



Climate Tools Overview and Panel – West Virginia

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Climate Change Web Tools

■ Riverine Flood Hazard

#1 hazard of State Hazard Mitigation Plan

- *Web Tools:* WV Flood Tool (www.mapwv.gov/flood) & WV Property Viewer
- *Current Focus:* **1% Annual Chance (100-yr) flood event**
- *Climate Change Models:* Incorporate **higher flood depths** (500-yr flood, BFE + 2' & 3', climate change models)
- *Risk Communications:* Show *higher risks* and various *mitigation measures*
 - Estimate higher building damage losses due to climate change
 - Show 3D flood visualizations with climate change scenarios
 - New Structures: Build to higher freeboard standard to increase resiliency
 - Existing Structures: Identify building stock suitable for mitigation measures

■ Landslide Hazard

#2 hazard of State Hazard Mitigation Plan

- *Web Tools:* WV Landslide Tool (www.mapwv.gov/landslide) & WV Flood Tool
- *Current Focus:* Statewide **Landslide Susceptibility Map**
- *Climate Change Models:* Incorporate **rainfall intensity-duration thresholds**
- *Risk Communications:* Predict *when* landslides may occur

Climate Scenario Damage Estimates

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

Public Expert **Risk MAP** Risk Reference Basemaps Address Search

Building Loss Estimate (100-Yr)
Loss estimates for climate scenarios can be added

RiskMAP View

Flood Risk Building Info

100-Yr Damage Loss Estimate

Flood Risk Assessment Building Link

Concept Slide

Address	Parcel	Risk
Building #1 in Parcel: 19-07-022B-0021-0000		
Flood Exposure for Building: 19-07-022B-0021-0000_7170		
Building Replacement Cost	\$280,700	
Content Cost	\$140,350	
Building Info	Area: 4,006 sq ft Stories: 2	
Occupancy Class	RES1 (Single Family Dwelling)	
Year Built	1900 (Pre-FIRM)	
Foundation Type	Basement	
First Floor Height	4.0 ft above ground	
Water Depth-in-Structure	-3.5 ft (Subgrade Basement or Below LF)	
Flood Damage Estimates for Building: 19-07-022B-0021-0000_7170		
Building Damage Pct	4% (Slight Damage)	
Building Loss USD	\$11,228	
Content Damage Pct	2%	
Content Loss USD	\$3,437	

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: 498.8 ft (BFE - Non-Restudy)
Water Depth: About 0.8 ft (Source: HEC-RAS)
HEC-RAS Model: N/A

Flood Profile: 54037_028

Address: 7170 QUEEN ST, Kearneysville, WV, 25430
Parcel: 19-07-022B-0021-0000 | Assessment

Flood Risk Information
Flood Risk Assessment
3D Flood Visualization

<https://www.mapwv.gov/flood/map/?v=1&pid=19-07-022B-0021-0000>

Climate Change 3D Visualizations

Flood Depth

FEMA 100-Yr

FEMA 500-Yr

2052 Climate Model

Add 3D Visualizations Depths for FEMA 500-Yr and 2052 Climate Model



3D Flood Model

3D Visualization

7170 QUEEN ST, Kearneysville, WV, 25430
Building ID: [19-07-022B-0021-0000 7170](#)

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

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 facades are destroyed when water gets behind the stucco material, which can occur at 0.5 foot of floodwater. Brick and concrete masonry are destroyed around them, but by 0.5 feet of floodwater they will need to be completely restored or replaced.

Windows - Includes window frames and panes, as well as structural window frames. The panes are destroyed 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.

Concept Slide

Climate Change 3D Visualizations

WV Flood Tool
Remember: When In Doubt, Call 800-442-2347

Views: Public, Expert, Risk MAP, Risk, Re...

