1. West Virginia Statewide Risk Assessment: Identify At-Risk Significant Structures

Many communities in West Virginia are updating their hazard mitigation plans (HMPs) to reflect current risks and priorities. These communities now have access to a wealth of detailed information on local flood and landslide risks. The data were produced by the West Virginia Statewide Risk Assessment. This is an ambitious project led by the West Virginia GIS Technical Center (WVGISTC) at West Virginia University. It features building-level risk assessments for flood and landslide hazards across the state. They cover all of the state’s 11 regions, 55 counties, 229 incorporated places, and 55 unincorporated areas.

About This Resource

This fact sheet is the second in a series published by FEMA Region 3. The goal is to help mitigation planning teams use the West Virginia Statewide Risk Assessment for plan updates. The three fact sheets should be read in order:

1. *Overview:* The first fact sheet gives an overview of the Statewide Risk Assessment’s datasets. It explains how planning teams can use the results in each phase of mitigation planning.
2. ***Identify At-Risk Significant Structures:*** The second fact sheet focuses on analyzing exposure, vulnerability, and impacts from flood hazards. It explains how to get the data, extract key information, and add local context.
3. *Prioritize At-Risk Significant Structures:* The third fact sheet focuses on summarizing exposure and vulnerability from flood hazards. It explains how to tap into local values to set priorities and create problem statements.

About the West Virginia Statewide Risk Assessment

The WVGISTC developed this project with support from FEMA and the state Emergency Management Division. It aims to help planning teams understand local disaster risks in more detail and create more effective solutions. The project focuses on floods and landslides. These are the two costliest natural disasters in the state.

The Statewide Risk Assessment includes the following information: 1) a full inventory of the buildings in the state; 2) detailed, building-level flood risk assessments; and 3) detailed, building-level landslide risk assessments. The flood risk assessments are known as Total Exposure in Floodplain (TEIF). The landslide risk assessments are known as Total Exposure Area Landslide (TEAL). These results are provided in a range of formats, including spreadsheets, reports, maps, GIS files, and interactive map viewers. Plan owners and planning consultants can access the results online. They can also ask the WVGISTC for a customized data package.

Step 1: Get the Data

The WVGISTC’s building-level flood risk assessments give planning teams in West Virginia the opportunity to exceed the minimum requirements for plan updates. Planning teams can use the data to discuss flood risk at the structure level. They can use it to consider *why* a significant structure (community asset or essential facility) is at risk to flooding and the *value* it brings to the community. The first step is to get the data for the planning area. Plan owners and their consultants can access the data online, or ask the WVGISTC for a data package.

Access significant structure data at:

* **Building-Level Risk Assessment Tables:** <https://data.wvgis.wvu.edu/pub/RA/State/BL/BLRA/>

These are countywide spreadsheets. They list each building in the effective or advisory 1%-annual-chance floodplain. Advisory 1%-annual-chance floodplains are non-regulatory high-risk flood zones that are likely to become effective in the future.

* **Essential Facilities Table:** <https://data.wvgis.wvu.edu/pub/RA/State/BL/EssentialFacility/>

This is a statewide spreadsheet. It lists all essential facilities in the effective or advisory 1%-annual-chance floodplain as well as the 0.2%-annual-chance floodplain. The WVGISTC defines essential facilities as those that provide critical services to the community. They include police and fire stations, emergency operations centers, schools, hospitals, and nursing homes.

* **Community Assets Table:** <https://data.wvgis.wvu.edu/pub/RA/State/BL/CommunityAsset/>

This is also a statewide spreadsheet. It lists all non-historical community assets in the effective or advisory 1%-annual-chance floodplain. These may be government facilities (federal, state, local), emergency medical services, religious organizations, utilities, post-secondary educational facilities, and other buildings of significance. It also includes historical structures listed on the National Register of Historic Places to include buildings constructed before 1930 in the registered historic districts.

