WV FLOOD RISK ASSESSMENT

Schema of Risk Data Layers

D-R-A-F-T

NOVEMBER 27, 2019

WV GIS TECHNICAL CENTER
In support of FEMA HMGP Project

Contents

Community's Exposure to Hazards

Community Profile

Community Profile	Data Field name	Primary Data Source	Scale Level
• Community Identifier	CID	FEMA	CID
• Community Name			CID
• County		FEMA	CID
• Incorporated / Unincorporated			CID
• WV RPDC Region			CID
• Freeboard Amount		WV NFIP	CID
• Building Code Standard			CID
• Community Rating System Class	CRS Class	Community Status Book	CID
• Total Population		Census	CID
• Total Community Area			CID
• Area of SFHA (aSFHA); NSFHA community	aSFHA (mSFHA)	FRAGIS	CID
• Buildings in SFHA (bSF)	bSF	FRAGIS	CID
• Building in High Risk Advisory Zones	bHRAFZ	FRAGIS	CID
• Critical Facilities (high and moderate risk zones)	bCF	FRAGIS	CID
• Total Building Exposure in Dollars ($) in SFHA		FRAGJS	CID
• NFIP Status (Participating/Not Participating/No Status)		FEMA CSB	CID

FIRM Dates and Maps

FIRM Dates and Maps	Data Field name	Primary Data Source	Scale Level
• What is the date of the community's first Flood Insurance Rate Map? The date is important for the dividing line between the two building categories Pre-FIRM and Post-FIRM.	Init FIRM Identified	FEMA Community Status Book	CID
• What is the *Dividing Line Date* between the Pre-FIRM and Post-FIRM?	Dividing Line Date	CSB	CID
• What is the date of your currently effective Flood Insurance Rate Map (FIRM)?	Initial FIRM Date of Community	FEMA	CID
• Number of structures in High-Risk Flood Zones are Pre-FIRM, Post-Firm, Unknown?	IAS Year	Assessment	Bldg.

Demographics

Community Demographics	Data Field name	Primary Data Source	Scale Level
Area			
• Area of Community	Area_Sqmi	GIS calculated	CID
Population			
• Population Total	Population_Total	2017 Census ACS	CID
• Population Density	Population_Density		CID
Households			
• Households Total	Households_Total	2017 Census ACS	CID
• Average Household Size	Average_Household_Size	2017 Census ACS	CID
Income			
• Per Capita Income	PerCapita_Income	2017 Census ACS	CID
• Median Household Income	Median_Household_Income	2017 Census ACS	CID
• Percent below State Median Income	Percent_below_State_Median_Income	2017 Census ACS	CID
Residential Housing			
• Occupied Residential Units	Occupied_Res_Units	2017 Census ACS	CID
○ Owner Occupied Residential	Owner_Occupied_Res	2017 Census ACS	CID
○ Renter Occupied Residential	Renter_Occupied_Res	2017 Census ACS	CID
• Vacant Residential Units	Vacant_Res_Units	2017 Census ACS	CID
Spending on Housing			
• % of households spend 30% or more of their income on housing	Percent_Spending_atleast_30pct_on_Housing	2017 Census ACS	CID
Age			
• Age_pct_Under_15	Age_pct_Under_15	2017 Census ACS	CID
• Age_pct_15_64	Age_pct_15_64	2017 Census ACS	CID
• Age_pct_65_over	Age_pct_65_over	2017 Census ACS	CID

Total Steam Miles

Total Steam Miles	Data Field name	Primary Data Source	Scale Level
• Total Stream Miles	Flood Zone Type	NHD & NFHL	CID
• Percentage of detailed zones (AE, AO, AH)?	Flood Zone Type	NHD & NFHL	CID
• Percentage of Approximate A Zones?	Flood Zone Type	NHD & NFHL	CID

Total Acreage of Flood Zones

Total Flood Zone Acreage	Data Field name	Primary Data Source	Scale Level
• SFHA Acreage. Percent Detailed and Approximate A	Flood Zone Type	NFHL	CID
• Non-Regulatory Layers: Preliminary, Updated AE, Advisory A	Flood Zone Type	Non-Regulatory	CID
• X Zone: 500-year (Shaded X) and Protected Levee Zone (X)	Flood Zone Type	NFHL	CID

