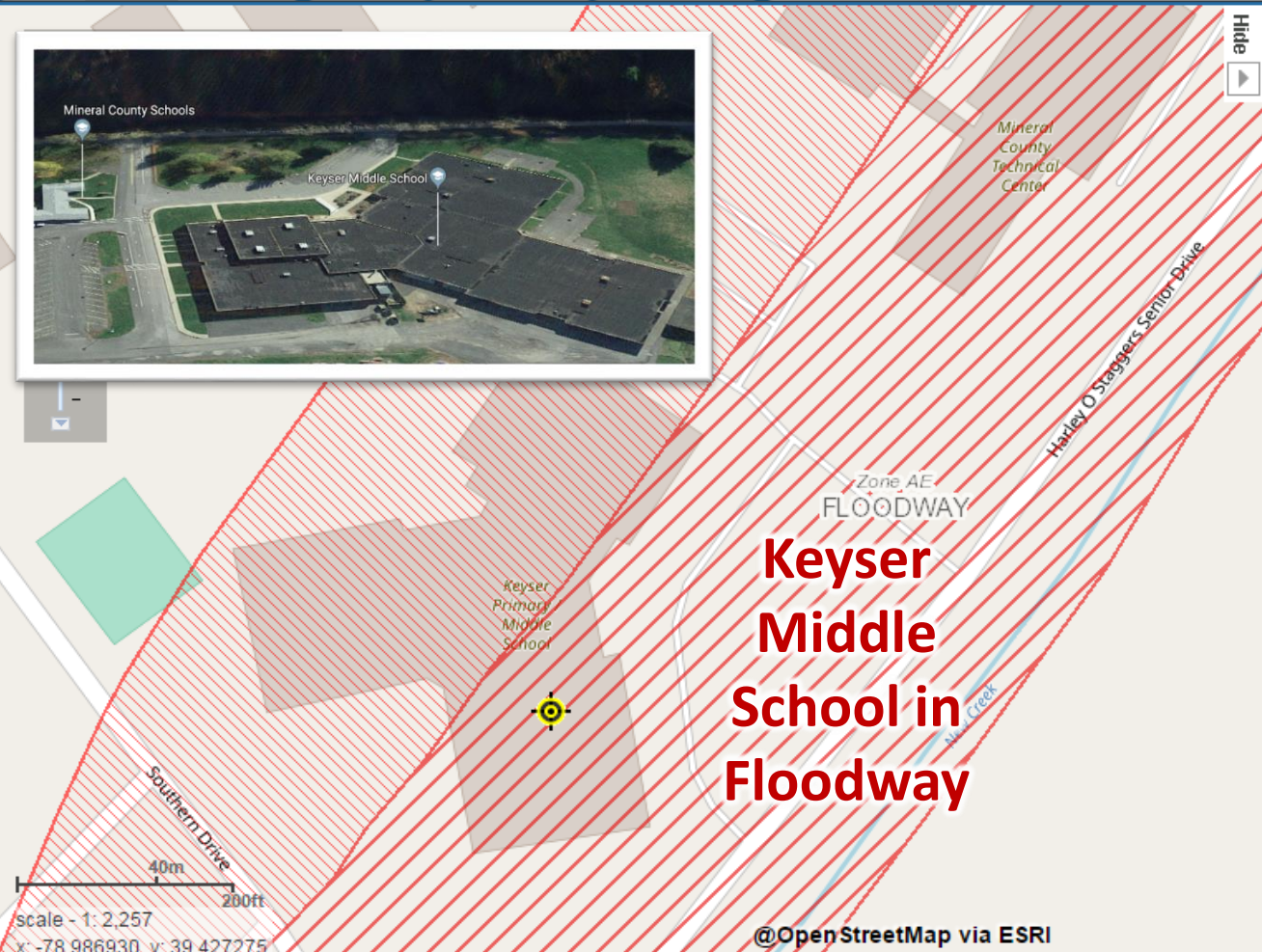
Tools: [Icons for search, edit, share, print, etc.]



Mineral County Schools

Keyser Middle School

Keyser Primary Middle School



Keyser Middle School in Floodway

Zone AE FLOODWAY

New Creek

Harley O Stangers Senior Drive

Scale: 1:2,257  
x: -78.986930, y: 39.427275

@OpenStreetMap via ESRI

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

**Flood Zone:** AE (Floodway)

**Stream:** New Creek

**Watershed (HUC8):** North Branch Potomac (2070002)

**FEMA Flood Map:** [54057C0186D](#) [NFHL](#)

**Map Effective Date:** 3/19/2013

**Contacts:** Mineral

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

**Water Depth:** About 4.0 ft (Source: HAZUS)

**HEC-RAS Model:** N/A

**Flood Profile:** [54057\\_008](#)

**Community:** City of Keyser  
CID: 540130 CRS Class: 10

**Location (long, lat):** (-78.989076, 39.426405)

**Location (UTM 17N):** (673087, 4366025)

**External Viewers:** [Social media icons]

**Elevation:** About 835 ft (Source: FEMA 2016)

**Address:**  multiple addresses

**Parcel ID:**  29-07-0012-0082-0000 [Disclaimer](#)

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

Flood Risk Assessment [N/A](#)

[3D Flood Visualization](#)

# Buildings in SFHA (Top 20)

## Communities

Community	Buildings in SFHA
KANAWHA COUNTY *	9,199
LOGAN COUNTY *	5,166
MINGO COUNTY *	3,041
BOONE COUNTY *	3,013
WAYNE COUNTY*	2,834
LINCOLN COUNTY*	2,581
WHEELING, CITY OF	2,513
RALEIGH COUNTY *	2,293
WYOMING COUNTY *	2,233
MCDOWELL COUNTY *	2,163
MERCER COUNTY*	2,137
WOOD COUNTY *	2,089
PUTNAM COUNTY*	1,969
CABELL COUNTY*	1,923
CHARLESTON, CITY OF	1,704
RANDOLPH COUNTY *	1,467
HAMPSHIRE COUNTY*	1,440
LEWIS COUNTY*	1,356
MASON COUNTY *	1,310
MARION COUNTY*	1,258

## Unincorporated Areas

County Unincorporated	bSFHA
KANAWHA COUNTY	9,199
LOGAN COUNTY	5,166
MINGO COUNTY	3,041
BOONE COUNTY	3,013
WAYNE COUNTY	2,834
LINCOLN COUNTY	2,581
RALEIGH COUNTY	2,293
WYOMING COUNTY	2,233
MCDOWELL COUNTY	2,163
MERCER COUNTY	2,137
WOOD COUNTY	2,089
PUTNAM COUNTY	1,969
CABELL COUNTY	1,923
RANDOLPH COUNTY	1,467
HAMPSHIRE COUNTY	1,440
LEWIS COUNTY	1,356
MASON COUNTY	1,310
MARION COUNTY	1,258
CLAY COUNTY	1,219
DODDRIDGE COUNTY	1,175
GREENBRIER COUNTY	1,147

## Incorporated Places

Incorporated Place	bSFHA
WHEELING, CITY OF	2,513
CHARLESTON, CITY OF	1,704
WELLSBURG, CITY OF	1,097
DUNBAR, CITY OF	1,077
NEW MARTINSVILLE	898
HUNTINGTON, CITY OF	729
BUCKHANNON, CITY OF	593
MILTON, CITY OF	557
NITRO, CITY OF	508
WHITE SULPHUR SPRINGS	446
MARLINTON, TOWN OF	419
SOUTH CHARLESTON	404
RICHWOOD, CITY OF	371
BUFFALO, TOWN OF	370
GARY, CITY OF	368
WESTON, CITY OF	362
WELCH, CITY OF	356
MOUNDSVILLE, CITY OF	347
CLENDENIN, TOWN OF	345
VIENNA, CITY OF	336

*Preliminary Data Sources – not verified*

Of the 232 incorporated areas in West Virginia, only 12 municipalities (5%) have no regulatory floodplains

# Acreage of the SFHA (Top 20)

*Top 20 Unincorporated / Incorporated Areas with Highest Acreage of SFHA (aSFHA)*

<b>County Unincorporated</b>	<b>Modified aSFHA</b>
HAMPSHIRE COUNTY	26,388
MASON COUNTY	21,771
KANAWHA COUNTY	21,196
GREENBRIER COUNTY	20,060
RANDOLPH COUNTY	19,842
WOOD COUNTY	17,523
HARDY COUNTY	16,850
JACKSON COUNTY	15,300
WAYNE COUNTY	13,521
PENDLETON COUNTY	13,218
LINCOLN COUNTY	11,137
BERKELEY COUNTY	10,300
CABELL COUNTY	10,278
POCAHONTAS COUNTY	10,092
PRESTON COUNTY	9,965
PUTNAM COUNTY	9,934
NICHOLAS COUNTY	8,999
WEBSTER COUNTY	8,907
MINERAL COUNTY	8,885
RALEIGH COUNTY	8,719

<b>Incorporated Place</b>	<b>County</b>	<b>Modified aSFHA</b>
CHARLESTON, CITY OF (SPLIT)	KANAWHA COUNTY	1,486
WHEELING, CITY OF (SPLIT)	OHIO COUNTY	1,318
PARKERSBURG, CITY OF	WOOD COUNTY	1,217
HUNTINGTON, CITY OF (SPLIT)	CABELL COUNTY	823
NEW MARTINSVILLE, CITY OF	WETZEL COUNTY	652
BUCKHANNON, CITY OF	UPSHUR COUNTY	616
POINT PLEASANT, CITY OF	MASON COUNTY	614
MOUNDSVILLE, CITY OF	MARSHALL COUNTY	563
MARLINTON, TOWN OF	POCAHONTAS COUNTY	494
MOOREFIELD, TOWN OF	HARDY COUNTY	475
WEIRTON, CITY OF (SPLIT)	HANCOCK COUNTY	456
CLARKSBURG, CITY OF	HARRISON COUNTY	453
FAIRMONT, CITY OF	MARION COUNTY	408
MORGANTOWN, CITY OF	MONONGALIA COUNTY	387
MILTON, CITY OF	CABELL COUNTY	377
BUFFALO, TOWN OF	PUTNAM COUNTY	342
ELEANOR, TOWN OF	PUTNAM COUNTY	340
PRINCETON, CITY OF	MERCER COUNTY	332
BARBOURSVILLE, VILLAGE OF	CABELL COUNTY	314
DUNBAR, CITY OF	KANAWHA COUNTY	313

*Modified aSFHA = Total aSFHA minus (1) large water bodies and (2) federal lands > 10 acres*

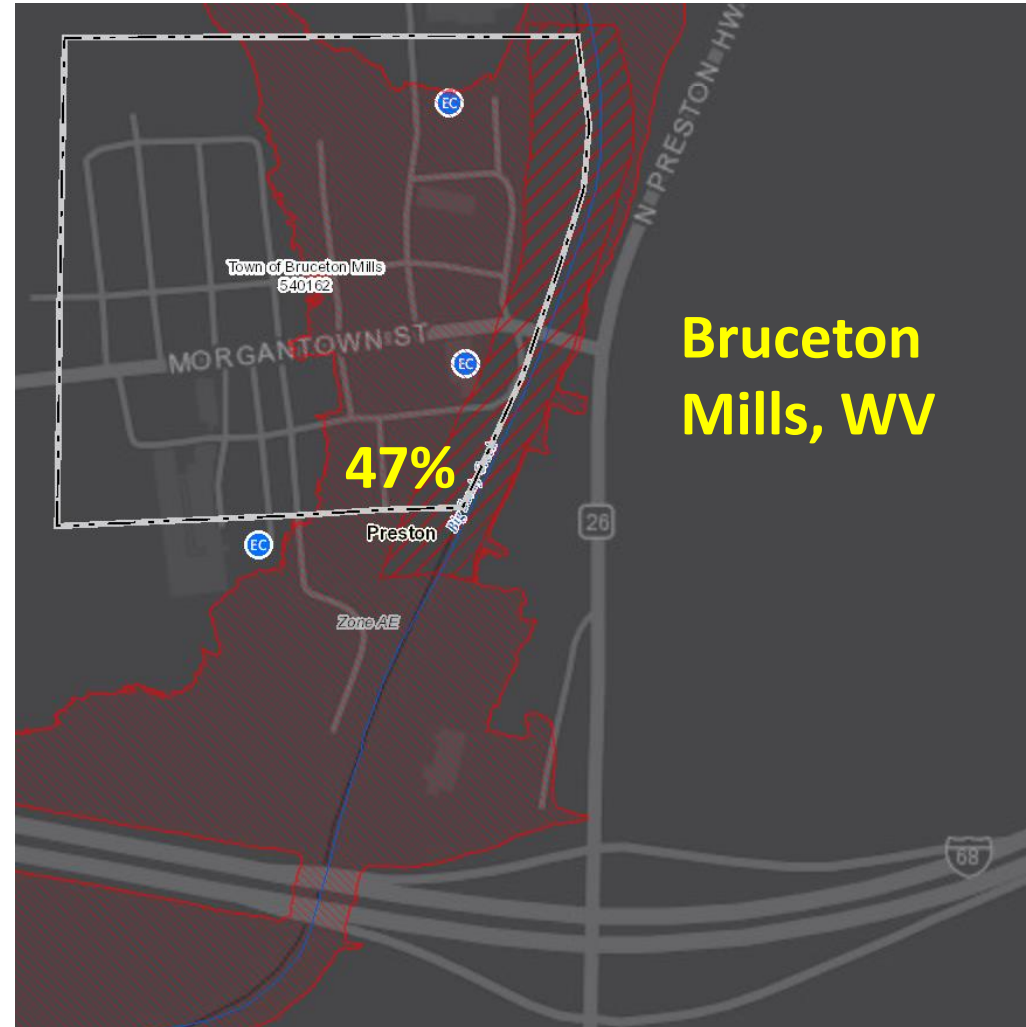




# Ratio of aSFHA to Community Area

*Top 20 Incorporated Areas with Highest Ratio of SFHA Acreage to Community Area*

Incorporated Places	County	aSFHA
FRIENDLY, TOWN OF	TYLER COUNTY	58.5%
HAMBLETON, TOWN OF	TUCKER COUNTY	50.0%
REEDY, TOWN OF	ROANE COUNTY	48.0%
<b>BRUCETON MILLS</b>	<b>PRESTON COUNTY</b>	<b>47.2%</b>
PARSONS, CITY OF	TUCKER COUNTY	43.5%
ELIZABETH, TOWN OF	WIRT COUNTY	42.9%
HENDERSON, TOWN OF	MASON COUNTY	42.6%
PINE GROVE, TOWN OF	WETZEL COUNTY	42.4%
MATEWAN, TOWN OF	MINGO COUNTY	41.7%
CAPON BRIDGE TOWN	HAMPSHIRE COUNTY	40.0%
SMITHERS, TOWN OF	KANAWHA COUNTY	40.0%
CHESAPEAKE, TOWN OF	KANAWHA COUNTY	39.4%
ALBRIGHT, TOWN OF	PRESTON COUNTY	38.9%
ROWLESBURG, TOWN OF	PRESTON COUNTY	38.5%
GARY, CITY OF	MCDOWELL COUNTY	37.9%
NEW MARTINSVILLE	WETZEL COUNTY	37.6%
MILTON, CITY OF	CABELL COUNTY	37.5%
ALDERSON, TOWN OF	MONROE COUNTY	37.3%
HARTFORD, TOWN OF	MASON COUNTY	36.4%
BANCROFT, TOWN OF	PUTNAM COUNTY	35.5%



