

# WV Flood Tool - FUTURE DIRECTIONS

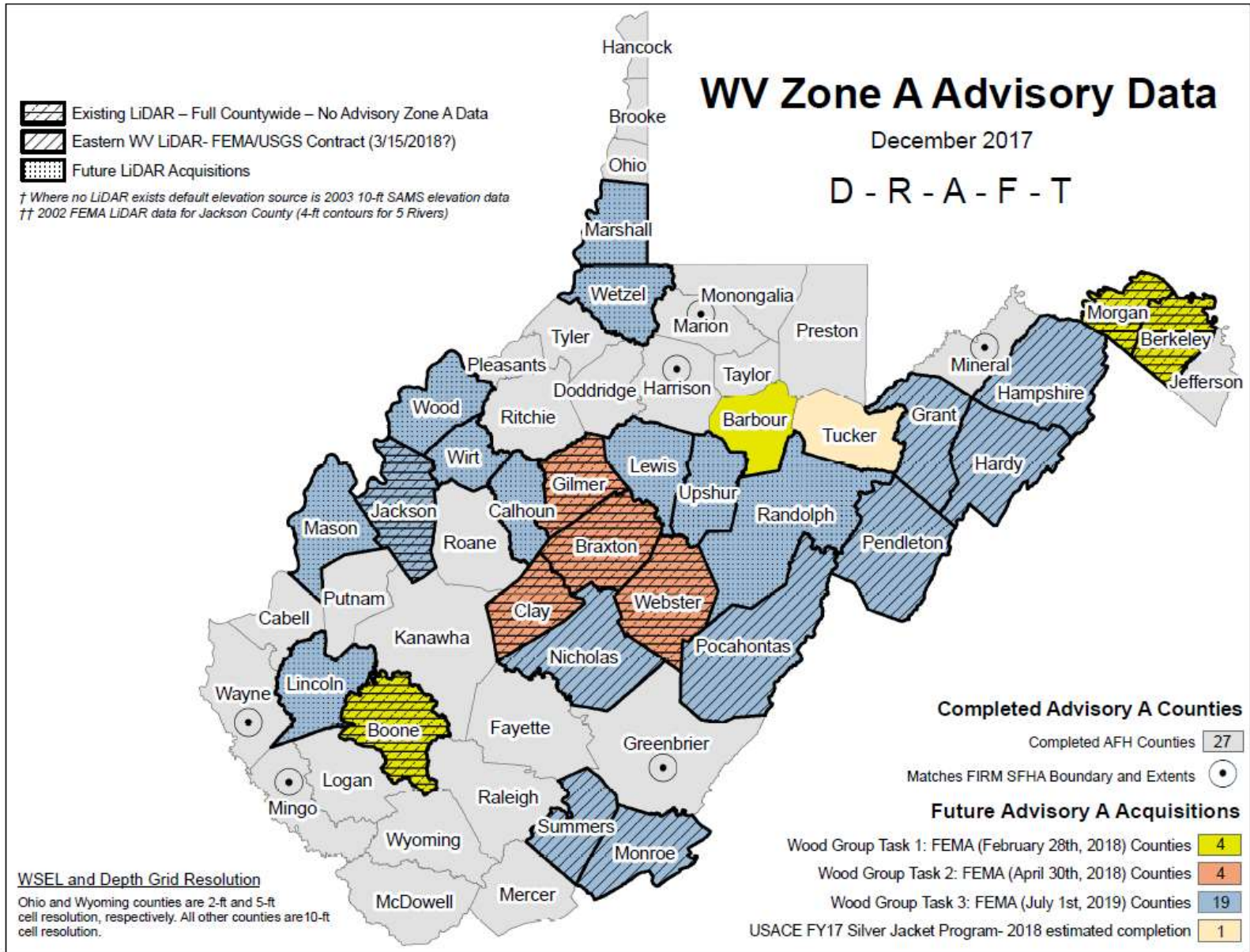
- **Flood Mapping Activity Updates**
  - Advisory A, Updated AE & Restudies
  - Lidar data delivery update
  - Other Status Graphics
- **Quick Comparison of NFHL and WV Flood Tool**
- **WV Flood Tool Planned Updates:** Flood Query Panel (new data flood data sources and updating query programming logic)
  - Flood Zones
    - Updated AE Floodplain Boundaries (e.g, Clear Fork & Jefferson County pilot AE Non-Restudy)
    - NFHL Moderate Flood Risk Zones (Shaded X, B)
  - Flood Heights
    - Base Flood Heights (e.g., Upper Mon Watershed Restudy)
  - Composite Depth Grid
    - Depth grids based on engineering models from various sources; goal is 5-ft. cell resolution statewide
    - Other depth grids (USGS HWM, Hazus, EQL)
- **Model WV Ordinance for Advisory Zones**
- **Reference Layers** for WV Flood Tool (ground elevation, footprints, parcels)
- **HMGP Multi-Hazard Proposal**
- **Other Topics**

January 2018

# Flood Mapping Activities

- **Flood Mapping Activity Updates**
  - Advisory A
  - Updated AE Floodplain Boundaries
  - Lidar data delivery update
  - Other Status Graphics
    - Updated NFIP/CRS Graphic
    - Parcels in WV Flood Tool

# AFH Proposed Schedule

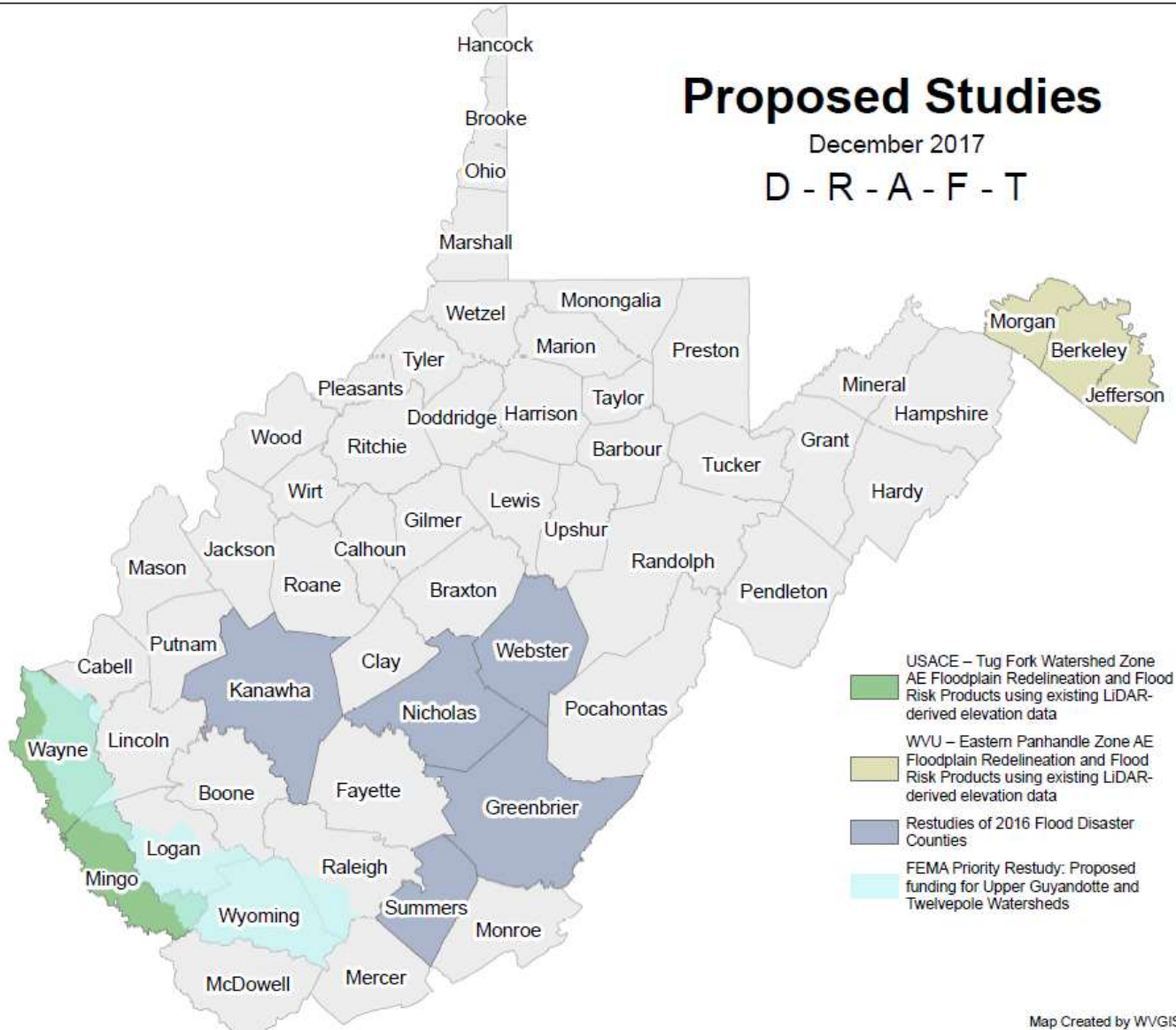


# Proposed Flood Studies

## Proposed Studies

December 2017

D - R - A - F - T



# New LIDAR Acquisitions

## Geospatial Coordination

### FEMA Region III

High Resolution  
Topographic Inventory  
Status Map

September 20, 2017

#### Legend

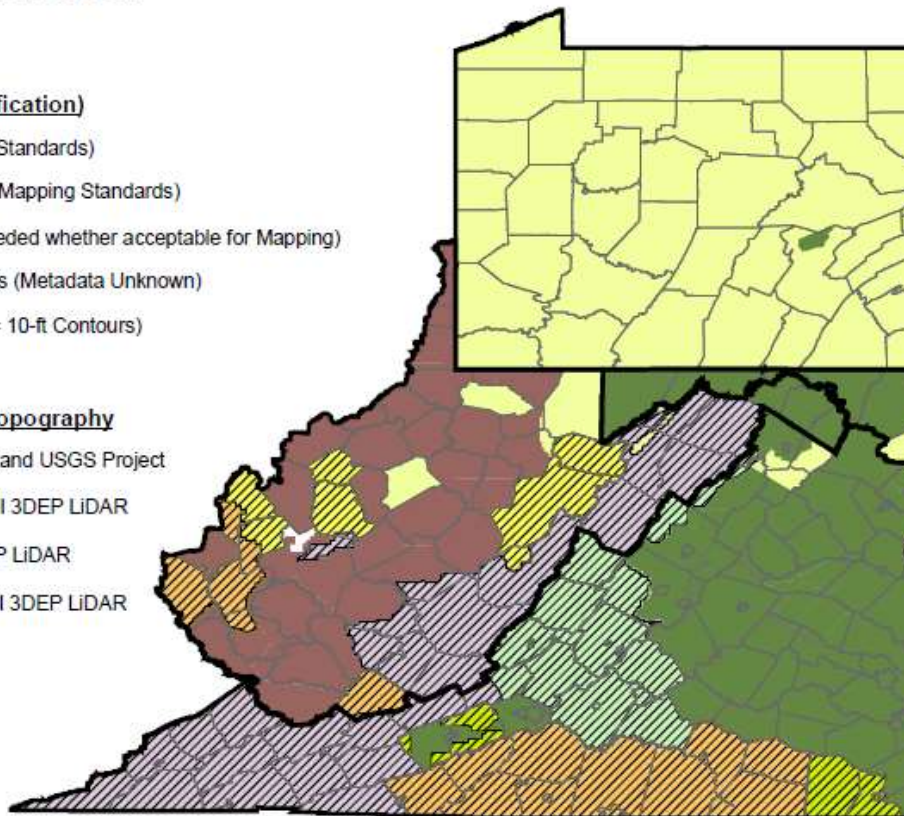
##### Available High Resolution

##### LiDAR (Quality Level Specification)

- QL2 (Meets FEMA Mapping Standards)
- QL3 or higher (Meets FEMA Mapping Standards)
- QL Undefined (Research Needed whether acceptable for Mapping)
- ▨ Other Federal LiDAR Projects (Metadata Unknown)
- Low Resolution (Supports >= 10-ft Contours)

##### Pending High Resolution Topography

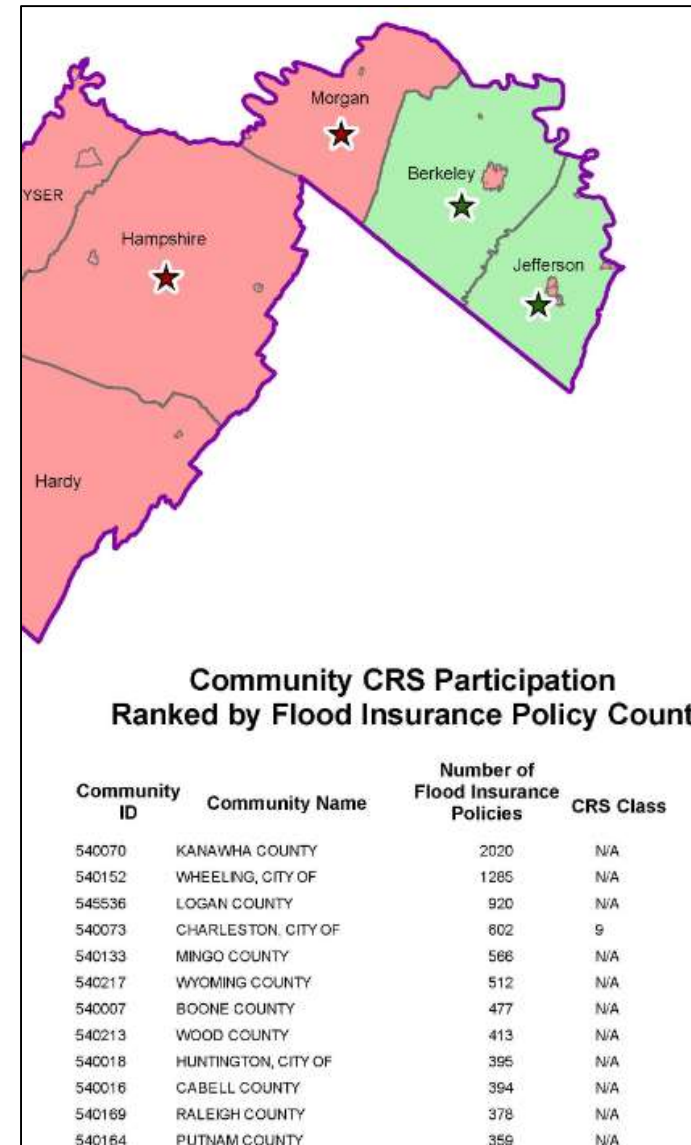
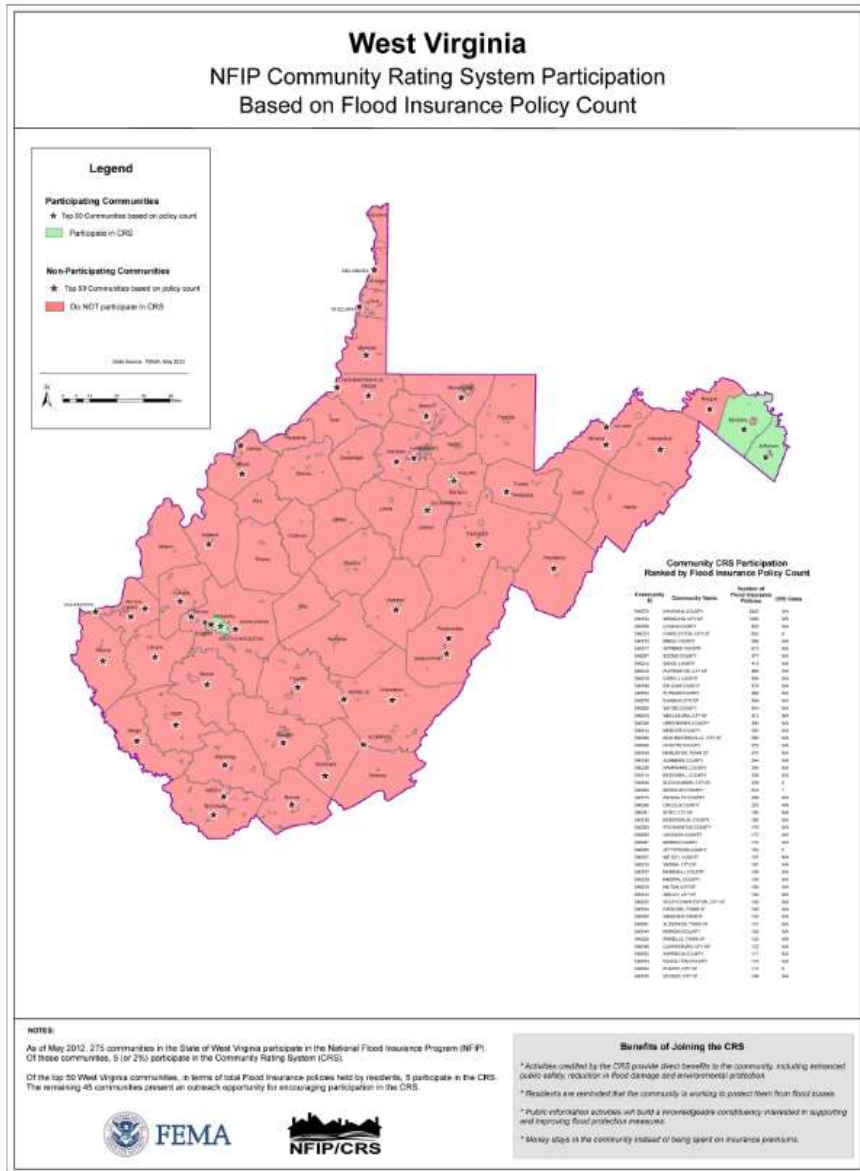
- ▨ QL2 - 2017 - VDOT, NRCS, and USGS Project
- ▨ QL2 - FY16 FEMA Region III 3DEP LiDAR
- ▨ QL2 - FY17 FEMA HQ 3DEP LiDAR
- ▨ QL2 - FY17 FEMA Region III 3DEP LiDAR
- ▨ QL2 - 2017 USDA NRCS



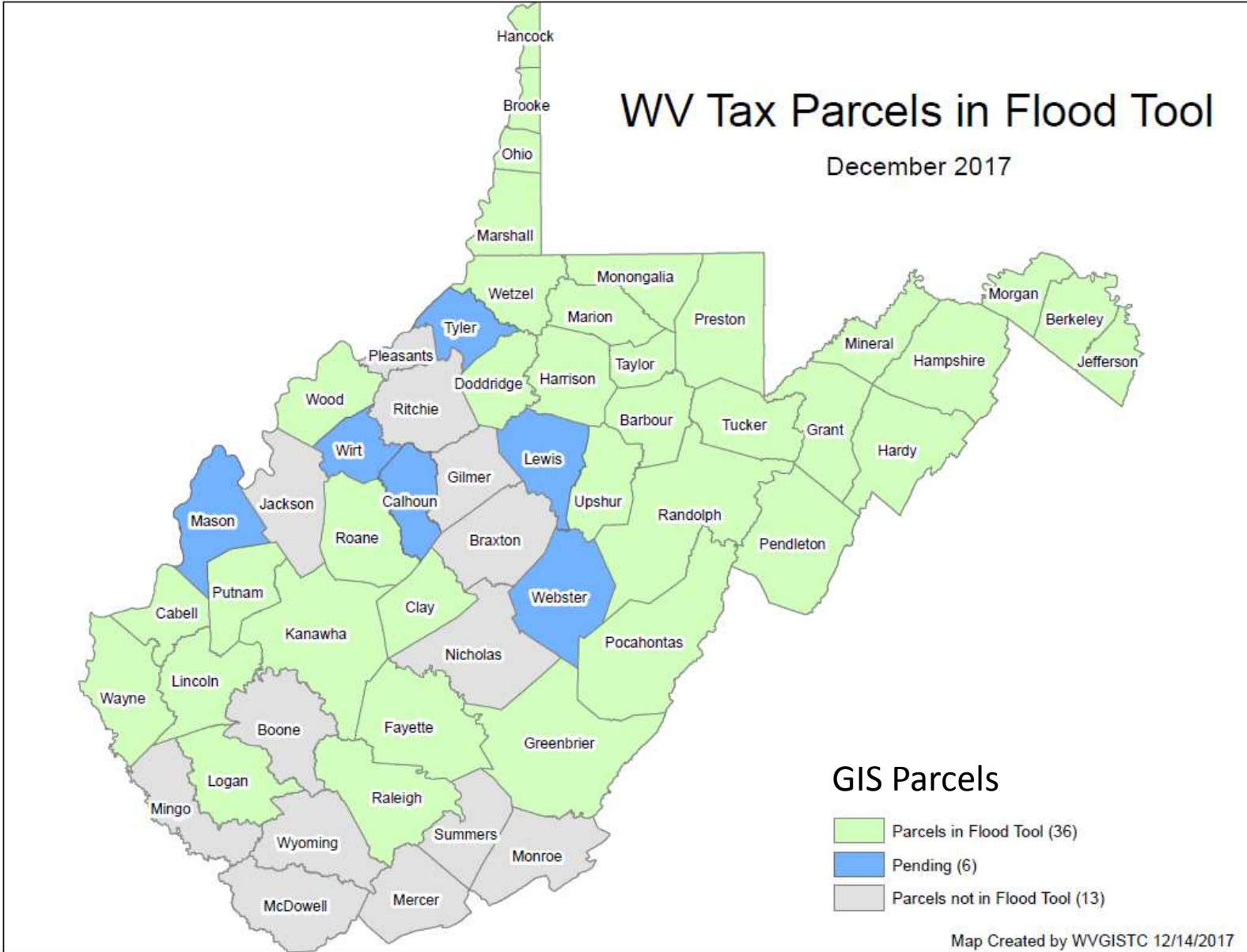
New FY17 WV  
Lidar Coverage:

Randolph,  
Tucker, Mercer,  
Roane, Wirt,  
Mason, Wayne,  
Putnam, Lincoln  
counties?