Historical Flooding

Historical Flooding	Data Field name	Primary Data Source	Scale Level
• Number of Food-related Presidential Disaster Declarations (County Level)		FEMA	County
• USGS High-Water Marks		USGS	HW Point, CID
• Other past flooding or stormwater problem areas		Community	

Building Exposure Community-Wide

Structure Estimates for Entire Community	Data Field name	Primary Data Source	Scale Level
• Total estimated number of structures in your community?	E-911 Sites or Bldg. Footprints	E-911 Sites	Bldg.
• Total estimated value of structures in your community? (Total Exposure in Community)	IAS Building Appraisal Value	Assessment	Parcel
• What is the breakdown of these structures?			
○ Breakdown by Property Class? (Residential, Farms, Commercial, Industrial, Utility, Exempt)	IAS Property Class	Assessment	Bldg.
○ Percentage of these that are commercial or non-residential	Property Class	Assessment	Bldg.

Flood-Risk Structures

High-Risk Regulatory SFHA and Floodway (Red Colored Warning Zones)

Structures in Flood Zones	Data Field name	Primary Data Source	Scale Level
• Total number of structures in your **high-risk regulatory** A zones of SFHA? Total building value exposure? • Total number of structures in r**egulatory floodway**? Total building value exposure? These red-colored zones on the WV Flood Tool are AE, AO, AH, and Approximate A.	bSF	FRAGIS	Bldg.

High-Risk Advisory Zones (Orange Colored Warning Zones)

Structures in Flood Zones	Data Field name	Primary Data Source	Scale Level
• Total number of additional structures mapped in **high-risk advisory zones**? These orange-colored zones on the WV Flood Tool indicate Preliminary Studies, Advisory A, and Updated AE. Total Building Value Exposure?	bHRAZ	FRAGIS	Bldg.

Moderate-Risk Zones (Yellow Colored Warning Zones)

Structures in Flood Zones	Data Field name	Primary Data Source	Scale Level
• Total number of structures mapped in **moderate risk zones**? These yellow-colored zones on the WV Flood Tool include the 0.2 Percent Annual Chance Zone (Shaded X, 500-year) and Area with Reduced Flood Risk due to Levee (X Zone, Levee-Protected)	bCF	FRAGIS	Bldg.

High Risk Flood Zones

Building Exposure Characteristics

Building Exposure Values, Occupancy Class, and Foundation Type of Structure in Flood High Hazard Areas (Red and Orange Zones on WV Flood Tool)	Data Field name	Primary Data Source	Scale Level
Structures in High-Risk Regulatory & Advisory Flood Zones (Total Exposure in Floodplain Version 3.0)			
• Total number of structures in high-risk A Zones?	bSF + High Risk Advisory	FRAGIS	Bldg.
• Total value of structures exposed in high-risk A zones?	IAS Building Value	FRAGIS, Assessment	Bldg.
Occupancy Class			
• Breakdown by Hazus Occupancy Class/Land Use (Residential, Agriculture, Commercial, Industrial, Education, Government, Religious)	IAS Land Use, Hazus Occ. Class	Assessment	Bldg.
Residential versus Non-Residential			
• Number and percentage of Residential	Occup. Class	Assessment	Bldg.
• Number and percentage of Non-Residential	Occup. Class	Assessment	Bldg.
Residential Unit Types			
• Percentage of these that are 1-4 family residential structures	RES1 to RES3B	Assessment	Bldg.
○ Single Family Dwelling	RES1	Assessment	Bldg.
○ Mobile Home	RES2	Assessment	Bldg.
○ Multi Family Dwelling – Duplex	RES3A	Assessment	Bldg.
○ Multi Family Dwelling – 3-4 Units	RES3B	Assessment	Bldg.
• Percentage of these structures that are multifamily (5 or more families)	RES3C to RES6	Assessment	Bldg.
○ Multi Family Dwelling – 5-9 Units	RES3C	Assessment	Bldg.
○ Multi Family Dwelling – 10-19 Units	RES3D	Assessment	Bldg.
○ Multi Family Dwelling – 20-49 Units	RES3E	Assessment	Bldg.
○ Multi Family Dwelling – 50+ Units	RES3F	Assessment	Bldg.
○ Temporary Lodging	RES4	Assessment	Bldg.
○ Institutional Dormitory	RES5	Assessment	Bldg.
○ Depository Institutions	RES6	Assessment	Bldg.
Basements in Floodplain			
• Foundation Type			
○ Full	Fdtn Code = 4	Assessment	Bldg.
○ Crawl	Fdtn Code = 5	Assessment	Bldg.

