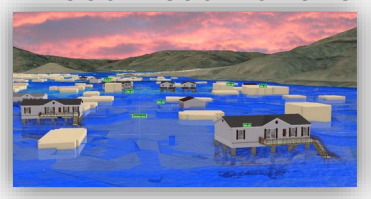
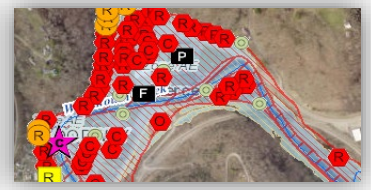
WV Flood Resiliency Framework

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

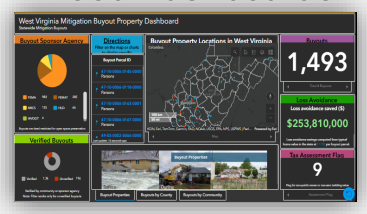
Flood Visualizations



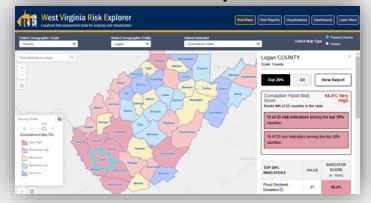
WV Flood Tool



Flood Dashboards



WV Risk Explorer



Example Risk Tools

RISK TOOLS

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

10 Geographic Scales

COMMUNITY ENGAGEMENT

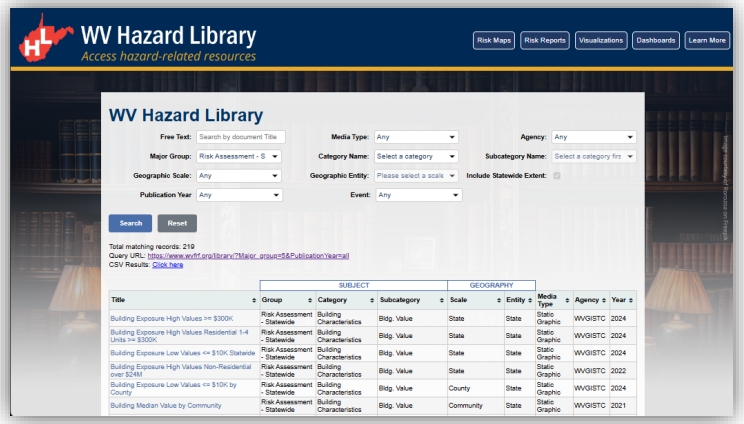
- Focused Outreach Meetings
- Flood Symposium
- Resiliency Tools & Products
- Learning Resources & Reports

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



Hazard Library

Community Engagement Meeting

Flood Symposium **Stakeholders**

Stakeholders

Tool Usage by Stakeholder Groups

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

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

Popularity of Tools [2] *by Stakeholder Group*

[1] **Floodplain Managers** may be representatives of other stakeholder groups such as E-911 Directors or Mayors.
[2] **Floodplain Managers** and **Risk Reduction Associates** stakeholders have the highest demand for flood resiliency tools.
[3] **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**.

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

WV Hazard Library

***Hazard Library** of online hazard resources including data, documents, and media searchable by title, subject, event, geography, and more.*

WV HAZARD LIBRARY

TOPICS

- **Risk Assessment & Planning**
  - State Risk Assessments
  - Local Risk Assessments
  - Planning Resources
  - Web Tools
- **Mitigation**
  - Flood Insurance
  - Floodplain Management
  - Floodplain Mapping
  - Other Mitigation Measures
- **Flood Disaster Events**
  - Flood Event
  - Flood Research

MEDIA TYPES

- 3D Movie
- Bldg. Profile
- Dashboard
- Data-GIS
- Data-Metadata
- Data-Table
- Flyer
- Graphic
- Guide
- Journal Article
- Letter
- News Article
- Picture
- Plan
- Poster
- Report
- Slides
- Social Media
- Static Map
- Story Map
- Video
- Viewshed
- Web Info
- Web Tool

SEARCH TYPES

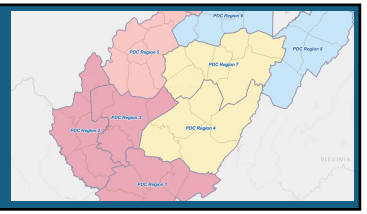
- Agency
- Downloadable Data
- Event Disaster
- Event Meeting
- Geographic Scale
  - Entity
- Media Type
- Publication Date
- Subject
  - Major Group
  - Category
  - Subcategory
  - *cross-indexing*
- Stakeholder Type
- Title (free text search)
- Predefined Searches
  - Visualizations
  - Floodplain Management Key Materials