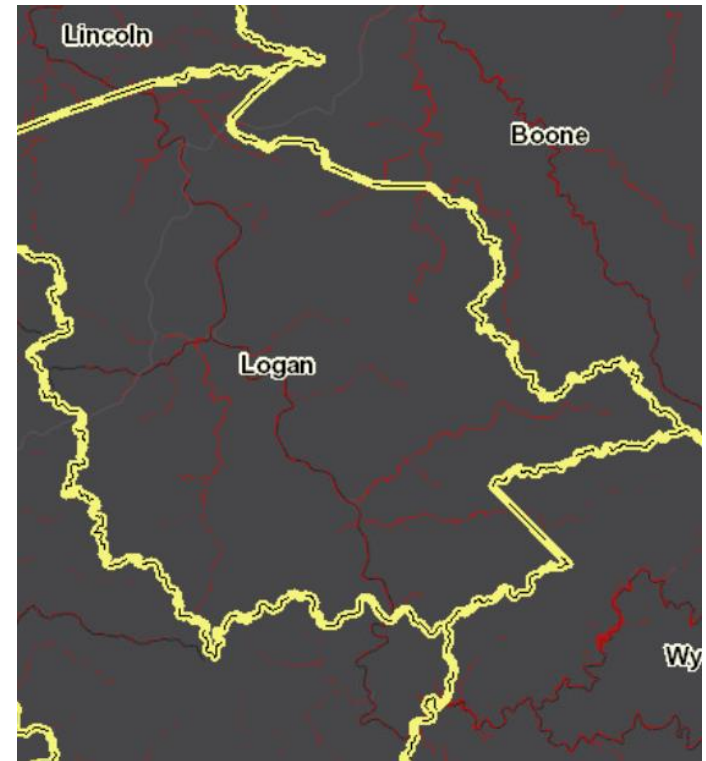
*Ratio = Acreage of SFHA (aSFHA) divided by Community Area*

# Building Cost / Property Class

Community Name	SFHA Building Count	Residential	Commercial	Apartment Class	Farm Class	Industrial Class	Building Cost Community-wide
BERKELEY COUNTY *	624	424	81	0	68	1	\$ 5,362,549,400
MORGANTOWN, CITY OF	304	140	135	22	0	1	\$ 4,264,243,155
MONONGALIA COUNTY *	940	624	174	62	25	6	\$ 4,176,539,753
CHARLESTON, CITY OF	1630	1134	241	59	0	2	\$ 3,806,378,642
KANAWHA COUNTY *	8464	6929	729	278	12	56	\$ 3,214,064,214
JEFFERSON COUNTY *	470	351	58	0	31	17	\$ 2,964,853,200
PUTNAM COUNTY*	1818	1112	368	0	292	5	\$ 2,647,809,016
RALEIGH COUNTY *	2407	1970	145	0	121	20	\$ 2,136,911,200
HUNTINGTON (Ohio Co.)	459	428	16	1	0	1	\$ 2,122,688,800
WOOD COUNTY *	1685	958	385	121	157	8	\$ 1,824,892,600
WHEELING (Cabell Co.)	2659	2170	340	30	0	7	\$ 1,762,753,250
CABELL COUNTY*	1532	1022	247	28	157	9	\$ 1,710,523,700
PRESTON COUNTY*	475	321	29	0	47	1	\$ 1,687,091,500
HARRISON COUNTY*	1249	727	156	0	301	2	\$ 1,396,697,400
PARKERSBURG, CITY OF	226	144	59	10	0	3	\$ 1,370,712,900
MERCER COUNTY*	1976	1161	712	0	18	8	\$ 1,348,812,600
GREENBRIER COUNTY*	1007	785	118	0	75	0	\$ 1,322,271,000
BRIDGEPORT, CITY OF	97	66	23	3	0	0	\$ 1,200,009,322

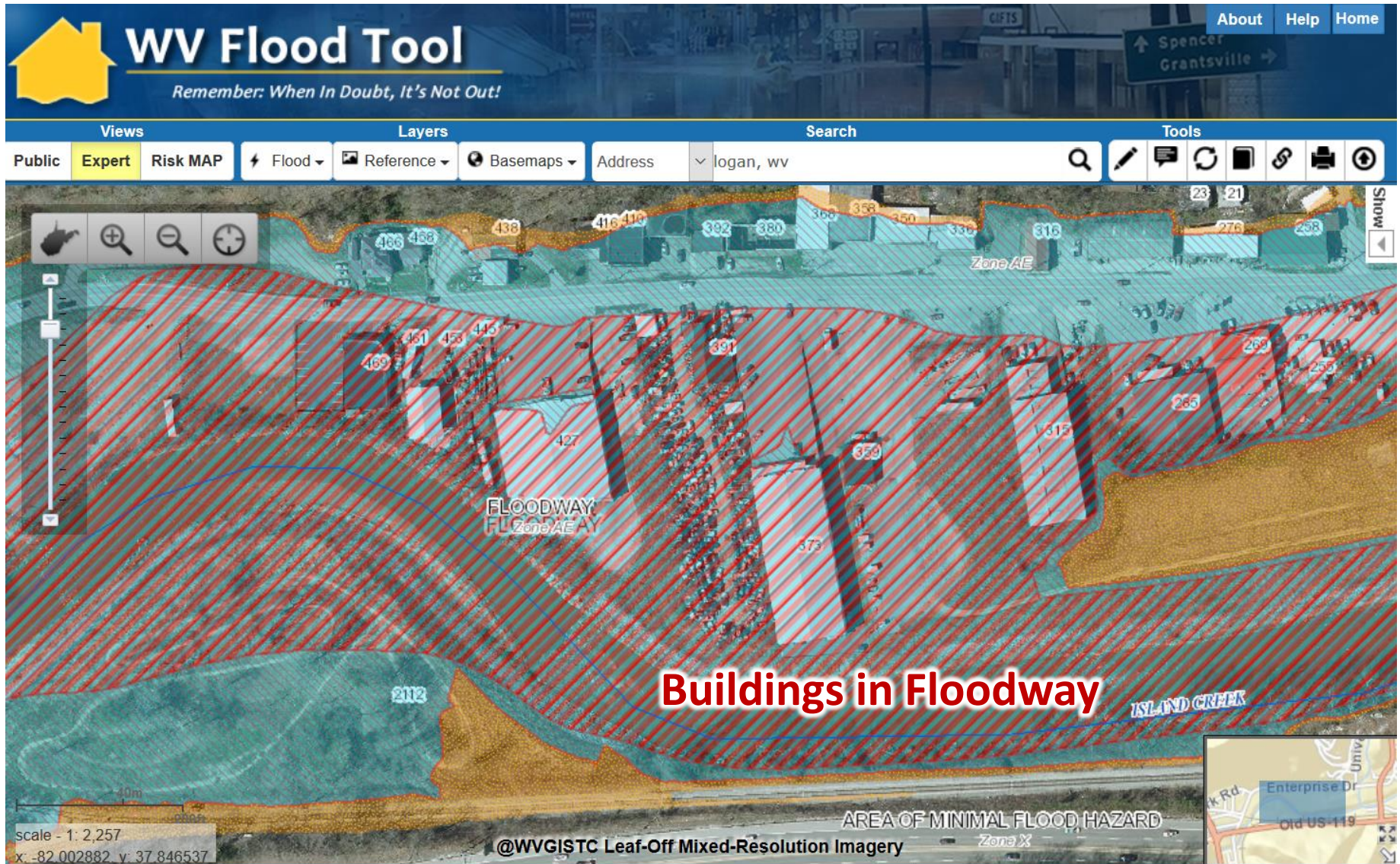
# Building Counts – Logan County

Community Name	Regulatory Floodway	Effective SFHA	Non-Regulatory High Risk
KANAWHA COUNTY *	1,216	8,230	234
<b>LOGAN COUNTY *</b>	<b>1,124</b>	<b>5,696</b>	<b>706</b>
HAMPSHIRE COUNTY*	613	1,501	0
BOONE COUNTY *	454	2,932	535
MINGO COUNTY *	398	3,295	258
WAYNE COUNTY*	332	3,102	232
MCDOWELL COUNTY *	331	2,369	928
SUMMERS COUNTY *	289	1,362	104
WYOMING COUNTY *	279	2,421	831
MINERAL COUNTY *	196	707	2
RICHWOOD, CITY OF	136	366	0
KEYSER, CITY OF	116	290	0
MORGAN COUNTY*	115	767	54
HANCOCK COUNTY *	110	307	21
WHEELING, CITY OF	110	2,658	1
NEW MARTINSVILLE	103	905	0
MASON COUNTY *	102	1,182	0
WHITE SULPHUR SPRINGS	99	470	0
PLEASANTS COUNTY *	93	481	66
PARSONS, CITY OF	91	356	0
WELCH, CITY OF	90	380	18
MERCER COUNTY*	84	1,907	69



*Logan County has a significant number of structures in the SFHA, Floodway, and Non-Regulatory Advisory A Zones that are High Risk*

# Building Counts in Floodway



# Building Counts in Advisory A

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

Views: Public | Expert | Risk MAP | Flood | Reference | Basemaps

Layers: [dropdown]

Search: Address [dropdown] e.g., 123 street name, city, state, zip

Tools: [icons]

**Buildings in Non-Regulatory Advisory A Zones**

Scale: 1:2,257  
x: -81.928880, y: 37.857116

@WVGISTC Leaf-Off Mixed-Resolution Imagery

**Flood Hazard Area:** Location is **WITHIN** an advisory floodplain but **NOT** a FEMA 100-year effective floodplain. [More Info](#)

**Flood Zone:** Advisory A (Advisory Flood Heights available)

**Stream:** Dingess Run

**Watershed (HUC8):** Upper Guyandotte (5070101)

**FEMA Issued Flood Map:** 54045C0225E [Download](#) **NFHL**

**Map Effective Date:** 2/6/2008

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

**Flood Height:** About 763 ft (Source: AFH) [More Info](#)

**Water Depth:** About 2.0 ft (Source: HEC-RAS)

**HEC-RAS Model:** N/A

**Flood Profile:** N/A

**Community:** Logan County  
CID: 545536 **CRS Class:** 10

**Location (long, lat):** (-81.929073, 37.858018)

**Location (UTM 17N):** (418272, 4190468)

**External Viewers:** [Google Earth](#) [ArcGIS](#) [Leaflet](#) [Mapbox](#)

**Elevation:** About 763 ft (Source: WVDEP 2010-13)

**Address** :

**Parcel ID** : 23-04-0146-0003-0000 [Disclaimer](#)

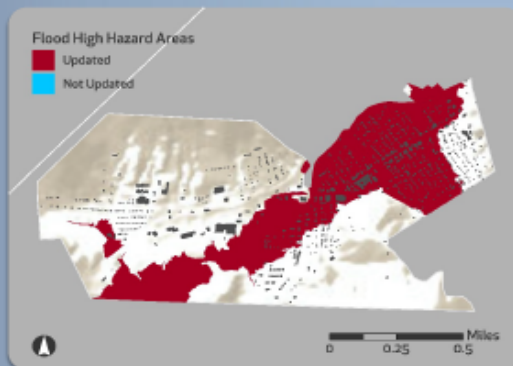
# New Flood Studies Affect Building Counts

Estimated structures of **RAINELLE** newly mapped IN: **+394**



## Town of Rainelle/ Greenbrier County, WV

**KNOW YOUR RISK** (The information below are estimates as of April 2019. <sup>1</sup> Flood Insurance Rate Map. <sup>2</sup> Since 1978. <sup>3</sup> Households that own with mortgage.)