Building Exposure Values, Occupancy Class, and Foundation Type of Structure in Flood High Hazard Areas (Red and Orange Zones on WV Flood Tool)	Data Field name	Primary Data Source	Scale Level
○ Slab	Fdtn Code = 7	Assessment	Bldg.
○ Pile or Pier	Code = 1 or 2	Assessment	Bldg.
○ Other	Code 3, 6	Assessment	Bldg.
○ Unknown	No Code Value	Assessment	Bldg.

Population and Ownership

Population and Ownership of Structure in High-Risk Zones (Red and Orange Zones on WV Flood Tool)	Data Field name	Primary Data Source	Scale Level
Residing Population			
• Total Community Population	Population_Total	2017 Census ACS	CID
• Average Residential Household Size	Average_Household_Size	2017 Census ACS	CID
• Population residing in High-Risk Flood Zone		RES? x HHS	Bldg. summed to CID
• Percentage of Community Population residing in high-risk Flood Zone		Calculated	CID
Owner Occupied			
• Percentage of Owner-Occupied Homes	Tax Class 2	Assessment	Bldg.

Stream Names Building Counts and Values

Steam Names	Data Field name	Primary Data Source	Scale Level
Building Counts by Stream Name		Stream Query Layer	Bldg.
Building Values by Stream Name		Stream Query Layer	Bldg.

Water Depth Models

Physical Damage Building Impact

Hazus Building Impact Damage Estimates – Physical Damage Direct Economic Costs	Data Field name	Primary Data Source	Scale Level
• ***Building, Content, Inventory Damage Loss Estimates*** • ***Building Debris Removal Amounts*** • ***Building Maximum Restoration***			
○ Depth in Structure	Depth_in_Struc	FAST	Bldg.
○ Occupancy ID	SOID	FAST	Bldg.
○ Building Damager Percent	BldgDmgPct	FAST	Bldg.
○ Building Loss $	BldgLossUSD	FAST	Bldg.
○ Content Cost $	ContentCostUSD	FAST	Bldg.
○ Content Damager Percent	ContDmgPct	FAST	Bldg.
○ Content Loss $	ContentLossUSD	FAST	Bldg.
○ Inventory Cost	InventoryCostUSD	FAST	Bldg.
○ Inventory Damager Percent	InvDmgPct	FAST	Bldg.
○ Inventory Loss	InventoryLossUSD	FAST	Bldg.
○ Debris Finished	Debris_Fin	FAST	Bldg.
○ Debris Structure	Debris_Struc	FAST	Bldg.
○ Debris Foundation	Debris_Found	FAST	Bldg.
○ Debris Total	Debris_Tot	FAST	Bldg.
○ Restore Days Minimum	Restor_Days_Min	FAST	Bldg.
○ Restore Days Maximum	Restor_Days_Max	FAST	Bldg.
○ Grid Name	GridName	FAST	Bldg.
• ***Occupancy Class***	HazOcc	FAST	Bldg.
• ***Residential versus Non-Residential***	SOID	FAST	Bldg.
• ***Substantial Damage Estimates*** classification of Building Damage Percent? See SDE damage estimates Appendix E Residential and Appendix F Non-Residential		FAST	Bldg.
○ 0 – 25%		FAST	Bldg.
○ 25 – 50%		FAST	Bldg.
○ >= 50%		FAST	Bldg.
• Model Input Issues (Depth grid sources, verification of first-floor heights)		Depth Grid FFH	Bldg.
• Building Impact Model Summaries by Community			
○ Building Count		FAST	CID
○ Total Building Loss ($)		FAST	CID
○ Total Building Exposure ($)		FAST	CID
○ Percent of Total		FAST	CID
○ Loss Ratio		FAST	CID
○ Total Debris (tons)		FAST	CID
SDE Appendix E Guidance for Estimating Percent Damage for **Residential** Structures SDE Appendix F Guidance for Estimating Percent Damage for **Non-Residential** Structures			