# Other Graphics – CRS/NFIP Policies



# Other Graphics – Parcels in Flood Tool



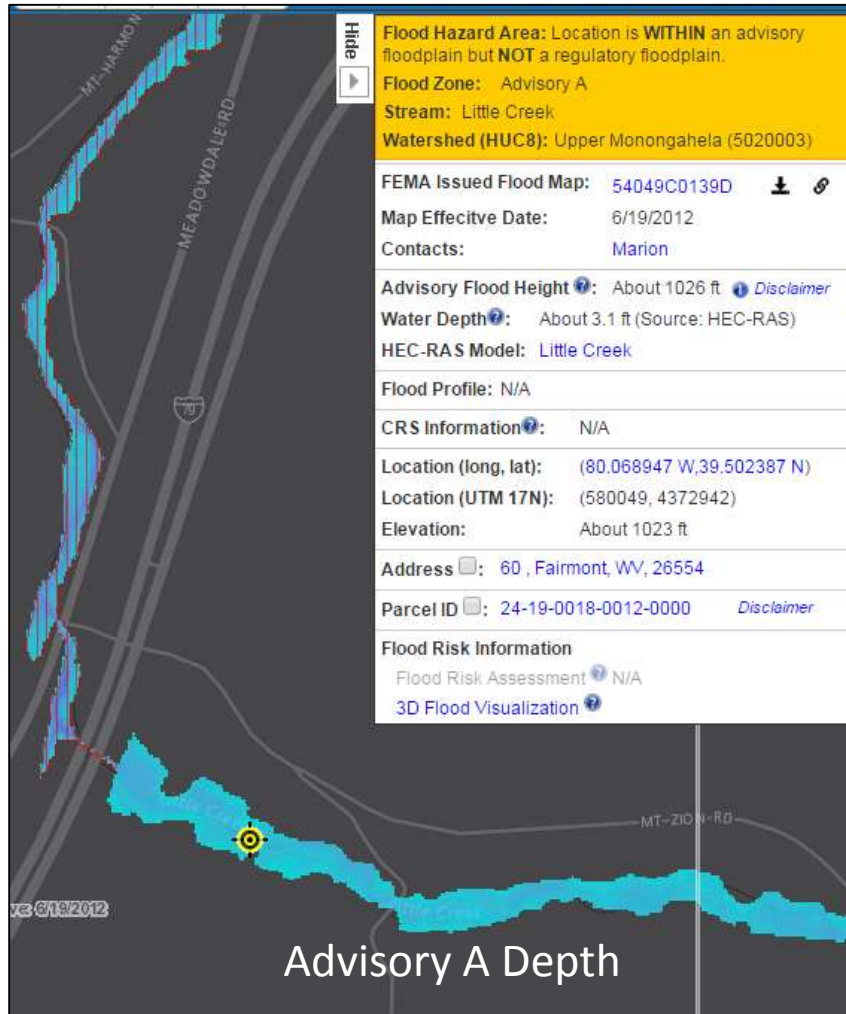
# Compare NFHL & WV Flood Tool

Comparison of **FEMA's NFHL Web App** and **WV Flood Tool**



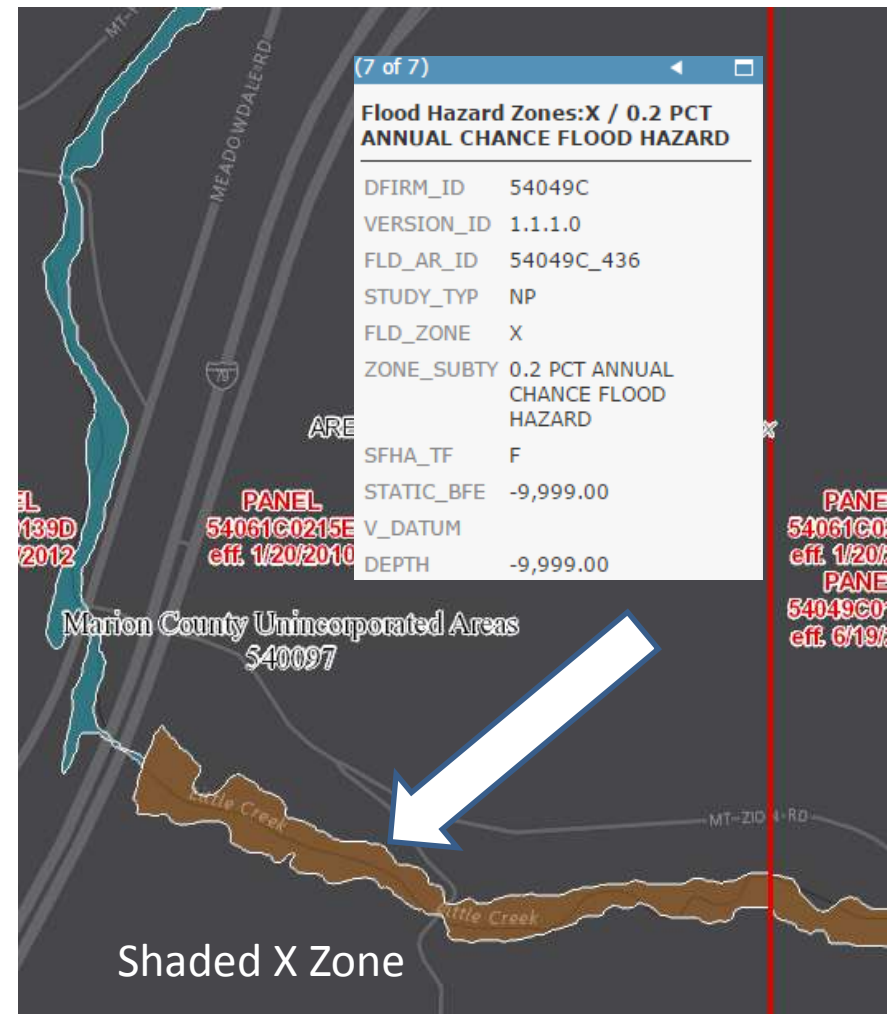
# Compare NFHL & WV Flood Tool

## WV Flood Tool



<https://www.mapwv.gov/flood/map/?wkid=102100&x=-8913234&y=4793892&l=9&v=1>

## NFHL Web App



<https://arcg.is/1K9D1z>

# Comparison of FEMA & State Applications

	FEMA's NFHL ArcGIS.com Web App.	WV Flood Tool ( <a href="http://www.mapWV.gov/flood">www.mapWV.gov/flood</a> )
WV Application Programming and System Admin. Support	More capacity and resources to sustain web application	Limited capacity and resources to support a web application that is more complex in its presentation of different user views, query logic, external web services, and various flood and reference layers
NFHL Regulatory Layers	Authoritative source of all NFHL layers. Most current.	Web links to ArcGIS REST services or download copy of NFHL layers. Ability to display preliminary flood layers. Missing flood zone labels. Moderate risk hazard zones (Shaded X, B) currently not displayed.
Customization	Less customizable to state and local community preferences	<p>More customized to local floodplain management needs and data resources:</p> <ul style="list-style-type: none"> <li>• User Views for Public, Expert, and Risk Reduction</li> <li>• Query Panel Results (<i>refer to Slides 14 &amp; 15</i>)</li> <li>• Data Layers (<i>Slide 11</i>) <ul style="list-style-type: none"> <li>✓ Group flood hazard layers together into single layer (SFHA, X-section, BFE)</li> <li>✓ Revised Floodplain Boundaries: Advisory A and Updated AE (<i>Slides 27-32</i>)</li> <li>✓ Flood Height Data (<i>Slides 17-18</i>) <ul style="list-style-type: none"> <li>○ FIS profile images</li> <li>○ Restudy BFE grids</li> <li>○ A Zone Advisory Flood Heights (AFH)</li> </ul> </li> <li>✓ Water Depth Grids (HEC-RAS, Hazus, EQL, USGS Inundation) (<i>Slides 19-21</i>)</li> <li>✓ State/Local Reference Layers <ul style="list-style-type: none"> <li>○ Parcels (<i>Slides 37– 52</i>)</li> <li>○ Addresses</li> <li>○ Leaf-Off Imagery</li> <li>○ Building Footprints (<i>Slide 35</i>)</li> <li>○ Ground Elevation (Hybrid SAMS-Lidar DEM) – (<i>Slide 34</i>)</li> </ul> </li> <li>✓ External Web Data Services (USGS, WV DOT, WV DEP) – (<i>Slide 11</i>)</li> <li>✓ More base map options (Multi-year imagery, hillshade, customized topographic, etc.)</li> <li>✓ Risk Map Layers (e.g., building exposure, building loss estimates, and loss) (<i>Slides 55-60</i>)</li> </ul> </li> <li>• 3D Flood Visualizations (<i>Slides 61-64</i>)</li> </ul>

# WV Flood Tool Layers

FLOOD LAYERS	Public View <i>for general public</i>	Expert View <i>for floodplain managers</i>	RiskMAP View <i>for flood risk reduction efforts</i>
<b>Flood Hazard Layers</b> <ul style="list-style-type: none"> <li>Flood Hazard Zones (9 status conditions)</li> <li>Panel Index (link to FEMA issued map)</li> <li>X-Sections / BFE's</li> <li>LOMAs / LOMRs*</li> <li>Structures, Levees, Mile Markers*</li> <li><i>Updated Floodplain Boundaries</i></li> <li>Flood Height Values (BFE and AFH)</li> <li><i>Political Areas/CRS Communities</i></li> </ul>	Yes Yes No No No No No Yes	Yes Yes Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes Yes
<b>Flood Risk</b> <ul style="list-style-type: none"> <li>Flood Water Depths (HEC-RAS models)</li> <li>Other Water Depths (USGS HWM, Hazus, EQL)</li> <li>Historical High-Water Marks (points)</li> <li><i>Site-Specific Flood Risk Assessment Data</i></li> <li><i>Historical Flood/Dam/Levee Inundation Maps</i></li> <li><i>Flood Elevation Certificates (Putnam Co. Pilot)</i></li> </ul>	No No No No No No	Yes No No No No Yes	Yes Yes Yes Yes Yes Yes
<b>Property Mitigation</b> <ul style="list-style-type: none"> <li>Mitigated Structures/Buyout Properties</li> </ul>	No	Yes	Yes
<b>Flood Prediction</b> <ul style="list-style-type: none"> <li>USGS Real-Time Stream Gages*</li> </ul>	No	Yes	Yes

*Italics Text* = To Be Added

\* External Agency Web Map Services

# WV Flood Tool Updates Planned

- Data Layer Development for WV Flood Tool
  - Addition and enhancements of flood data layers (e.g., BFE Flood Heights and Updated AE depth Grids)
  - Improving data flow of NFHL layer updates to WV Flood Tool
  - Ensuring no data integrity issues exist between NFHL and WV Flood Tool layers

*New data flood data sources and updating query programming logic*

# WV Flood Tool Updates Planned

- **WV Flood Tool Update: Flood Query Panel**
  - **Flood Zones**
    - Updated AE Floodplain Boundary (e.g, Clear Fork & Jefferson County pilot AE Non-Restudy)
    - NFHL Moderate Flood Risk Zones (Shaded X, B)
  - **Flood Heights**
    - Base Flood Heights (e.g., Upper Mon Watershed Restudy)
  - **Composite Depth Grid**
    - Model-backed Depth Grids from various sources; 5-ft. cell resolution statewide
    - Other depth grids (USGS HWM, Hazus, EQL)

*New data flood data sources and updating query programming logic*

# Changes to Flood Query Results

## New Data Sources (BFE, Advisory AE, Depth, Elev.)

#	Each Location Query Answers:
1	In Flood Hazard Area? Flood Zone? Floodway?
2	Stream name?
3	Watershed name?
4	FEMA Issued Flood Map?
5	Floodplain Manager Contact?
6	Flood Height value?
7	Water Depth value?
8	HEC-RAS Model available?
9	Flood Profile available?
10	In a CRS community?
11	Coordinate x,y location?
12	Ground elevation value?
13	Street address location?
14	Parcel ID location?
15	Flood risk assessment info?
16	3D flood visualization?

0020-0000

Search: 256 Rodeo Drive, Martinsburg, WV

Tools: [Icons for various map functions]

Click Here

256 Rodeo Dr.

37S-7

37 M-27

37 S

37S-7

1

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

2

Flood Zone: A

3

Stream: DRY RUN Tributary

4

Watershed (HUC8): Conococheague-Opequon (2070004)

5

FEMA Issued Flood Map: 54003C0151E

6

Map Effective Date: 7/7/2009

7

Contacts: Berkeley

8

Advisory Flood Height: N/A

9

Water Depth: About 4.4 ft (Source: EQL)

10

HEC-RAS Model: N/A

11

Flood Profile: N/A

12

CRS Information: Berkeley County

13

Location (long, lat): (77.991540 W, 39.483028 N)

14

Location (UTM 17N): (758751, 4374702)

15

Elevation: About 513 ft

16

Address: 256 RODEO DR, Martinsburg, WV, 25403

Parcel ID: 02-04-037M-0020-0000

Flood Risk Information

Flood Risk Assessment

3D Flood Visualization

# Flood Zone: < zone designation >

Status #	Flood Risk Zone Designation	Message	Flood Degree Risk	Color Warning Status
1	AE, AH (5), AO (2)	Location is WITHIN the FEMA 100-year floodplain.	Hi	Red
2	AE (Floodway)	Location is WITHIN the FEMA 100-year floodplain and floodway.	Hi	Red
3	A	Location is WITHIN the FEMA 100-year floodplain.	Hi	Red
4	A (Advisory A)	Location is WITHIN the FEMA 100-year floodplain. Advisory Flood Heights available.	Hi	Red
5	Updated AE Floodplain Boundary	Location is WITHIN an updated detailed floodplain boundary but NOT a 100-year regulatory floodplain. <i>More info link.</i>	Hi	Orange
6	Advisory A	Location is WITHIN an advisory floodplain but NOT a 100-year regulatory floodplain. <i>More info link.</i>	Hi	Orange
7	Shaded X, B	Location is WITHIN a moderate flood risk hazard such as a 500-year floodplain.	Medium	Yellow
8	<i>Near Flood Zone</i>	Location is NOT WITHIN identified flood hazard area, but within 75 feet of an identified flood hazard area.	Medium	Yellow
9	<i>Out of 100-YR Flood Zone</i>	Location is NOT WITHIN any identified flood hazard area. Unmapped flood hazard areas may be present.	Low	Green

Three Degrees of Risk: Hi, Medium, Low. Four Warning Status Colors: In 100-YR Effective Floodplains (red), Advisory Floodplains (orange), moderate risk or close to high risk zones (yellow), low risk (green). Two Floodplain Boundary GIS Files: SFHA.poly and Advisory\_FPB.poly

# Need to Update Flood Query Logic for new information: **AE Advisory Flood Hazard Areas & Restudy BFE Flood Heights**

(1) If location in an Effective Flood Zone (SFHA) then **RED** message - **Flood Hazard Area: Location is WITHIN the FEMA 100-year floodplain.**

Display **Flood Zone**: SFHA: (A, AE, AH, AO); Floodway; Advisory A

- If location in Floodway (SFHA) then *add* to **Flood Zone** text: “**(Floodway)**” *This applies only to effective detailed flood zones.*
- If location in SFHA A Zone and Advisory A Zone (WSEL\_AFH) then *add* to **Flood Zone** text “**(Advisory A)**”. *This applies only to Advisory A flood zones.*

Display **Flood Height**: Advisory Flood Height, BFE, Flood Profile

- If location in Advisory A Zone (WSEL\_AFH) then display “**Flood Height:**” About <value> ft. **(Advisory Flood Height)**”. Disclaimer.
- If location in AE Zone Restudy (WSEL\_BFE) then display “**Flood Height:** <value> ft. **(Base Flood Elevation)**”. Disclaimer.
- ELSE if location in Detailed Zone (SFHA: AE, AH, AO) and not AE Zone Restudy (WSEL\_BFE) then Display “**Flood Height:** Refer to **Flood Profile** of Detailed Study”. Disclaimer.



(2) ELSE if location in Advisory Flood Zone (Depth\_HEC-RAS) and not in Effective Flood Zone (SFHA) then **ORANGE** message - **Flood Hazard Area: Location is WITHIN an advisory floodplain but NOT a 100-year regulatory floodplain.**

- If location in Advisory A Zone (WSEL\_AFH) then **Flood Zone** text “**Advisory A**”.
  - Display “**Flood Height:** About <value> ft. **(Advisory Flood Height)**”. Disclaimer.
- If location in Advisory AE Zone (Depth\_HEC-RAS) then **Flood Zone** text “**Updated AE Floodplain Boundary**”.