**11/19/1987**  
Initial FIRM<sup>1</sup> date

**10/16/2012**  
Effective FIRM date

**\$3.7M**  
Total paid losses<sup>2</sup>

**129**  
Total paid claims<sup>2</sup>

**45**  
Flood insurance policies in force

**4**  
Policies in the effective flood high hazard area

**780**  
Estimated structures in the community

**410**  
Estimated structures in the updated flood high hazard area

Estimated structures newly mapped in	Estimated structures newly mapped out
<b>+394</b>	<b>-0</b>

**42%**  
Of the population is in the updated flood high hazard area

**32%**  
Of households<sup>3</sup> spend 30% or more of their income on housing

**23**  
Paid claims outside of the effective flood high hazard area<sup>2</sup>

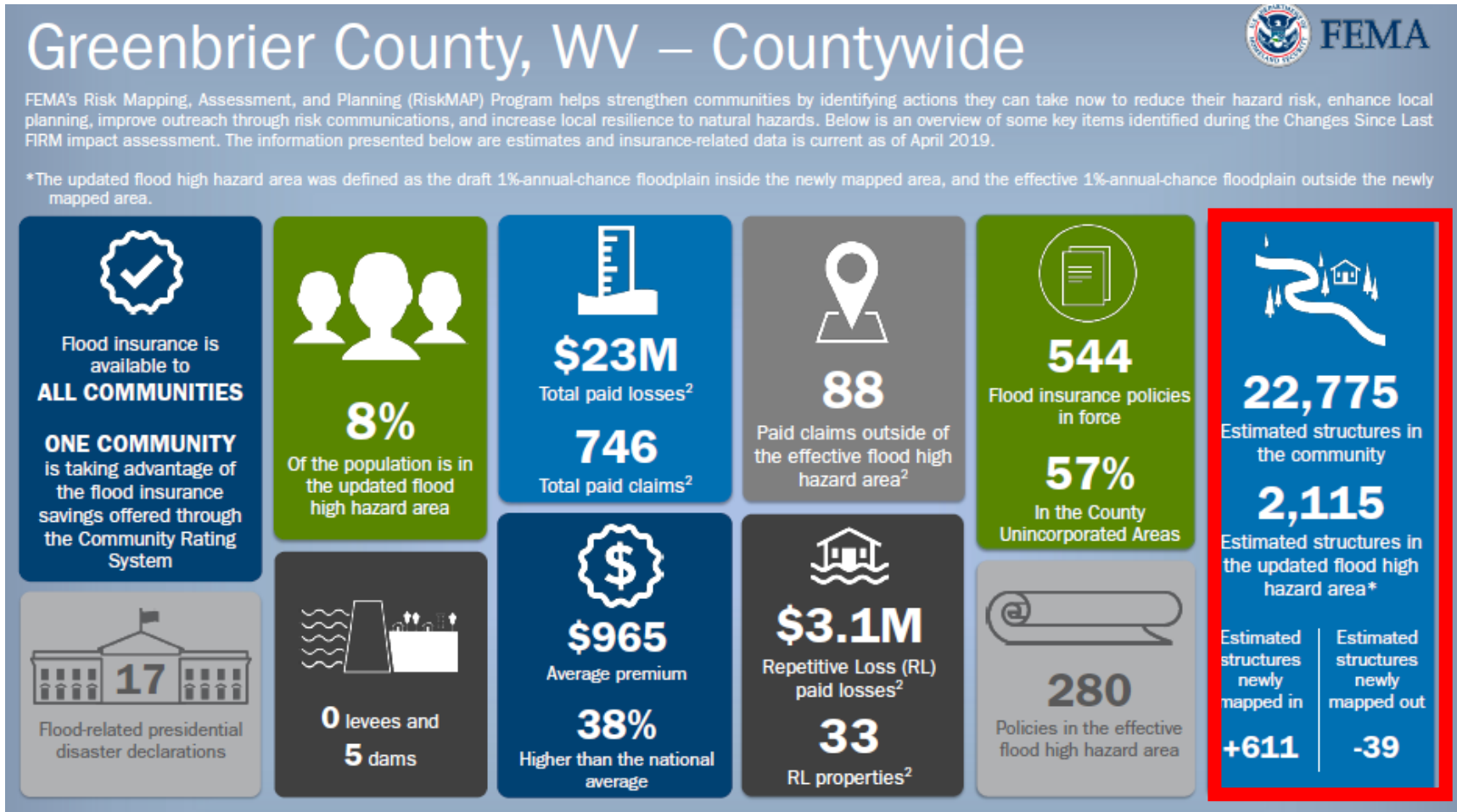
**\$720K**  
Repetitive Loss (RL) paid losses<sup>2</sup>

**10**  
RL properties<sup>2</sup>

**17**  
Flood-related countywide presidential disaster declarations

# New Flood Studies Affect Building Counts

Estimated structures of **Greenbrier County** newly mapped IN: **+611**

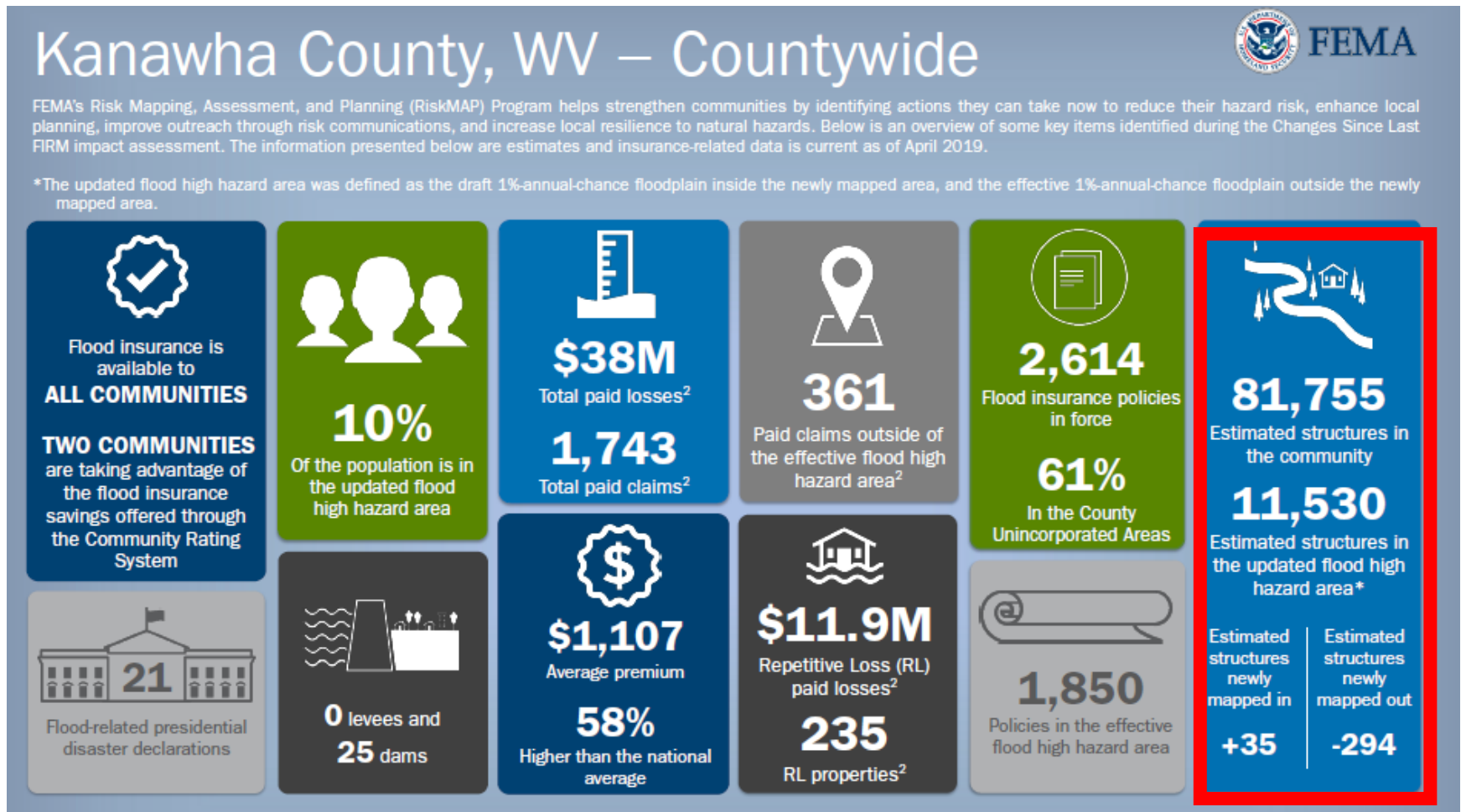


Source: FEMA Flood Risk Review meeting May 20109



# New Flood Studies Affect Building Counts

*Estimated structures of KANAWHA COUNTY newly mapped OUT: -294*



Source: FEMA Flood Risk Review meeting May 2019

# Community Profile Dashboards

Flood Risk

CRS Credits

Landslide Risk

## City of Bluefield

Bluefield City Hall  
200 Rogers Street  
Bluefield West Virginia, 24701  
Community ID: 540285

### Area Flood Policy Summary

Flood Insurance Policies in Force	\$378,000
Written Premiums In Force	572
Policies In Force	2



WV Flood Tool Quick View of Bluefield

### National Flood Insurance Program Status



Initial FIRM Date	3/2/2005
Effective FIRM Date	3/2/2005

### Community Rating System

CRS Status	Not Participating
Current CRS Class	10
Discount for SFHA Status	0%
Discount for Non-SFHA Status	0%

*Story Maps of Flood Risk and Mitigation*

# Statewide Flood Risk Assessment

## Building-Level Reports

# Building 7170:19-07-022B-0021-0000

<b>Building ID</b>	<b>7170:19-07-022B-0021-0000</b>
Full E-911 Address	7170 QUEEN ST, KEARNEYSVILLE, WV 25430
Full Owner Address	7170 QUEEN ST, KEARNEYSVILLE, WV 25430
GIS Parcel ID	19-07-022B-0021-0000
WV Flood Tool Link	<a href="https://mapwv.gov/assessment/detail/?pid=1907022B002100000000">https://mapwv.gov/assessment/detail/?pid=1907022B002100000000</a>
WV Parcel Assessment Link	<a href="https://mapwv.gov/flood/map/?pid=19-07-022B-0021-0000">https://mapwv.gov/flood/map/?pid=19-07-022B-0021-0000</a>
CID	540065
Community Name	JEFFERSON COUNTY *
County	JEFFERSON COUNTY
Incorporated/Unincorporated	Unincorporated
Flood Zone Designation	Effective 100 yr Zone AE - Floodway
<b>Floodway</b>	<b>Yes</b>
Regulatory Status	Regulatory
FIRM Status	Pre-FIRM
Flood Depth Value	0.5
Flood Depth Source	HEC-RAS
Ground Elevation	151.9
Ground Elevation Source	2012 FEMA Jefferson, Berkeley & Morgan Lidar
Year Built	1900
Grade	B+
Property Class Code	R
Property Class Description	Residential
Land Use Code	101 - Residential 1 Family
Land Use Description	101
Hazard Occupancy Code	RES1
Stories	2
Exterial Wall Type	Frame
Architectural Style	None
Structure Area	4006
Basement Type	Part
Dwelling Value	269300
OBY Value	5160
<b>Building Appraisal</b>	<b>\$274,500</b>

# Building 7170:19-07-022B-0021-0000

The screenshot displays the WV Flood Tool interface. The top navigation bar includes a home icon, the title "WV Flood Tool", and links for "About", "Help", and "Home". Below this is a secondary navigation bar with "Views" (Public, Expert, Risk MAP), "Layers" (Flood, Reference, Basemaps), a "Search" field with a dropdown menu, and "Tools" (various icons). The main map area shows a residential area with a red-hatched "FLOODWAY Zone AE" and a yellow target icon. A blue line indicates a stream, "Turkey Run". The map includes a scale bar and navigation controls. A data panel on the right provides detailed information about the flood hazard area, including FEMA's Flood Map, Map Effective Date, Contacts, Flood Height, Water Depth, HEC-RAS Model, Flood Profile, Community, Location (long, lat), Location (UTM 17N), External Viewers, Elevation, Address, and Parcel ID. A dark blue text box at the bottom left of the map area contains the text: "Residential Home in Floodway with High Building Exposure Value of \$274,500".

**WV Flood Tool** About Help Home

Views: Public Expert Risk MAP Layers: Flood Reference Basemaps Search: e.g., 123 street name, city, state, zip Tools

**Flood Hazard Area:** Location is **WITHIN** the FEMA 100-year floodplain and floodway.  
**Flood Zone:** AE (Floodway)  
**Stream:** Turkey Run  
**Watershed (HUC8):** Conococheague-Opequon (2070004)

**FEMA's Flood Map:** 54037C0115E NFHL  
**Map Effective Date:** 12/18/2009  
**Contacts:** Jefferson

**Flood Height:** Refer to FIS report for BFE [More Info](#)  
**Water Depth:** About 0.7 ft (Source: HEC-RAS)  
**HEC-RAS Model:** N/A [All Models](#)

**Flood Profile:** 54037\_028

**Community:** Jefferson County  
**CID:** 540065 **CRS Class:** 6

**Location (long, lat):** (-77.982901, 39.302667)  
**Location (UTM 17N):** (760163, 4354705)

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

**Elevation:** About 498 ft (Source: FEMA 2012)

**Address:** 7170 QUEEN ST, KEARNEYSVILLE, WV, 25430  
**Parcel ID:** 19-07-022B-0021-0000 [Disclaimer](#)

**Residential Home in Floodway with High Building Exposure Value of \$274,500**

Mixed-Resolution Imagery

# Building 7170:19-07-022B-0021-0000



External Link to Google Street View

# Building 7170:19-07-022B-0021-0000

## WV Real Estate Assessment Data

[About](#) [New Search](#) [Structure Drawing](#)

Parcel ID 19-07-022B-0021-0000 Tax Year 2018 County Jefferson  
 Root PID 1907022B002100000000

### Property Owner and Mailing Address

Owner(s) WHEATON TREVOR D & SHARON M  
 Mailing Address 7170 QUEEN ST, KEARNEYSVILLE, WV 25430

### Property Location

Physical Address 7170 QUEEN ST  
 E-911 Address 7170 QUEEN ST 25430  
 Parcel ID 19-07-022B-0021-0000  
 County 19 - Jefferson  
 District 7 - Middleway District  
 Map [022B](#) (Click for PDF tax map)  
 Parcel No. 0021  
 Parcel Suffix 0000  
 Map View Link <https://mapwv.gov/parcel/?pid=19-07-022B-0021-0000>

### General Information

Tax Class	Book / Page	Deeded Acres	Calculated Acres	Legal Description
2	1192 / 126	0.700	0.82	7/10 AC REININGER
		0.82		

### Cost Value

Dwelling Value \$269,300  
 Other Bldg/Yard Values \$5,160  
 Commercial Value ---

### Appraisal Value

Land Appraisal \$36,500  
 Building Appraisal \$274,500  
 Total Appraisal \$311,000

### Cost Value

Dwelling Value \$269,300  
 Other Bldg/Yard Values \$5,160  
 Commercial Value ---

### Appraisal Value

Land Appraisal \$36,500  
 Building Appraisal \$274,500  
 Total Appraisal \$311,000

### Building Information

Property Class R - Residential  
 Land Use 101 - Residential 1 Family  
 Sum of Structure Areas 4,006  
 # of Buildings (Cards) 1

Card	Year Built	Stories	Grade	Architectural Style	Exterior Wall	Basement Type	Square Footage (SFLA)	Building Value
1	1900	2	B+	Conventional	Frame	Part	4,006	\$269,300
							4,006	\$269,300

Card	Year Built	Attic	Fuel	Heat System	Heat/AC	Bedrooms	Full Baths	Half Baths	Total Rooms
1	1900	Unfinished	Oil	Hot Water	Central	5	2	1	9
						5	2	1	9

### Other Building and Yard Improvements

Bldg/ Card #	Line	Type	Year Built	Grade	Units	Size	Area	Replace Cost	Adjusted Replace Cost
1	1	Frame or CB Detached Garage	1984	C	1	10x20	200	\$3,910	\$3,400
1	2	Four Side Closed Wood Pole Barn	1981	C	1	28x20	560	\$4,550	\$1,760

### Flood Zone Information

Learn more at [WV Flood Tool](#)

Acres (c.) Risk  
 0.82 **High** This parcel appears to be in a HIGH RISK flood hazard zone.