Population Displacement

Population Displacement & Short-Term Shelters	Data Field name	Primary Data Source	Scale Level
Population			
• Population in High-Risk Effective and Advisory Flood Zones			Bldg.
• *Population Displacement*			
• Estimated Displaced Population (Inundation >-= 1 Foot)?			Bldg.
• Percentage of Population in Flood Zones Displaced			Bldg.
○ Number of households with inundation water depth >= 1 foot		Assessment Occ. Class	Sum of Bldgs.
○ Estimated People per household?		Census	CID
• *Short-Term Shelter Needs*			
• Estimated Population in Need of Short-Term Shelter (10% of total population displacement)		Jefferson Co. Model	CID
• Percentage of Population in Flood Zones in Need of Shelter			CID
• Companion Pets Shelter Needs?			
○ Number of households with Depth Grid > 1 foot			
○ Dogs? (38% of households)		AVMA	CID
○ Cats? (25% of households)		AVMA	CID
• Model Input Issues		Depth Grid FFH	Bldg.
https://www.avma.org/KB/Resources/Statistics/Pages/Market-research-statistics-US-pet-ownership.aspx https://ebusiness.avma.org/productcatalog/product.aspx?ID=1531			

Future Map Conditions

Future Map Conditions	Data Field name	Primary Data Source	Scale Level
• Total **High-Risk Advisory Structures**. Does your community have high risk advisory zones (orange zones on the WV Flood Tool) that have been mapped? High Risk orange zones include Preliminary Studies, Advisory A, and Updated AE Zones)	Flood Zone Type	Stacked Flood Layers	Bldg.
• Future Map Conditions (High Risk Advisory Zones) ○ Structures Mapped in SFHA (potential high flood risk structure) ○ Structures Mapped Out SFHA (structure may qualify for LOMA) ○ No Change SFHA ○ Regulatory Floodway	Flood Zone Type	Stacked Flood Layers	Bldg.
• High Risk – Regulatory versus Non-Regulatory ○ Preliminary NFHL ○ Advisory A	Flood Zone Type	Stacked Flood Layers	Bldg.

Critical Facilities

Critical Facilities	Source	Primary Data Source	Scale Level
Total number of **critical facilities** located in high and moderate risk flood zones?			
Essential facilities			
○ 911 Centers	WVDHSEM	911 Centers	Bldg.
○ Fire Stations	WVDHSEM	Fire Stations	Bldg.
○ Hospitals	WVDHSEM	Hospitals	Bldg.
○ Nursing Homes	WVDHSEM	Nursing	Bldg.
○ Police Departments	WVDHSEM	Police	Bldg.
○ Schools (university buildings?)	WVDHSEM, WVDE	Schools	Bldg.
○ List other essential or critical facilities?			
Community Assets			
○ Historical structures		Historical	Bldg.
○ Government facilities (Federal, State, Local)	BRIM, Reference USA, WV Real Estate	Govt	Bldg.
○ Religious organizations	Reference USA, GNIS	Religious	Bldg.
○ List other essential or critical facilities?			

Most Vulnerable Building Lists (Top 10 Lists)