(3) ELSE if location in a moderate flood risk zone or near a high risk zone then YELLOW message

- If location within a Shaded X or B Zone of SHFA then YELLOW message - **Location is WITHIN a moderate flood risk hazard such as 500-year floodplain**
- If location within 75 ft. of Floodplain (Unified FPB Buffer) then YELLOW message - **Flood Hazard Area: Location is NOT WITHIN identified flood hazard area, but within 75 feet of an identified flood hazard area.**



(4) ELSE if location not in Floodplain (N/A) then **GREEN** message - **Flood Hazard Area: Location is NOT WITHIN any identified flood hazard area. Unmapped flood hazard areas may be present.**



# Flood Height: < Value >

Flood Height Designation	Flood Height Determination	Disclaimer
Base Flood Elevation (Restudy) <b>NEW</b>	< value> feet (Base Flood Elevation)	Refer to the FEMA FIS Flood Profile to validate base flood elevation.
Advisory Flood Height	About < value> ft. (Advisory Flood Height)	CAUTION CAUTION!! The advisory flood height should be used with caution in the proximity of a culvert, bridge, flood control structure or other impoundment since stream crossings were not included in the hydraulic analyses for approximate floodplains. Also, if the site is close to the confluence with a larger stream, compare the advisory flood height at the location of interest to the advisory flood height or Base Flood Elevation on the larger stream to determine whether the site is within the backwater influence of the larger stream.
Non-Restudy AE <b>NEW</b>	Refer to FIS report	For an accurate BFE determination refer to the Flood Profiles or Flood Elevation Tables in the FIS Report

Invisible Composite Query Rasters for flood height values of Water Surface Elevation Level (WSEL) layers: *Effective* WSEL Grid (E\_WSEL\_01pct.grid) and *Advisory* WSEL Grid (A\_WSEL\_01pct.grid)

# BFE Flood Height (Upper Mon)

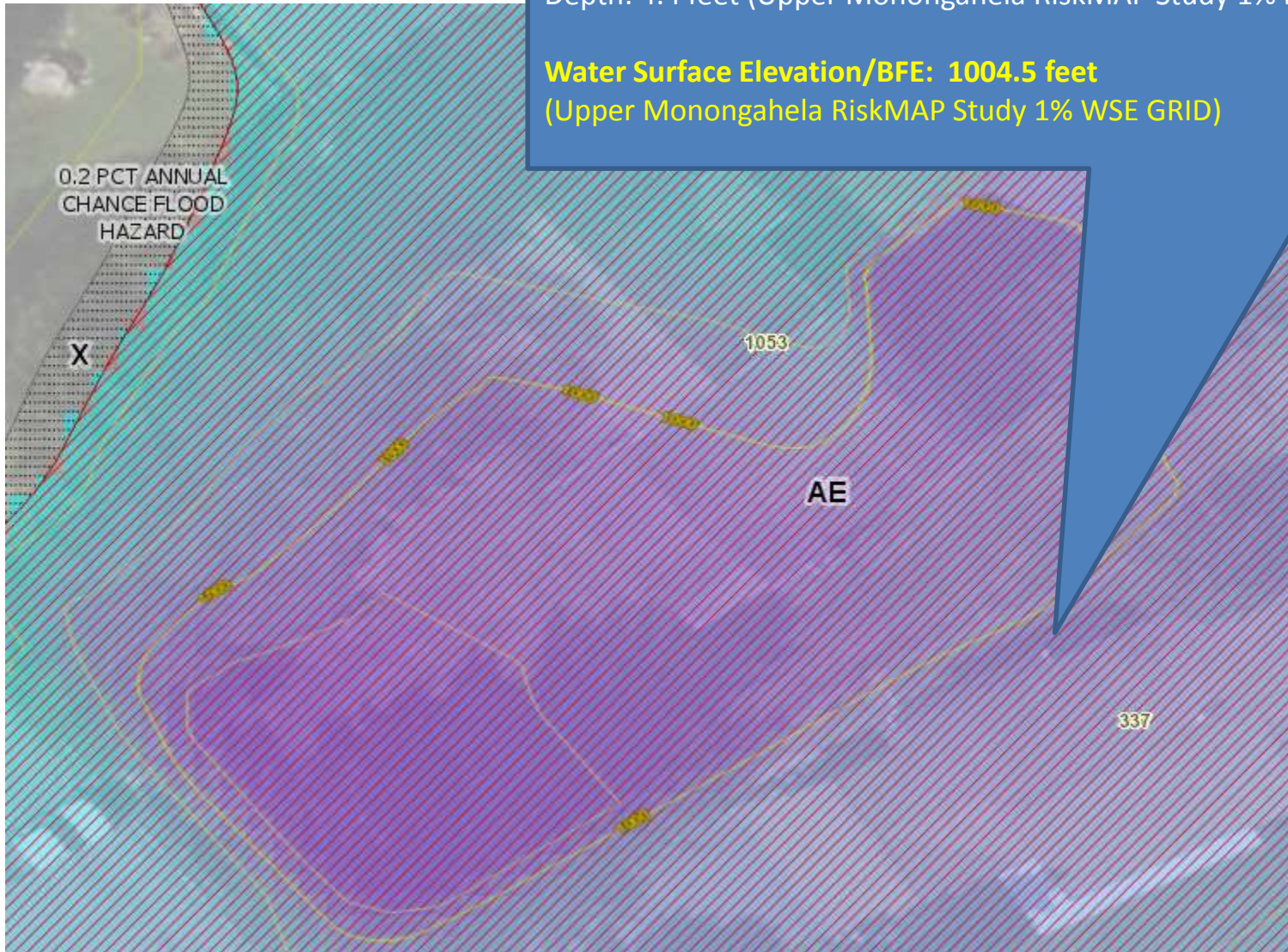
Location: 337 Pattenon Drive, Morgantown, WV 26505

Ground Elevation (Back Side of House): 1002 ft (Flood Tool)

Depth: 4.4 feet (Upper Monongahela RiskMAP Study 1% Depth GRID)

**Water Surface Elevation/BFE: 1004.5 feet**

**(Upper Monongahela RiskMAP Study 1% WSE GRID)**



# Water Depth: about <<value>>

Water Depth	Message	Sources
Water Depth:	About << value >> ft.	<ul style="list-style-type: none"><li>• Model-Backed Depth Grids<ul style="list-style-type: none"><li>○ Engineering Studies (HEC-RAS)</li><li>○ AE Non-Restudy Re-Delineations</li></ul></li><li>• Other Depth Grids<ul style="list-style-type: none"><li>○ HAZUS</li><li>○ EQL</li><li>○ USGS Inundation Layers</li></ul></li></ul>

A statewide “composite” Flood Risk Assessment Depth Grid will be created from model-backed *effective* and *advisory* depth grids at a 5-foot cell resolution.

Water Depth Grids are a *flood risk assessment* product – *not a flood regulatory* product. Water depths are important for flood loss damages and by flood visualizations of site-specific structures.

Depth grids a source of credits for CRS communities

See FEMA’s Flood Risk Assessment Guidance (May 2016) for guidance on composite depth grids:

[https://www.fema.gov/media-library-data/1469146645661-31ad3f73def7066084e7ac5bfa145949/Flood\\_Risk\\_Assessment\\_Guidance\\_May\\_2016.pdf](https://www.fema.gov/media-library-data/1469146645661-31ad3f73def7066084e7ac5bfa145949/Flood_Risk_Assessment_Guidance_May_2016.pdf)

# Jefferson County Composite Depth Grid

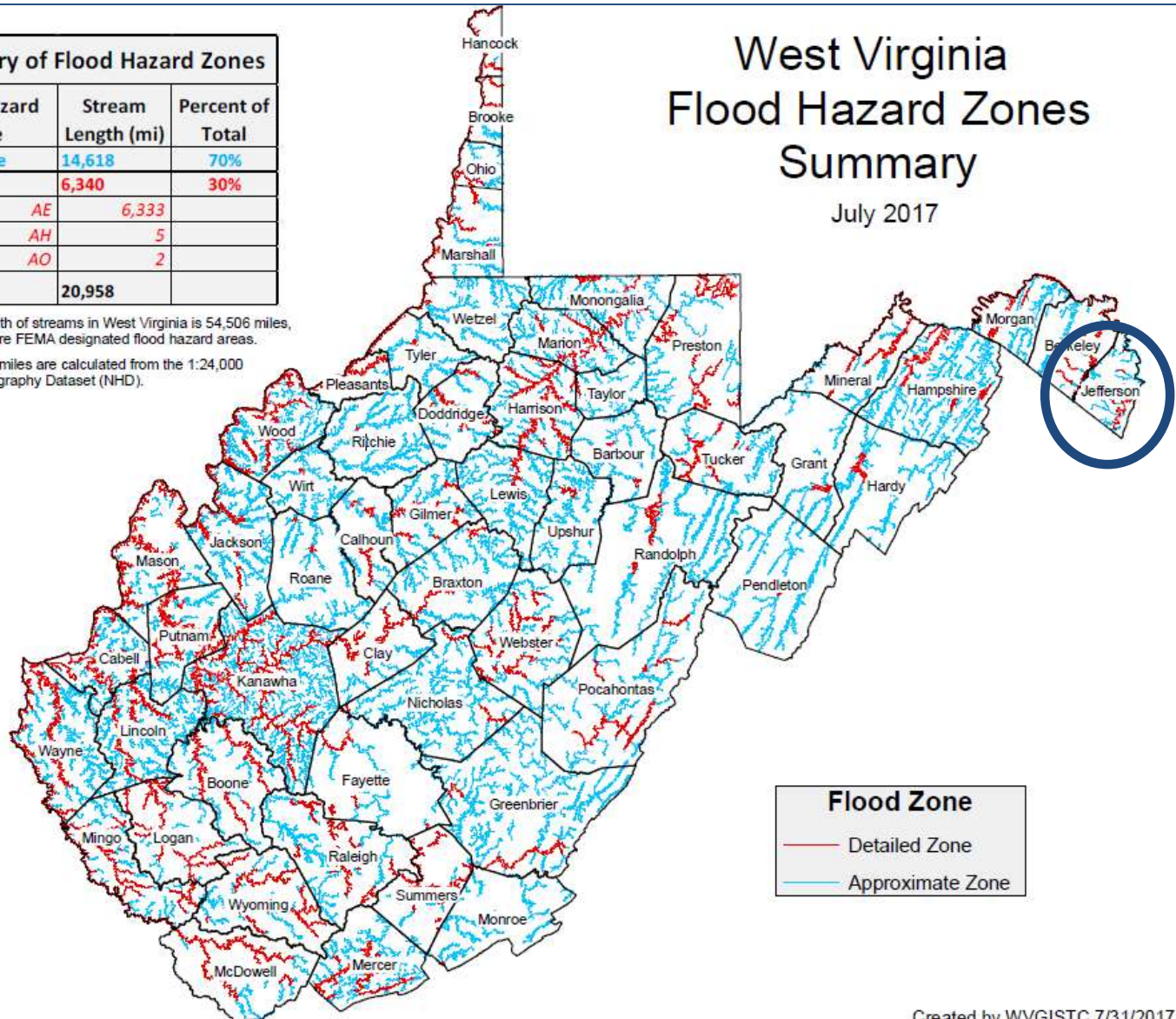
Summary of Flood Hazard Zones		
Flood Hazard Zone	Stream Length (mi)	Percent of Total
Approximate	14,618	70%
Detailed	6,340	30%
AE	6,333	
AH	5	
AO	2	
<b>Total</b>	<b>20,958</b>	

† The total length of streams in West Virginia is 54,506 miles, of which 38% are FEMA designated flood hazard areas.

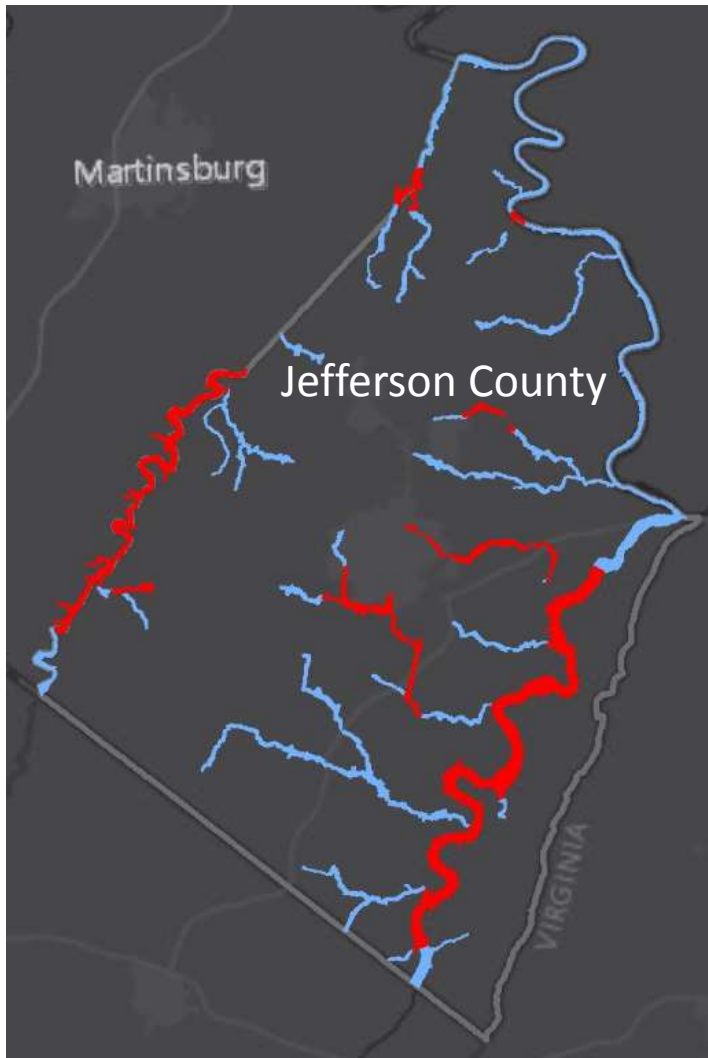
†† The stream miles are calculated from the 1:24,000 National Hydrography Dataset (NHD).

## West Virginia Flood Hazard Zones Summary

July 2017



# Countywide Depth Grid (Jefferson County)



- “Model-Backed” Depth Grid for 1% Annual Event Flood for all of Jefferson County
- Depth grids derived from newer 1-meter lidar elevation data
- Water Depth important for 3D flood visualizations and flood risk building loss estimates
- Communities receive CRS credit for published water depth grids



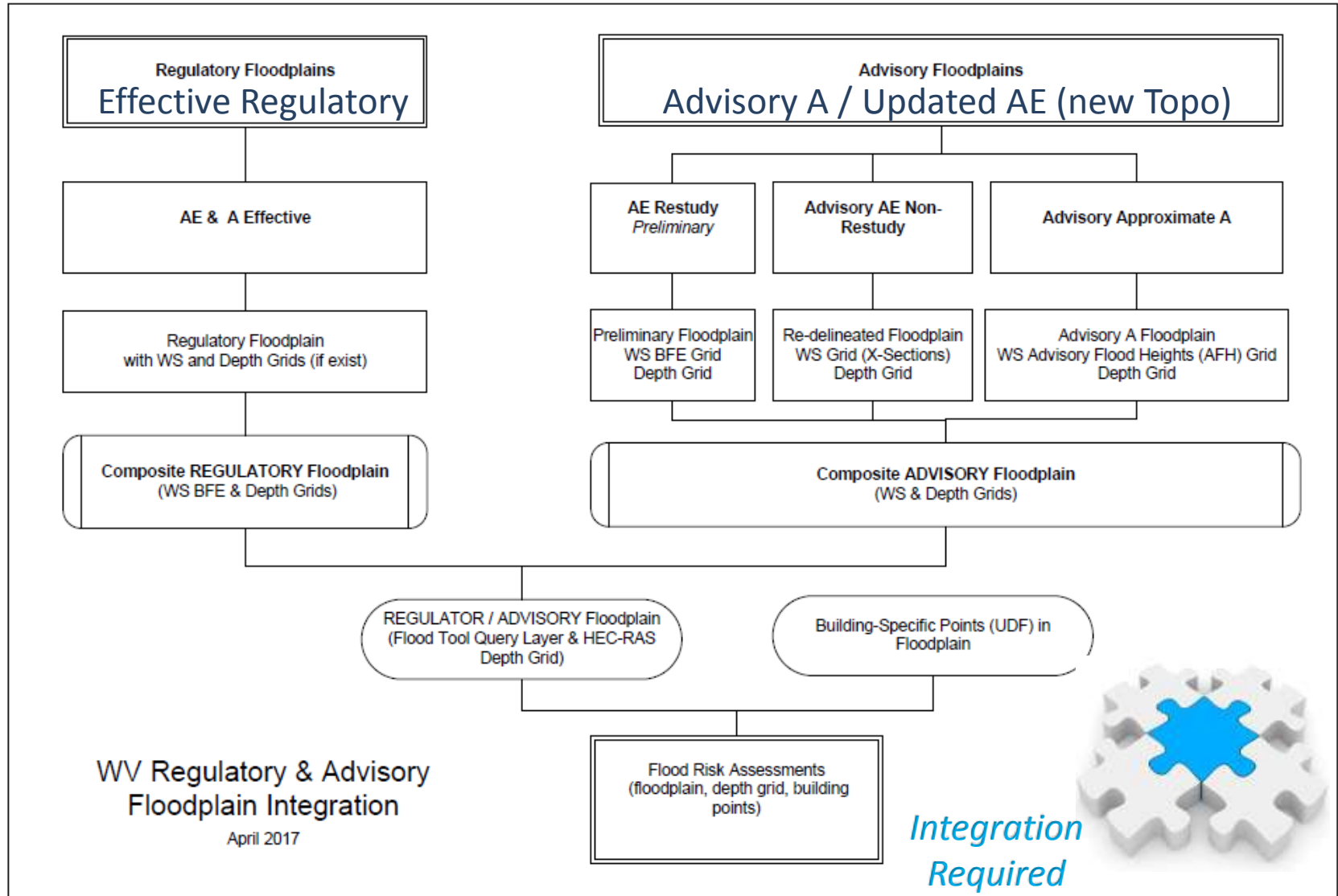
**Advisory A Depth Grid (AECOM)**



**Depth Grid from Updated AE Floodplain Boundary (WVU)**

Jefferson County: 162 stream miles of **Approximate A Zones**, 77 miles of **Detailed Flood Zones**

# Regulatory vs. Floodplain Boundaries based on new Topo



# Model Ordinance for Advisory Floodplains

- **Model WV Ordinance for Advisory Zones**

- Also...what is in the “advisory” name for *flood heights*? Are stakeholders confused?

- ✓ **Advisory Flood Heights**

- ~~Advisory Base Flood Elevations~~

- ~~Non-Regulatory Base Flood Elevations~~



# WV Model Ordinance – Advisory Zones

- **Robert Perry's 2010 Vision Statement**

“WV Floodplain Management Coordinator proposes displaying these newly created flood hazard areas on the WV Flood determination tool and having the local governments adopt these areas on separate maps as “Local Flood Hazard Areas” to be managed in accordance with the flood damage reduction requirements of the ordinance.”

