WV Flood Resiliency Tool – Key Score Variables and proposed format for Online Report Tables
12/9/2023

*57 TOTAL Indicators****- 4 Hazard Risk*** *- 40 Structure Risk****- 3 People/Social Risk*** *- 10 Mitigation Measures*

\***Boldfaced Text** represents a Risk Indicator or Mitigation Indicators. Highlighted yellow in suggested table header formats also represents risk or mitigation indicators.

# **HAZARD RISK**

<< FLOOD HAZARD RISK >>

1% Annual Chance Flood *4 Indicators*

HAZARD

< Floodplain Area >
Special Flood Hazard Area (SFHA);*CRS programming variable aSFHA
Incorporated Place (points)*

* *Unincorporated Place (polygons)*
* *Communities*
* *County*
* *Region*
* *State*
* *Watershed*
* *Stream*

**SFHA Ratio**

< Floodplain Length >
*AE Miles, AH Miles, AO Miles*
Effective AE/AO/AH Miles
Effective A Miles
Total Effective Flood Zone Miles
Advisory A Flood Zone Miles
Total Stream Length Miles
**Stream Length Ratio to Land Area**

< Maximum Flood Depth >
**Highest FEMA 100-yr Flood Depth (include Depth Grid Source HEC-RAS or Hazus (Run Top Report)** OR **Highest FSF 100-yr 2052 Climate model depth**

< Declared Disaster >
**Declared Disasters** *(county level; communities yes if county yes; verify latest)*
Last Disaster Date

< LAND COVER >
Impervious Surfaces (not calculated yet - Annie)
Ratio of Developed Area in 100-year Floodplains (to be calculated by Annie)

Area of Floodplain (*example header/data fields for online web reports*)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | SFHA AREA (aSFHA) | SFHA Acres | SFHA Score | SFHA Ratio | SFHA Ratio % Score |  |
|  |  | # | **%** | % | **%** |  |

Floodplain Length (Miles) by Flood Zone

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | RIVER//STREAM LENGTH (Miles) | Zones AE/AO/AH | Zone A | Total Effective | Advisory | Total Length | Total Length Score |
|  |  | Miles | Miles | Miles | Miles | Miles | Miles |

Floodplain Length (Percentage) by Flood Zone

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | RIVER/STREAM LENGTH by (%) | Detailed Zone % | Approx. Zone A % | Advisory Zone A % | Advisory | Total Length to Area  | Total Length Ratio % Score |
|  |  | % | % | % | % | Miles/Sq. Meter | % |

FEMA Declared Disasters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | DELCARED DISASTERS | Declared Disasters | Declared Disasters Score | Last Disaster Date |  |  |
|  |  | # | % | Date |  |  |

Highest Flood Depth for 100-yr FSF Climate and FEMA Models. Changing Climate/Environmental Conditions (First Street Foundation 2052 Climate Models). COMBINED INDICATOR

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| # | MAXIMUM FLOOD DEPTH | Highest 100-yr 2052 Climate model depth  | Highest 100-yr FSF 2052 Climate model depth - Score | Highest FEMA 100-yr Flood Depth | Highest FEMA 100-yr Flood Depth Score |
|  |  | Feet | % | Feet | % |

**STRUCTURE RISK**

<< PHYSICAL EXPOSURE / VULNERABILITY >>
1% Annual Chance Flood
*40 Indicators*

BUILDINGS COUNTS BY FLOOD ZONE TYPE

Zone A
Zone AE/AO/AH
**Floodway Zone AE**
**SFHA Total** (bSF CRS programming variable) (Column W)

BUILDINGS COUNTS BY FUTURE MAP CONDITIONS

SFHA - Flood Fringe to Floodway
SFHA Floodway

SFHA No Change
Mapped in SFHA
Mapped in SFHA Floodway
Mapped out SFHA
High-Risk Floodplain Total

BUILDING RATIOS FOR GEOGRAPHIC LEVEL AND FLOODWAY

[GEO LEVEL] E-911 Bldg. Total (*computed in communitywide report*)

[GEO LEVEL] Building Footprint Total (*computed in communitywide report*)

[GEO LEVEL] Average (*computed in communitywide report*)

[GEO Level] SFHA Bldg. Total (bSF)