High Risk Building Lists (Top 10 Lists)	Data Field name	Primary Data Source	Scale Level
High Building Exposure in Floodplain			
○ Building Appraisal Value		FRAGIS	Bldg.
○ Occupancy Class (residential versus non-residential)		FRAGIS	Bldg.
○ Floodway (buildings may be subject to high velocities)		FRAGIS	Bldg.
○ Building Year / Pre-FIRM / Post-FIRM		FRAGIS	Bldg.
○ Basement Type		FRAGIS	Bldg.
Floodway Exposure Report			
○ Building Appraisal Value		FRAGIS	Bldg.
○ Occupancy Class (residential versus non-residential)		FRAGIS	Bldg.
○ Building Year / Pre-FIRM / Post-FIRM		FRAGIS	Bldg.
○ Basement Type		FRAGIS	Bldg.
Building Impact Hazus Flood Loss Models			
○ Building Damage Percent ($)		FRAGIS	Bldg.
○ Substantial Damage Classification		FRAGIS	Bldg.
○ Building Appraisal Value		FRAGIS	Bldg.
○ Building Damage Loss ($)		FRAGIS	Bldg.
○ Building Appraisal Value		FRAGIS	Bldg.
○ Occupancy Class		FRAGIS	Bldg.
○ Building Year / Pre-FIRM / Post-FIRM		FRAGIS	Bldg.
○ Floodway		FRAGIS	Bldg.
○ Basement Type		FRAGIS	Bldg.
New Development in Floodplain			
○ Post-FIRM / Building Year		FRAGIS	Bldg.
○ Building Appraisal Value		FRAGIS	Bldg.
○ Floodway		FRAGIS	Bldg.
○ Building Damage Model Outputs		FRAGIS	Bldg.
○ Basement Type			
Critical Facilities			
○ Post-FIRM / Building Year		FRAGIS	Bldg.
○ Building Appraisal Value		FRAGIS	Bldg.
○ Floodway		FRAGIS	Bldg.
○ Building Damage Model Outputs		FRAGIS	Bldg.
○ Basement Type		FRAGIS	Bldg.
Lowest Floor below BFE			
• Base Flood Height		FRAGIS	Bldg.
• First Floor or Lowest Floor Height		FRAGIS	Bldg.
• Basement		FRAGIS	Bldg.

Repetitive Loss Properties

<table>
<tr><th>Repetitive Loss Properties</th><th>Primary Data Source</th><th>Scale Level</th></tr>
<tr><td>

Repetitive Loss BUILDINGS

- Do you have repetitive loss BUILDINGS in your community?
- How many repetitive loss buildings are in the SFHA? Outside the SFHA?

See FEMA's definition of repetitive loss properties here.

The analysis of repetitive loss (RL) properties should be community priorities for mitigation and outreach efforts. A RL analysis makes for stronger hazard mitigation plan, validates building impact flood models, factor for buyout and acquisition, and pre-requisite for CRS Community and CRS Credits

If there are one or more repetitive loss properties in the community, the community should take certain actions to include reviewing and updating the list of repetitive loss properties, mapping repetitive loss areas, describing the causes of the losses, and sending an outreach project to those areas each year. A community with 50 or more repetitive loss properties must also prepare a repetitive loss area analysis or floodplain management plan that addresses its repetitive flood problem.
</td><td>RL List</td><td>Bldg.

CID</td></tr>
<tr><td>

Repetitive Loss AREAS

- How many repetitive loss AREAS do you have in your A zones? What is the total number of buildings in these areas?
- How many rwepetitive loss AREAS do you have in your B, C, and X zones? What is the total number of buildings in these areas?

The community defines Repetitive Loss Areas as buildings on FEMA's RL list and nearby buildings that are subject to the same flood hazard.
</td><td>RL map points</td><td>Area

CID</td></tr>
<tr><td>

Severe Repetitive Loss Properties

How many severe repetitive loss properties do you have in your A zones? How many severe repetitive loss properties do you have in your B, C, and X zones?
</td><td>RL</td><td>CID</td></tr>
</table>

Dams and Levees

Dams and Levees	Data Field name	Primary Data Source	Scale Level
• Could your community be impacted by the failure of a high hazard potential dam* (in or outside of your community)? • Who owns and maintains the dam? • What is the hazard category of the dam?	Dams	NID, Dam Safety Office	Point CID
• Does your community have levees,* a levee system,** or could it be impacted by a levee failure? • What is the levee certification status?	Levees	FEMA, USACE	Line CID
• Do you have dam/levee failure inundation maps that include water arrival times, peak water depths, and building inventories affected by a breach?		FEMA, USACE, Dam Safety	