Step 2: Extract Key Information

The WVGISTC produces a wealth of data. The second step for planning teams is to extract the information they need. There are many ways to do this. One way is to begin with the Building-Level Risk Assessment tables. Select the ones for the counties in the planning area. These tables include a large amount of information on the buildings in the 1%-annual-chance floodplain. There are 16 data fields related to each building’s identification and location and 11 related to its flood zone. More than 20 data fields relate to each building’s characteristics (what is at risk), and more than 20 others relate to its estimated flood losses (the degree of risk). The “MetaData” tab describes all the available data fields in more depth. To make sense of all this data, planning teams will have to focus on the elements they need. What types of significant structures are they most interested in? What flood zone information do they find most relevant? What loss estimates are most important?

* + 1. Which Significant Structures are At Risk?

The data points in Table 1 can help planning teams narrow down the list of buildings, based on each one’s function. They can help answer the question “which significant structures are at risk” from riverine flooding. Planning teams can use the “Filter” tool in Excel to show only the significant structures that they are most interested in. They can then copy the filtered data to a new tab in the spreadsheet.

Table : Which significant structures are at risk?

|  |  |  |
| --- | --- | --- |
| 1. Column | 1. Data Point | 1. How to Use the Data Point |
| F | Full E-911 Address | This column can be used to orient community representatives to the structures in the spreadsheet. |
| L | Community Name | Filter this column to see the communities of interest. |
| AA | Owner Name | This column can be used to orient community representatives to the structures in the spreadsheet. |
| AE | Property Class Description | This column can be used with the General Occupancy Code to remove residential properties. Use the “Filter” tool and unselect “Residential.” |
| AH | Land Use Description | This column can be used to find a building’s function. |
| AJ | General Occupancy Code | This column can be used with the Property Class Description to remove residential properties. Use the “Filter” tool and unselect “Residential.” |
| AU | Building Appraisal | This column shows building replacement values. The data comes from tax assessment data and other local, state, and national sources. It can help you understand a building’s monetary value. |
| AZ | Critical Infrastructure | This column lists all “essential facilities” and “non-historical community assets” identified by the WVGISTC. The exception is historical structures listed on the National Register of Historic Places. The planning team can use the “Filter” tool to select the categories of interest. Options include:   * 911 Center * College / University * EMS (Emergency Medical Services) * Fire Station * Government (Local, State, and Federal) * Hospital * Nursing Home * Police Station * Religious Institutions * School * Utility * Other |
| I | WV Flood Tool Link | This column includes a link to each building in the Risk MAP view of the WV Flood Tool. It can be used to orient community representatives to the structures in the spreadsheet. It can also help them ground-truth the spreadsheet’s data, based on local knowledge. |

* + 1. What is the Degree of Risk?

The planning team will now have a table showing key significant structures that are at risk from flooding. Next, they may want to focus on the flood zone information and loss estimates they find most important. The WVGISTC’s full dataset includes 11 data points related to the flood zone and more than 20 related to estimated flood losses. To make sense of all this data, planning teams will have to choose key data points to evaluate. Table 2 shows the data points that may have the most value. For data points related to flood zone information, the team should choose columns that help them answer “why is this significant structure at risk?” For data points related to flood losses, the team should choose columns that help them answer “what is the degree of risk?” Planning teams can use the “Hide” function in Excel to show only their columns of interest.

Table : What is the degree of risk?

