WEBSITE STRUCTURE: WV Flood Resiliency Framework  
D-R-A-F-T Concept

1. **HOME.** WV FLOOD RESILIENCY FRAMEWORK / Landing Page
   1. Description. The WV Flood Resiliency Framework includes analytical tools that show which areas of the state are at most risk to riverine flooding as well as which areas reveal higher levels of mitigation measures associated with flood reduction efforts. A suite of six interactive tools identify and quantify riverine flood resiliency factors at nine different geographic levels that range between from the building-level to state-level units of analyses. Besides descriptive statistics of the “hazard risk,” these risk analytical tools answer the questions “what is at risk,” “the degree of risk,” and “what has been mitigated.”
   2. Purpose. These tools can support mitigation planning, emergency management, resilience building, response and recovery, as well as FEMA’s National Flood Insurance Program (NFIP) and Community Rating System (CRS) programs. Public-facing flood risk products include maps to explore, reports, community dashboards, downloadable data, etc.
   3. Methodology.
      1. Scoring, Ratings, Rankings, Index. More than 50 flood indicators are organized into the following major groups: hazard characteristics, physical/human exposure, physical loss/human impacts, and mitigation. For aggregate level analysis, values of the risk indicators are represented by its percentile ranking between 0 and 100, by which a qualitative vulnerability rating describes comparisons to other geographies at the same level, ranging from “Very Low” to “Very High.” For example, if a given community’s percentile for a flood indicator type is 93.5%, a “Very High” rating, then its risk index value is greater than 93.5% of all other communities in the state. The tool ranks most of the risk assessment factors using percentiles. Percentiles show how much each geographic unit experiences compared to similar geographies. Certain resiliency indicators use a simple yes/no instead of percentages. Risk indicators are highlighted if the geographic unit of interest is at or above the percentile threshold. Likewise, the hazard, exposure, or physical damage / social loss categories are highlighted if a risk indicator is above the threshold. Cumulative flood risk factors that indicate a high degree of risk are displayed on the maps and reports for each geographic area of interest. A separate mitigation category includes resiliency factors that are highlighted on the map and report if certain thresholds are met. For some building-level risk indicators at the lowest geographic area – incorporated places – the structures are not included in the analysis where small communities have less than 25 buildings so as not to skew the data results. National percentiles and indexes (e.g., mobile homes, owner occupied, SVI) for select risk indicators are included in the local analysis results.
      2. Data Types: Descriptive Statistics / Normalized / Logical / Ranked. Data types for both source and aggregate levels.
         1. *Raw Data Values.* Original data values.
         2. *Descriptive Statistics.* Descriptive statistics are brief informational coefficients that summarize a given data set, which can be either a representation of the entire population or a sample of a population. Descriptive statistics are broken down into measures of *central tendency* and measures of *variability* (spread). Measures of central tendency include the mean, median, and mode, while measures of variability include standard deviation, variance, minimum and maximum variables. The median value typically is preferred because of data skewness.
         3. *Normalized Data*. Values of risk indicators are often normalized for indicators (e.g., ratio, density, percentage) for easier comparisons or to provide context. Normalized data eliminates the original units of measurement for the data.
         4. *Ratio Data*. Normalized data is also utilized to remove geographic biases of larger areas such as floodplain communities in which county unincorporated areas are much larger in geographic size than incorporated towns and cities. For example, floodplain building counts are divided by geographic area to calculate the building density, while population displacement counts in the floodplain are divided by total populations of a geographic areas to compute population density. Online and downloadable reports display both normalized and raw data values, especially since original source values such as the area of the Special Flood Hazard Area (aSFHA) or total number of primary buildings in SFHA (bSF) are required as CRS program variables for communities.
         5. *Ranked Data*. Ranked data is data that is compared to other pieces of data and given a “place” relative to the other pieces of data. For example, top building lists are useful data extracts to show the *highest* vulnerabilities for exposure values, water depth in structure, damage estimates, and Post-FIRM minus rated structures can downloaded and viewed as well. Statistical or *fractional rankings* are also utilized for risk index scores such as the Social Vulnerability Index (SVI). *Ordinal ranking* is also applied to certain indicators so a unit of interest can be compared to other areas. *Percentile ranking* is used to rank risk values under a specific threshold. Percentile is a term that describes how a score compares to other scores from the same risk dataset. It is expressed as the percentage of values in a set of data scores. A risk score of the 90th percentile indicates 10% of that score and 90% of the values lie below that score. The key difference between percentage and percentile is the percentage is a mathematical value presented out of 100 and percentile is the per cent of values below a specific value. The percentage is a means of comparing quantities. A percentile is used to display position or rank. The unit of percentile is denoted by xth, for example, 30th
         6. *Logical Data*. Logical data is a binary data type that assumes two values such as Yes or No. An example logical field is whether communities participate in FEMA’s CRS program or not. Both the CRS class rating (9 to 1) value and the logical field are listed in the community reports. Very few risk indicators are represented as logical data.
      3. Flood Models (and Depth Grids). Most of the flood risk factors are derived from FEMA’s flood maps, specifically the 1% annual chance riverine floodplains and model-backed depth grids. Building damage, debris, and people displacement estimates are computed at the structure-level using FEMA’s Hazus methodology. Model-backed depth grids are uses for the entire state except for the Approximate A Zones of 14 counties in which less accurate Hazus depth grids are substituted.
      4. Building Inventory. Get text from document
      5. Disclaimer.
   4. Aggregation Levels. The aggregation level indicates the geographic area for the risk analysis and loss calculations. Users may analyze detailed flood risk data at the building level or aggregated at higher geographic levels at the community, county, region, state, watershed, or river/stream map scales. Community-level data is further subdivided by incorporated and unincorporated areas to align with FEMA’s NFIP communities in support of local floodplain management ordinances and enforcement. Geographic units of analysis at detailed aggregate levels such as the community and river/stream levels allow for greater granularity and clarity for localized risk assessment analysis.
   5. Geographic Levels - 12
   6. 1 National Level for comparison statistics (if applicable)
      1. **9 Aggregation Levels** (units of analysis) of data
         1. Political Boundaries
            1. State (1)
            2. Region (11)
            3. County (55)
            4. Community (NFIP)
            5. Unincorporated Area (55)
            6. Incorporated Place