Transportation Infrastructure

Transportation Infrastructure	Data Field name	Primary Data Source	Scale Level
Transportation Exposure			
• Total miles of Roads			County
○ Total miles or roads in flood high hazard areas			County
○ Total miles flooded to total county mileage			County
• Total miles of railroads			County
○ Total miles of railroads in flood high hazard areas			County
○ Total miles flooded to total county mileage			County
• Total number of bridges			County
○ Total number of bridges in flood high hazard areas			County
○ Percent total flooded to total county			County
Water Depth Inundation Models **Highways** **Railroads** **Bridges**			
• Water Depth Model (Below 1 ft., 1 to 3 ft., above 3 ft.) (Flooded miles and percentage)		Water Depth	County
○ Highways (US Routes, WV Routes, Other Roads)		Railroads	County
○ Railroads		Roads	County
• Bridge Water Depth Model (bridge count and percentage)		Bridges	County
○ Inundated			
○ Non-Inundated			
• Source model water depths		Water Depths	County
Community Recorded Notes			
• Community notes on repetitive flooding of highways and bridges		Community	

Undeveloped Areas

Open Space Preservation

Open Space Preservation	Data Field name	Primary Data Source	Scale Level
• What is the area of your total SFHA?	aSFHA	FRAGIS	CID
○ What is the area of your SFHA minus large water bodies and federal lands?	Modified aSFHA (mSFHA)	FRAGIS	CID
○ Percentage of open space preservation	aOSP		CID
○ Percentage of community area	aSFHA / CID Area		CID
• Land Use in SFHA? Community-wide? Developed versus undeveloped?			CID
○ Developed – Assessment Data (Residential, Agricultural, Commercial, Industrial, Religious) and Land Cover (impervious surfaces)	Occup. Class	FRAGIS Land Cover	Parcel
○ Undeveloped – Assessment Data and Land Cover (pervious surfaces)	IAS Building App. Val.	Assessment Land Cover	Parcel
• Open space preservation (OSP)? What open space lands protected from future development? Is your community's floodplain used for hunting, fishing, or recreational uses such as golf courses or summer camps? CRS 420 (OSP)	Protected Lands (PAD-US)	FRAGIS	Parcel CID
○ Total area of parcels preserved as open space (OSP) in SFHA	aOSP, aPublic, aPrivate, aDR	Public Lands, Private Lands, Deed Restricted	Parcel
○ Deed Restricted (DR) in SFHA	aDR	Buyout Properties	Parcel
○ Natural Functions	aNFOS	R & E Species	Parcel

Natural Floodplain Functions

Natural Floodplain Functions	Data Field name	Primary Data Source	Scale Level
• Does your community have wetlands, threatened and/or endangered species habitat, and/or other areas deserving protection for their natural floodplain functions? Is your community's floodplain used for hunting, fishing, or recreational uses?			
○ Wetlands (acreage) in SFHA?		Wetlands	Feature
○ Riparian areas in SFHA?		Riparian Zones	Zonal
○ Number of threatened and/or endangered species in SFHA?		aSFHA / CID Area	Feature Buffer

Reducing Flood Losses to Existing Development

Repetitive Loss Properties	Primary Data Source	Scale Level
### Mitigated Buyout Properties • How many property parcels have been acquired or relocated? • What percentage in the SFHA?	Mitigated Properties aDR, rDR	Parcel
### Primary Buildings Acquired or Relocated How many flood-prone buildings have been acquired or relocated out of harm's way? • Total properties removed from the SFHA? How many of these properties were Repetitive Loss (bRL) or Severe Repetitive Loss (bSRL)? • What is ratio of building acquired or relocated in SFHA to bSF? • Total number of Repetitive Loss (bRL) or Severe Repetitive Loss (bSRL) buildings removed from anywhere in the community, including outside the regulatory floodplain? • How many critical facilities removed from the SFHA or 500-yer flood zones?	bAR, bRL, bSRL, bCF,	Building

Paid Claims and Flood Insurance

Paid Claims and Flood Insurance	Data Field name	Primary Data Source	Scale Level
### Paid Claims			
• Total Number of Paid Losses (Total Paid Claims)		FEMA	CID
• Total Paid Losses Dollar Amt. Previous Claims		FEMA	CID
• Paid Claims Outside the Effective Flood High Hazard Area (SFHA)		FEMA	CID
### Flood Insurance			
• Number of flood insurance policies in force		FEMA	CID
• Number of Pre-FIRM Policies		FEMA	CID
• Percent of SFHA Structures Without Flood Insurance (County Level>)		FEMA	CID
• Community-Owned Buildings Requiring Flood Insurance. If a community received funding for a structure and flood insurance was a requirement of the funding, the community must carry the flood insurance. See CRS Coordinator's Manual.			BLDG