|  |  |  |
| --- | --- | --- |
| 1. Column | 1. Data Point | 1. How to Use the Data Point |
| R | Floodway | This column shows whether or not a building is in the floodway. The floodway is the natural conduit for flood waters. Sites in a floodway or closest to a river or stream may be subject to the greatest flood depths, highest velocities, and greatest impacts from debris.  The information in this column can reveal why a building was identified as being at risk from flooding. |
| S | Regulatory Status | This column shows whether the building is in the effective or advisory high-risk flood zone. If the value is “Regulatory,” the building is in the effective high-risk flood zone. If it is “Non-Regulatory,” the building is in the advisory high-risk flood zone.  The information in this column can indicate why a building was identified as being at risk from flooding. |
| T | FIRM Status | This column shows whether a structure was built before or after the National Flood Insurance Program (NFIP) requirements took effect. Post-FIRM buildings must meet the minimum NFIP standards. Most Pre-FIRM buildings were built without accounting for the flood hazard.  The information in this column can indicate which buildings are more vulnerable to flooding. |
| U | Flood Depth | This column shows the height of the 1%-annual-chance flood above the ground surface. It can help users see how flooding at the site could disrupt the community. |
| CE | Water Depth in Structure | This column shows the height of the 1%-annual-chance flood above the first floor of the building. It can indicate the degree of flood risk to a building. |
| CI | Building Damage Percentage | This column, with Building Dollar Loss, can be used to assess the potential damage to each building. |
| CJ | Building Dollar Loss | This column, with Building Damage Percentage, can be used to assess the potential damage to each building. |
| CM | Content Damage Percentage | This column, with Content Dollar Loss, can be used to assess the potential content damage for each building. |
| CN | Content Dollar Loss | This column, with Content Damage Percentage, can be used to assess the potential content damage for each building. |
| CQ | Inventory Damage Percentage | This column, with Inventory Dollar Loss, can be used to assess the potential loss of inventory for businesses in the floodplain. |
| CR | Inventory Dollar Loss | This column, with Inventory Damage Percentage, can be used to assess the potential loss of inventory for businesses in the floodplain. |
| CW | Debris Removal Total | This column shows the tons of debris that a building could generate in the 1%-annual-chance flood. The debris total is based on a “substantially damaged” structure. This is one that experiences a loss greater than 50 percent. It assumes that the building is torn down and replaced. This can help assess how flooding at the site could disrupt the community. |
| CY | Maximum Restoration Time | This column shows the maximum number of days to restore a building after a 1%-annual-chance flood. This estimate also assumes that a “substantially damaged” structure is torn down and replaced. It is another way to assess how flooding at the site could disrupt the community. |

Step 3: Add Local Context

The result of the step above will be a table that shows the at-risk significant structures. It will also have key information on potential flood impacts from the Statewide Risk Assessment. The final step is to use local knowledge to assess the full range of possible impacts for each significant structure. “Impacts,” in hazard mitigation planning, are the effects of a hazard on the people, economy, and built and natural environments of a community. The Statewide Risk Assessment focuses on impacts to the built environment. Planning teams must also consider the potential impacts on the health, safety, and livelihoods of the people in the community.

There are many ways to add local context to the results of the Statewide Risk Assessment. One way is to add one or two new columns to the significant structure table. This can document the input from local stakeholders. For example, one column could address health and safety impacts. Another could address economic impacts. Plan owners and their consultants can help local stakeholders participate in gathering this local information. Such a process could use the WV Flood Tool link, as well as selected building characteristics. “Owner Name,” “General Occupancy Code,” and “Critical Infrastructure” can help orient stakeholders to each at-risk asset. The team could also use discussion questions to help draw out information on the impacts of past and potential floods. These questions could include the following:

* What is this significant structure and how does it serve the community?
* Who are the people served by this significant structure? Do they include any socially vulnerable groups?
* Has this significant structure ever been damaged by flooding?
* If so, did it affect the “day-to-day” activities of the community? Did it limit the ability to access essential services?
* If a future disaster took this asset offline, how would that affect the “day-to-day” activities of the community?

The team could document the local input gathered in this way in the significant structure table’s new columns. The final output will be a table of key significant structures that are at risk from flooding. The table will include a full range of potential impacts. The planning team can use this information to highlight any significant structures that need attention. It can also use it to drive local action. Do you want information on using these outputs to update local priorities and mitigation actions? See the third fact sheet in the series: *West Virginia Statewide Risk Assessment: Prioritize At-Risk Significant Structures.*