SFHA Floodway Building Count

**Floodplain Ratio - SFHA Bldg. % to GEO LEVEL** (Ratio: Floodplain to GEO Level)

**Floodway Ratio - Floodway Bldg. % of Floodplain** (Ratio: Floodway to Floodplain)

FLOODPLAIN BUILDING DENSITY

[GEO LEVEL] Floodplain Acreage (aSFHA)

SFHA Building Total (bSF) **Building Density (Buildings per acre)**

<< Flood Depth >>

**Buildings where FSF 100-yr Climate 2052 Depth > 10 ft.
Buildings where FEMA 100-yr Depth > 10 ft.**

Regulatory Floodplains – Buildings by Flood Zone

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| # | BUILDING COUNT | Zone A | Zone AE/AO/AH | FloodwayZone AE | FloodwayScore | SFHA Total (bSF) | SFHA Score |  |
|  |  | # | # | **#** | **%** | **#** | **%** |  |

High-Risk Advisory Floodplains – Future Map Conditions

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| # | FUTURE MAPS | SFHA - Flood Fringe to Floodway | SFHA Floodway | SFHA No Change | Mapped in SFHA | Mapped in SFHA Floodway | Mapped Out SFHA | Total High-Risk Floodplain |
|  |  | # | # | # | # | # | # | % |

Floodplain Building to Total [GEO LEVEL] Buildings; Floodway Buildings to Floodplain Building Total. COMBINED?

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| # | BUILDING RATIO | [GEO LEVEL] E-911 Bldg. Total | [GEO LEVEL] Building Footprint Total | [GEO LEVEL] SFHA Bldg. Total (bSF) | SFHA Floodway Bldg. Count | SFHA Bldg. % to GEO LEVEL | SFHA Bldg. % Score | SFHA Floodway Bldg. % of Floodplain | Floodway Bldg. % of Floodplain Score |
|  |  | # | # | # | # | % | % | % | % |

Floodplain Building Density for [GEO LEVEL] aSFHA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| # | BUILDING DENSITY | [GEO LEVEL] aSFHA Area | SFHA Total | SFHA Building Density % | SFHA Building Density % Score |
|  |  | Acre | # | Bldg. per Acre | % |

Buildings with High Flood Depths: FSF (Climate) and FEMA Flood Models. COMBINED.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| # | Buildings with High Flood Depth | In FSF 100-yr Climate 2052 where Flood Depth > 10 ft.  | In FSF 100-yr Climate 2052 where Flood Depth > 10 ft.  | FEMA 100-yr where Flood Depth > 10 ft.  | FEMA 100-yr where Flood Depth > 10 ft. Score |
|  |  | # | **%** | **#** | **%** |

BUILDING TYPE AND VALUE
Residential Count
Residential Count%
Residential Value $
Residential Value%

Commercial Count
Commercial Value $
Other Non-Residential Count
Other Non-Residential Value

Total Building Count (Effective & Advisory) **Total Building Value**

**Total Building Value to Community Building Value$ (?)
Median Building Value**

Residential count
**Residential count %**Non-Residential count
**Non-Residential %**

Residential Value
**Residential Value %**
Non-Residential Value **Non-Residential %**

Building Count and Value by 3 Occupancy Classes (WV Flood Tool)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | BUILDING TYPE | ResidentialCount | Residential Value | Commercial Count | Commercial Value | Other Non-Res. | Other Non-Res. Value |
|  |  | # | $ | # | $ | # | $ |

Total and Mean Building Value

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| # | BUILDING VALUE | TotalBuilding Value | Total Building Value Score | Median Building Value | Median Building Value Score |
|  |  |  |  |  |  |

Building Type Count Residential versus Non-Residential

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | BUILDING TYPE | ResidentialCount | Residential % | Residential Count % Score | Non-Residential | Non-Residential % | Non-Residential Count % Score |
|  |  | # | % | % | # | % | % |

Building Type Value Residential versus Non-Residential

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | BUILDING TYPE | ResidentialValue | Residential % | Residential Value % Score | Non-Residential | Non-Residential % | Non-Residential Value % Score |
|  |  | # | % | % | # | % | % |

VULNERABLE STRUCTURES
Manufactured Homes **Manufactured Homes %**
**Basement %**
**One-Story %**
Renter Occupied % (?)
**Low Value %**