Flood Information Data

Quality of Flood Information

Quality of Flood Information	Data Source	Scale Level
Flood Height Grids? The Base Flood Elevation, or BFE, is the height of the base (1-percent-annual-chance) flood also known as the 100-year flood. Available base flood height information is displayed in the flood results query panel on the WV Flood Tool. Base Flood Elevations (BFEs) are the regulatory elevation requirement for flood proofing structures and for determining flood insurance premiums. Ongoing statewide mapping initiatives are creating gridded water surface elevation for both detailed AE and Approximate A zones. • What percentage of your detailed AE zones have gridded Base Flood Elevations displayed on the WV Flood Tool? • What percentage of your Approximate A zones have base flood elevations known as Advisory Flood Heights displayed on the WV Flood Tool?	BFE AFH	Bldg. CID
Depth Grids? The Flood Depth Grid on the WV Flood Tool helps your community better understand the severity of funding at a given location through 3D flood visualizations and building impact damage models for a 1-percent-annual-chance flood event (also known as the 100-year flood). Flood depth grids generated using engineering modeling software like HEC-RAS are more accurate than Hazus-software generated grids. • What percentage of your high-risk flood zones have model-backed depth grids? Only partial coverage of model-backed depth grids for State. Sources are RiskMAP restudies, Non-restudies Updated AE, and model-backed Advisory A studies.	HEC-RAS Hazus	Bldg. CID

Map Revisions

Map Revisions	Primary Data Source	Scale Level

Map Revisions?
 	
• Are you keeping your FIRM up to date? Keep track of LOMCs?
  ○ LOMCs FRAGIS
  ○ LOMCs FEMA Database
 	
This includes revisions for new subdivisions, annexations, letters of map change (LOMAs and LOMRs)? LOMAs that exclude buildings from the regulatory floodplain should be dropped from your buildings count (bSF). It is important for communities submit annexation changes through the Census Boundary Annexation Survey (BAS) program.
	LOMCs
	
	Community Boundary File
		Bldg.
		
		Parcel
		
		CID

Quality of Reference Layers for Identifying Flood Structures

Quality of Reference Layers for Identifying Flood Structures	Primary Data Source	Scale Level

Reference Layers? GIS reference layers are important for identifying and pinpointing at-risk structures in flood zones.
 	
• What is the quality of your GIS reference layers?
  ○ Leaf-off aerial imagery
  ○ Parcels and assessment attributes
  ○ E-911 Addresses
	Imagery
	
	Parcels / Assessment
	
	Addresses
		Bldg. or Parcel.
		
		CID

Flood Risk Values

Flood Risk Values (useful for Mitigation Calculators and Flood Visualizations)	Data Field name	Primary Data Source	Scale Level
Base Flood Heights			
○ Detailed AE / AO / AH Zones (BFE grid values)		BFE Grid	Bldg.
○ Approximate A Zones (Advisory Flood Heights)		AFH Grid	Bldg.
Depth Grid			
○ HEC-RAS model-backed (more accurate).		HEC-RAS Depth	Bldg.
○ Hazus software generated (less accurate)		Hazus Depth	Bldg.
First Floor Elevation			
○ Ground Elevation		DEM Grid	Bldg.
○ First Floor Height		Assessment or User-Defined	Bldg.
Lowest Floor Elevation Below BFE			Bldg.
○ Base Flood Elevation			Bldg.
○ First Floor Height			Bldg.
○ Basement Information (below-grade or below ground)			Bldg.
If the structure is below the BFE, particularly if it has a below-grade (below ground) crawl space or basement, the risk of flooding for that structure is high and flood insurance rates will be accordingly high.			
• **Source Data Limitations**			