### Sales History

Sale Date	Price	Sale Type	Source Code	Validity Code	Book	Page
6/5/2017					1192	123
6/5/2017					1192	123
6/2/2017	\$343,250	Land and Buildings	4	0	1192	126

## Parcel Assessment Report

# Building 7170:19-07-022B-0021-0000



## West Virginia

### Real Estate Assessment - Building Sketch

Jefferson County, District 7, Map 22B, Parcel 21

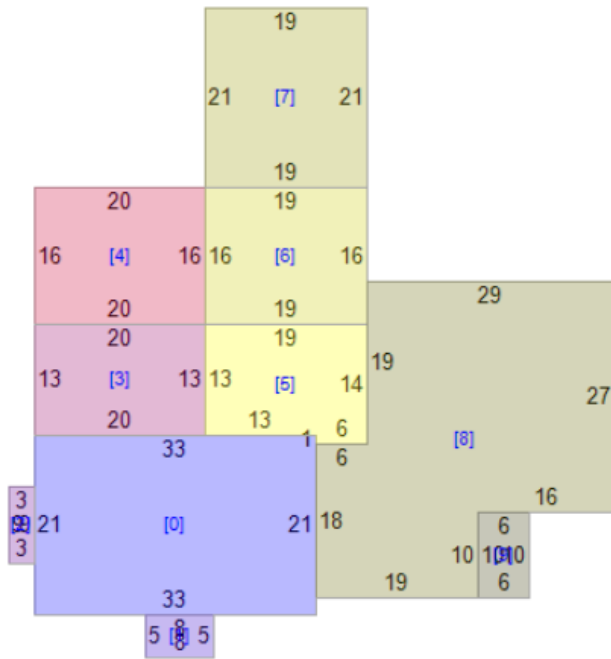
Parcel ID: 1907022B002100000000

Building: 1 of 1

#### Additions

#	Lower	First	Second	Third	Area	Value
0		Refer to Base Area Description			693	\$0
1	---	Masonry terrace	---	---	40	\$530
2	---	Frame bay window	---	---	27	\$1,040
3	---	One story frame	One half story frame	---	260	\$14,460
4	Basement unfinished	One story brick	One half story frame	---	320	\$21,260
5	---	One story frame	---	---	253	\$9,730
6	---	One story frame	---	---	304	\$11,690
7	---	Patio (concrete)	---	---	399	\$1,140
8	---	One story frame	---	---	1,021	\$39,250
9	---	Open frame porch	---	---	60	\$1,230

Show dimensions  Show addition numbers



Building Sketch



# Building 7170:19-07-022B-0021-0000

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

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

Layers: Flood | Reference | Basemaps

Search: Address: e.g., 123 street name, city, state, zip

Tools: [Map Tools]

**Flood Hazard Area:** Location is WITHIN the FEMA 100-year floodplain and floodway.  
**Flood Zone:** AE (Floodway)  
**Stream:** Turkey Run  
**Watershed (HUC8):** Conococheague-Opequon (2070004)

**FEMA's Flood Map:** 54037C0115E NFHL  
**Map Effective Date:** 12/18/2009  
**Contacts:** Jefferson

**Flood Height:** Refer to FIS report for BFE  
**Water Depth:** About 0.8 ft (Source: HEC-RAS)  
**HEC-RAS Model:** N/A

**Flood Profile:** 54037\_028

**Community:** Jefferson County  
**CID:** 540065 **CRS Class:** 6

**Location (long, lat):** (-77.982918, 39.302619)  
**Location (UTM 17N):** (760162, 4354700)

**External Viewers:** [Social Media Icons]

**Elevation:** About 498 ft (Source: FEMA 2012)

**Address:** 7170 QUEEN ST, KEARNEYSVILLE, WV, 25430  
**Parcel ID:** 19-07-022B-0021-0000

**Flood Risk Information**  
[Related Resources](#) | [Flood Risk Assessment](#) | [3D Flood Visualization](#)

scale - 1: 564  
x: -77.982509, y: 39.302318  
@WVGISTC Leaf-Off Mixed-Resolution Imagery

1% Annual Chance Flood Depth Exists for this Building

# Building 7170:19-07-022B-0021-0000

## 3D Visualization

7170 QUEEN ST, KEARNEYSVILLE, WV, 25430

Depth

[0 Foot](#)

[1 Foot](#)

[2 Feet](#)

[3 Feet](#)

[4 Feet](#)

[5 Feet](#)

[6 Feet](#)

[7 Feet](#)

[8 Feet](#)

[9 Feet](#)

[10 Feet](#)

[11 Feet](#)

[12 Feet](#)

[13 Feet](#)

[14 Feet](#)



Parcel ID: 19-07-022B-0021-0000

Water Depth: ~ 0.8 ft ( HEC-RAS)

[Google Map](#)

**General Damage** - Furniture, insulation, walls, electrical outlets damaged.

**Exterior Wall/Facade** - Painted exterior walls will have to be painted at 0.5 foot to 1.0 foot of water as a result of staining. Walls will have to be painted completely because of the inability to match weather-worn paint. Modern stucco facade materials are destroyed when water gets behind the stucco material, which can occur at 0.5 foot of floodwater. Brick veneer will require cleaning.

**Windows** - Includes window frames and panes, as well as structural window frames. These items can sustain some water around them, but by 0.5 feet of floodwater they will need to be completely restored or replaced.

**Mobile Home Ductwork** - Underfloor ductwork found in mobile homes and is damaged completely at 0.5 foot of floodwater.

# Building 755:19-04-0009-0009-0000

755 HALLTOWN RD, HARPERS FERRY, WV 25425

Address	Parcel	Risk
<b>DESCRIPTION</b>		
<b>PROPERTY OWNER</b>		
Property Owner(s) <b>CONSOLIDATED INVESTMENTS LLC;</b>		
Owner Address <b>228 BROADWAY SECOND FLOOR STE, HANOVER, PA 17331</b>		
<b>PHYSICAL ADDRESS</b>		
<b>BUILDING INFORMATION</b>		
<b>COST VALUES</b>		
<b>APPRAISED VALUES</b>		
Land Appraisal	\$573,500	
Building Appraisal	\$2,688,200	
Total Appraisal	\$3,261,700	



**Flood Hazard Area:** Location is **WITHIN** the FEMA 100-year floodplain.  
**Flood Zone:** AE  
**Stream:** Flowing Springs Run  
**Watershed (HUC8):** Shenandoah (2070007)

**FEMA's Flood Map:** 54037C0135E [↓](#) [↓](#) NFHL  
**Map Effective Date:** 12/18/2009  
**Contacts:** Jefferson

**Flood Height:** Refer to FIS report for BFE [More Info](#)  
**Water Depth:** About 1.5 ft (Source: HEC-RAS)  
**HEC-RAS Model:** N/A [All Models](#)

**Flood Profile:** 54037\_009

**Community:** Jefferson County  
**CID:** 540065 **CRS Class:** 6

**Location (long, lat):** (-77.799994, 39.313196)  
**Location (UTM 17N):** (775897, 4356416)

**External Viewers:** [Google Maps](#) [ArcGIS](#) [Mapbox](#) [OpenStreetMap](#)

**Elevation:** About 400 ft (Source: FEMA 2012)

**Address:**  multiple addresses

**Parcel ID:**  19-04-0009-0009-0000 [Disclaimer](#)

Industrial Building Valued at \$2.6M located in AE Zone

X: -77.797891, Y: 39.312611

# Building 755:19-04-0009-0009-0000

## General Information

Tax Class	Book / Page	Deeded Acres	Calculated Acres	Legal Description
3	1044 / 201	33.500	30.04	33 1/2 A HALLTOWN PAPERBOARD
			30.04	

## Cost Value

Dwelling Value	---
Other Bldg/Yard Values	\$62,960
Commercial Value	\$2,625,200

## Appraisal Value

Land Appraisal	\$573,500
Building Appraisal	\$2,688,200
Total Appraisal	\$3,261,700

## Building Information

Property Class	I - Industrial
Land Use	452 - Paper Finishing & Converting
Use Type	27-Dwelling, 43-Manufacturing, 45-Warehouse, 82-Multi-Use - Office, 84-Multi-Use - Storage, 85-Enclosure, 86-Support Area
Living Area	203,128
Cubic Feet	4,245,616
# of Buildings (Cards)	18
# of Units	

Assessment Report for Industrial Building Valued at \$2.6M located in AE Zone

# Building 1801:119-09-0011-0009-0021

← → ↻ https://mapwv.gov/flood/map/?pid=19-09-0011-0009-0021

## WV Flood Tool

Views: Public | Expert | Risk MAP | Flood | Reference | Basemaps

Layers: [dropdown]

Search: Address [dropdown] e.g., 123 street name, city, state, zip

Tools: [dropdown]

1801 KNOTT RD,  
SHEPHERDSTOWN, WV 25443

11-9.21 1071 1801 11A-13 1777 11-9 11A-17

Is 1801 Knott Road a **Primary** or **Accessory** Structure?

x: -77.746178, y: 39.408552

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

Flood Zone: A (Advisory Flood Heights available)

Stream: Potomac River

Watershed (HUC8): Conococheague-Opequon (2070004)

FEMA Issued Flood Map: 54037C0075E [NFHL](#)

Map Effective Date: 12/18/2009

Contacts: Jefferson

Community: Jefferson County

CID: 540065 CRS Class: 6

Location (long, lat): (-77.746860, 39.409275)

Location (UTM 17N): (780095, 4367246)

External Viewers: [icons]

Elevation: About 299 ft (Source: FEMA 2012)

Address  : multiple addresses

Parcel ID  : 19-09-0011-0009-0021 [Disclaimer](#)

Flood Risk Information [Related Resources](#)

Flood Risk Assessment  N/A

3D Flood Visualization

# Building 1801:119-09-0011-0009-0021

Cost Value		Appraisal Value	
Dwelling Value	\$947,300	Land Appraisal	\$78,000
Other Bldg/Yard Values	\$1,490	Building Appraisal	\$948,800
Commercial Value	---	Total Appraisal	\$1,026,800

Building Information		
Property Class	R - Residential	<b>1801 Knott Road is a Gazebo valued at \$1,490 – not the primary structure 1071 Knott Road valued at \$948,800</b>
Land Use	101 - Residential 1 Family	
Sum of Structure Areas	5,644	
# of Buildings (Cards)	1	

Card	Year Built	Stories	Grade	Architectural Style	Exterior Wall	Basement Type	Square Footage (SFLA)	Building Value
1	2006	2	X+	Cape Cod/Cape Ann	Frame	Full	5,644	\$947,300
							5,644	\$947,300

Card	Year Built	Attic	Fuel	Heat System	Heat/AC	Bedrooms	Full Baths	Half Baths	Total Rooms
1	2006	None	Electric	Heat Pump	Central A/C	4	4	1	12
						4	4	1	12

Other Building and Yard Improvements									
Bldg/ Card #	Line	Type	Year Built	Grade	Units	Size	Area	Replace Cost	Adjusted Replace Cost
1	1	Gazebo Gazebo	2006	C	1	10x10	100	\$1,050	\$1,490
					1		100	\$1,050	\$1,490