Vulnerable Structures (Manufactured Homes)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | Manufactured Homes | Mobile Homes Count | Mobile Homes Score | Mobile Homes % of Single Dwellings (RES 1 & RES2) | Mobile Homes % of Single Dwellings (RES 1 & RES2) Score | Mobile Homes % of Total Buildings | Mobile Homes % of Total Buildings Score |
|  |  | # | % | % | % | % | % |

Vulnerable Structures (Building Characteristics)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | Building Vulnerabilities | Basement % | One-Story % | Renter Occupied % | Low Value % | Low Value % Score |  |
|  |  | % | % | % | % | % |  |

FIRM Status
Initial FIRM Effective Date
FIRM Effective Date
% Pre-FIRM
% Post-FIRM regulated to Pre-FIRM
% Post-FIRM
% Unknown
*% Unknown RES2 Mobile Homes
% Unknown Tax Exempt (Property Class X or Other Non-Residential)*

 **% Pre-FIRM score
% Post-FIRM score**
FIRM Status

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | FIRM STATUS | Initial FIRM Effective Date | FIRM Effective Date | % Pre-FIRM | % Post-FIRM regulated to Pre-FIRM | % Post-FIRM | % Unknown |
|  |  | Date | Date | % | % | % | % |

Post- and Pre-FIRM Percentages

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | FIRM STATUS RATIOS | % Pre-FIRM | Pre-FIRM % Score | % Post-FIRM | % Post-FIRM Score |  |  |
|  |  | % | % | % | % |  |  |

BUILDING YEAR NEW CONSTRUCTION

**Minus-Rated Post-FIRM Structures**
**Median Building Year** (newest buildings)

New Construction Post-FIRM (New Building Year)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | NEW CONSTRUCTION | Minus-Rated Post-FIRM | Minus-Rated Post-FIRM Score | Median Building Year  | Median Building Year Score |  |  |
|  |  | # | % | Year | % |  |  |

Building Year
Median Building Year (?)
Building Year (?)

|  |  |  |  |
| --- | --- | --- | --- |
| # | Building Year | Median Building Year  | Median Building Year Oldest |
|  |  | Year | % |

SIGNIFICANT STRUCTURES

Essential Facilities
Police Station

Fire Station

911 Center

School

Hospital

Nursing Home

Essential Facilities Total #
**Essential Facilities Most Vulnerable** ([School, Hospital, Nursing Home] OR [In Floodway] OR [Flood Depth > 3 ft. Flood])

Community Assets Non-Historical
Religious Org.

Govt. Bldg.

Utility

Education

EMS

Other

Community Assets Non-Historical #
**Community Assets Non-Historical Most Vulnerable** ([In Floodway] OR [Flood Depth > 3 ft. Flood])

Community Assets Historical

NR Bldg. Sites

Bldgs. in NR Areas (older than 1930)

Total Historic Bldgs.

# NR Areas / Districts in 1% Floodplain

**Community Assets Historical #** *(percent rank; review newest NR structures and areas; update CA report)*
Total Community Assets
Estimated Total Community Assets #

Essential Facilities

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | ESSENTIAL FACILITIES | Police Station | Fire Station | 911 Center | School | Hospital | Nursing Home |
|  |  | # | # | # | # | # | # |

Vulnerable Essential Facilities

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| # | VULNERABLE ESSENTIAL FACILITIES | Total Essential Facilities | Vulnerable Essential Facilities  | Vulnerable Essential Facilities  |
|  |  | # | # | True / False |

Community Assets Non-Historical

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| # | COMMUNITY ASSETS NON-HISTORICAL | Religious Org | Govt. Bldg. | Utility # | Education | EMS | Other | Total Non-Historical |
|  |  | # | # | # | # | # | # | # |

Community Assets Historical

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| # | COMMUNITY ASSETS HISTORICAL | NR Bldg. Sites | Bldgs. In NRA Areas | Total Historical Bldgs. | # NR Areas / Districts in 1% Floodplain |
|  |  | # | # | # | # |

Community Assets Ranked

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | COMMUNITY ASSETS RANKED | Non-Historical Community Assets | Vulnerable Community Assets Non-Historical # | Vulnerable Community Assets Non-Historical  | Community Assets Historical # | Community Assets Historical Score | Total Community Assets |
|  |  | # | # | True / False | # | % | # |

