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**Executive Summary**

**Riverine Flood Risk Assessment**

**For Communities of:**

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**Camden-on-Gauley, Clendenin, Marlinton,**

**Rainelle, Richwood, and White Sulphur Springs**

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**WV GIS Technical Center**

**West Virginia University**

**October 2024**

# CUMULATIVE RISK INDEX

* **Clendenin** ranks ***1st*** in the ***top 10%*** of all 229 incorporated places with the highest risk index score of 100%. This community is in the top 10% for nine risk indicators and in the top 20% for 15 of them.
* **Marlinton** (ranked ***4th***) in the ***top 10%*** of all incorporated places with a risk index score of 98.6%. It is among the top 10% for nine risk indicators and the top 20% for 14.
* **Richwood** (ranked ***18th***) is among the ***top 10%*** of incorporated places with a cumulative risk index score of 92.5%. This community is in the top 10% for five risk indicators and the top 20% for nine.
* **Rainelle** (ranked ***19th***) is in the ***top 10%*** of incorporated places with a risk index score of 92.1%. It ranks in the top 10% for seven risk indicators and in the top 20% for 13.
* **White Sulphur Springs** (ranked 82nd) has a cumulative risk index score of 64.4%, placing it in the top 10% for two risk indicators and the top 20% for four.
* **Camden-On-Gauley** (ranked 85th) has a risk index score of 63.1%, placing it in the top 10% for two indicators and the top 20% for five.

## *Cumulative Risk Index Table:*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Incorporated Place | **CUMULATIVE RISK INDEX** | | | | |
| Cumulative Index Score (0 to 100%) | Index Rating | Rank in Incorporated Places | Cumulative Top 10% Rank Flags | Cumulative Top 20% Rank Flags |
| Clendenin | **100%** | **VERY HIGH** | 1 | 9 | 15 |
| Marlinton | **98.6%** | **VERY HIGH** | 4 | 9 | 14 |
| Richwood | **92.5%** | **VERY HIGH** | 18 | 5 | 9 |
| Rainelle | **92.1%** | **VERY HIGH** | 19 | 7 | 13 |
| White Sulphur Springs | 64.4% | Relatively High | 82 | 2 | 4 |
| Camden-On-Gauley | 63.1% | Relatively High | 85 | 2 | 5 |

Relatively Low: 20% - 39.9%

Relatively High: 60% - 79.9%

Very Low: 0% - 19.9%

Risk Index Legend

**VERY HIGH**: 90% - 100% (Among the top 10% incorporated places)

Moderate: 40% - 59.9%

Very High: 80% - 100% (Among the top 20% incorporated places)

# FLOODPLAIN CHARACTERISTICS

## Floodplain Area Ratio *(Statewide avg. for incorporated places: 18.3%)*

* **Marlinton** (ranked ***25th*** with 31.5% of the community area) and **Rainelle** (ranked ***28th*** with 31.2% of the community area) are among the ***top 20%*** incorporated places.

Floodplain Length Ratio *(Statewide avg. for incorporated places:* *0.0059 miles/acre)*

None of these communities are among the top 20% for this indicator.

### Flood Declared Disasters *(Statewide avg. for incorporated places: 17)*

* **Clendenin** (24 disasters in Kanawha County) is in the ***top 20%*** incorporated places.

Flood Depth Median *(Statewide med. for incorporated places: 1.8 feet)*

* **Clendenin** (ranked ***10th*** with 6.4 feet) and **Camden-on-Gauley** (ranked ***11th*** with 6.1 feet) are among the ***top 10%*** incorporated places.
* **Marlinton** (ranked ***35th*** with 4.0 feet) is among the ***top 20%*** incorporated places.

## *Floodplain Characteristics Category Index*

* **Clendenin** (ranked ***22nd***) is among the ***top 10%*** incorporated places for combined floodplain characteristics.
* **Camden-On-Gauley** (ranked ***37th***), **Marlinton** (ranked ***40th***), and **Rainelle** (ranked ***43rd***) are among the ***top 20%*** incorporated places for combined floodplain characteristics.

## *Floodplain Characteristics Table:*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Incorporated Place | **FLOODPLAIN CHARACTERISTICS** | | | | | |
| Floodplain Area Ratio | Floodplain Length Ratio | Flood Declared Disasters | Flood Depth Median | Category Score  (0 to 100%) | Category Rank in Incorporated Places |
| Clendenin | 24.1% | 0.0039 | 24 | **6.4** | **90.7%** | 22 |
| Camden-on-Gauley | 16.4% | 0.0069 | 17 | **6.1** | 84.2% | 37 |
| Marlinton | 31.5% | 0.0063 | 15 | 4.0 | 82.8% | 40 |
| Rainelle | 31.2% | 0.0052 | 18 | 2.1 | 81.5% | 43 |
| Richwood | 23.1% | 0.0046 | 18 | 1.8 | 69.7% | 70 |
| White Sulphur Springs | 22.0% | 0.0049 | 18 | 1.5 | 62.2% | 87 |

# BUILDING EXPOSURE

## Building Floodplain Count *(Statewide avg. for incorporated places: 140)*

* **Marlinton** (ranked ***12th*** with 371 buildings), **Rainelle** (ranked ***14th*** with 336 buildings), **Clendenin** and **White Sulphur Springs** (ranked ***20th*** each with 302 structures), and **Richwood** (ranked ***22nd*** with 286 buildings) are among the ***top 10%*** incorporated places.