- **What is Needed? WV Model Ordinance Language for Advisory Zones**
  - Advisory A
  - Updated AE
- **What about CRS credits? Do **CRS credits** apply to WV Advisory Flood Zones that are adopted as *community identified floodplains*?**
- **Kevin Sneed to verify with FEMA’s Heather Davis-Jenkins about model ordinance.**

2016 WV Model Ordinance:

[http://data.wvgis.wvu.edu/pub/temp/FEMA/FRA/Ordinance/WV\\_Model\\_Ordinance\\_2016\\_FINAL\\_APPROVED\\_03-24-16.docx](http://data.wvgis.wvu.edu/pub/temp/FEMA/FRA/Ordinance/WV_Model_Ordinance_2016_FINAL_APPROVED_03-24-16.docx)



# WV Model Ordinance – Advisory Zones

- **ARTICLE III – ESTABLISHMENT OF THE SPECIAL FLOOD HAZARD AREA**  
**Section 3.1 Identification**
  - a. The identified special flood hazard area shall be those areas of (community name) which are subject to a one percent or greater chance of flooding in any given year as shown on the Flood Insurance Rate Map (FIRM) and described in the Flood Insurance Study (FIS) prepared for (community name) by the Federal Emergency Management Agency (FEMA) dated (community name) or the most recent revision thereof including all digital data developed as part of the FIS.
  - b. The identified special flood hazard area shall also be those special flood hazard areas which have been identified as flood hazard areas by (community name) by use of historic or other technical data and shown on an officially recognized “FIRM”. These areas shall be designated as appropriate with the level of technical data described below and shall be managed accordingly.
- **Comments from FEMA’s Sarah Wolfe - Floodplain Management & Insurance**

*” The local ordinance outlines the areas where the regulations apply. To be compliant with the NFIP, these areas at a minimum must include the current effective FIS and FIRM (including any revisions). Should a community want to regulate beyond these areas, such as within a “advisory floodplain,” that community would need to formally recognize these additional areas. These areas must be formally adopted or “officially recognized” as such by the community in order for the regulations of the local ordinance to apply. WV ordinances also typically include language for what is commonly referred to as a “community identified floodplain” – areas of flood risk not included on the FEMA FIRM - however no communities in WV (to my knowledge) have formally recognized any of these areas.*

Advisory A or Updated AE Floodplains are not recognized as “community identified floodplains” unless formally adopted or “officially recognized” as such in the local community ordinance

# WV Model Ordinance – Advisory Zones

- Section 4.3 Approximated Floodplain (Zone A)

Within any Approximated Floodplain Area:

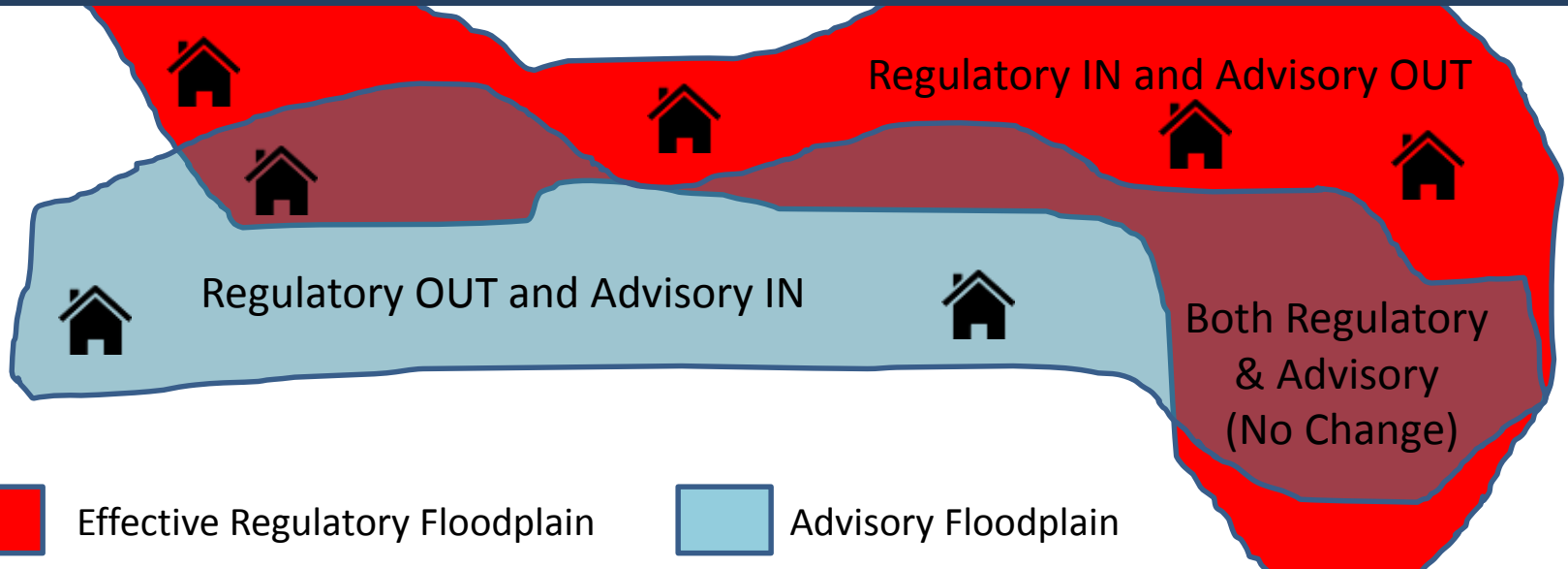
a. The Floodplain Administrator shall use elevation and floodway information from Federal, State, or other acceptable sources when available to determine the elevation above which development will be reasonably safe from flooding.

- Comments from FEMA's Sarah Wolfe - Floodplain Management & Insurance

*"As for the use of non-regulatory BFEs that are provided for Approximate A Zones, these can be utilized and enforced by the local floodplain manager because of the specific regulations adopted for Zone A. A minimum requirement of the NFIP is that the floodplain manager utilize elevation and floodway data in A Zone when available from an acceptable source (which would include the information included on the Flood Tool)."*

Non-regulatory BFEs (or Advisory Flood Heights) are currently enforceable in FEMA mapped effective Approximate A Zones

# Advisory Zones – Outreach Information



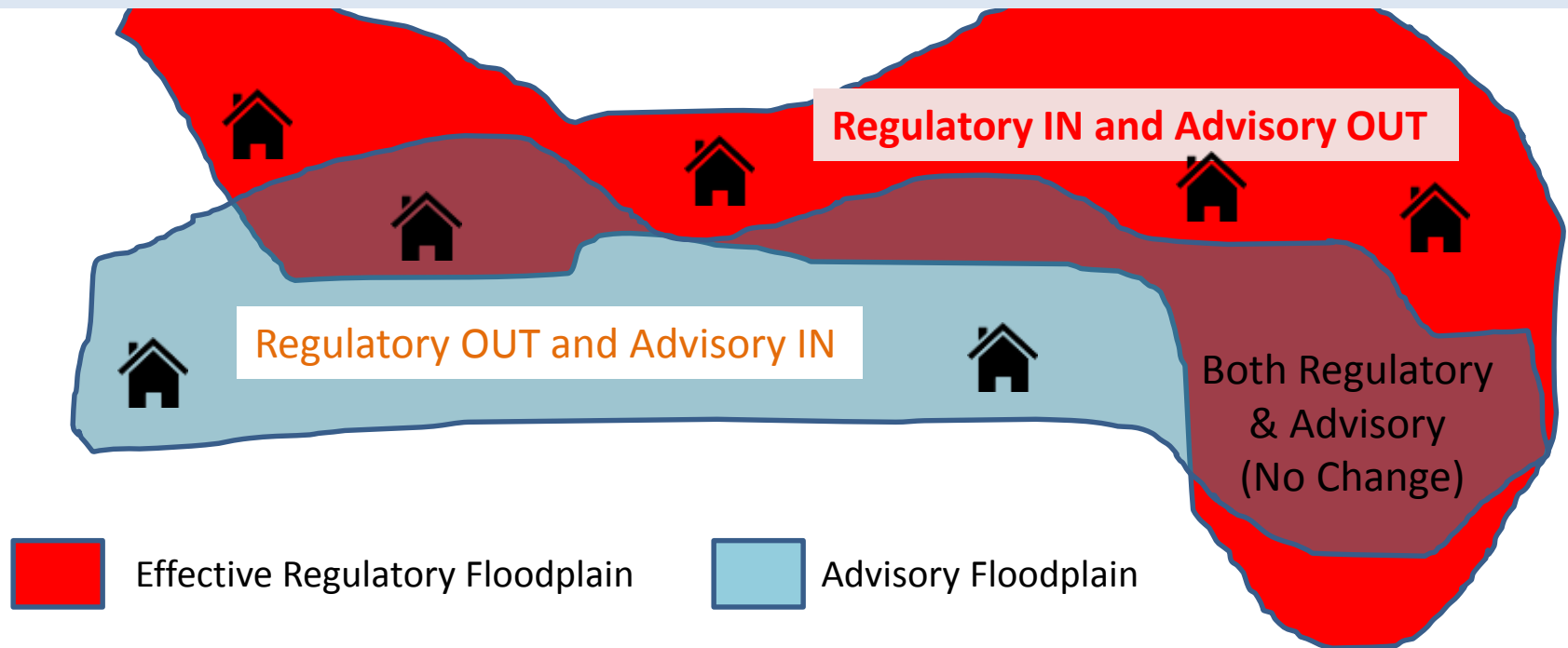
Union	Meaning	Building Changes	Area Changes
No Change	IN both Regulatory and Advisory	1	11 m <sup>2</sup>
Advisory Only	Regulatory OUT and Advisory IN	2	13 m <sup>2</sup>
Regulatory Only	Regulatory IN and Advisory OUT	4	21 m <sup>2</sup>

County	Name	Advisory Only	Regulatory Only	Advisory & regulatory	SUM regulatory
54009C	Brooke	73	1710	87	1797
54011C	Cabell	64	2492	85	2577

The geographic union of Regulatory and Advisory Floodplains generates a change polygon for flood risk analysis by area. Subsequently the union polygon can be intersected with site-specific structures to analyze the impact of the Advisory Floodplain changes to the Regulatory Floodplain.

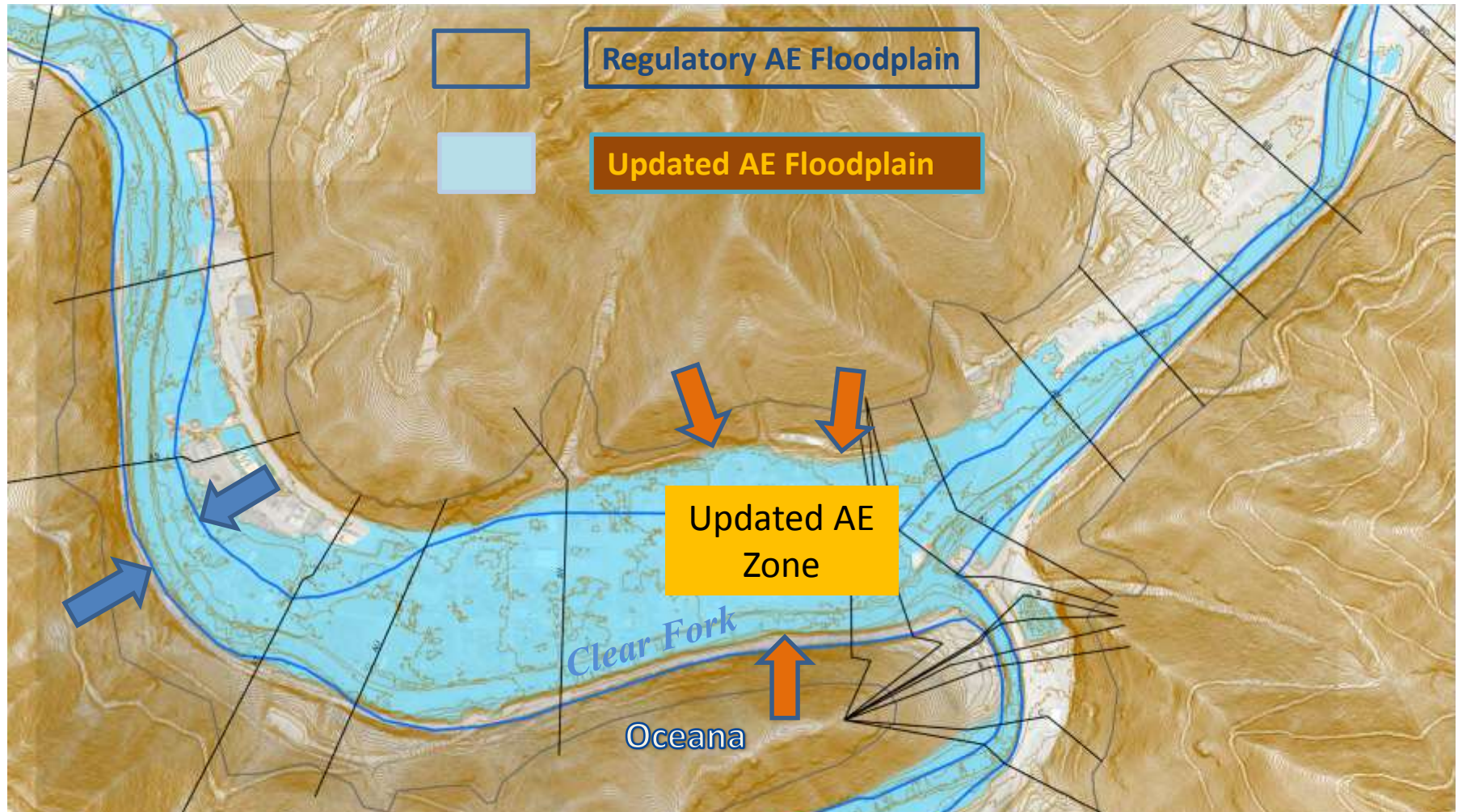
# Advisory Zones – What is the message for property owners??

- **Regulatory In but Advisory Out (Lower Flood Risk)** – Property owners are not at the highest risk to a 1% Annual Chance Flood but still recommend flood insurance. Owners can acquire an elevation certificate and use the advisory base flood elevation to **acquire a LOMA** and lower NFIP insurance rates.
- **Regulatory Out but Advisory In (Higher Flood Risk)** – Advisory information indicates a flood hazard area and will be incorporated into future effective regulatory or community identified floodplains. Floodplain managers should recommend property owners of existing structures in Advisory Floodplains that they are at high risk of a 1% Annual Chance Flood and recommend Flood Insurance. New development should not occur in Advisory Floodplains without a detailed study to show development reasonably safe from flooding.



# Updated AE Floodplain Boundaries - Example

## Redelineated Floodplain Using New Topo

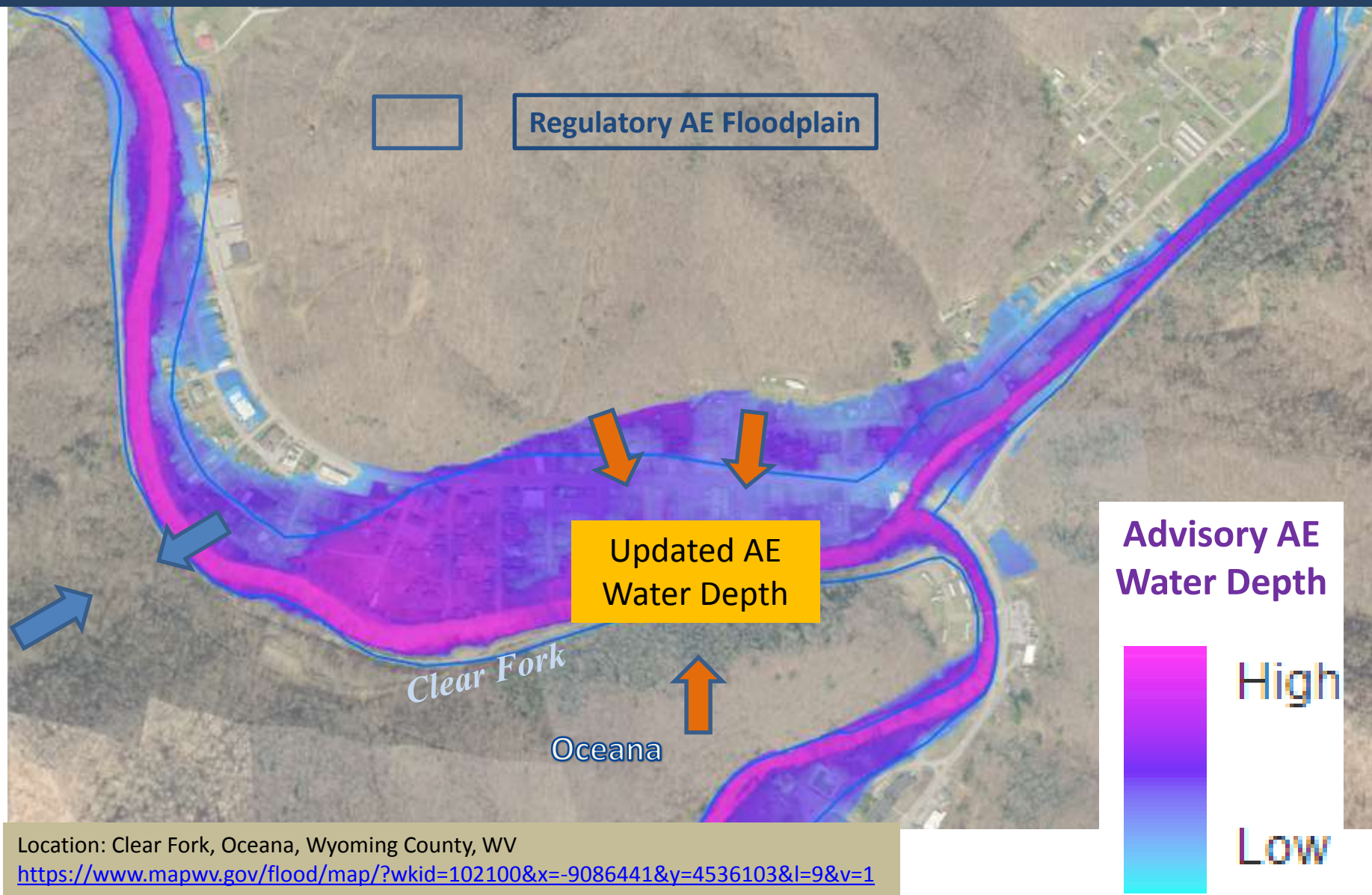


Location: Clear Fork, Oceana, Wyoming County, WV

Objective: Zone AE Floodplain Redelineation and Flood Risk Products using existing LiDAR-derived elevation data

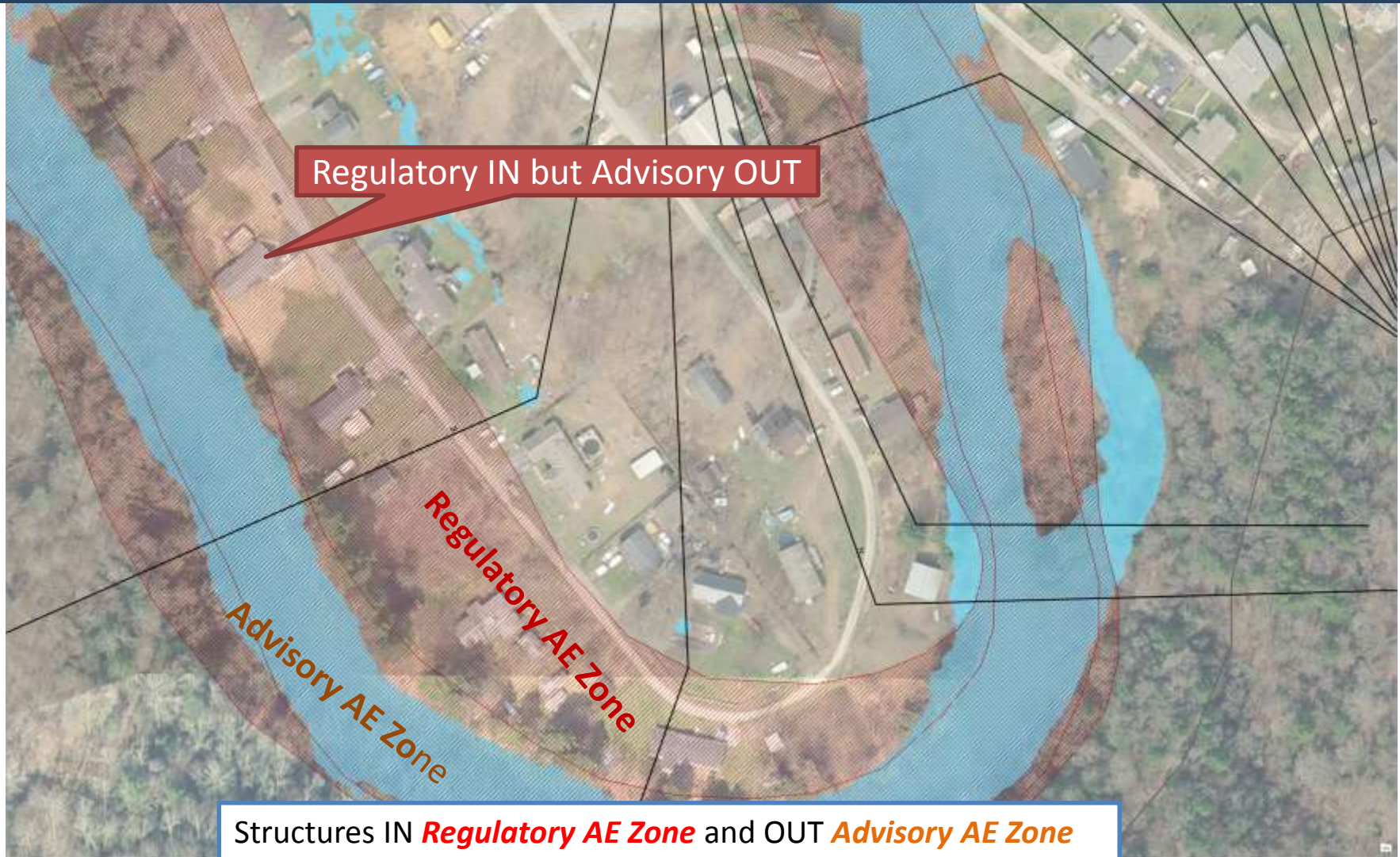
<https://www.mapwv.gov/flood/map/?wkid=102100&x=-9086441&y=4536103&l=9&v=1>

