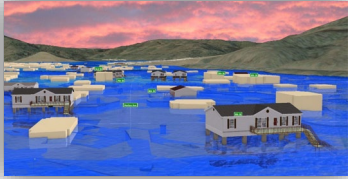




# WV Flood Resiliency Framework

A virtual hub of risk assessment, visualization, planning, and training resources for building community flood resiliency in WV

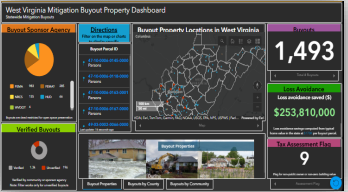
## Flood Visualizations



## WV Flood Tool



## Flood Dashboards



## WV Risk Explorer



## Risk Tools

### RISK TOOLS

- WV Risk Explorer
- WV Flood Tool
- Visualizations
- Dashboards

9 Geographic Scales

### COMMUNITY ENGAGEMENT

- Focused Outreach Meetings
- Flood Symposium
- Resiliency Tools & Products
- Learning Resources & Reports



Community Engagement Meeting

### HAZARD LIBRARY

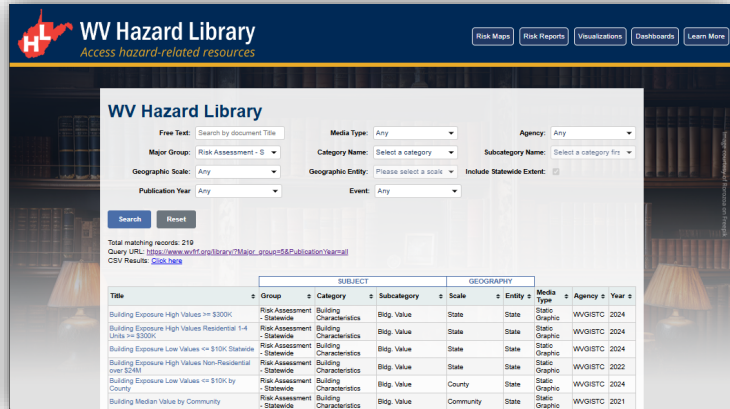
Search online hazard resources by title, subject, media, event, geography, data, etc.

### STAKEHOLDERS

- Risk Reduction Associates
- Emergency Responders
- Floodplain Managers
- Local Officials
- Volunteers
- Public



Flood Symposium Stakeholders



Hazard Library



# WVFRF Tools at Multiple Scales

GEOGRAPHIC SCALES		APPLICATIONS				WVFRF TOOLS		
Geographic Unit	# Units	Floodplain Management & Mitigation	FEMA Mapping	Risk Planning	Disaster Management	WV Risk Tools (WV Flood Tool & WV Explorer)	Flood Visualization Tools	Hazard Library (Document Center Tool)
<i>PROPERTY LEVEL</i>								
<b>Structures<sup>1</sup></b>	98,000	X	X	X	X	Yes	Yes	Yes
<b>Parcels</b>	275,000	X	X	X	X	Yes		Yes
<b>Other Features<sup>2</sup></b>		X	X	X	X	Yes		Yes
<i>COMMUNITY LEVEL</i>								
<b>Incorporated Places</b>	211	X	X	X	X	Yes	Yes	Yes
<b>Unincorporated Areas</b>	55	X	X	X	X	Yes	Yes	Yes
<b>Communities (NFIP)<sup>3</sup></b>	266	X	X	X	X	Yes	Yes	Yes
<i>COUNTY-REGION-STATE LEVEL</i>								
<b>Counties</b>	55	X	X	X	X	Yes	Yes	Yes
<b>Regions (RPDCs)</b>	11	X	X	X	X	Yes		Yes
<b>State</b>	1	X	X	X	X	Yes		Yes
<i>DRAINAGE LEVEL</i>								
<b>Watersheds</b>	32	X	X	X	X	Yes		Yes
<b>Streams (named)</b>	6,748	X	X	X	X	Yes	Yes	Yes

**NOTES:**

<sup>1</sup> Primary structures located in high-risk effective and advisory floodplains (1%-annual-chance flood)

<sup>2</sup> Other Features include roads, bridges, National Register Areas, flood mitigation structures (dams, levees, floodwalls)

<sup>3</sup> Total 284 communities in state: 266 NFIP; 18 incorporated places not in NFIP