Split Community (8)

* + - 1. Waterbody Features
         1. Watershed (33)
         2. Major River/Stream (Top 30?)
    1. **2 Property Level**
       1. Parcel
       2. Building

1. **RISK.** FLOOD RISK TOOLS (map visuals\*).
   1. **Cumulative** Risk\*.It identifies a cumulative risk score and qualitative ratings of the most vulnerable flood-prone areas in state.
   2. **Compare** Risk. Provides a side-by-side comparison of flood risk areas. *May be combined with Tool 1.*
   3. **Rank** Risk. Lists vulnerability rankings for specific flood risk factors at different geographic levels.
   4. **Indicators** of Risk\*. Graphically displays indicators of flood risk to include physical, human, and social vulnerabilities. *May be combined with Tool 1.*
   5. **Building-Level** Risk\*. Displays building-level risk and mitigation assessments of structures located in the high-risk floodplain.
      1. Hazard Characteristic
      2. Risk Assessment
      3. Mitigation Assessment
   6. **Count** Risk\*. Count and summarize risk indicators from user-defined areas on the map. *May be combined with Tool 5.*
2. **RESOURCES.** Resource web links for flood risk and other hazards.
   1. Flood Risk
      1. 2D / 3D Flood Visualizations (index map)
      2. Methodology
      3. Reports and Publications
      4. Data (GIS data, tables, etc. of downloadable risk products)
      5. External links to other flood resiliency sites, tools, datasets, etc.
   2. Other Hazards
      1. Landslides
      2. Karst
3. **ABOUT**
   1. Team
   2. Contact

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| **HOME** | **RISK** | **RESOURCES** | **ABOUT** |
| (overview)  (index) | *Cumulative* Risk  *Compare* Risk  *Rank* Risk  *Indicators* of Risk  *Building-Level* Risk  *Count* Risk | *Flood Risk*   * + - 2D / 3D Flood Visualizations (index map)     - Methodology     - Reports and Publications     - Data (GIS data, tables, etc. of risk products)     - External links to other sites, tools, datasets, etc.   *Other Hazards*   * Landslides * Karst * Dams | *Team*  *Contact* |

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| HOME | **RISK** | Cumulative | Compare | Indicators | Building-Level | Count Risk |
| HOME | **RESOURCES** | Flood Risk | Other Hazards |  |  |  |
| HOME | **ABOUT** | Team | Contact |  |  |  |

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| HOME | RESOURCES | ***Flood Risk*** | 3D Visuals | Methodology | Reports | Data | External |
| HOME | RESOURCES | ***Other Hazards*** | Landslides | Karst | Dams |  |  |

FEMA NATIONAL RISK INDEX

https://www.fema.gov/flood-maps/products-tools/national-risk-index

REPORT EXAMPLE

https://hazards.fema.gov/nri/report/viewer?dataLOD=Counties&dataIDs=C54059

FEMA PRODUCT LINK  
https://www.fema.gov/flood-maps/products-tools

National Risk Index

Home

Learn More

Take Action

Get Help

Related Section

How the Risk Index Can Help

Determining Risk

-Social Vulnerability

-Community Resilience

-Expected Annual Loss

Understanding Scores and Ratings

-Behind the Risk Index

-Literature Review

-Working Groups Collaboration

-Data and Methods

-Risk Index Contributors

Data Resources

Data Archive

Frequently Asked Questions

Disclaimer

Resilience Analysis & Planning Tool (RAPT)

https://www.fema.gov/about/reports-and-data/resilience-analysis-planning-tool