# Not a Building

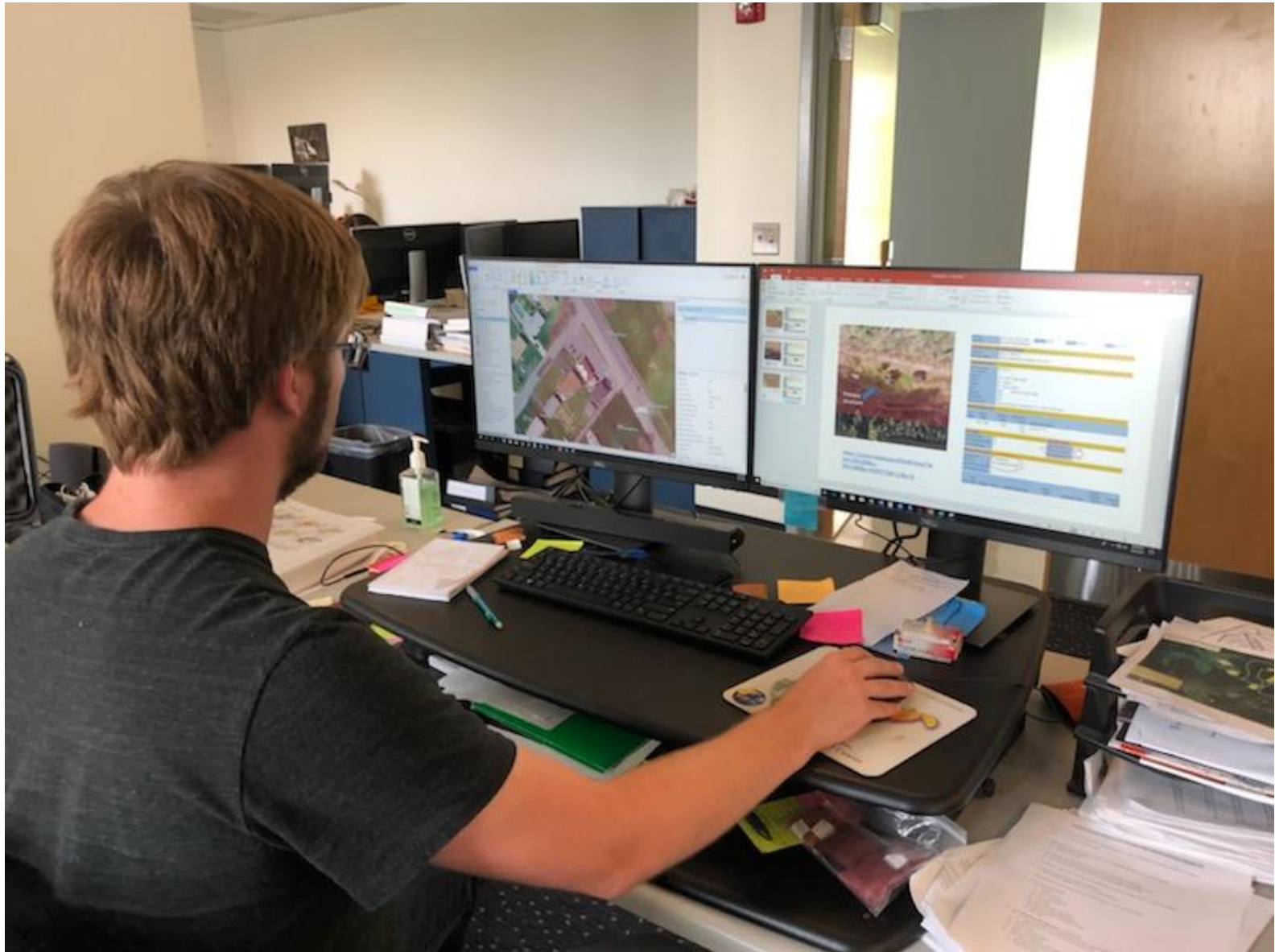
*CRS Manual Page 300-5*

## “Not a Building”

- ✓ Open pavilions, carports, underground pump stations, trailers, etc. are not buildings
- ✓ Accessory structures are not counted



# Building Accuracy Improvement

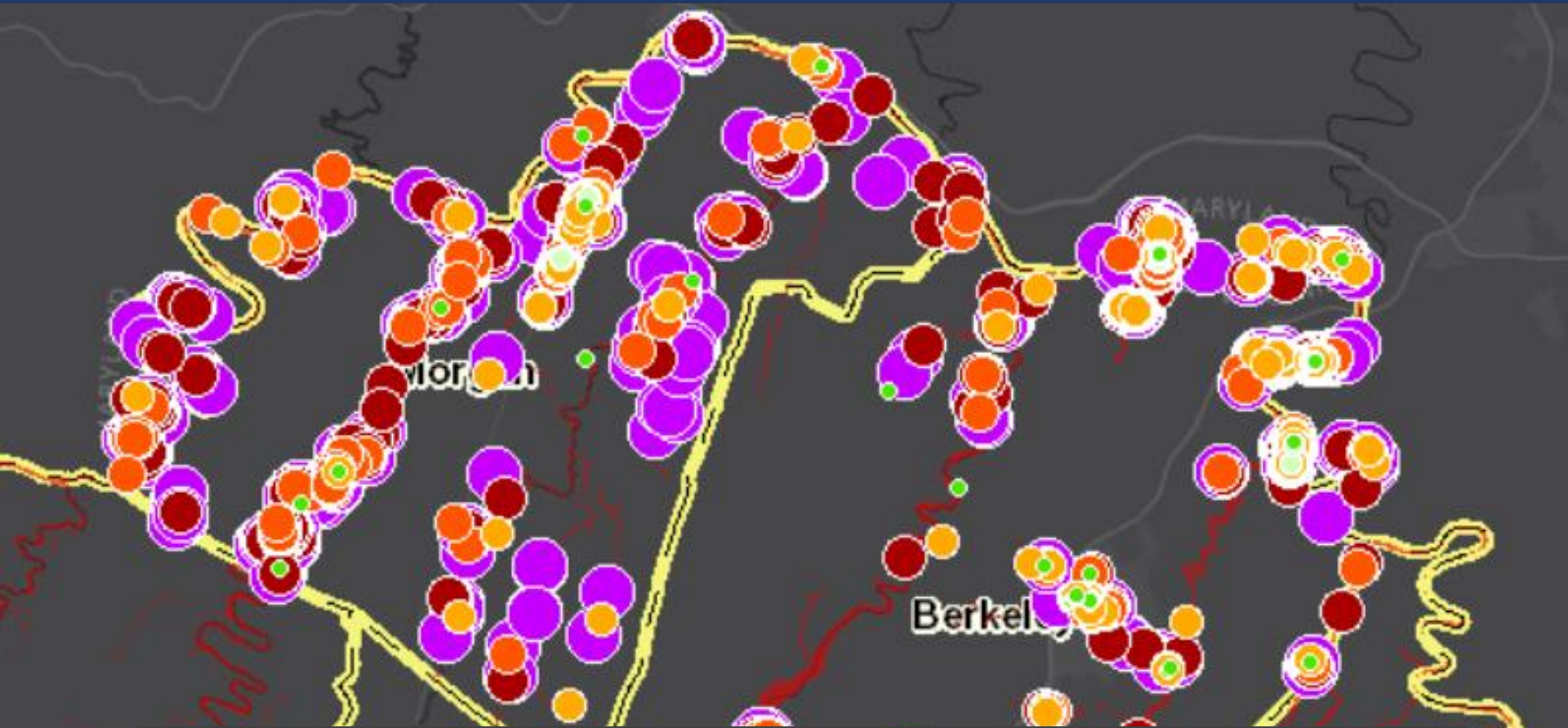




# Statewide Flood Risk Assessment

## **Risk Map Building Layers**

# Statewide Flood Risk Assessment



## Flood Risk Building Layers

*Published to RiskMAP View of WV Flood tool*

# RiskMAP View

[About](#) [Help](#) [Home](#)



## Flood Risk Awareness & Mitigation Planning

**View** Public | **Expert** | **Risk MAP**

**Layers** Flood | Reference | Basemaps

**Search** Address e.g., 123 street name, city, state, zip

**Tools** [Icons for pan, zoom, home, print, etc.]

**Map Legend:**

- Site Bldg Exposure Costs (BI)
- Site Bldg Damage Loss (UDF)
- Render Map By:  Percent  Value
- 2016-17 Hazus Level II (Census Blocks)
- Total Bldg Assets Exposed
- Building Damage Loss
- Debris Removal
- Temporary Shelters
- 2010 Hazus Level I

**Risk Assessment - UDF**  
Site BLDG Loss (UDF)(% Damaged)

- 0
- 0 - 1
- 1 - 10
- 10 - 25
- 25 - 50
- 50 - 100

**Map Data:** 100 Yr High Risk Flood Zone

**Info Panel:**

- Flood Hazard Area: Location is WITHIN the FEMA 100-year floodplain.
- Flood Zone: AE
- Stream: Dry Run
- Watershed (HUC8): Conococheague-Opequon (2070004)
- FEMA Issued Flood Map: 54003C0154E
- Map Effective Date: 7/7/2009
- Contacts: Berkeley
- Flood Height: Refer to FIS report for BFE
- Water Depth: About 4.8 ft (Source: EQL)
- HEC-RAS Model: N/A
- Community: City of Martinsburg
- CID: 540006 CRS Class: 8
- Location (long, lat): (-77.959498, 39.468441)
- Location (UTM 17N): (761562, 4373175)
- External Viewers: [Icons]
- Elevation: About 449 ft (Source: FEMA 2012)
- Address: 301 W MOLER AVE, Martinsburg, West Virginia, 25404
- Parent ID: 02-06-0006-0048-0000

**Map Interaction:** A blue rectangle highlights a specific area on the map, which is also circled in black. A purple dot is visible within this area.

**Bottom Right Panel:**

- Flood Risk Information
- Flood Risk Assessment
- 3D Flood Visualization

# Flood Risk Structures of Martinsburg

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

Views: Public Expert **Risk MAP** Layers: Flood Reference Basemaps Search: martinsburg, wv

**Flood Risk Building Info**

Exposure Replacement Cost (BI)	
Building Replacement Cost	\$156,882
Content Cost	\$108,165
Building Area	1,232 sq ft
Hazus Occupancy Code	RES1
Number of Stories	2
Year Built	1920
Building Construction	Brick
Building Condition	Low
Building Foundation	Basement
First Floor Ht	4 ft above ground

Damage Estimates (UDF)	
Building Damage Pct	57%
Building Loss USD	\$88,834

**Flood Risk Assessment Building Link**

**Flood Risk**

- Low
- Moderate
- Severe

**Building Flood Loss Damage**

57% of Residential Home Damaged at a Loss of \$88,834

**Flood Risk Information**

Flood Risk Assessment

Risk Information for the highlighted census block area: 540039716001007

- Total Assets Exposed: \$173k
- Total Loss (Bldgs and Contents): \$0k
- Building Loss: \$0k
- Debris Removal: 0k ton
- Temporary Shelter: 0 person(s)
- Depth: About 10.0 ft (Source: EQL)

<https://www.mapwv.gov/flood/map/?wkid=102100&x=-8678481&y=4788856&l=11&v=2>

The Risk MAP View allows for viewing flood loss estimates at the building or structure level for a 1%-annual-chance flood event.

# RiskMAP View – 3D Visualization

Click on each tab to view information

Address Parcel Risk

## Exposure Replacement Cost (BI)

Building Replacement Cost \$156,882

Content Cost \$108,165

Building Area 1,232 sq ft

Hazus Occupancy Code RES1

**Building Exposure**

Number of Stories 2

Year Built 1920

Building Construction Brick

Building Condition Low

Building Foundation Basement

First Floor Ht 4 ft above ground

## Damage Estimates (UDF)

Building Damage Pct 57%

Building Loss USD \$88,834

Content Damage Pct 54%

Content Loss USD \$42,701

**HAZUS Loss Estimate**



**Flood Depth**



**Street View Image**

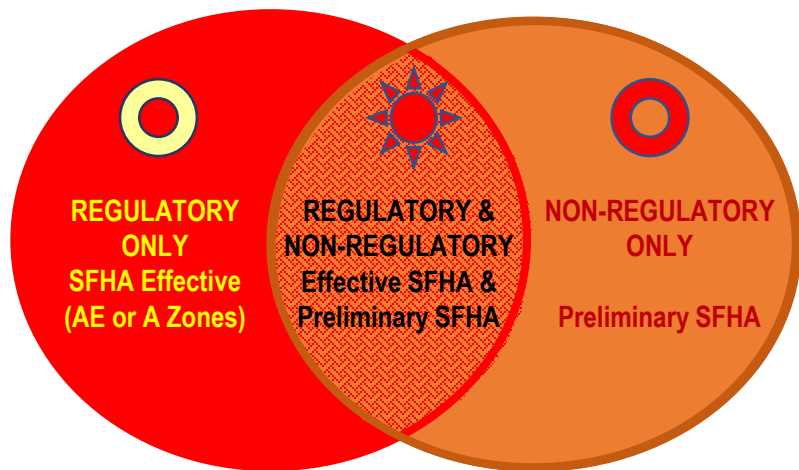
# Building-Level Risk Symbology

- **Flood Zones**
  - Floodway
  - Regulatory
  - Non-Regulatory
- **Building Exposure**
  - Building Exposure (\$) Community-wide
  - Building Exposure (\$) 100-YR Floodplains
- **Building Physical Damage**
  - Damage by Percent (%)
  - Damage by Dollars (\$)
- **Critical infrastructure**

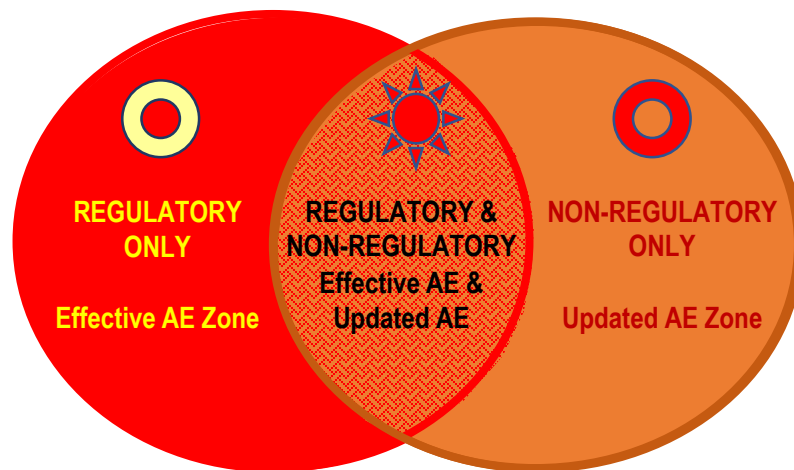
Dual Symbols: Property Class letters (R, F, C, I, A, U, X) combined with symbols. Also may contrast between building points that have been verified for accuracy and those that have not.