# WV Risk Tools

## Analytical & Visualization Tools at multiple scales

WV RISK TOOLS	
2 KEY FLOOD RISK TOOLS	9 GEOGRAPHIC SCALES
<p><i>&lt;&lt; Aggregate &amp; Property Levels &gt;&gt;</i></p> <ul style="list-style-type: none"> <li>• <b>WV Risk Explorer</b> <ul style="list-style-type: none"> <li>○ Risk Maps</li> <li>○ Risk Reports</li> <li>○ Bldg. Risk Tool</li> <li>○ Dashboards</li> <li>○ Visualizations</li> <li>○ Data Access</li> </ul> </li> </ul> <hr/> <p><i>&lt;&lt; Property Level &gt;&gt;</i></p> <ul style="list-style-type: none"> <li>• <b>WV Flood Tool</b> <ul style="list-style-type: none"> <li>○ WV Property Viewer</li> </ul> </li> </ul>	<p><i>&lt;&lt; Political Boundaries &gt;&gt;</i></p> <ol style="list-style-type: none"> <li>1) State</li> <li>2) Region</li> <li>3) County</li> <li>4) Community</li> <li>5) Incorporated Place</li> <li>6) Unincorporated Area</li> </ol> <hr/> <p><i>&lt;&lt; Drainage Areas / Streams &gt;&gt;</i></p> <ol style="list-style-type: none"> <li>7) Watershed</li> <li>8) Stream/River</li> </ol> <hr/> <p><i>&lt;&lt; Property Levels &gt;&gt;</i></p> <ol style="list-style-type: none"> <li>9a) Parcel</li> <li>9b) Building</li> </ol>

## Risk Factors for riverine hazard assessments

WV RISK FACTORS	
RISK INDICATORS	ENVIRONMENTS
<ul style="list-style-type: none"> <li>• Floodplain Characteristics</li> <li>• Building Exposure</li> <li>• Building Characteristics</li> <li>• Critical Infrastructure</li> <li>• Community Assets</li> <li>• People/Social Vulnerabilities</li> <li>• Other Hazards</li> </ul>	<ul style="list-style-type: none"> <li>• Physical (Flood Factors, Topography, Hydrology, Hydraulics)</li> <li>• Human (People)</li> <li>• Social</li> <li>• Economic</li> <li>• Institutional</li> <li>• Manmade (Buildings, Roads)</li> </ul>



# Risk Tools Comparison

## WV Flood Tool

Determine the degree of flood risk for a *specific area or property* using the Public and Expert Views. View building risk assessments and mitigation measures using the Risk Map View.

### Primary Components:

- Public View
- Expert View (Floodplain Management)
- RiskMap View (Risk Reduction)
- Reference Layers & Basemaps
- Property Search Tools
- Links to External Viewers & Resources



### Applications:

- Flood Risk Determinations at Property Level
- Floodplain Management
- Mitigation Measures
- Damage Assessments
- Property Identification
- Flood Visualizations & Risk Communications
- CRS Map Credits
- Other Hazards

## WV Risk Explorer

View and analyze riverine flood risk at the *aggregate level* for community, county, region, watershed, and stream scales. *Compare risk* among different geographic entities, complete with risk scores and rankings, from the building level to state scales.

### Primary Components:

- Risk Maps Tool
- Risk Reports Tool
- Risk & Mitigation Dashboard Tools
- Building Level Risk Tools
- Flood Visualization Tools
- Data linkages WV Flood Tool & Hazard Library




### Applications:

- Plans (Resiliency, Emergency Operations, Hazard Mitigation)
- Risk Studies (Risk MAP, Risk Reduction, Community Focused)
- Mitigation Measures, Tracking & Monitoring
- Flood Visualizations & Risk Communications
- CRS Programming Variables
- Other Hazards