Corporation of Harpers Ferry

100-yr Flood Event

FEMA Effective Floodplains

- Zone AE FLOODWAY
- Zone AE (AH, AO)
- Zone A
- Updated Zone AE
- Mississippi Zone A

Building Damage Percentage

- 0 - 5%
- 5 - 10%
- 10 - 25%
- 25 - 50%
- 50 - 100%
- Non-primary structure/Outside of floodplains
- Community Boundary

High Risk Advisory Flood Zones

3D Movie Play Button

Harpers Ferry

Add Climate Change Models for 3D Loss Estimates

[Map Link \(turn movie layer on\)](#)

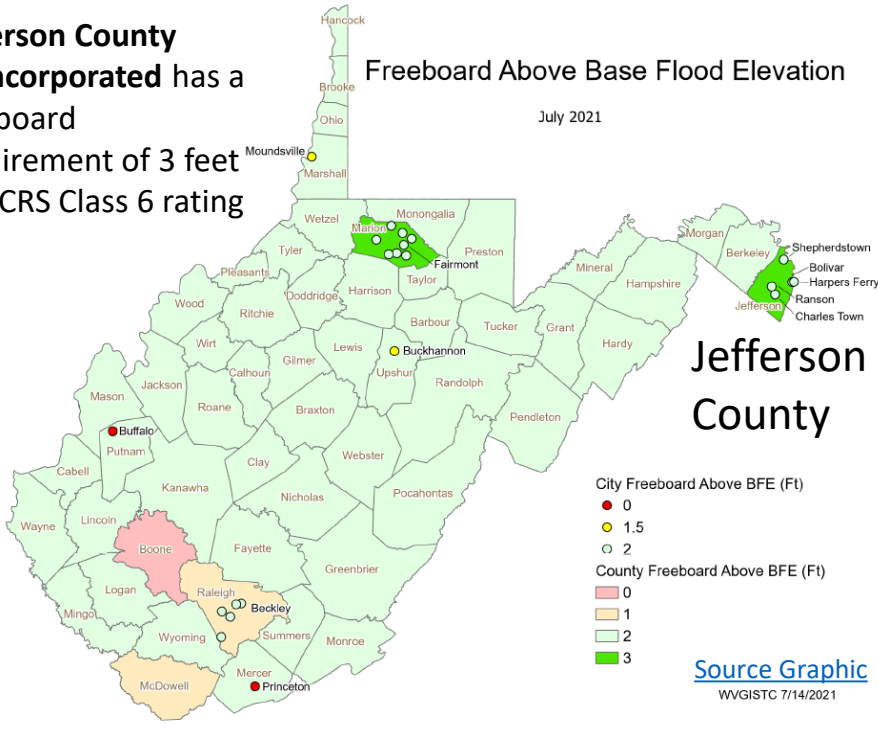
[Harpers Ferry Flood Risk 3D Visualization Movie](#)

Build to Higher Standard (Freeboard)

Jefferson County Unincorporated has a freeboard requirement of 3 feet and CRS Class 6 rating

Freeboard Above Base Flood Elevation

July 2021



The WV Flood Tool's query panel displays the community's Freeboard and CRS Class

[WV Flood Tool Map Link](#)

RISK COMMUNICATIONS

Build new structures to higher freeboard standard for changing climate conditions