# Updated AE Floodplain Boundary - Depth Grid



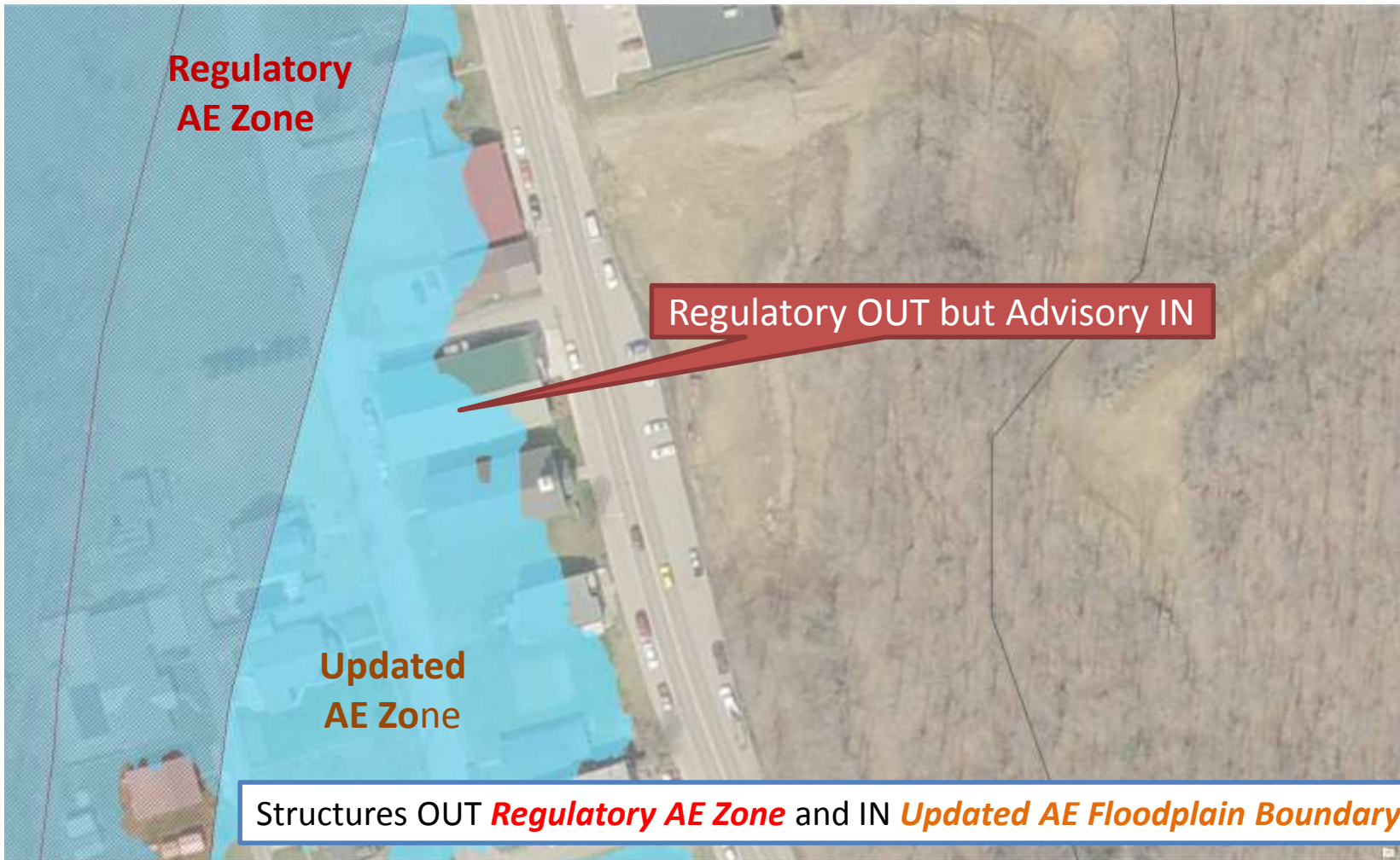
Location: Clear Fork, Oceana, Wyoming County, WV  
<https://www.mapwv.gov/flood/map/?wkid=102100&x=-9086441&y=4536103&l=9&v=1>

# Advisory AE Determinations



**What do you tell the public?** Acquire an elevation certificate and use the Updated AE Floodplain Boundary information to request a LOMA to amend the effective NFIP map.

# Updated AE Floodplain Boundaries



**What do you tell the public?** Updated AE floodplain boundary information indicates a flood hazard area and will likely be incorporated into future effective NFIP maps. New development should not occur in updated floodplains without a detailed study to show development reasonably safe from flooding. Recommend purchasing flood insurance for existing structures.



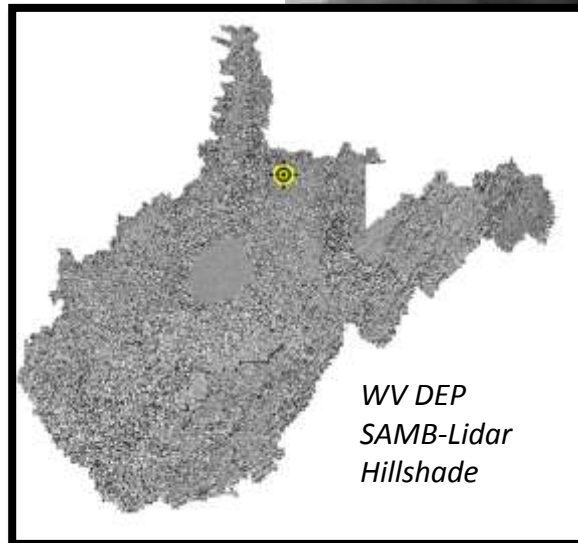
# Reference Layers

- Ground Elevation
- Building Footprints
  - Created from multiple sources
  - Useful for identifying structures and 3D community flood visualizations
- Parcels
  - Coordinating Parcel Acquisition in WV
    - State/County programs
    - DHS HIFLD Secure/CoreLogic (data coordination issues)
    - FEMA HMGP proposal
  - Statewide Tax Department Real Estate application with flood hazard awareness would increase public awareness

# Improved Ground Elevation Layer

*New Elevation Layer for WV Flood Tool: Hybrid of SAMB and Lidar elevation layers*

Layer	Source	Coverage
SAMB	2003 SAMB, 3-meter, 10-foot contours	Statewide
Lidar	Lidar, 2-foot or 1-foot contours	Select Areas



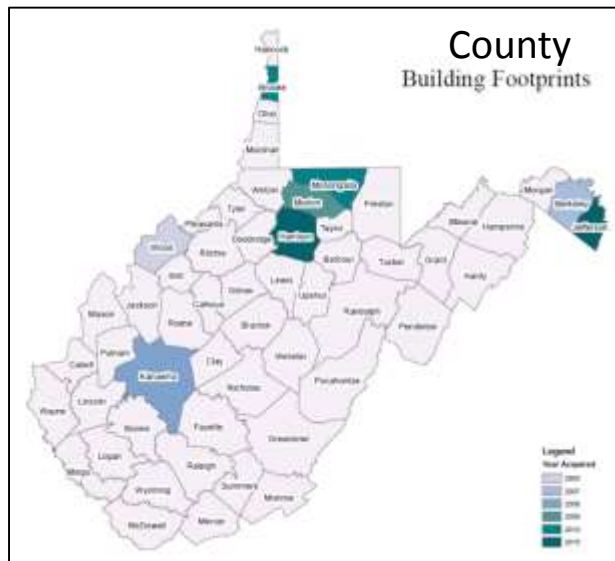
**SAMB ELEVATION**

**LIDAR ELEVATION**

# Statewide Building Web Service

*Statewide building footprint reference layer created from best available sources*

Layer	Source	Coverage
SAMB	2003 2-ft. resolution leaf-off imagery, Statewide Addressing & Mapping Board (large buildings only)	Statewide
Counties	6" or better leaf-off imagery	Select Counties
Oak Ridge National Lab(?)	2016 1-meter Leaf-On, FEMA Region III contract to Oak Ridge National Lab	Statewide



## How are **BUILDING FOOTPRINTS** beneficial?

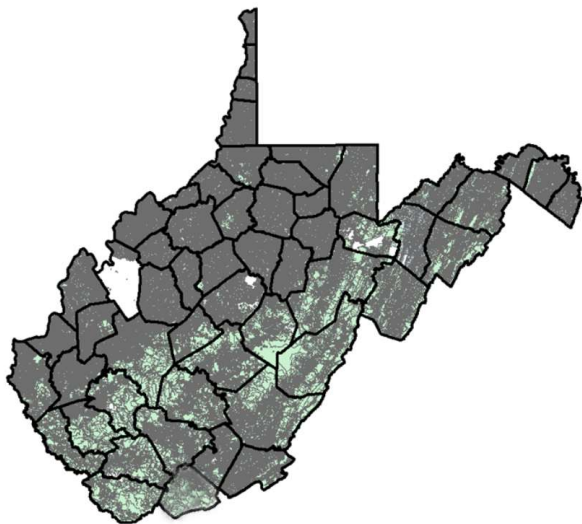
- Improves the locational pin-pointing of structures for multi-hazard assessments
- Enhances visual representation of structures on 2D flood risk maps
- Necessary for 3D flood visualization models
  - Building footprints extruded to known heights
  - Beneficial to communicating flood risk to communities

# Statewide Digital Parcel File



2013 WEST VIRGINIA STATEWIDE STANDARD  
HAZARD MITIGATION PLAN UPDATE

ID	Description	Priority (H, M, L)	Responsible Agency	Potential Funding Sources	Interim Measure of Success	Target Comple- tion Date	Hazard Mitigated
2013-16	Creation of a statewide tax parcel for use in the HIRA/THIRA.	H	DHSEM, WVGISTC	Agency budget	Develop a prototype map that would consist of a pilot study to determine what would be possible if/when data was available or created.	2014 for pilot	All, except Dam & Levee



**High Priority  
of  
2013 State Hazard Mitigation Plan**

# Parcels link to Owner/Building Info

629 PENNSYLVANIA AVE, Morgantown, WV, 26501

<https://www.mapwv.gov/flood/map/?wkid=102100&x=-8899684&y=4811867&l=13&v=0>

The screenshot displays the West Virginia Flood Map application interface. It is divided into several sections:

- Search and Tools:** The search bar contains the address "629 PENNSYLVANIA AVE, Morgantown, WV, :". Tools include a search icon, a pencil, a speech bubble, a refresh icon, a print icon, and a link icon.
- Information Tabs:** "Address", "Parcel", and "Risk" tabs are visible. The "Parcel" tab is selected.
- Property Information Table:**

DESCRIPTION	
Land use	101 - Residential 1 Family
Year built	1911
- Flood Hazard Data:**
  - Flood Hazard Area: Location is **WITHIN** the FEMA 100-year floodplain.
  - Flood Zone: AE
  - Stream: Deckers Creek
  - Watershed (HUC8): Upper Monongahela (5020003)
  - FEMA Issued Flood Map: 54061C0114E
  - Map Effective Date: 1/20/2010
  - Contacts: Monongalia
  - Advisory Flood Height: N/A
  - Water Depth: About 1.0 ft (Source: HAZUS)
  - HEC-RAS Model: N/A
  - Flood Profile: 54061\_005
  - CRS Information: N/A
  - Location (long, lat): (79.947234 W, 39.626885 N)
  - Location (UTM 17N): (590352, 4386875)
  - Elevation: About 823 ft
  - Address: 629 PENNSYLVANIA AVE, Morgantown, West Virginia, 26501
  - Parcel ID: 31-10-0029-0130-0000** (circled in red)
  - Flood Risk Information: Flood Risk Assessment: N/A
  - 3D Flood Visualization** (circled in red)
- 3D Flood Model:**
  - Depth selection: 0 Feet, **1 Foot** (highlighted), 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: 31-10-0029-0130-0000
  - Water Depth: ~ 1.0 ft (HAZUS)
  - 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.
  - Google Map icon (circled in red)

**Residential or Farm Property**

# Parcels link to Owner/Building Info

## Residential or Farm Property

629 PENNSYLVANIA AVE, Morgantown, WV, 26501

<https://www.mapwv.gov/flood/map/?wkid=102100&x=-8899684&y=4811867&l=13&v=0>



<b>DESCRIPTION</b>	
GIS Parcel ID	31-10-0029-0130-0000
Legal Description	BL 12-1/2 LOT 10
Acreage (deed)	0.0373
Tax Year	2015
Tax Class	4
Deed Book / Page	1259 / 45
<b>PROPERTY OWNER(S)</b>	
Property Owner(s)	Smith John
<b>BUILDING INFORMATION</b>	
<b>Property Class Type</b>	<b>R- Residential</b>
Land Use	101 - Residential 1 Family
Year Built	1911
Architectural style	Conventional
Exterior Wall	Aluminum
Stories	2
Total Rooms	8
Building Grade	C
Basement Type	Full
Structure Area	1,320
Building (card) Number	1
# of main BLDGs (cards)	1
<b>APPRAISED VALUES</b>	
Land Appraisal	\$33,200
Building Appraisal	\$29,000
Total Appraisal	\$62,200

# Parcels link to Owner/Building Info

## Commercial or Industrial Property

1501 DECKERS CREEK BLVD, Morgantown, West Virginia, 26505  
<https://www.mapwv.gov/flood/map/?v=0&pid=31-14-0031-0101-0000>



<b>DESCRIPTION</b>	84 Lumber
GIS Parcel ID	31-14-0031-0101-0000
Legal Description	5.0922 AC;SABRATON
Acreage (deed)	5.09
Deed Book / Page	1376 / 234
<b>PROPERTY OWNER(S)</b>	
Property Owner(s)	SPIRIT SPE PORTFOLIO

<b>BUILDING INFORMATION</b>	
<b>Property Class Type</b>	<b>C- Commercial</b>
Land Use	373 - Retail-Single Occupancy
Year Built	1994
Stories	2
Exterior Wall	Brick or Stone
Construction Type	Pre-Engineered Steel
Building Grade	D+
Basement Type	None
Business Living Area	15,255
Cubic Feet	292,380
Use Type	34-Retail Store, 82- Multi-Use Office

<b>COST VALUES</b>	
Other Bldg/Yard Values	\$67,020
Commercial Value	\$227,700
<b>APPRAISED VALUES</b>	
Land Appraisal	\$378,800
Building Appraisal	\$294,700
Total Appraisal	\$673,500

# Total Property Parcels

## West Virginia Parcel Property Class Breakdown for Tax Year 2017 (Computed from statewide parcel file that is 95% complete)

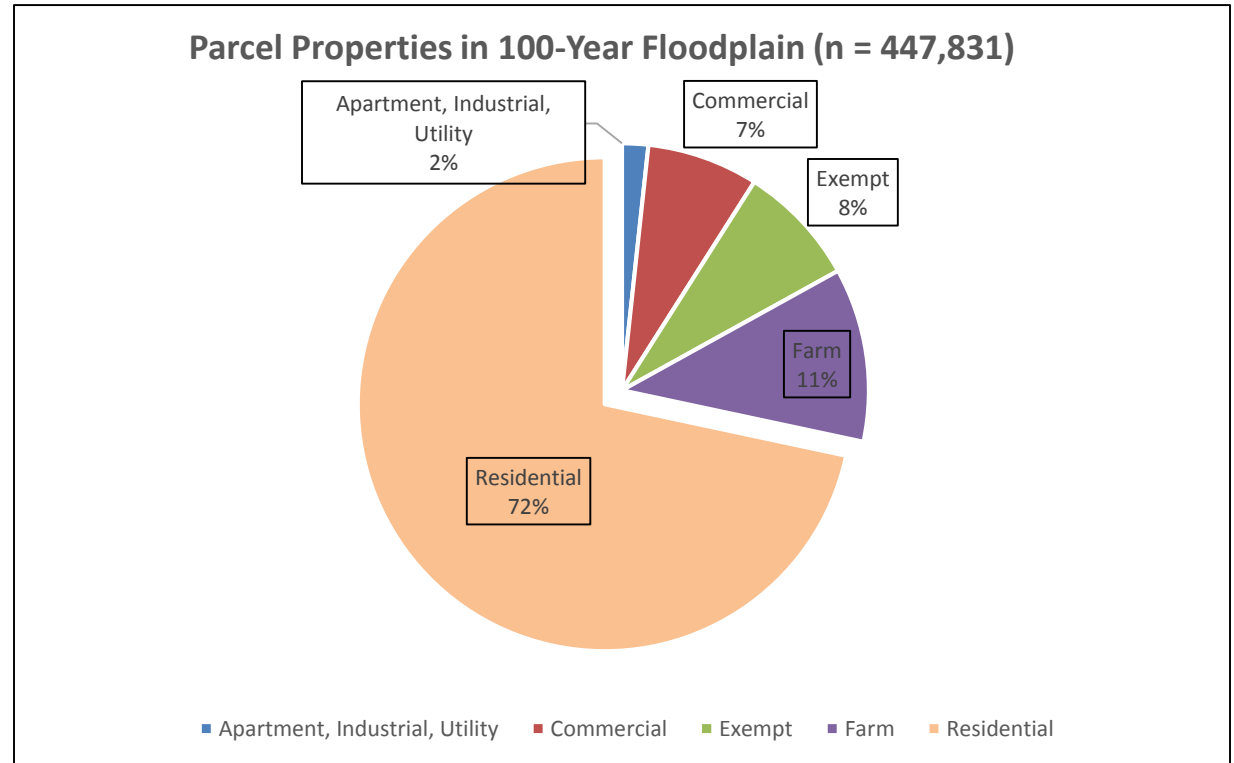
Code*	Property Class	# of Parcels	Percent (%)
R	Residential	1,164,470	79.61%
F	Farm	121,384	8.30%
A	Apartment	3,222	0.22%
C	Commercial	65,784	4.50%
I	Industrial	3,105	0.21%
X	Exempt	97,773	6.68%
U	Utility	192	0.01%
Other	Not classified	6,837	0.47%
		1,462,767	100.00%
	<b>Property Parcels intersecting 100-YR floodplain</b>	<b>447,831</b>	<b>31%</b>

Assessment records are important for **building inventories** and are used to estimate the total building exposure (\$) and building loss (\$) for multi-hazards. Often building inventories and corresponding loss estimates are organized by **property class**.