# WV Hazard Library

*Hazard Library of documents and visual media relevant to West Virginia*

WV HAZARD LIBRARY		
TOPICS	MEDIA TYPES	SEARCH TYPES
<ul style="list-style-type: none"> <li>• <b>Risk Assessment &amp; Planning</b> <ul style="list-style-type: none"> <li>○ State Risk Assessments</li> <li>○ Local Risk Assessments</li> <li>○ Planning Resources</li> <li>○ Web Tools</li> </ul> </li> <li>• <b>Mitigation</b> <ul style="list-style-type: none"> <li>○ Mitigation Measures</li> <li>○ Floodplain Mapping</li> <li>○ Floodplain Management</li> <li>○ Flood Insurance</li> </ul> </li> <li>• <b>Flood Disaster</b> <ul style="list-style-type: none"> <li>○ Flood Event</li> <li>○ Flood Research</li> <li>○ Flood Forecast</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 3D Movie</li> <li>• Bldg. Profile</li> <li>• Dashboard</li> <li>• Data</li> <li>• Flyer</li> <li>• Graphic</li> <li>• Guide</li> <li>• Letter</li> <li>• Multiple Types</li> <li>• Map</li> <li>• Metadata</li> <li>• News Article</li> <li>• Plan</li> <li>• Poster</li> <li>• Report</li> <li>• Slides</li> <li>• Story Map</li> <li>• Study</li> <li>• Survey</li> <li>• Table</li> <li>• Video</li> <li>• Viewshed</li> <li>• Web App</li> <li>• Website</li> </ul>	<ul style="list-style-type: none"> <li>• Agency</li> <li>• Downloadable Data</li> <li>• Event Disaster</li> <li>• Event Meeting</li> <li>• Geographic Scale               <ul style="list-style-type: none"> <li>○ Entity</li> </ul> </li> <li>• Media Type</li> <li>• Publication Date</li> <li>• Subject               <ul style="list-style-type: none"> <li>○ Major Group</li> <li>○ Category</li> <li>○ Subcategory</li> <li>○ <i>cross-indexing</i></li> </ul> </li> <li>• Stakeholder Type</li> <li>• Title (free text search)</li> <li>• Resource Type (learning, study, reference)</li> </ul> 





# Community Engagement

*Community Engagement modes to convey flood risk and build resiliency*

## COMMUNITY ENGAGEMENT METHODS

### **Focused Outreach Meetings**

- Risk Communications
- Risk Reduction Meetings

### **Resiliency Tools & Products**

- Risk Assessments (Detailed or Summarized)
- Mitigation Measures (Planned or Implemented)
- Flood Visualizations

### **Learning Resources & Published Reports**

- Best Practice Guides and Training Materials
- Lessons Learned
- Planning Documents
- Research and Policy Papers

*Risk information communicated via WV Risk Tools, WV Hazard Library, and other resources.*



Flood Symposium **Stakeholders**



Flood Symposium **Project Team**



# Community Engagement



White Sulphur Springs, WV (11/17/2022)



Rainelle, WV (11/18/2022)

## ■ Feedback desired from Focus Groups:

- What lessons were learned from the immediate response and longer-term recovery from the 2016 flood?
- What priorities are needed for a stronger flood response and recovery plan in the event of a future flood?

## ■ Feedback of Flood Study Products:

- Flood Characteristics and Models
- Flood Risk Assessment (vulnerability, exposure, loss)
- Mitigation Maps
- Flood Visualization Tools

# Stakeholders







# Tool Usage by Stakeholder Groups

## Stakeholder Groups of anticipated usage of Risk Tools and Hazard Library

#	Stakeholders	Property-Level Scale				All Geographic Scales	
		Property Viewer	Flood Tool			Risk Explorer Tools	Hazard Library <sup>3</sup>
			Public	Expert	RiskMAP		
1	<b>Floodplain Managers<sup>1</sup> – FM</b> (includes surveyors and engineers)	FM		FM	FM	FM	FM-Learning
2	<b>Risk Reduction Associates - RRA</b> (planners, researchers, mitigation specialists, etc.)	RRA		RRA	RRA	RRA	RRA-Studies
3	<b>Emergency Responders – ER</b>	ER			ER	ER	ER-Learning
4	<b>Local Officials</b>	Officials	Officials			Officials	Off-Learning
5	<b>Public</b> (includes realtors and insurance officials)	Public	Public				Pub-Learning
6	<b>Volunteers – Vols.</b> (VOAD, Charities, etc.)	Vols.	Vols.				Vol-Learning



Popularity of Tools<sup>2</sup> by Stakeholder Group

<sup>1</sup> **Floodplain Managers** may be representatives of other stakeholder groups such as E-911 Directors or Mayors.

<sup>2</sup> **Floodplain Managers** and **Risk Reduction Associates** stakeholders have the highest demand for flood resiliency tools.

<sup>3</sup> **All Stakeholders** benefit by using the Hazard Library which is broadly categorized into learning, study, and reference resources. The primary stakeholder group for the WV Property Viewer is the **Public**, while the main stakeholder group for WV Flood Tool is the **Floodplain Managers**, and for the WV Risk Explorer various **Risk Reduction Specialists**.