Geographic Scales of Analytical & Visualization Tools

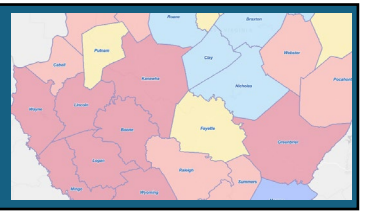
Political Boundaries

State

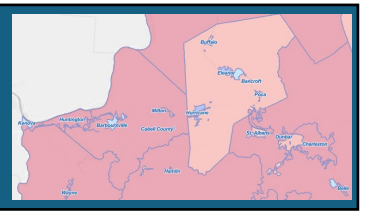
PDC Regions (11)



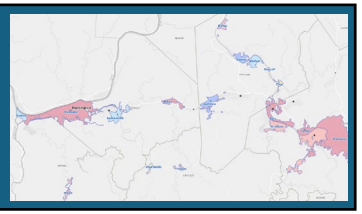
Counties (55)



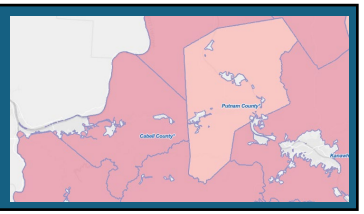
Communities (284)



Incorporated Places (229)

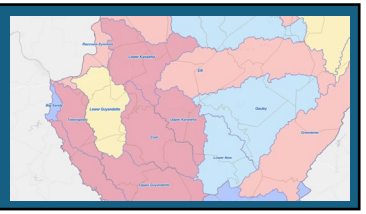


Unincorporated Areas (55)

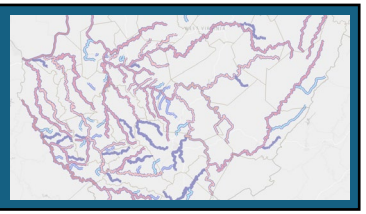


Drainage Areas / Streams

Watersheds (33)



Streams/Rivers (156)



Property Levels

Parcels

Buildings

Risk 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)
PROPERTY LEVEL								
Structures[1]	98,000	**X**	X	X	**X**	Yes	Yes	Yes
Parcels	275,000	**X**	X	X	**X**	Yes		Yes
Other Features[2]		X	**X**	X	**X**	Yes		Yes
COMMUNITY LEVEL								
Incorporated Places	211	X	X	X	X	Yes	Yes	Yes
Unincorporated Areas	55	X	X	X	X	Yes	Yes	Yes
Communities (NFIP)[3]	266	**X**	**X**	**X**	**X**	Yes	Yes	Yes
COUNTY-REGION-STATE LEVEL								
Counties	55	X	X	**X**	**X**	Yes	Yes	Yes
Regions (RPDCs)	11	X	X	**X**	X	Yes		Yes
State	1	**X**	X	**X**	**X**	Yes		Yes
DRAINAGE LEVEL								
Watersheds	32	X	**X**	X	X	Yes		Yes
Streams (named)	6,748	X	**X**	X	X	Yes	Yes	Yes

NOTES:

[1] Primary structures located in high-risk effective and advisory floodplains (1%-annual-chance flood)

[2] Other Features include roads, bridges, National Register Areas, flood mitigation structures (dams, levees, floodwalls)

[3] Total 284 communities in state: 266 NFIP; 18 incorporated places not in NFIP

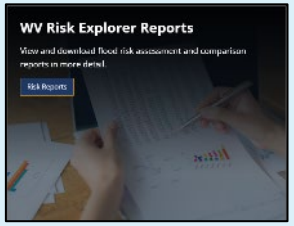
Risk Tool Types

Risk Assessment Tools

- Localized riverine flood risk assessment by quantifying and aggregating detailed building-level data at multiple scales
- Help identify the communities most at risk of riverine flooding for efficient allocation of limited mitigation resources

Building/Property-Level

Aggregated



Mitigation Assessment Tools

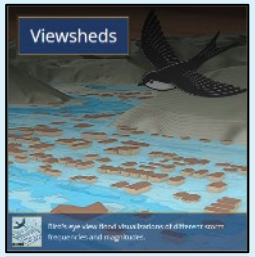
- Quantifies mitigation efforts such as elevation, relocation, and buyouts and calculation of loss estimates
- Enable planners and decision-makers to evaluate past and ongoing efforts, identify gaps, and prioritize future investments