<< PHYSICAL DAMAGE ACTUAL & ESTIMATES >>

BUILDING DAMAGE ESTIMATES (Hazus)
1% Annual Chance Flood

Residential Damage Loss
Commercial Damage Loss
Other Non-Residential Loss
Total Building Dollar Loss (Residential and Non-Residential)
**Building Loss Ratio**

Slight Damage 1-10%
Moderate Damage 10-50% **Substantial Damage > 50%
Substantial Buildings %**

**Median Dollar Damage
Median Percent Damage
High Damage Count**Debris Damage
Model Date

Building Damage Value Loss and Ratio

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | DAMAGE ESTIMATES | Residential Damage Loss | Commercial Damage Loss | Other Non-Residential Loss | Total Building Damage | Building Loss Ratio  | Building Loss Ratio Score |
|  |  | $ | $ | $ | $ | % | % |

Substantial Damage Estimates

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| # | SUBSTANTIAL DAMAGE ESTIMATES | *<1 % or No Depth Value* | 1-10% (Slight Damage) | 10-50% (Moderate Damage) | 50-100% (Substantial Damage) | 50-100% (Substantial Damage)Score | % of SD Buildings | % of SD Buildings |
|  |  | *#* | # | # | # | #% | % | % |

Other Damage Estimates

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| # | OTHER DAMAGE ESTIMATES | Median Dollar Damage | Median Dollar Damage Score | Median Percent Damage | Median Percent Damage Score | High Damage Count (Building Damage Pct >= 50% OR BldgLossUSD > $10K | High Damage Score | Debris Damage Total |
|  | % | $ | % | % | % | # | % | Tons |

TRANSPORTATON INFRASTRUCTURE
Road Miles Total of Land Area

Major Roads Inundated

Total Road Miles Inundated

**Total Roads Inundated to all Roads %**

Railroad Miles Total of Land Area
Railroad Miles Inundated

Total Railroads Inundated to all Railroads %

Bridges Total in Floodplain

Bridges Inundated

Roads Inundated

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | ROAD INUNDATED | Total Roads  | Major Roads Flooded | Total Roads Flooded | Total Roads Flooded Score | % Total Roads Flooded to Land Area Ratio  | % Roads Flooded to all Roads |
|  |  | Miles | Miles | Miles | % | % | % |

Railroads Inundated

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | RAILROADS INUNDATED | Total RR in Geographic Area | Total RR Flooded | Total RR Flooded Score | % RR Flooded to Land Area Ratio | % RR Flooded to all RR |
|  |  | Miles | Miles | % | % | % |

Bridges Inundated

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| # | BRIDGES INUNDATED | Total Bridgesin Floodplain | Total Bridges Inundated | Total Bridges Inundated Score |
|  |  | # | # | % |

RECORDED BUILDING DAMAGE LOSSES
 **Paid Claims #**

**Previous Paid Losses $
Repetitive Loss Structures**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | RECORDED DAMAGE LOSSES | Paid Claims  | Paid Claims Score | Previous Paid Losses  | Previous Paid Losses Score | Repetitive Loss Structures  | Repetitive Loss Structures Score |
|  |  | # | % | $ | $ | % | % |

# **PEOPLE/SOCIAL RISK**

*3 Indicators
No aggregate levels for watershed and streams*

<< PEOPLE EXPOSURE / SOCIAL VULNERABILITY >>

SOCIAL VULNERABILITY (Census)

< Socioeconomic Status >

Poverty Rate

State Ratio

Percentile in State

USA Ratio

Unemployment Rate
State Ratio

Percentile in State

USA Ratio

< Vulnerable Age/Disability Characteristics >
Vulnerable Ages
State Ratio

Percentile in State

USA Ratio

<< Education Characteristics >
No High School Diploma
State Ratio

Percentile in State

USA Ratio

< Household Characteristics >
Median Housing Value ($)
State Median

Percentile in State

USA Median

Mobile Homes %
State Ratio

Percentile in State

USA Ratio

< Population Change >
Population Growth Ratio
State Ratio

Percentile in State

USA Ratio (N/A)