# Building-Level Symbols - Flood Zones: Regulatory / Non-Regulatory / Floodway

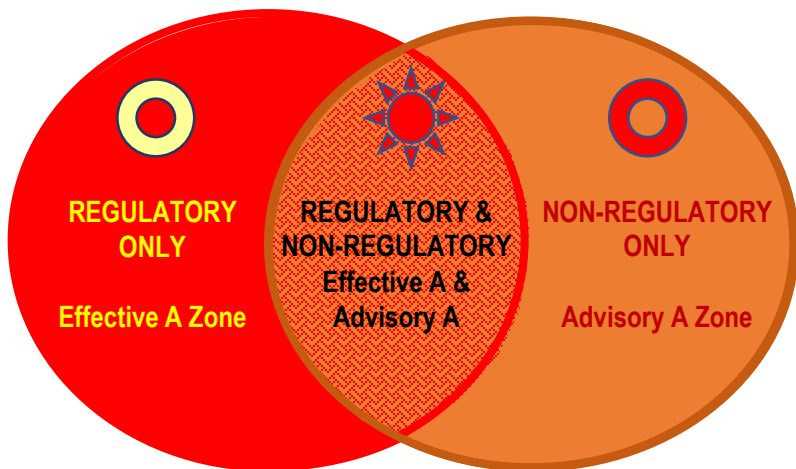
**Effective SFHA** versus **Preliminary SFHA**



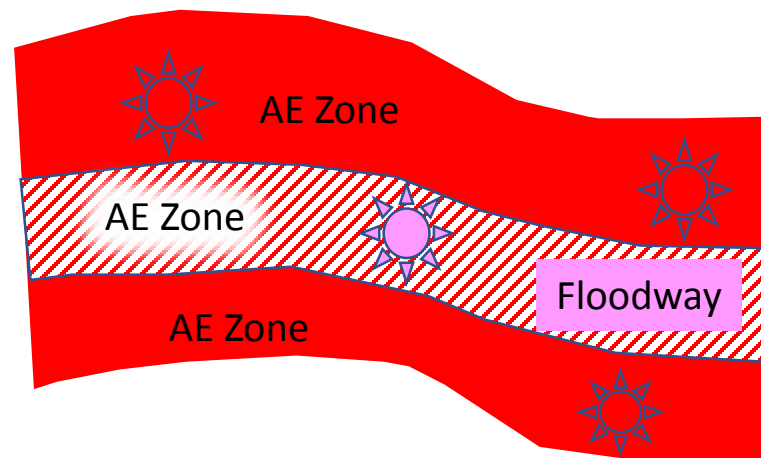
**Effective AE Zone** versus **Updated AE Zone**



**Effective A Zone** versus **Advisory A Zone**



**Effective AE** versus **Floodway AE**



# Building Changes Since Last FIRM

Near Matoaka in Mercer County

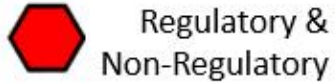
## Floodplain Type



Floodway



Non-Regulatory



Regulatory & Non-Regulatory



Regulatory

## Property Type

**C** Commercial

**R** Residential

**O** Other

Mapped IN SFHA

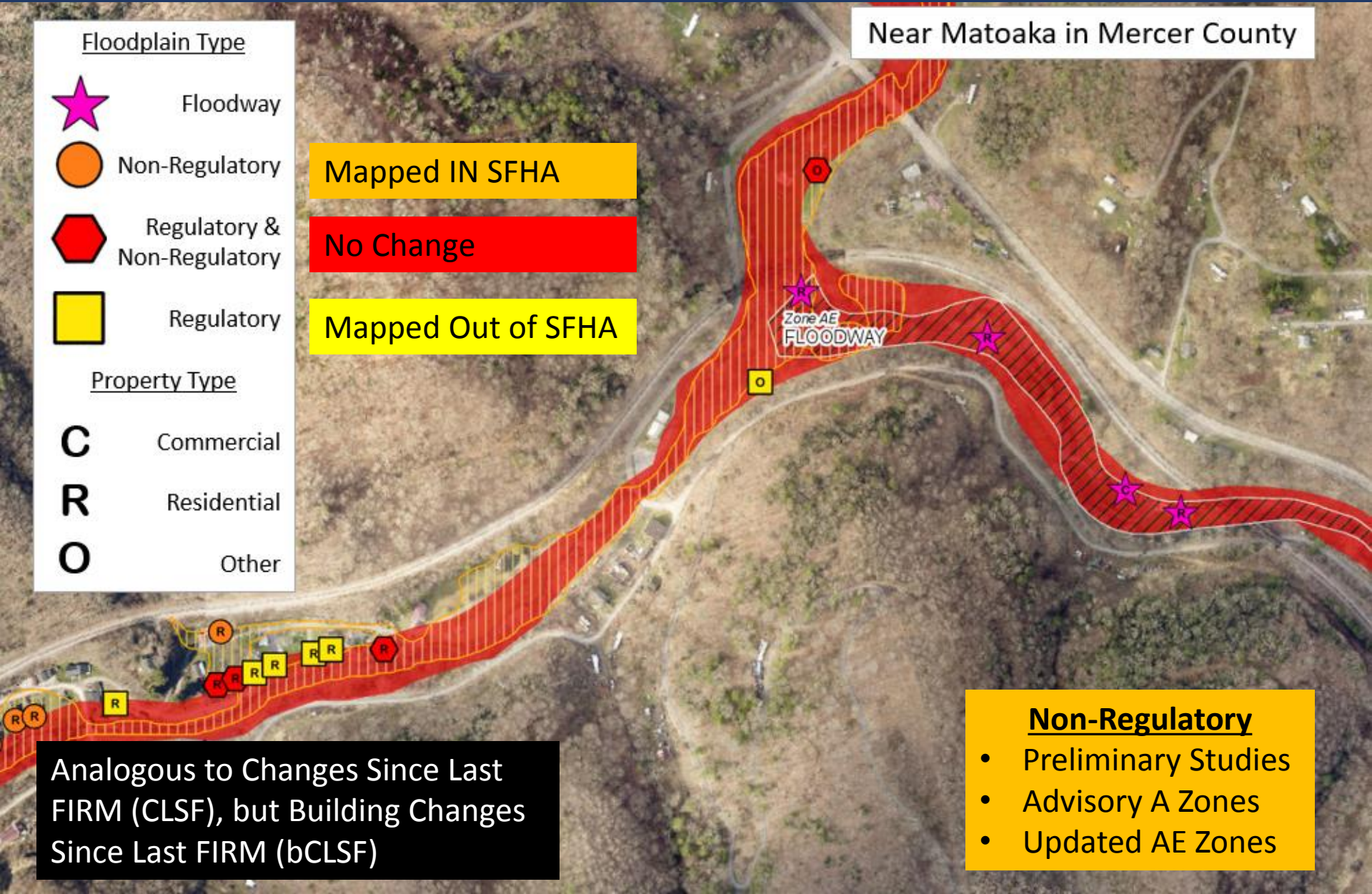
No Change

Mapped Out of SFHA

Analogous to Changes Since Last FIRM (CLSF), but Building Changes Since Last FIRM (bCLSF)

## Non-Regulatory

- Preliminary Studies
- Advisory A Zones
- Updated AE Zones





# Building Exposure and Building Physical Damage

## Building Exposure

### Risk Assessment - BI

Site Building Exposure Costs (BI)



Parcel Centroid -  
Statewide

Building  
Accuracy  
Improvement –  
100-YR  
Floodplain  
Regulatory &  
Non-Regulatory

## Building Physical Damage

### Risk Assessment - UDF

Site BLDG Loss (UDF)(% Damage)

- 0
- 0 - 1
- 1 - 10
- 10 - 25
- 25 - 50
- 50 - 100
- No Model

Hazus UDF Output –  
Building % Damage

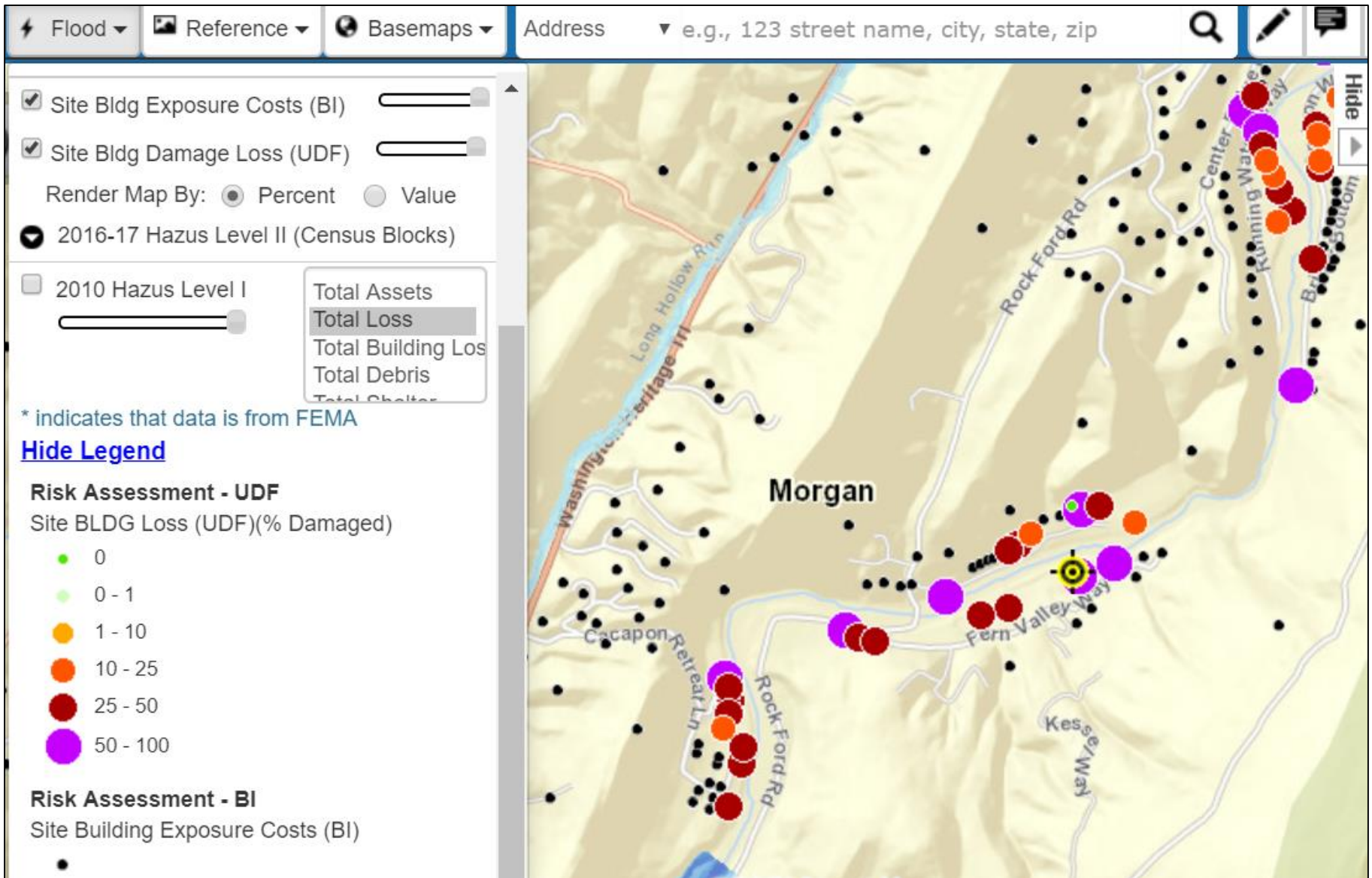
### Risk Asmt UDF (value)

Site BLDG Loss (UDF)(Dollars, 1000s)

- 0
- 0 - 2
- 2 - 10
- 10 - 50
- 50 - 100
- 100 - 1230
- No Model

Hazus UDF Output –  
Building Cost Damage

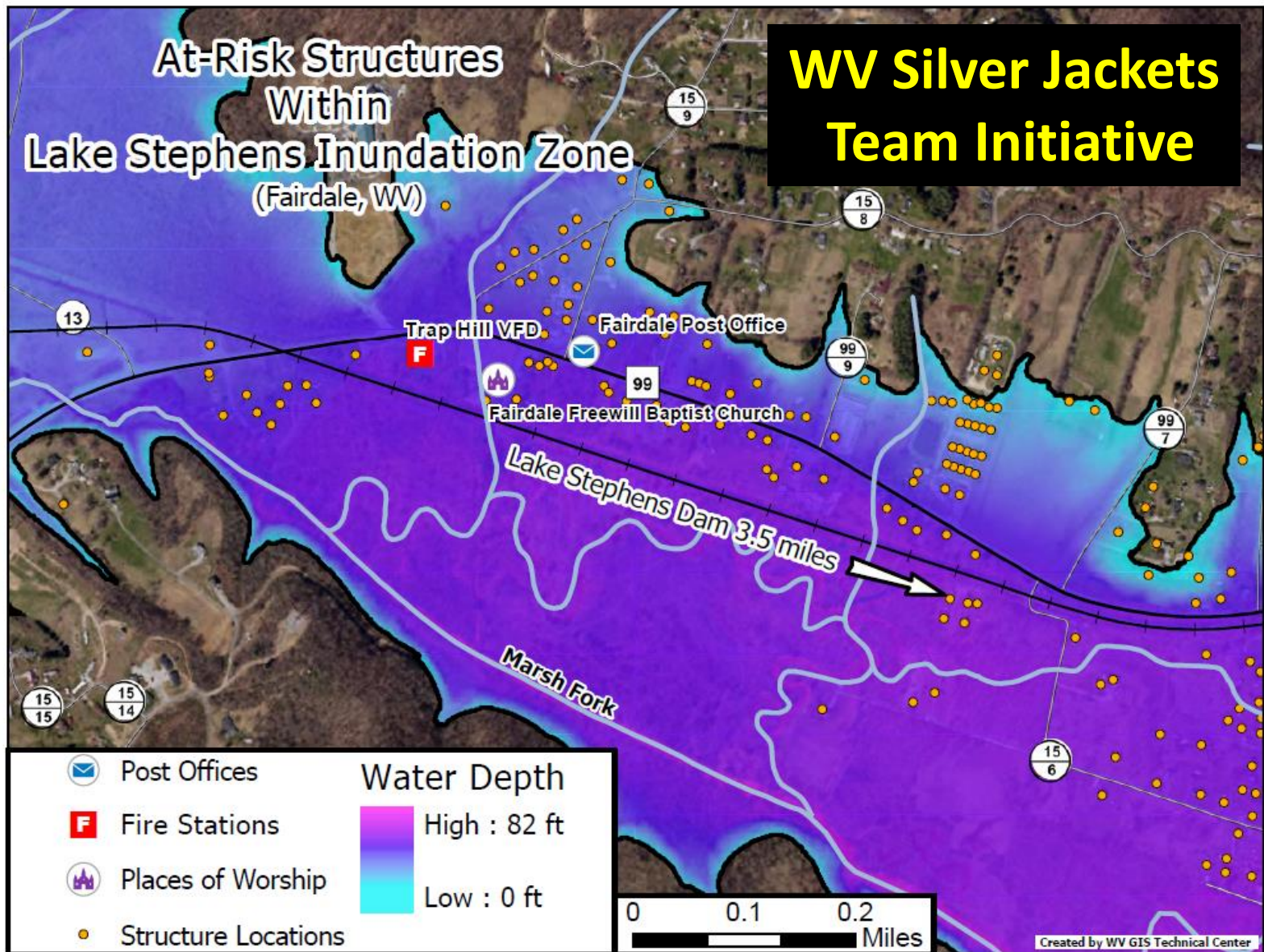
# Building Exposure and Building Physical Damage