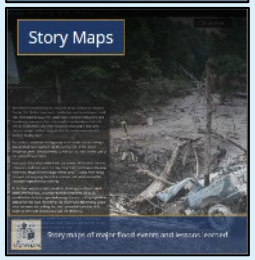
Mitigated Structures Dashboard

Open-Space Mitigation Dashboard

Risk Communication Tools

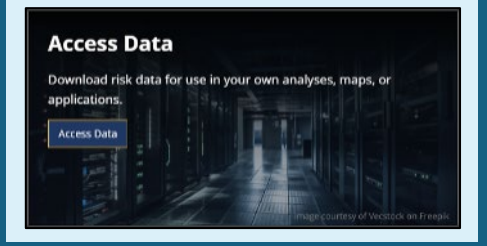
- Scenario-based 2D and 3D visualizations for effective risk communication
- Facilitate risk comprehension for various stakeholders to support informed decision-making and encourage public engagement

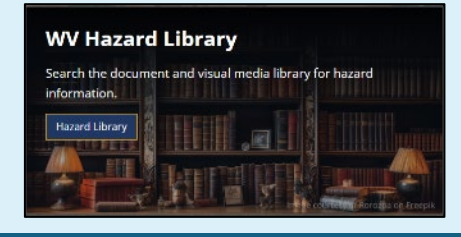




Hazard Library and Data Access Tools

- Access to online hazard resources including data, documents, and media searchable by title, subject, event, geography, and more.
- Allow users to access comprehensive datasets for use in analyses, maps, or applications to support planning, research, and decision-making related to hazard mitigation and response





WV Flood Risk Index & Factors

Overall Flood Risk

(1) FLOODPLAIN CHARACTERISTICS	(2) BUILDING EXPOSURE	(3) BUILDING CHARACTERISTICS	(4) CRITICAL INFRASTRUCTURE	(5) COMMUNITY ASSETS	(6) BUILDING DAMAGE LOSS	(7) PEOPLE / SOCIAL VULNERABILITIES	(8) OTHER HAZARDS
Floodplain Area	Building Floodplain Count[1,2]	Building Value[1,2]	Essential Facilities	Historical Assets	Substantial Damage Estimates*[1,2]	Population in Floodplain	Landslides
Floodplain Length[1,2]	Building Floodway Count[1,2]	Mobile Homes	Roads Inundated	Non-Historical Assets	Previous Claims	Population Displaced	Karst**
Floodplain Depth[1,2]	Building Floodplain Ratio[2]	Basement			Repetitive Losses	WV Social Vulnerability Index	Dam/Levee Failure**
Flood Disaster Frequency	Building Density[1,2]	One Story					
		Building Year*					

Used for the Index

* Multiple Indicators ** In Progress [1] River/Stream Indicator [2] Watershed Indicator

WV Risk Tools & Risk Factors

***Analytical & Visualization Tools** at multiple scales*

WV RISK TOOLS	
2 KEY FLOOD RISK TOOLS	**10 GEOGRAPHIC SCALES**
<< Aggregate & Property Levels >> • **WV Risk Explorer** ○ Risk Maps ○ Risk Reports ○ Bldg. Risk Tools ○ Dashboards ○ Visualizations ○ Data Access --- *<< Property Level >>* • **WV Flood Tool** ○ WV Property Viewer	*<< Political Boundaries >>* 1) State 2) Region 3) County 4) Community 5) Incorporated Place 6) Unincorporated Area --- *<< Drainage Areas / Streams >>* 7) Watershed 8) Stream/River --- *<< Property Levels >>* 9) Parcel 10) Building

***Risk Factors** for riverine hazard assessments*

WV RISK FACTORS	
RISK INDICATORS	**ENVIRONMENTS**
• Floodplain Characteristics • Building Exposure • Building Characteristics • Critical Infrastructure • Community Assets • People/Social Vulnerabilities • Other Hazards	• Physical (Flood Factors, Topography, Hydrology, Hydraulics) • Human (People) • Social • Economic • Institutional • Manmade (Buildings, Roads)

Risk Tools Comparison

WV Flood Tool	WV Risk Explorer
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.	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: • Public View • Expert View (Floodplain Management) • RiskMap View (Risk Reduction) • Reference Layers & Basemaps • Property Search Tools • Links to External Viewers & Resources	Primary Components: • Risk Maps Tool • Risk Reports Tool • Risk & Mitigation Dashboard Tools • Building Level Risk Tools • Flood Visualization Tools • Data linkages to WV Flood Tool & Hazard Library
Applications: • Flood Risk Determinations at Property Level • Floodplain Management • Mitigation Measures • Damage Assessments • Property Identification • Flood Visualizations & Risk Communications • CRS Map Credits • Other Hazards	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