Mitigate Existing Structures

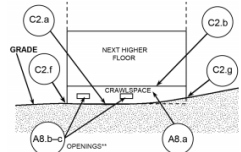


Crawlspace Enclosure

DIAGRAM 8

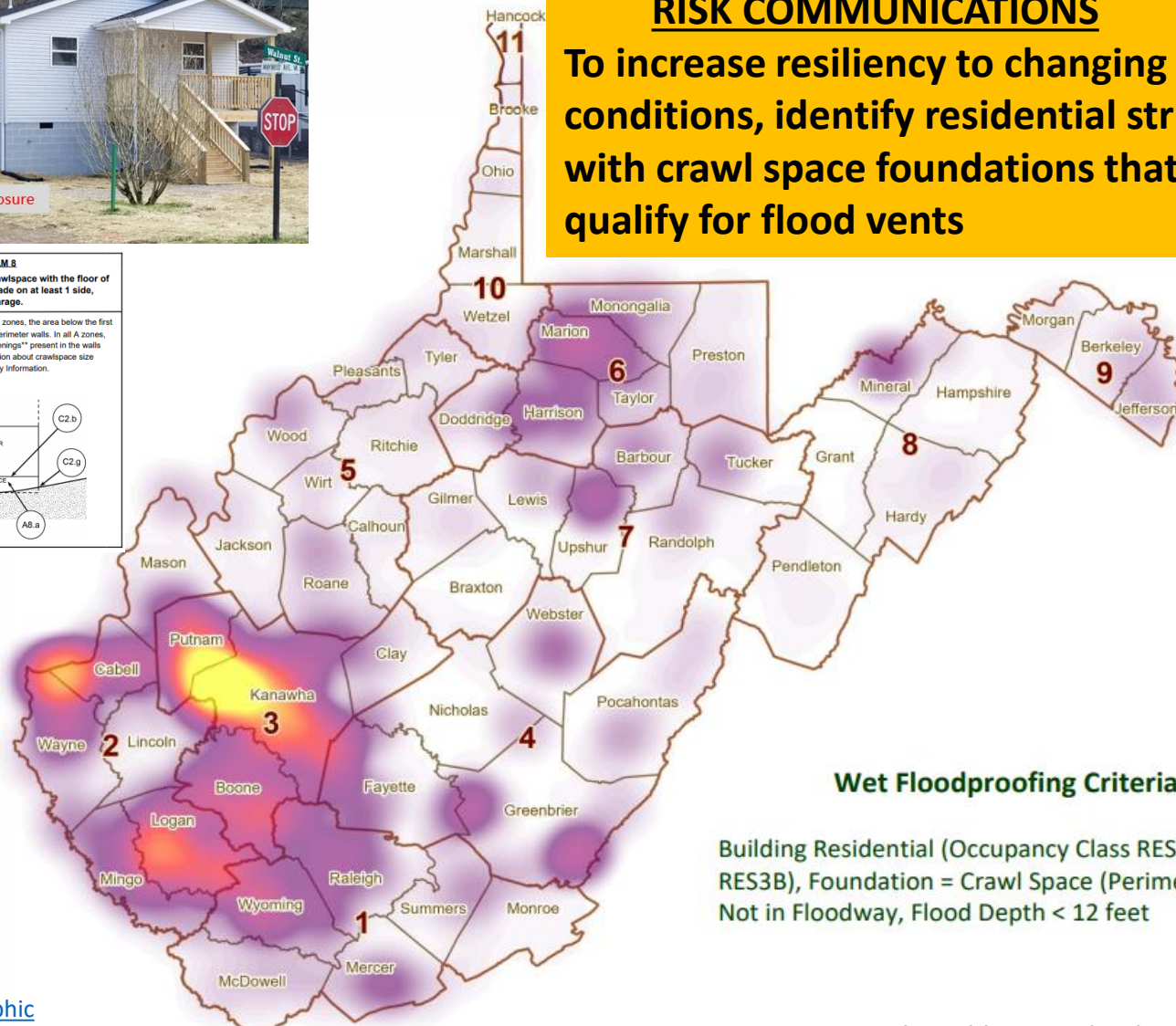
All buildings elevated on a crawlspace with the floor of the crawlspace at or above grade on at least 1 side, with or without an attached garage.

Distinguishing Feature – For all zones, the area below the first floor is enclosed by solid or partial perimeter walls. In all A zones, the crawlspace is with or without openings** present in the walls of the crawlspace. Indicate information about crawlspace size and openings in Section A – Property Information.



RISK COMMUNICATIONS

To increase resiliency to changing climate conditions, identify residential structures with crawl space foundations that could qualify for flood vents



Wet Floodproofing Criteria:

Building Residential (Occupancy Class RES1, RES3A, RES3B), Foundation = Crawl Space (Perimeter Wall), Not in Floodway, Flood Depth < 12 feet

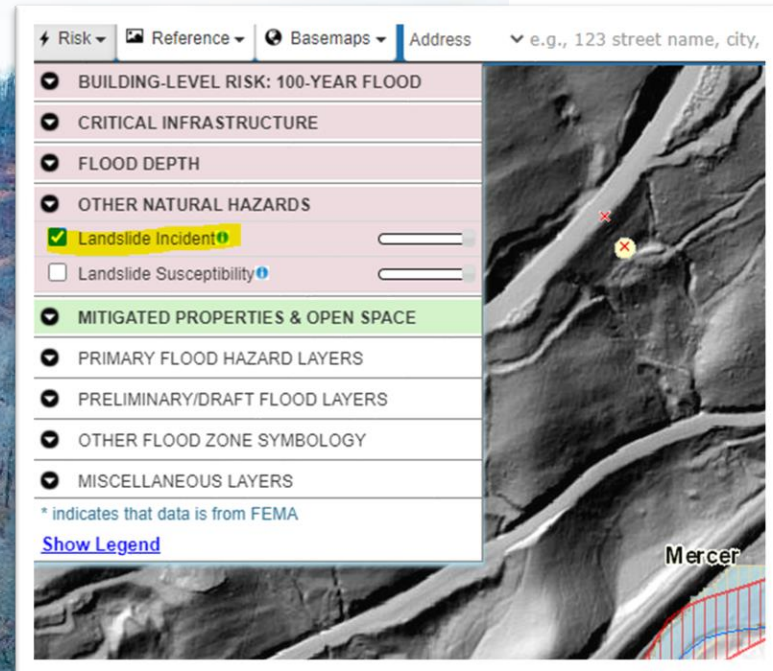
[Source Graphic](#)