# Parcels in 100-YR Floodplain

Property Class	Count	%
Residential	320,892	72%
Farm	50,988	11%
Exempt	35,610	8%
Commercial	32,665	7%
Apartment, Industrial, Utility	7,676	2%
<i>total (31% of all 1.46 million parcels)</i>	447,831	100%



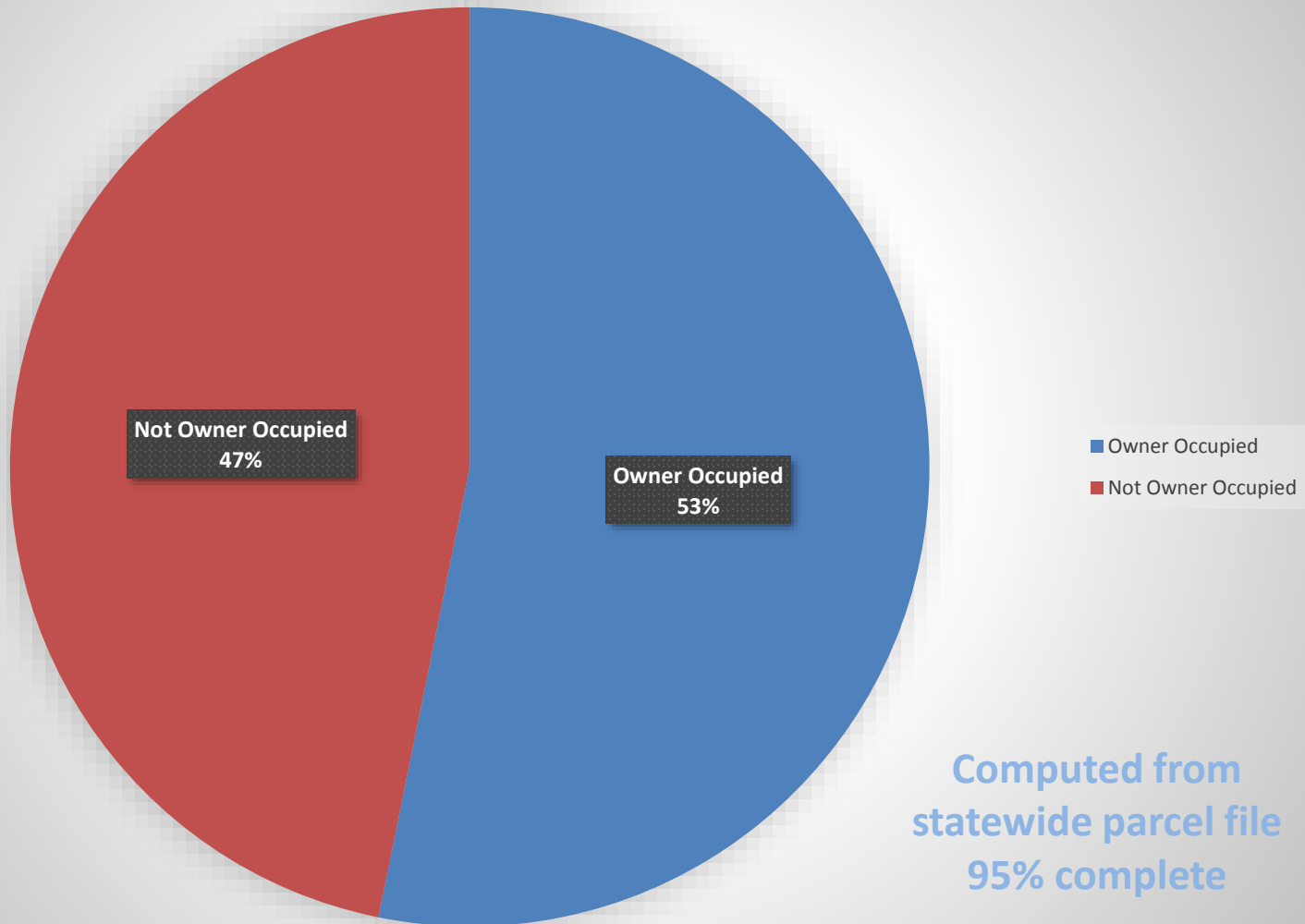
Computed from  
statewide parcel file  
95% complete

*An estimated **450,000 property parcels** or 31% of total 1.46 million statewide parcels intersect the 100-YR floodplain*

*A more detailed site-specific building analysis is needed statewide*

# Parcels in 100-YR Floodplain

Parcel Properties in 100-Year Floodplain (n= 447,831)



Computed from  
statewide parcel file  
95% complete

# WV Tax Map Products

	Individual Finished Tax Maps	Web Finished Tax Maps	Digital Parcel File (subset of Digital Tax Map)
Map Content	Parcel Boundary Parcel Identifier Parcel Dimensions Lot Boundaries Contextual Information	Parcel Boundary Parcel Identifier Parcel Dimensions (most viewers) Lot Boundaries (most viewers)	Parcel Boundary Parcel Identifier
Coverage	Statewide*	30 Counties with Web Viewers	95% State Coverage**
Current	Yes	Yes	Varies by County
Source	County Assessors	County Assessors	Assessors, E-911, MLMP
Map System	Digital/Manual (80%/20%)	Digital (GIS)	Digital (GIS)
Static or Dynamic	Static - viewed as paper map or fixed image	Dynamic - interactive web maps with online tools	Dynamic - interactive web maps with online tools
Linkable to IAS	No	Yes	Yes
Seamless	No	Yes	Yes
Aerial Photos	No	Yes	Yes
Formats	Paper or Digital (PDF, TIFF) Print-Ready images	Web Map Services	Shapefiles, Geodatabase, CAD Files, Web Map Services

\* All paper tax maps are scanned to a digital image-file format by the Tax Department for statewide coverage

\*\* Varying source years when created

# Finished Tax Map Standard 189-3

- Show the property and lot lines, set forth dimensions and/or areas, and other cadastral and cultural features that assessors are required by state law to maintain and publish for the public.
- Created by either *manual* or *automated* methods in accordance with 189-3 standards approved by the Property Valuation Training and Procedures Commission
  - Cartographic Design / Layout Specifications
  - Map Content
  - Maintenance Procedures / Map Currency
  - Submission Requirements / County Monitoring



# WV Digital Tax Map Products

## ***Parcel Related Features***

- Geo-Referenced Tax Map
- **PARCEL BOUNDARY** (*Shapefiles*)
- Parcel ID Label
- Interior Lot Lines and IDs
- Land Hooks and Buildings
- Parcel Dimension/Acre Annotation

## ***Reference Datasets***

- Road and Water Layers
- Aerial Photography



- **FULL or FINISHED DIGITAL TAX MAP**  
(*Web Map or Static TIFF/PDF*)



# Tax Map Survey - Current Trends

GIS Status	
GIS	43
Transition	7
Paper	5

Outsource % of Digital/Manual Maintenance	
In-House	29
Outsource	26

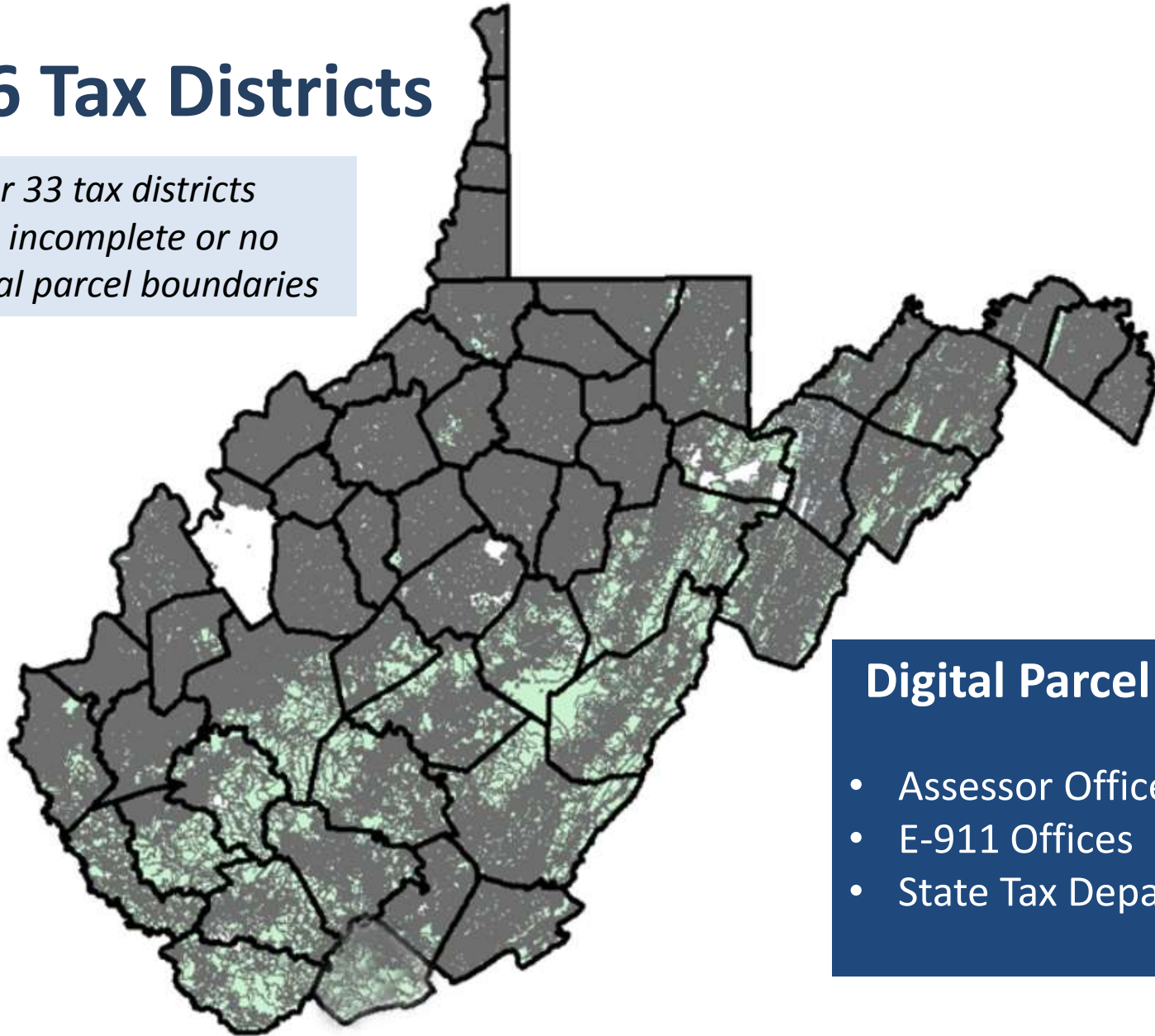
Maintenance	
Digital	43
Both	5
Manual	7

GIS Software	
ESRI	49
AUTOCAD	1
None	5

# Statewide Digital Parcel File

## 606 Tax Districts

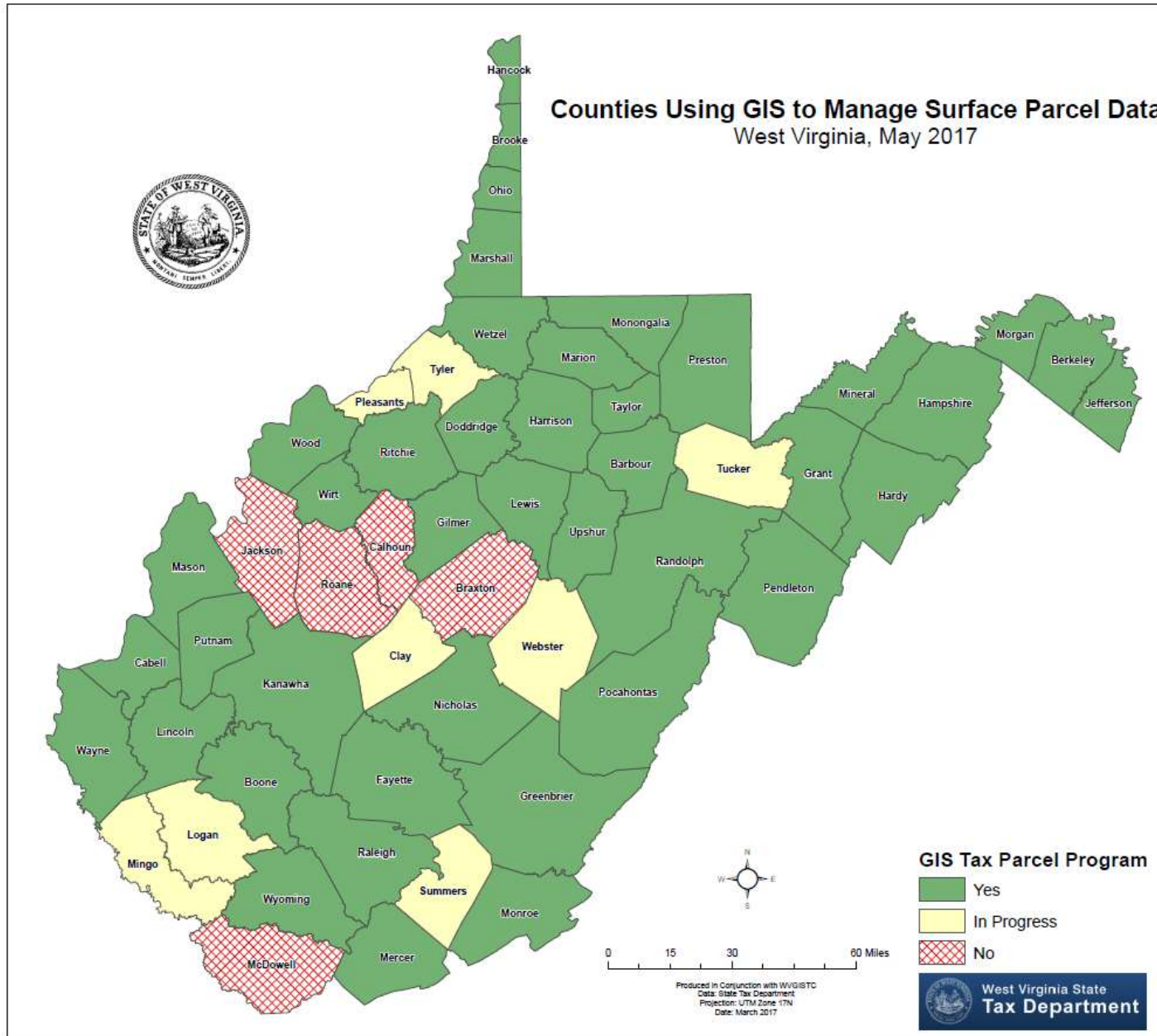
*5% or 33 tax districts  
have incomplete or no  
digital parcel boundaries*