< WV SVI Index >

**WV Socioeconomic Cumulative Index**

State Ratio

Percentile in State

*No USA Ratio (Not applicable)*

Socioeconomic Indicators (comparison geography tables for reports will have to be formatted differently)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| # | SOCIOECONOMIC INDICATORS | Value  | State Ratio/Median | Percentile in State | USA Ratio/Median |
|  | Poverty Rate | % |  |  |  |
|  | Unemployment Rate | % |  |  |  |
|  | Vulnerable Ages | % |  |  |  |
|  | Disability | % |  |  |  |
|  | Education (No High School Diploma) | % |  |  |  |
|  | Median Housing Value | $ |  |  |  |
|  | Mobile Home | % |  |  |  |
|  | Population Growth | % |  |  |  |
|  | WV Socioeconomic Index | #  |  |  | N/A |

POPULATON EXPOSURE & DISPLACEMENT

Population of Geographic Area
Average Residential Household Size

Population in High-Risk Floodplain

**1% Floodplain Population Ratio**

Population Exposure

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | POPULATION EXPOSURE | Population of Land Area | Average Residential Household Size | Population in High-Risk Floodplain | Population Ratio % | Population % Score |
|  |  | % |  | % | % | % |

POPULATION DISPLACEMENT & SHELTER NEEDS (Hazus methodology)
Population Displaced (> 1 ft. of water)
Population Displaced %
**Population Displaced Ratio to Floodplain**
People Short-Term Shelter (Hazus)
People Short-Term Shelter %
Companion Pets (Dogs and Cats)
Maximum Restoration Days
Hazus Flood Model Date

Population Displacement

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | POPULATION DISPLACED | Population Displaced (> 1 ft. of water) | Population Displaced % | Population Displaced % Score | Population Displaced Ratio to Floodplain | Population Displaced Ratio to Floodplain Score |
|  |  | % | % | % | % | % |

Shelter Needs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | POPULATION DISPLACED | People Short-Term Shelter | People Short-Term Shelter % | Companion Pets (Dogs & Cats) | Maximum Restoration Days | Hazus Model Date |
|  |  | # | # | # | Days | Date |

# **MITIGATION MEASURES**

<< FLOOD RISK MITIGATION >>
*10 Indicators*

FLOOR RISK MITIGATION

**CRS Class Rating** (higher level geographies TRUE if contains a single CRS) **Freeboard 2 ft. or greater** (higher level geographies TRUE if all communities 2 ft. or greater)
**Flood Disclosure Laws**

Flood Insurance Policies in Force

**Flood Insurance Policies to SFHA Buildings Ratio**Total Coverage

**Mitigated Structures**
**Structure to DFE**

**Structures that qualify for Wet Floodproofing (Flood Vents).**

* Wet Floodproofing Criteria: Building Residential (Occupancy Class RES1, RES3A, RES3B), Foundation = Crawl Space (Perimeter Wall), Not in Floodway, Flood Depth < 12 feet

**Structures that qualify for Dry Floodproofing.**

* Dry Floodproofing Criteria: Building (Occupancy Class Residential Res3C to RES64, Commercial, and Other Non-Residential), Not in floodway, Flood Depth < 3 feet)

**Buyout Parcels**
Open Space Acreage
**Open Space %**

Higher Standards

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | HIGHER STANDARDS | CRS Class Rating | CRS True or False | Freeboard | Freeboard True or False | Flood Disclosure Laws (True or False) |  |
|  |  | Class # | True/False | # | True/False | True/False |  |

Flood Insurance Policies

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | FLOOD INSURANCE POLICIES | Policies in Force | Policies in Force % to SFHA Ratio  | Policies in Force % to SFHA Score | Total Coverage | % Structures built to DFE |
|  |  | # | % | % | $ | % |

Mitigated Structures

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | MITIGATED STRUCTURES | Mitigated Structures | Mitigated Structures Score | Structures to DFE | % Structures built to DFE | % Structures built to DFE Score |
|  |  | # | % | # | % | % |

Buildings to consider for Mitigation Adaptive Measures

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| # | POTENTIAL MITIGATED STRUCTURES | Wet Floodproofing  | Wet Floodproofing Score | Dry Floodproofing  | Dry Floodproofing Score |
|  |  | # | % | # | % |

Open Space Preservation

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | OPEN SPACE  | # Buyout Parcels | Buyout Parcels Score | Open Space Acreage | Open Space % of SFHA | Open Space Score |  |
|  |  | # | % | Acreage | % | % |  |