# Building Flood Risk by % Damage



# Building Stock: Dam / Levee Failures



# WV Flood Tool Updates

## June 2019 Updates

- **Flood Zones**

- Revise 10 Flood Zone Categories in Flood Query Results Panel
- Add Preliminary SFHA for viewing and display in Query Results Panel
- Add Upper Monongahela Watershed RiskMAP Study

- **Expert View**

- Consume additional NFHL layers
- Provide metadata links
- Utilize FEMA's Effective Panel layer for querying FIRM maps and downloads
- Reorganize and Group layers
- Permit user to display all Flood Zone View Types:
  - Expert View (default)
  - Public View
  - NFHL View)
- Update legend of Printed Map

- **Reference Data**

- Add new Logan County aerial imagery and lidar-derived DEM
- Add statewide Microsoft Building Footprints

*New flood data and updated query programming logic*

# Flood Zone Layers

The screenshot displays the WV Flood Tool interface. The top navigation bar includes 'Public', 'Expert', and 'Risk MAP' views, and 'Flood', 'Reference', and 'Basemaps' layers. A search bar shows 'logan, wv'. The main map area shows a flood zone with 'Zone AE' and 'FLOODWAY Zone AE' labels. A red box highlights the 'Primary Flood Hazard Layers' section in the left sidebar, which includes:

- Primary Flood Hazard Layers
  - Hazard Layers (100-Yr)
  - Hazard Layer (500-Yr)
  - Base Flood Elevations\*
  - Cross-Sections\*
  - LOMA\*
  - LOMR\*
  - FIRM Panel\*
  - Water Lines\*
- Preliminary Flood Hazard Layers
  - Elevation Certificates
  - Water Depth (HEC-RAS)-5
- Miscellaneous Layers
  - River Mile Marker\*
  - Levees\*
  - General Structures\*
  - Real-time Stream Gage\*
  - High Water Marks
  - Mitigated Properties
  - Flood Hazard Zones\*
  - Flood Hazard Boundaries\*

The right sidebar provides detailed information for the selected location:

- Flood Hazard Area:** Location is WITHIN the FEMA 100-year floodplain.
- Flood Zone:** AE
- Stream:** Elk River
- Watershed (HUC8):** Elk (5050007)
- FEMA's Flood Map:** 54039C0301E
- Map Effective Date:** 2/6/2008
- Contacts:** Kanawha
- Flood Height:** Refer to FIS report for BFE
- Water Depth:** About 15.0 ft (Source: HAZUS)
- HEC-RAS Model:** N/A
- Flood Profile:** 54039\_065
- Community:** Town of Clendenin (CID: 540075, CRS Class: 10)
- Location (long, lat):** (-81.361706, 38.482884)
- Location (UTM 17N):** (468453, 4259455)
- External Viewers:** [Icons for various sharing options]
- Elevation:** About 596 ft (Source: FEMA 2016)
- Address:** 7894 ELK RIVER RD N, CLENDENIN, WV, 25045
- Parcel ID:** 20-02-0011-0047-0000

Scale: 1:36,112. Coordinates: x: -81.378700, y: 38.460977. ©ESRI Dark Gray Canvas

# Preliminary Flood Data

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

Views: Public | **Expert** | Risk MAP | Layers: Flood | Reference | Basemaps | Search: Address | morgantown, wv | Tools: [Icons]

**Map Information:**  
Scale: 1:4,514  
Coordinates: x: -79.942336, y: 39.623310  
Map ID: 54061C0227E Eff: 1/20/2010  
Map ID: C0114E Eff: 1/20/2010

**Map Labels:** Monongalia, City of Morgantown 540141, Zone AE, 830.6 FEET

**Information Panel:**

- Flood Hazard Area:** Location is **WITHIN** an updated FEMA 100-year flood hazard zone. The flood zone is preliminary and under review to become effective.
- Flood Zone:** Preliminary Flood Zone
- Stream:** Deckers Creek
- Watershed (HUC8):** Upper Monongahela (5020003)
- FEMA Issued Flood Map:** 54061C0227E [Download](#) **NFHL**
- Map Effective Date:** 1/20/2010
- Contacts:** Monongalia
- Flood Height:** 830.2 ft (Source: BFE) [More Info](#)
- Water Depth:** About 1.7 ft (Source: HEC-RAS)
- HEC-RAS Model:** N/A
- Flood Profile:** N/A
- Community:** City of Morgantown  
CID: 540141 **CRS Class:** 10
- Location (long, lat):** (-79.944074, 39.623913)
- Location (UTM 17N):** (590627, 4386548)
- External Viewers:** [Icons]
- Elevation:** About 827 ft (Source: SAMS 2003)
- Address:**  multiple addresses
- Parcel ID:**  31-10-0035-0091-0000 [Disclaimer](#)
- Flood Risk Information** [Related Resources](#)

@ESRI Dark Gray Canvas

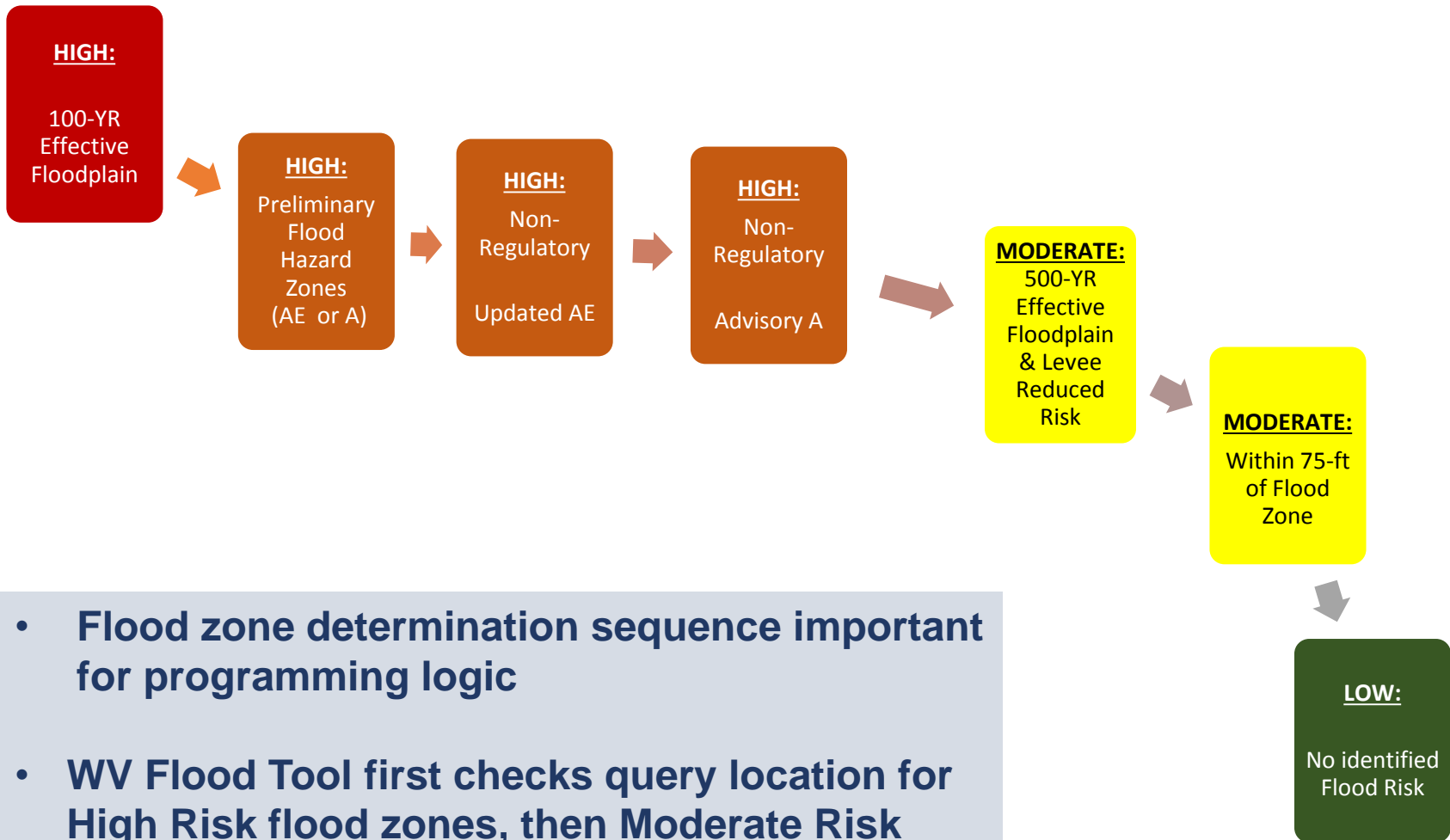
# Flood Zone: < zone designation >

Status #	Flood Risk Zone Designation	Message	Floodplain Type Label	Flood Degree Risk	Color Warning Status
1	AE, AH (5), AO (2)	Location is WITHIN the FEMA 100-year floodplain.	Effective 100 yr Zone AE, AH, AO	High	Red
2	AE (Floodway)	Location is WITHIN the FEMA 100-year floodplain and floodway.	Effective 100 yr Zone AE, AH, AO – Floodway	High	Red
3	A	Location is WITHIN the FEMA 100-year floodplain.	Effective 100 yr Zone A	High	Red
3A	A (Advisory Flood Heights available)	Location is WITHIN the FEMA 100-year floodplain. Advisory Flood Heights available.	Effective 100 yr Zone A and Advisory Zone A	High	Red
4	Preliminary Flood Zone	Location is WITHIN an updated FEMA 100-year flood hazard zone. The flood zone is preliminary and under review to become effective.	Preliminary 100 yr Zone A or Preliminary 100 yr AE	High	Orange
5	Updated AE Floodplain Boundary	Location is WITHIN an updated detailed floodplain boundary but NOT a FEMA 100-year effective floodplain.	Updated Zone AE	High	Orange
6	Advisory A (Advisory Flood Heights available)	Location is WITHIN an advisory floodplain but NOT a FEMA 100-year effective floodplain.	Advisory Zone A	High	Orange
7	Shaded X (500-YR Flood)	Location is WITHIN a moderate flood risk hazard such as a FEMA 500-year floodplain.	Zone X - 0.2 PCT ANNUAL CHANCE FLOOD HAZARD	Moderate	Yellow
8	X (Levee Protected)	Location is PROTECTED by a levee from a 100-year flood	Zone X - AREA WITH REDUCED FLOOD RISK DUE TO LEVEE	Moderate	Yellow
9	Near Flood Zone	Location is NOT WITHIN identified flood hazard area, but within 75 feet of an identified flood hazard area.	<i>Separate Buffer Layer</i>	Moderate	Yellow
10	Out of Flood Zone	Location is NOT WITHIN any identified flood hazard area. Unmapped flood hazard areas may be present.	<i>No Record Found</i>	Low	Green

Three Degrees of Risk: High, Moderate, Low. Four Warning Status Colors: In 100-YR Effective Floodplains (red), Preliminary Flood Zones and non-regulatory Advisory A/Updated AE Floodplains (orange), moderate risk or close to high risk zones (yellow), low risk (green). The query consists of six stacked floodplain boundary layers (see next slide)