## Digital Parcel Sources

- Assessor Offices
- E-911 Offices
- State Tax Department

# Counties using GIS

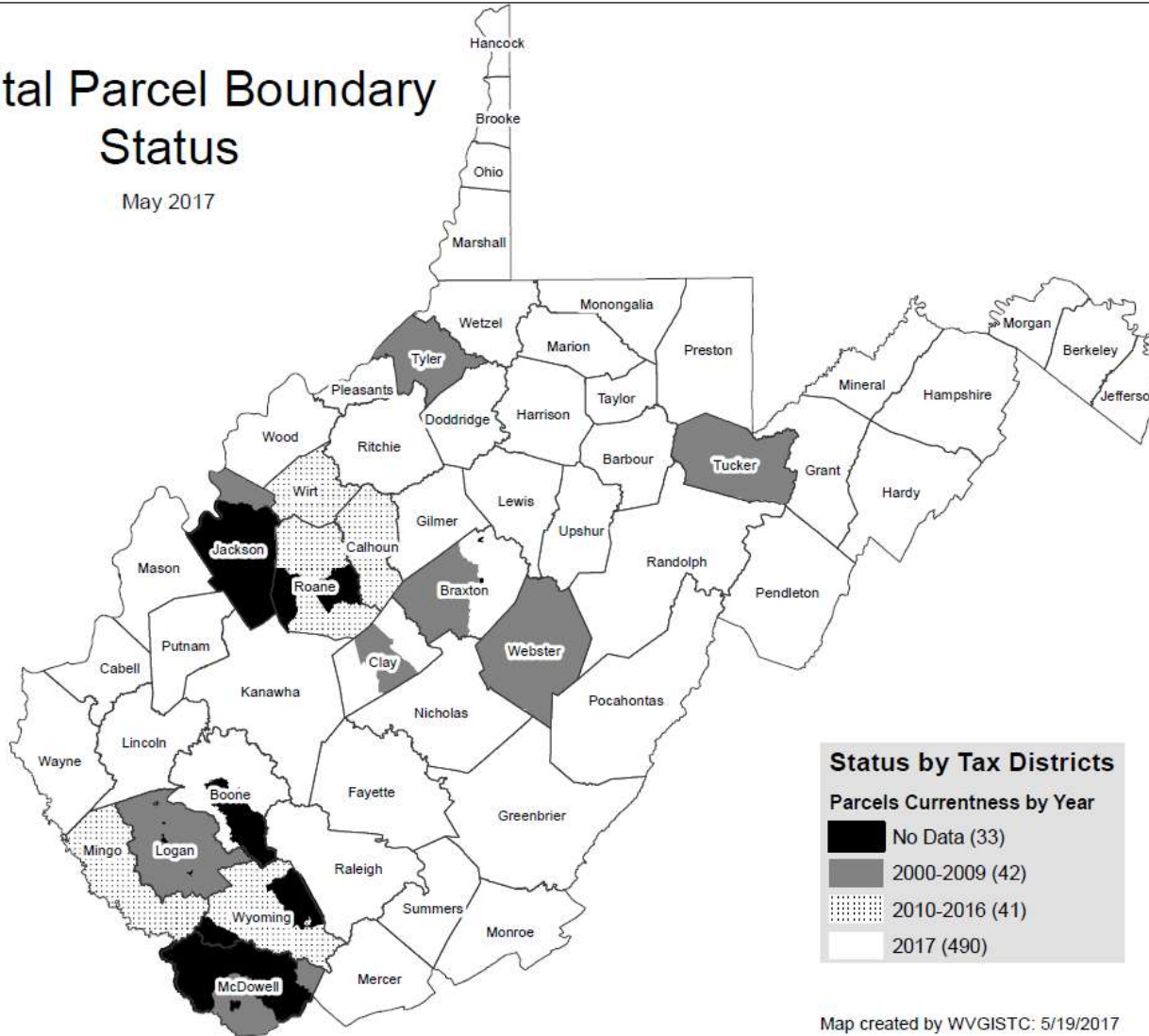




# Statewide Digital Parcel File

## Digital Parcel Boundary Status

May 2017

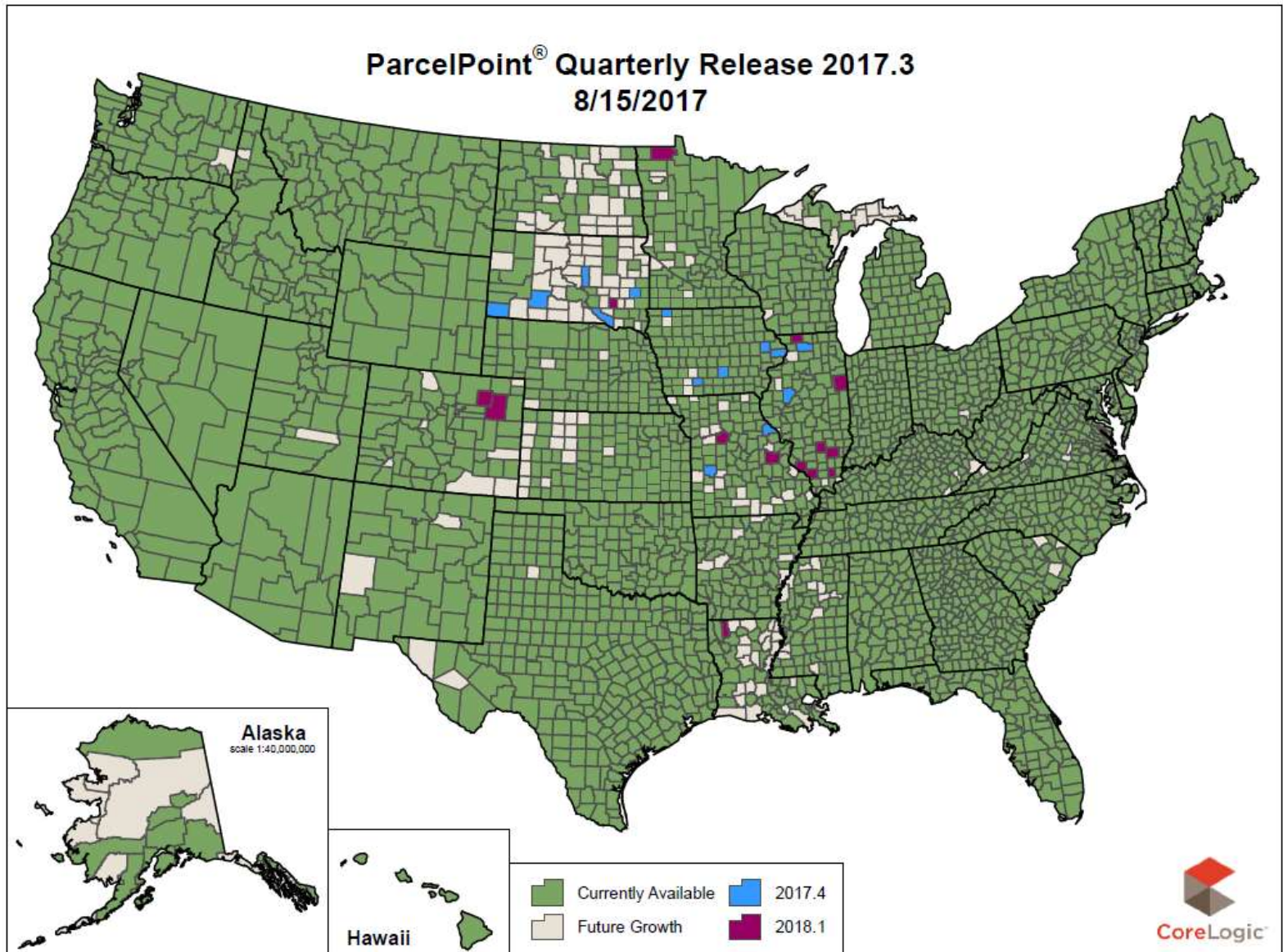


Map created by WVGISTC: 5/19/2017

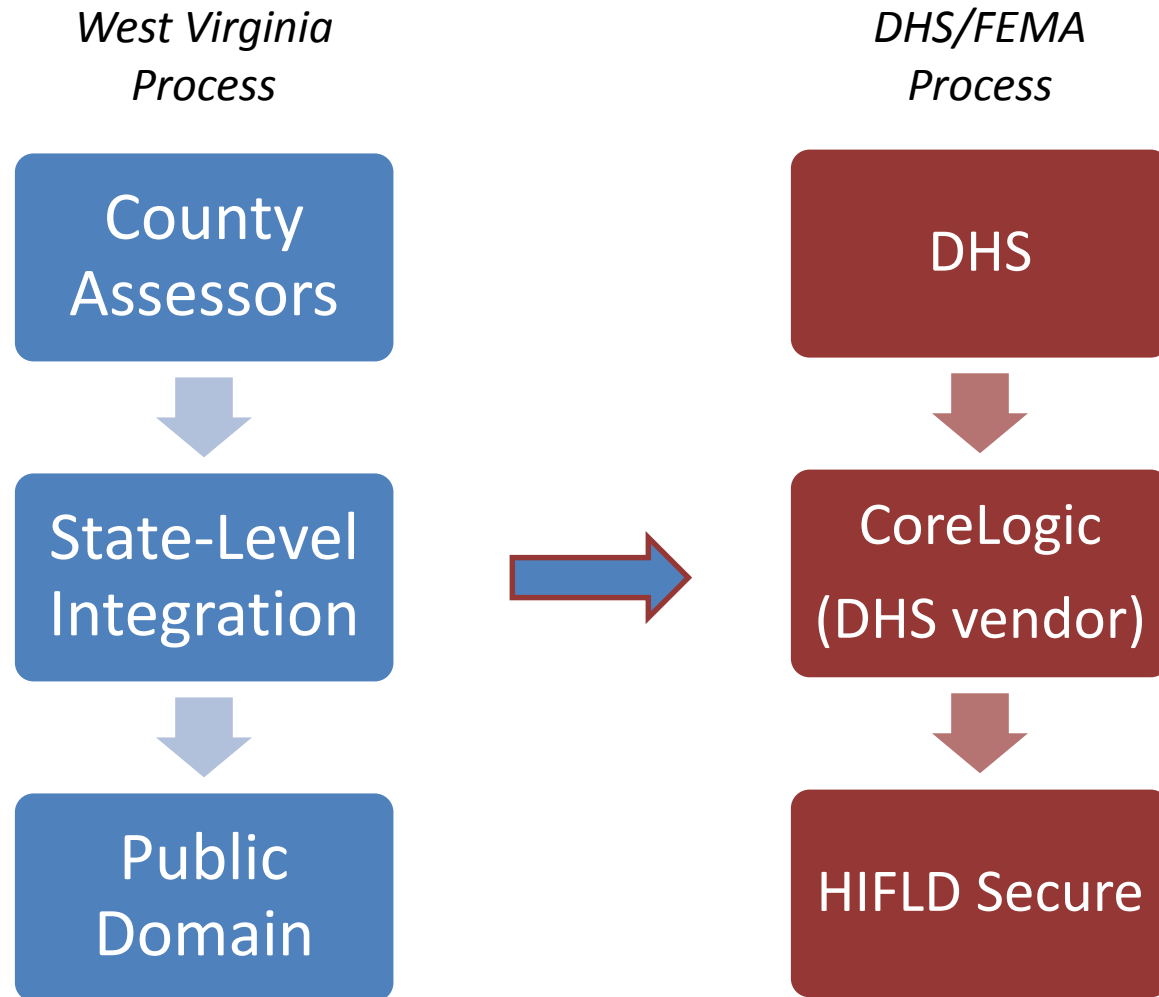
#	Missing/ Obsolete Data Parcels
1	Boone
2	Braxton
3	Calhoun
4	Clay
5	Jackson
6	Logan
7	McDowell
8	Roane
9	Tucker
10	Tyler
11	Wirt
12	Wyoming

- Estimated cost of \$420K to achieve a current, accurate, and maintained Full Digital Tax Maps
- SB 588 – As of July 5 parcels are free for download instead of \$165K to acquire Statewide Parcel File

# Parcel Bdry Layer – DHS/CoreLogic



# Parcel Coordination & Access



*Coordination of parcel development efforts between West Virginia and DHS/FEMA to avoid duplication*

# Flood Info/Links in Real Estate Web Apps

<< Charlotte County, Florida >>

[https://www.ccappraiser.com/sales\\_input.asp](https://www.ccappraiser.com/sales_input.asp)

CHARLOTTE COUNTY PROPERTY APPRAISER  
PAUL L. POLK, CFA

Real Property Record

Show 2018 Show 2017 Show 2016 Show 2015 Show 2014

General Parcel Information for 402128414000 for the 2018 Tax Roll

Parcel ID: 40203414000  
Property Address: 4376 EE JOSEPH RD  
Old Parcel ID Number: 0078950001000  
Property Zip Code: 33433  
Business Name: CAR WASH  
Section, Township-Range: 28-45-21  
Map Marker: JA288  
Zoning Code: DR-C-1  
Current Use: AUTO SALES, AUTO REPAIR AND STORAGE, AUTO SERVICE SHOP, BODY AND FENDER SHOPS, COMMERCIAL GARAGES, FARM AND MACHINERY SALES AND SERVICES, AUTO RENTAL, MARINE EQUIPMENT, MOBILE HOME SALES, MOTORCYCLES, CONSTRUCTION VEHICLE SALES  
Floods: Flooded  
Future Land Use (County, Plat): COMMERCIAL  
Tasting District: 704  
Waterfront: NO  
Market Area/Neighborhood/Subneighborhood: 217203  
SCH Base Year:

Flood Hazard	Floodway	SFHA	Flood Zone	FPS	COBRA	Community	Base Flood Elevation (ft)	Label of Map Revision (COM)
000F	OUT	IN	3AE	028C	COBRA OUT	10001	8	
000F	OUT	IN	3VE	028C	COBRA OUT	10001	8	

Ownership Information

Date	Book-Page	Sales Codes	Qual
8/5/08	000000	VACANT	
8/5/08	000000	VACANT	
10/1/01	000000	VACANT	

<< State of Tennessee >>

<http://tnmap.tn.gov/assessment/>

Tennessee Property Viewer

AREA OF 100-YEAR FLOOD HAZARD  
AREA OF 500-YEAR FLOOD HAZARD

Property Detail

County: Sumner  
Owner: MORRIS, E  
Parcel Number: 07 0001  
Deeded Acreage: 0.42  
Calculated Acreage: 0  
Subdivision:  
Date of Issuance: 2013

# Proposed State Multi-Hazard Risk Project

## – **Project Breakdown**

- Focus on flood and landslide hazards
- Statewide building inventory
- Fill in GIS data gaps (e.g., statewide parcel file)

## – **Detailed Building Inventories for multi-hazard assessments, CRS program credits, etc.**

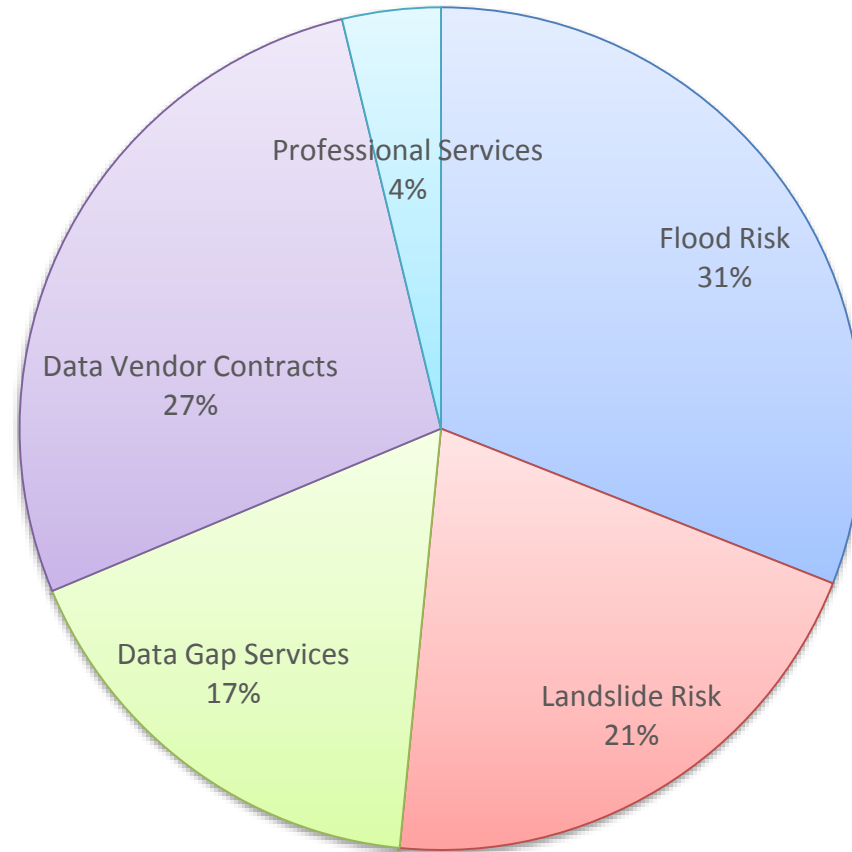
- Statewide building exposure inventory (parcel centroid spatial accuracy or better)
- Site-specific building loss estimates in SHFA/advisory flood zones at building centroid accuracy. Focus on 1%-annual-chance floods.
- Dam/levee inundations areas at parcel centroid accuracy or better

## – **Proposal Status**

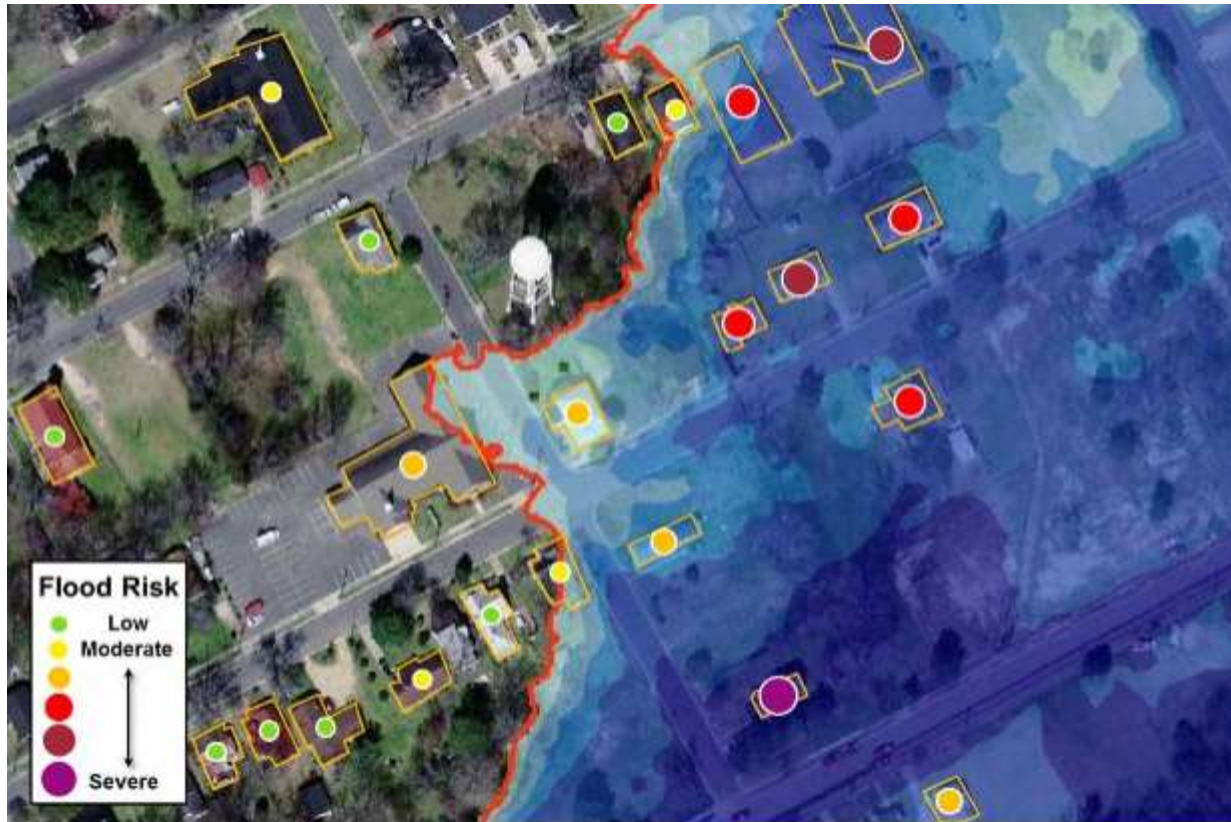
- Application at WV DHSEM for submission
- According to Brian Penix, TEIF/TEAL proposal still in the works but the WV Governor changed priorities that have a profound impact on HMGP. HMGP proposal must be submitted to FEMA before March 22 deadline.

# Proposed State Multi-Hazard Risk Project

## State HMGP Project Proposal



# Statewide Flood Risk Structure File



Various **Flood Risk Reports** by community, stream name, flood zones, etc. can be generated from the Flood Risk Data (FRD).

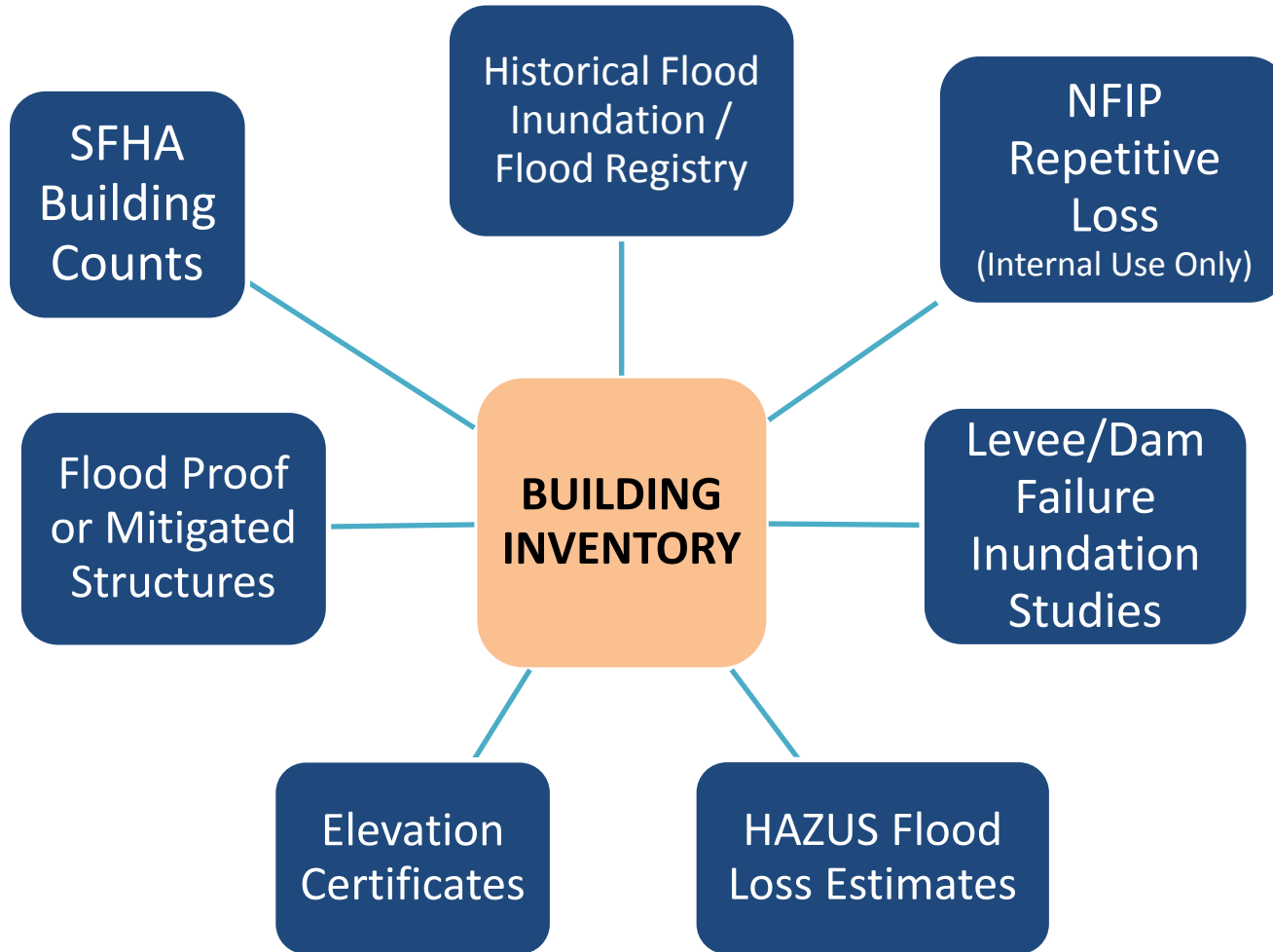
Structure-specific (called “User-Defined Facilities”, or UDFs, in Hazus) flood risk assessments produce loss estimates at the building or structure level, and can often help facilitate flood risk discussions with individual home- or business-owners in a community. These types of risk assessments can provide valuable information to communities to help pre-screen properties and projects before going through a more in-depth Benefit-Cost Analysis (BCA). Personally-identifiable information (PII) such as property address, name of owner, etc. will not be included in FEMA's Flood Risk Assessment dataset (S\_UDF\_Pt and L\_RA\_UDF\_Results). Source: Flood Risk Assessment Guidance - [https://www.fema.gov/media-library-data/1469146645661-31ad3f73def7066084e7ac5bfa145949/Flood\\_Risk\\_Assessment\\_Guidance\\_May\\_2016.pdf](https://www.fema.gov/media-library-data/1469146645661-31ad3f73def7066084e7ac5bfa145949/Flood_Risk_Assessment_Guidance_May_2016.pdf)

# Flood Risk Assessments

- **Source Data**
  - Quality digital source data is essential for correctly identifying and producing site-specific structures with accurate replacement values: assessment building records, property parcels, site addresses, leaf-off imagery, and building footprints
  - Engage local floodplain managers to quality check building inventories and critical facilities
- **Building Inventory Tool**
  - The Building Inventory Tool streamlines the process for creating an inventory of buildings assets exposed to multi-hazards and for executing Hazus flood loss models at the building or structure level. The Tool requires further refinements like updating the building construction tables for commercial/industrial properties and including building information from non-assessment sources. The tool also has to be robust in that building updates can be performed quickly when newer data sources become available.
- **Building Values**
  - Structures with significant variance between building **replacement values** and **appraised values** should be flagged and reviewed. Certain structures may require substituting the replacement value (cost to replace or rebuild the structure) with the appraised value (resell value).
  - Building values for tax-exempt properties like governmental, educational, or religious properties must be derived from other sources such as school and insurance databases. The WV Board of Risk and Insurance Management (BRIM) database is one such source.
- **Depth Grids**
  - Accurate and comprehensive flood depth grids are essential for credible building loss damage estimates. Many of the flood risk structures are located in AE Zones where no depth grids exist. A composite depth grid is created from the best available depth grids.