Public Outreach

### Flood Protection Information • Are you posting Elevation Certificates, real-time gage information, and flood protection messages conveyed under Activity 330 (Outreach Projects) on your community website? A community can receive credit for a county or regional website, provided that there is a link from the community's website and that the information is locally pertinent (see Example 352.c-1). See Louisville's community website (CRS Class 3), Jefferson County's website (CRS Class 6), or Georgia CRS 300 Series Toolkit examples. https://www.effinghamcounty.org/309/Special-Flood-Hazard-Information ### Elevation Certificates • How many Elevation Certificates have been published to WV Flood Tool? For flood data maintenance activities and to enter the CRS program, communities must maintain Elevation Certificates on all new buildings and substantial improvements constructed in the Special Flood Hazard Area (SFHA).	Elevation Certificates Real-time Stream Gages Other Flood Protection Informatio n (CRS 300 Series)	Bldg. CID

Story Maps

Floods **Flood Risk in West Virginia: What We Learned from the June 2016 Flood** https://wvu.maps.arcgis.com/apps/Cascade/index.html?appid=32292859b21b44e99c0be706f6da8aa3 **2016 Flood: WV Flooded Towns, June 2016.** The Historic Flooding of Southern West Virginia on June 23, 2016 https://wvu.maps.arcgis.com/apps/Cascade/index.html?appid=7b98379452094cd6827dc8f09c8293bd **1985 Flood: The Historic WV Flooding of November 4-5 1985** https://wvu.maps.arcgis.com/apps/Cascade/index.html?appid=8c8fd107215443b98dbd61252a9c6c40
Landslides **Causes of Landslides in Mountain State, West Virginia** https://arcg.is/1SW0Sn **West Virginia Landslides and Slide Prone Areas, WVGES 1976**. An online Story Map of the landslide risk assessment published in 1976 by the WV Geological and Economic Survey that was funded by the Appalachian Regional Commission. https://arcg.is/1KDnvq

Landslide Hazard Risks

Landslide Hazard Risks	Data Field name	Primary Data Source	Scale Level
Landslide Incidences • Number of Landslide Incidences mapped using LiDAR elevation		Landslide Database	Point
Slide Type		Landslide	
○ Slide		Landslide	Point
○ Debris Flow (flood related)		Landslide	Point
○ Multiple Failures		Landslide	Point
○ Lateral Spread		Landslide	Point
○ Rock Fall		Landslide	Point
○ Undetermined		Landslide	Point
Landslide Buyout Properties		Buyout	Point

APPENDIX A: Local Hazard Mitigation Plan Framework

- 287 communities: 232 incorporated cities (8 split communities), 55 unincorporated counties
- Abbreviated CRS Self-Assessment (2-pages) for all communities. Utilize SurveyMonkey.com.
- CRS Floodplain Management Plan for communities with advanced flood management programs
- Supplemental flood risk and landslide reports for local HMP's.
  - Flood risk layers integrated with WV Flood Tool
  - Landslide susceptibility layers with WV Landslide Inventory Tool
  - Data verification maps and tables for local floodplain managers and other community officials. Field Data Tool.
  - Public outreach web pages

- Challenges
  - Partial depth coverage of model-backed depth grids. Flood zones with no depth grids.
  - Water Surface Elevation Grids for Detailed Zones

APPENDIX B: Flood Risk Layers on WV Flood Tool

	Flood Risk Assessment GIS Layers
1	Bldg. Damage Percent*
2	Bldg. Damage Dollar Value*
3	Bldg. Debris Removal*
4	Bldg. Restoration Time*
5	Bldg. Population Displacement*
6	Short-Term Shelter Needs* (mapped at community scale)
7	Bldg. Future Flood Zone Conditions: (Floodway, No Change SFHA, Map in SFHA, Map Out SFHA)
8	Essential Facilities (Fire Stations, Police Stations, E-911 Offices, Hospitals, Nursing Homes, and Schools)
9	Community Points of Interest (Religious Organizations, Historical, Government Facilities)
10	Dams (Hazard Level High, Significant, Low, Undetermined)
11	Open Space Preservation
12	Transportation Infrastructure Flood Risk Assessment (Highways and Bridges)
	* = FEMA's OpenHazus Flood Risk Assessment Utility (FAST) modified by WVU for population displacement/short-term shelter needs