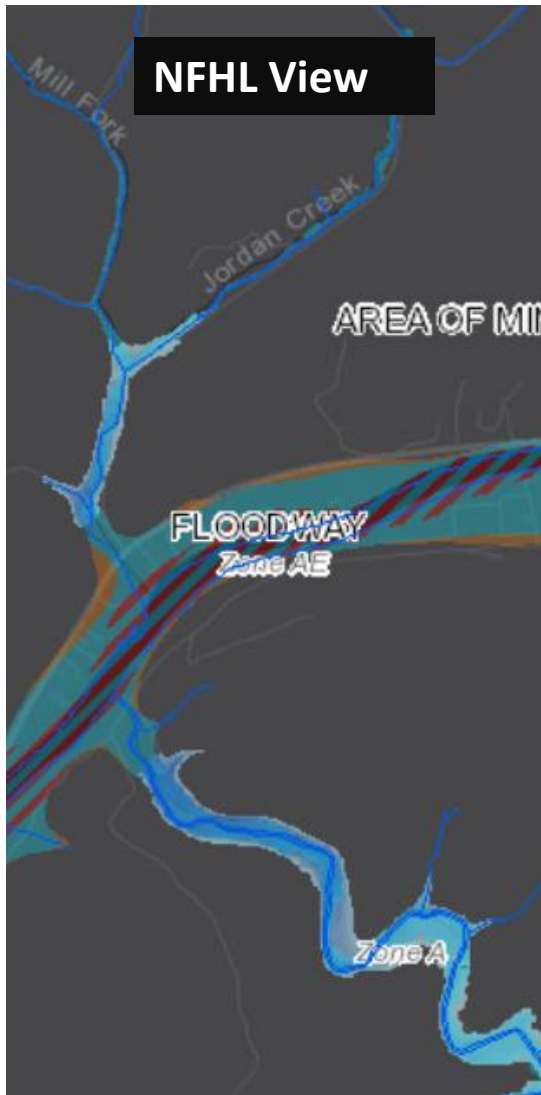


# Flood Zone Determination Sequence

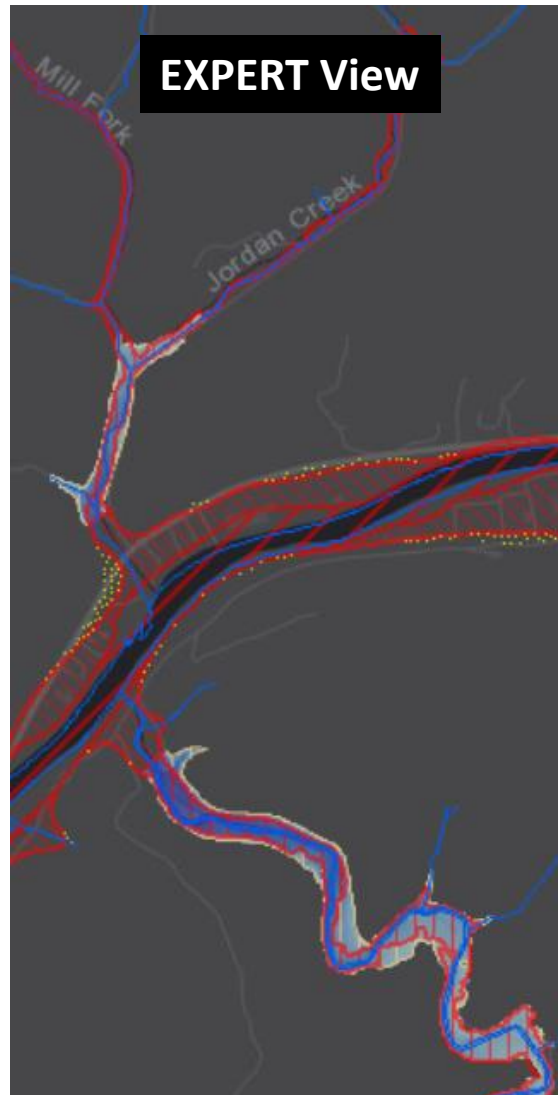


- Flood zone determination sequence important for programming logic
- WV Flood Tool first checks query location for High Risk flood zones, then Moderate Risk flood zones.

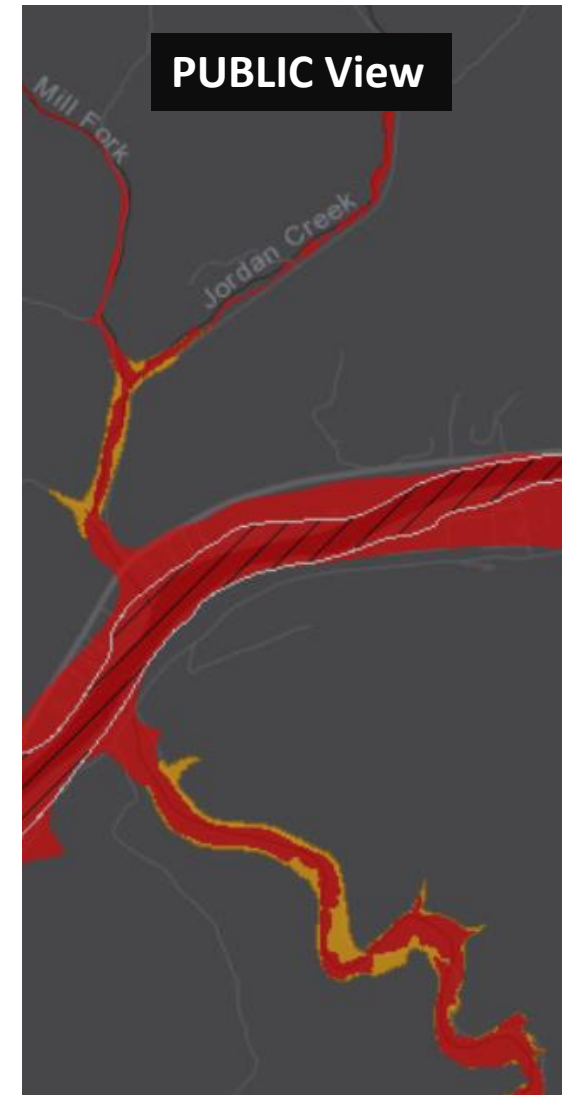
# Multiple Flood Zone Symbology Types



NFHL Viewer

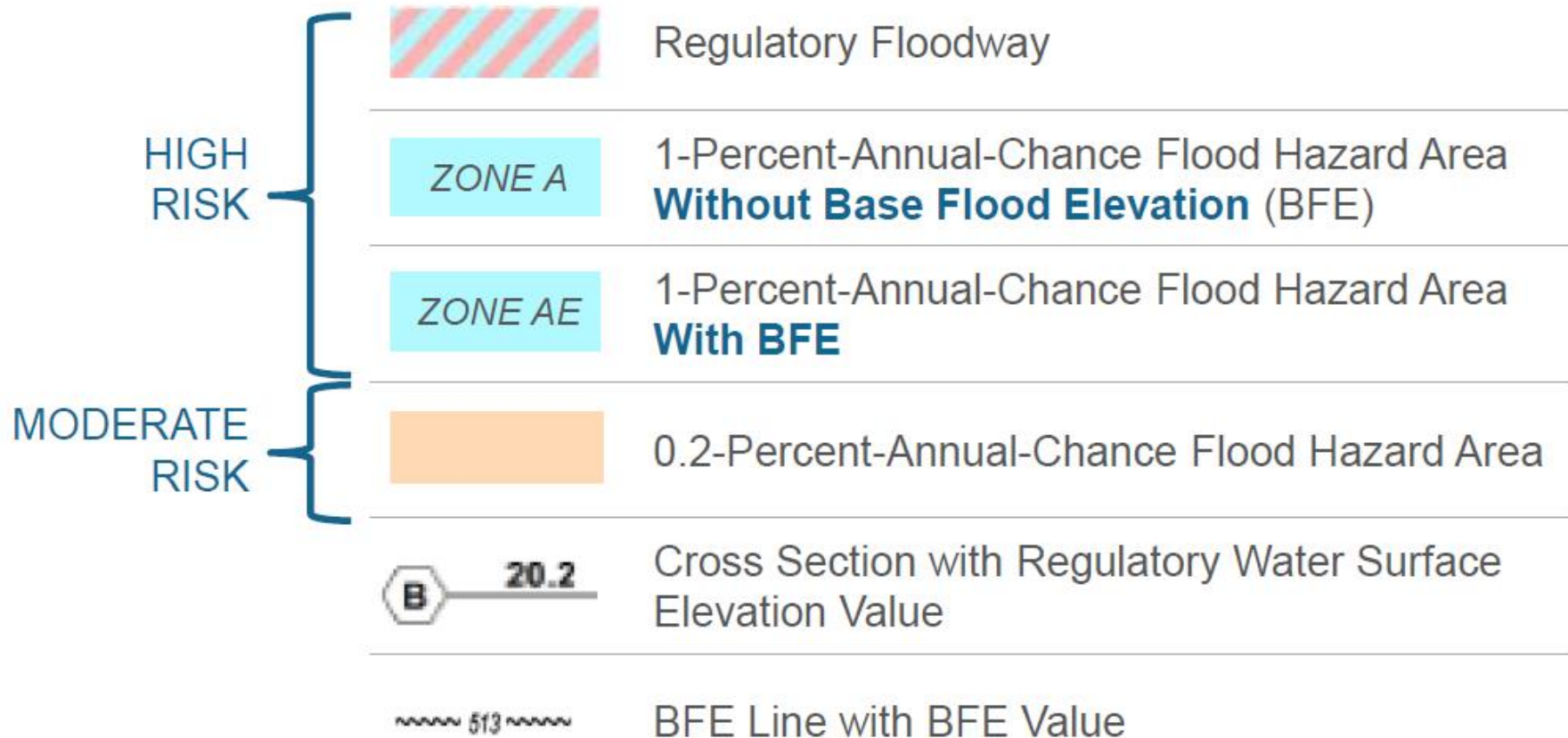


Depth Grid Underlies Flood Zones



Regulatory (red) and  
Non-Regulatory (orange)

# Floodplain Map Overview (FEMA NFHL Viewer)



# WV Flood Tool – Expert View

HIGH RISK



Regulatory Floodway



1-Percent-Annual-Chance Flood Hazard Area  
**Without Base Flood Elevation (BFE)**



1-Percent-Annual-Chance Flood Hazard Area  
**With BFE**



Non-Regulatory **Preliminary SFHA**



Non-Regulatory **Updated AE Boundary**



Non-Regulatory **Advisory A Zone**

MODERATE RISK



**Shaded X**  
0.2-Percent-Annual-Chance Flood Hazard Area or  
Levee Protected Zones

*Near Flood Zones* are presented on Flood Results Query Panel

# WV Flood Tool – Public View

HIGH  
RISK



Regulatory Floodway



1-Percent-Annual-Chance Flood Hazard Area  
**Without Base Flood Elevation (BFE)**



1-Percent-Annual-Chance Flood Hazard Area  
**With BFE**

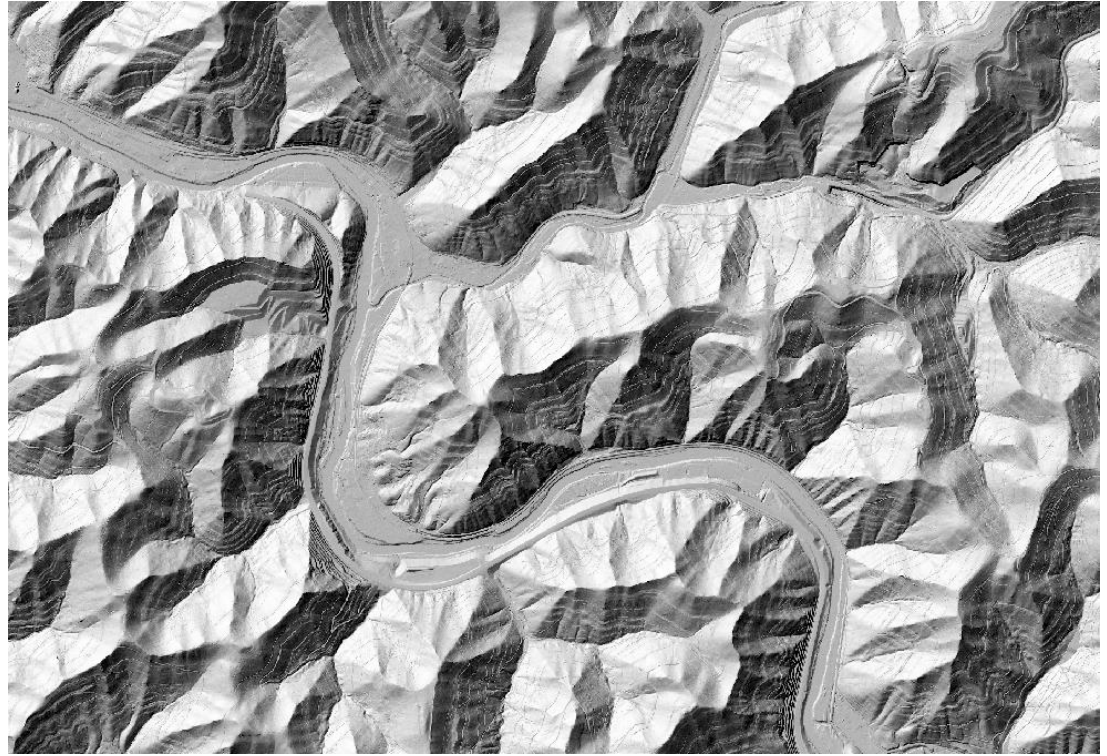


Non-Regulatory Flood Zones  
**Preliminary or Advisory A or Updated AE**

## **Moderate Risks:**

Shaded X or Near Flood Zones are presented in Flood Results Query Panel

# New Logan County Elevation Data



# Flood Tool Development Team



Kurt Donaldson  
Manager



Xiannian Chen  
Lead Programmer



Jim Schindling  
Database  
Programmer

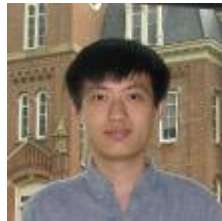


Kevin Kuhn  
GIS Analyst /  
Address-Parcel  
Specialist

WV GIS Technical Center  
West Virginia University  
Morgantown, WV  
<http://wvgis.wvu.edu>



Frank LaFone  
Systems  
Administrator



Yibing Han  
GIS Programmer



Maneesh Sharma  
GIS Analyst /  
Flood Risk  
Specialist



Eric Hopkins  
GIS Analyst /  
Flood Risk  
Specialist

# Contact Information

## WVU GIS Technical Center

**Kurt Donaldson**, GIS Manager

[kurt.donaldson@mail.wvu.edu](mailto:kurt.donaldson@mail.wvu.edu), phone: (304) 293-9467

**Eric Hopkins**, GIS Analyst

[Eric.Hopkins@mail.wvu.edu](mailto:Eric.Hopkins@mail.wvu.edu), phone: (304) 293-9463

**Maneesh Sharma**, GIS Analyst

[Maneesh.Sharma@mail.wvu.edu](mailto:Maneesh.Sharma@mail.wvu.edu), phone (304) 293-9466