# Building Inventories



*Building Inventories important for flood reduction activities*

# Building Inventories

## *CRS Activities Requiring Building Inventories*

<b>Table 302-1. Impact adjustments for buildings.</b>		
<b>Activity</b>	<b>Element</b>	<b>Denominator</b>
310 (Elevation Certificates)	ECPO	Number of post-FIRM buildings (bPO)
	ECPR	Number of pre-FIRM buildings (bPR)
510 (Floodplain Management Planning)	RLAA	Number of buildings in all repetitive loss areas
520 (Acquisition and Relocation)	All	bSF + number of credited buildings
530 (Flood Protection)	All	bSF
610 (Flood Warning and Response)	FTR, EWD, FRO, CFP	bSF
620 (Levees)	All	Number of buildings affected by levee failure (bLF)
630 (Dams)	DFR, DFW, DFO, DCF	Number of buildings inundated by a dam failure flood (bDF)
<i>Elements not listed do not have an impact adjustment calculation</i>		

*Building Inventories important for flood reduction activities including the NFIP Community Rating System*

Source: CRS Coordinator's Manual

[https://www.fema.gov/media-library-data/1493905477815-d794671adeed5beab6a6304d8ba0b207/633300\\_2017\\_CRS\\_Coordinators\\_Manual\\_508.pdf](https://www.fema.gov/media-library-data/1493905477815-d794671adeed5beab6a6304d8ba0b207/633300_2017_CRS_Coordinators_Manual_508.pdf)

# Building Inventories

## *CRS Activities Require Accurate Building Inventories*

### 301.a. Definition of “Building” (Page 300-4)

**Building:** For CRS purposes, the definition of what constitutes a building is based on whether the structure is **insurable**. It must meet the following criteria, which are taken from the definition in the National Flood Insurance Program’s Flood Insurance Manual for insurance agents. A “building” is

- A structure with two or more outside rigid walls and a fully secured roof, that is affixed to a permanent site; or
- A manufactured home (a “manufactured home,” also known as a mobile home, is a structure built on a permanent chassis, transported to its site in one or more sections, and affixed to a permanent foundation); or
- A travel trailer without wheels, built on a chassis and affixed to a permanent foundation, that is regulated under the community’s floodplain management and building ordinances or laws.

“Building” does not mean a gas or liquid storage tank or a recreational vehicle, a park trailer, or other similar vehicle, except as described above.

Examples of structures that are NOT counted as buildings include open pavilions for picnic tables, bleachers, carports with open sides, underground pumping stations, and sheds on skids that are moved to different construction sites.

Source: CRS Coordinator’s Manual

[https://www.fema.gov/media-library-data/1493905477815-d794671adeed5beab6a6304d8ba0b207/633300\\_2017\\_CRS\\_Coordinators\\_Manual\\_508.pdf](https://www.fema.gov/media-library-data/1493905477815-d794671adeed5beab6a6304d8ba0b207/633300_2017_CRS_Coordinators_Manual_508.pdf)

# Building Inventories

## *CRS Activities Require Accurate Building Inventories*

### 302.a. Counting Buildings (Page 300-6)

Accessory structures are not included when counting buildings for calculating impact adjustments. For example, a house with a detached garage and shed is counted as one building. The flood insurance policy is based on the elevation of the house. However, if a lot has several principal buildings, each is counted separately because each normally is insured under a separate policy. For example, a motel with three principal buildings counts as three buildings. If one of the three buildings is an unheated bathhouse for the swimming pool and houses only showers and supplies, then the motel would be counted as two buildings.

To determine building counts, communities may use any method that yields reasonably good estimates of the number of buildings. **Building counts should be accurate** so they will provide the most useful information for both CRS and community planning. Acceptable methods include

- Using geographic information system- (GIS-) based building footprints,
- Reviewing aerial photographs,
- Using U.S. Census tract data, and
- Using the number of utility connections in an area.

Communities are required to document how they obtained their building counts or estimated building counts.

*Building Inventories important for flood reduction activities  
including the NFIP Community Rating System*

# Buildings in Floodplain

	# of Structures	Percent (%)
Addressable Structures	1,010,819	91%
Non-Addressable Structures	101,928	9%
<i>total</i>	1,112,747	100%
<b>Buildings in Effective 100-YR floodplains</b>	99,520	9%
<b>Buildings in 100-YR floodplains</b> (Effective and Advisory A/Updated AE)	106,967	10%
<b>Buildings in 100-YR and 500-YR floodplains</b>	159,804	14%

- *An estimated **100,000** buildings or 9% of all statewide 1.1 million buildings are within the effective 100-YR floodplain.*
- *An estimated **160,000** buildings or 14% of all statewide 1.1 million buildings are within the 100-YR and 500-YR floodplains.*

*Data Source: Statewide Addressing and Mapping System (SAMS). Some counties track non-addressable structures in the floodplain while other counties do not.*

*A more detailed site-specific building analysis is needed statewide*

# Flood Risk Structures of Martinsburg

**Building Flood Loss Damage**

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

**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

**Flood Risk Assessment Building Link**

**Flood Risk Assessment**

Risk Information for the highlighted census block area: 540039716001007

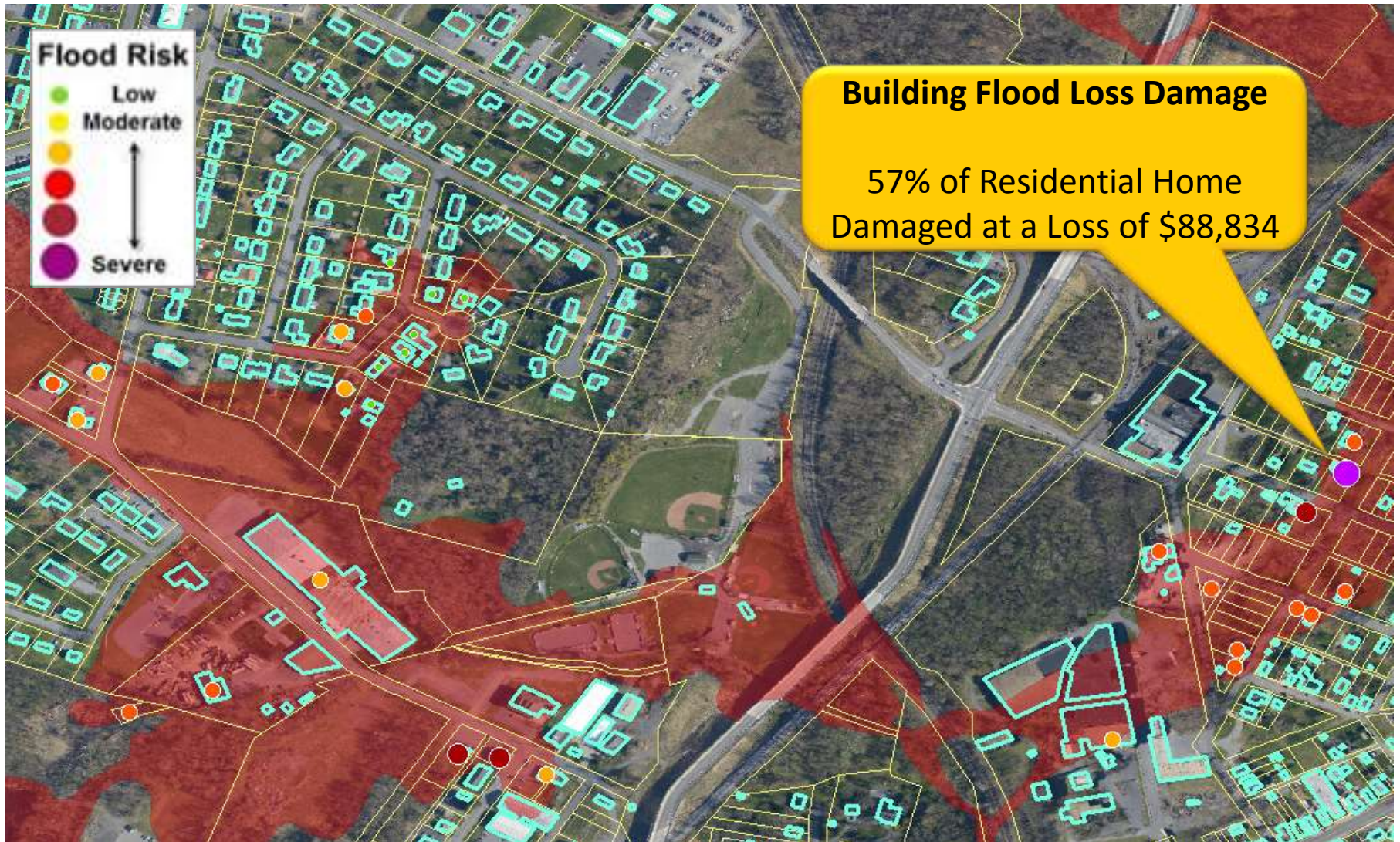
- Total Assets Exposed: \$173k
- Total Loss (Bldgs and Contents): \$0k
- Building Loss: \$0k
- Debris Removal: 0 tons
- Temporary Shelter: 0 person(s)
- Depth: About 10.0 ft (Source: EQL)

<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.

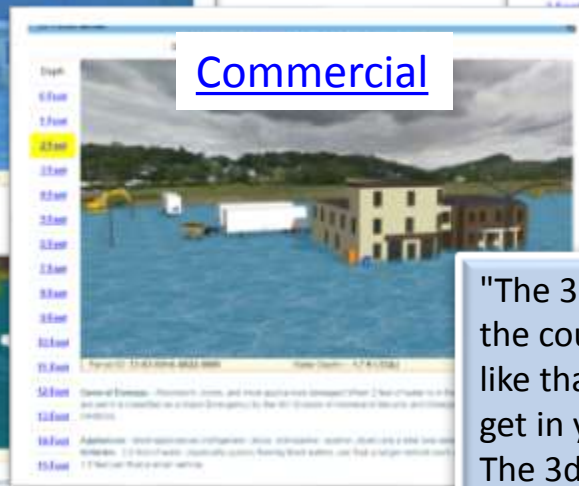
# Building Footprints

*Building footprints can enhance flood risk assessment maps*



# 3D Flood Visualizations

*Visualizations are easier for non-technical users to understand flood risks to their property in feet of water rather than comprehending the adjacent base flood elevation*



"The 3D visualization is really cool. Our citizen comes to the counter and says 'there is no way there can be a flood like that.' Then we show them how much water you will get in your house and how much it will cost to repair it. The 3d visual is really good! And then we like the way you can click on a parcel ID and it brings up all the information as far as property owner, tax map and parcel number, deed book, page number - everything is right there. And the building information is really good too because it tells what the structure is made of, whether it has a basement - all the information that we would have to go to another system to pull is right there." Source: 3D Flood Visualization Comment from Debbie Robinson, Kanawha County Planning and Development Office

3D flood visualizations are available statewide for locations where **flood depth grids** exist. The parcel assessment data fields (land use, stories) are necessary to identify the correct property type: residential one- or two-story homes, mobile home, commercial/industrial, etc.

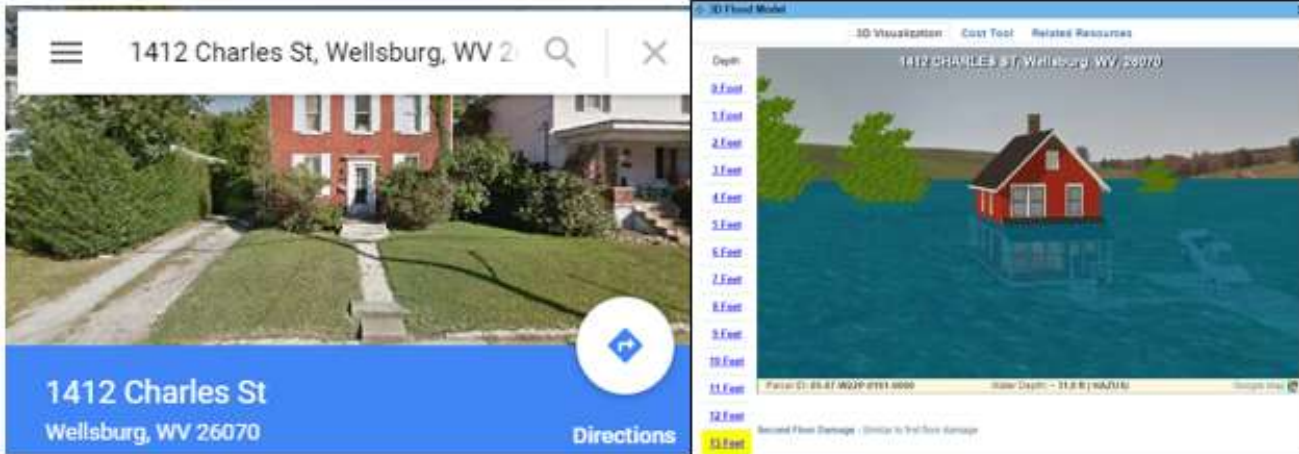


# 3D Flood Visualizations

## Brooke County

<https://www.mapwv.gov/flood/map/?v=1&pid=05-07-W22P-0161-0000>

1412 Charles St, Wellsburg, WV, 26070, Parcel ID: 05-07-W22P-0161-0000



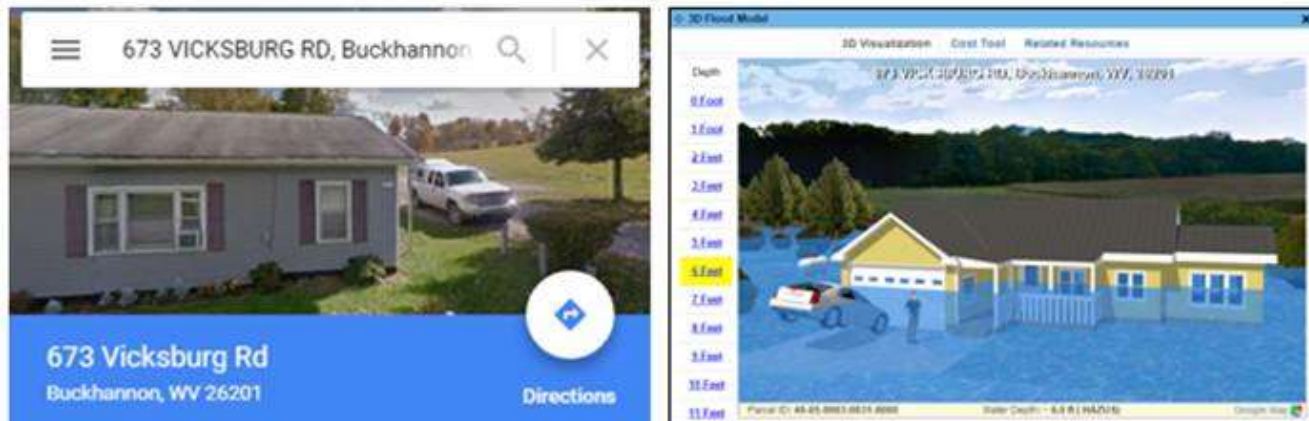
“This is the coolest thing ever....thank you!!!”

Source: 3D Flood Visualization Comment from Terri Jo Bennett, CFM, Upshur County Building Permit, Floodplain and Addressing and Mapping Coordinator

## Upshur County

<https://www.mapwv.gov/flood/map/?v=0&pid=49-05-0003-0031-0000>

673 Vicksburg Rd, Buckhannon, WV, 26201, Parcel ID: 49-05-0003-0031-0000



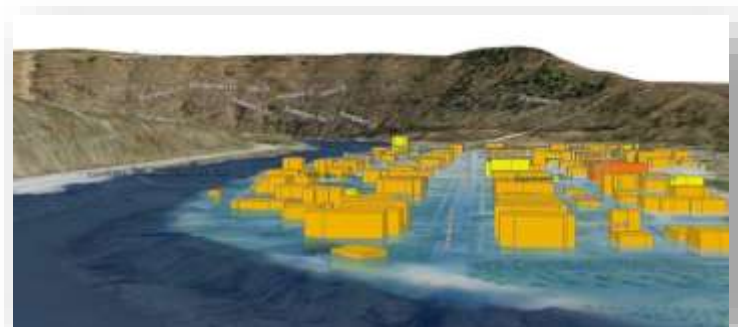
# 3D Flood Visualization - Community

## *Basic Steps for Creating 3D Flood Visualizations*

- Start with High-Resolution Digital Terrain Model
- Overlay High-Resolution Aerial Image
- Then add Streets
- Then add Building Footprints
- Extrude Building Footprints to Known Heights (“sugar-cube” 3D buildings)
- Generate Detailed 3D Building Models
- Photo-Texture the 3D Building Models
- Add Trees and other Landscape/Streetscape Features
- Add Flood Overlay (Riverine 1% Annual Chance Flood)

*Source: NEMAC*

***The objective is to make the 3D visualizations as realistic as possible in a minimal amount of processing time***



# 3D Flood Visualization - Community

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

Public Expert Risk MAP Flood Reference Basemaps Address 197 Rodeo Dr, WV 25403

Baltimore Street, Martinsburg, WV

3D

3D Northwest View

WV Flood Tool Conceptual Slide

Scale: 1:4,514  
x: -77.967507, y: 39.464872