WVGISTC 2022-2-8

Source: Statewide Building-Level Risk Assessment

Landslide Hazard

[Landslide Incidents](#) | [Landslide Susceptibility](#) | [Landslide Methodology Scholarly Paper \(2020\)](#)



The screenshot shows a web map interface with a layer list on the left and a map view on the right. The layer list includes:

- Risk
- Reference
- Basemaps
- Address (e.g., 123 street name, city)
- BUILDING-LEVEL RISK: 100-YEAR FLOOD
- CRITICAL INFRASTRUCTURE
- FLOOD DEPTH
- OTHER NATURAL HAZARDS
- Landslide Incident
- Landslide Susceptibility
- MITIGATED PROPERTIES & OPEN SPACE
- PRIMARY FLOOD HAZARD LAYERS
- PRELIMINARY/DRAFT FLOOD LAYERS
- OTHER FLOOD ZONE SYMBOLOGY
- MISCELLANEOUS LAYERS

* indicates that data is from FEMA

[Show Legend](#)

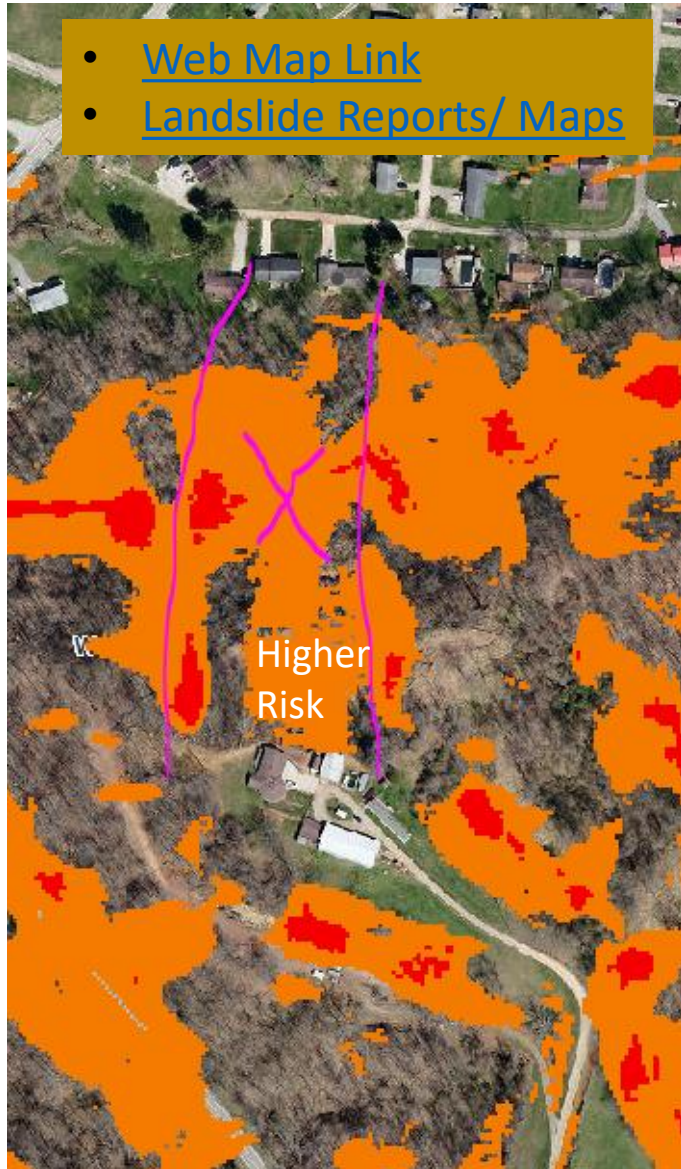
The map view shows a grayscale topographic map of a river valley with a red 'X' marker and a yellow 'X' marker. The word 'Mercer' is visible in the bottom right corner of the map view.

2019 Slide

Route 112
near Ingleside, WV
(Mercer County)

Landslide Web Map Link: <https://www.mapwv.gov/flood/map/?wkid=102100&x=-9034072&y=4480092&l=10&v=2>

Landslide Susceptibility



Landslide Susceptibility

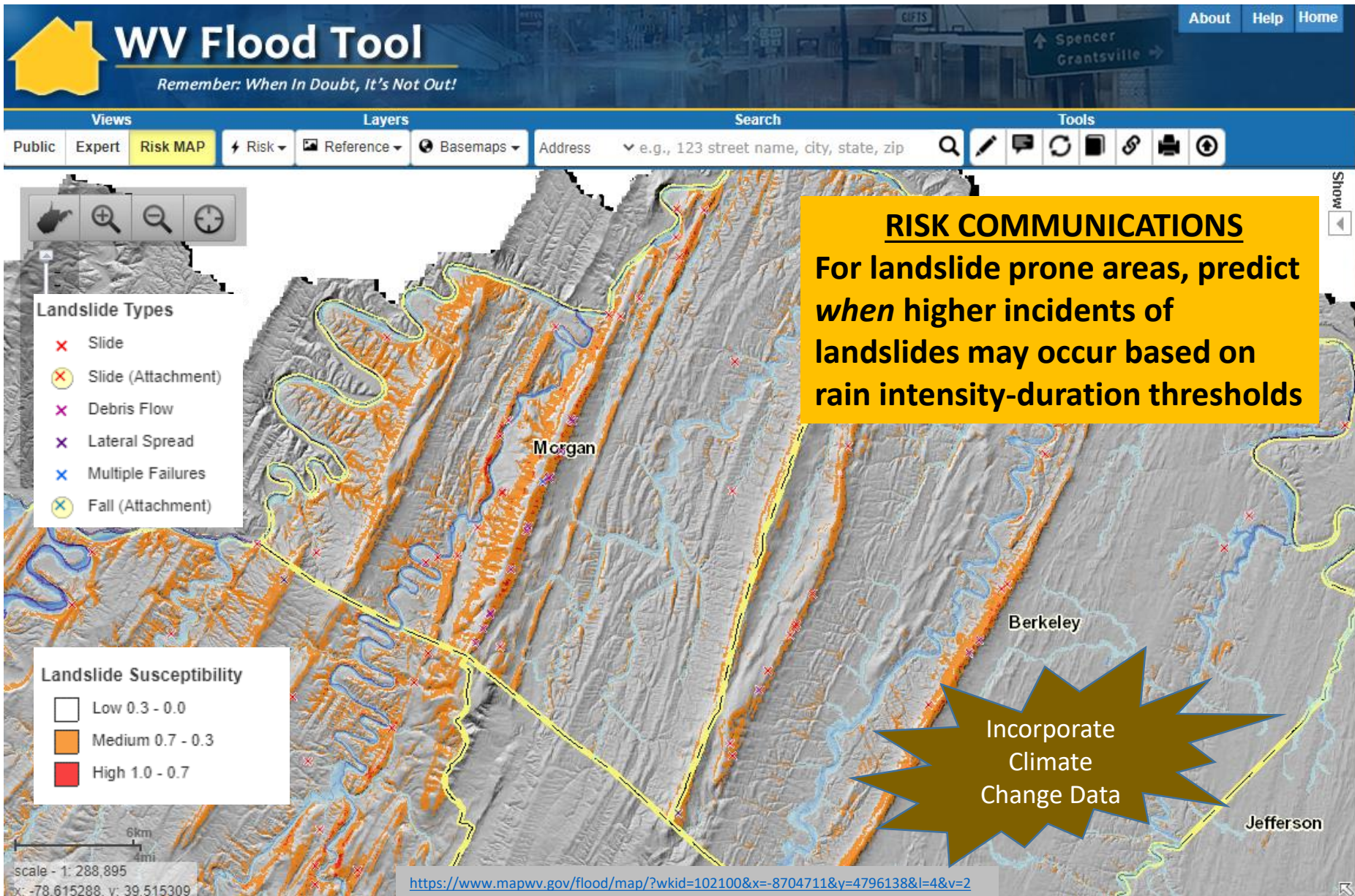


Spring 2020 Aerial Imagery



April 2020
Landslide
Wood County
*Impacted home
moved from
foundation*

Landslides and Climate Change



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Flood Risk
#1 WV Hazard



Landslide Risk
#2 WV Hazard