Building Floodway Count *(Statewide avg. for incorporated places: 14)*

* **Marlinton** (ranked ***1st*** in all incorporated places statewide with 189 buildings), **Richwood** (ranked ***3rd*** with 136 buildings), **White Sulphur Springs** (ranked ***7th*** with 105 buildings), and **Rainelle** (ranked ***18th*** with 47 structures) are among the ***top 10%*** incorporated places.

## Building Floodplain Ratio *(Statewide avg. for incorporated places: 15.5%)*

* **Marlinton** (ranked ***3rd*** in all incorporated places with 55.1% in floodplain), **Clendenin** (ranked ***6th*** with 52.5% in floodplain), and **Rainelle** (ranked ***19th*** with 33.7% in floodplain) are among the ***top 10%*** incorporated places.

## Building Density *(Statewide avg. for incorporated places: 0.93 /acre)*

* **Rainelle** (ranked ***32nd*** with 1.5 buildings/acre) and **Clendenin** (ranked ***46th*** with 1.3 buildings/acre) are among the ***top 20%*** of incorporated places.

## *Building Exposure Category Index*

* **Rainelle** (ranked ***3rd***), **Marlinton** (ranked ***7th***), **Richwood** (ranked ***15th***), **Clendenin** (ranked ***18th***), and **White Sulphur Springs** (ranked ***21st***) are among the ***top 10%*** incorporated places for combined building exposure indicators.

## *Building Exposure Table:*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Incorporated Place | **BUILDING EXPOSURE** | | | | | |
| Building Floodplain Count | Building Floodway Count | Building Floodplain Ratio | Building Density | Category Score  (0 to 100%) | Category Rank in Incorporated Places |
| Rainelle | **336** | **47** | **33.7%** | 1.5 | **99.1%** | 3 |
| Marlinton | **371** | **189**  **(1st Rank)** | **55.1%** | 0.8 | **97.3%** | 7 |
| Richwood | **286** | **136** | 21.3% | 1.2 | **93.8%** | 15 |
| Clendenin | **302** | 4 | **52.5%** | 1.3 | **92.1%** | 18 |
| White Sulphur Springs | **302** | **105** | 18.2% | 1.1 | **91.2%** | 21 |
| Camden-On-Gauley | 21 | 2 | 19.6% | 0.6 | 59.2% | 94 |

# BUILDING CHARACTERISTICS

## Building Median Value *(Statewide medium. for incorporated places: $41,500)*

None of these communities are among the top 20% for this indicator.

Bldg. Mobile Homes Ratio *(Statewide average for incorporated places: 18.1%)*

* **Camden-on-Gauley** (ranked ***39th*** with 30.8% related to 4 mobile homes) is among the ***top 20%*** incorporated places.

Bldg. Subgrade Basements Ratio *(Statewide avg. for incorporated places: 23.0%)*

None of these communities are among the top 20% for this indicator.

Building 1-Story Ratio *(Statewide avg. for incorporated places: 75.3%)*

None of these communities are among the top 20% for this indicator.

Bldg. Year Pre-FIRM Ratio *(Statewide avg. for incorporated places: 82.1%)*

* **Rainelle** (ranked ***6th*** with 98.8% related to 332 buildings) is among the ***top 10%*** incorporated places.
* **Camden-on-Gauley** (ranked ***25th*** with 95.3% related to 20 buildings) is among the ***top 20%*** incorporated places.

Bldg. Year Minus Rated Post-FIRM Ratio *(Statewide avg. for incorporated places: 4.8%)*

* **Clendenin** (ranked ***27th*** with 10.9% related to 33 buildings) is among the ***top 20%*** incorporated places.

## *Building Characteristics Category Index*

None of these communities are among the top 20% for this category index.

## *Building Characteristics Table:*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Incorporated Place | **BUILDING CHARACTERISTICS** | | | | | | | |
| Building Median Value | Bldg. Mobile Homes Ratio | Bldg. Subgrade Basements Ratio | Building 1-Story Ratio | Bldg. Year Pre-FIRM Ratio | Bldg. Year Minus Rated Post-FIRM Ratio | Category Score  (0 to 100%) | Category Rank in Incorporated Places |
| Clendenin | $49,000 | 6.4% | 34.8% | 75.5% | 84.5% | 10.9% | 78.5% | 50 |
| Rainelle | $38,500 | 5.9% | 6.8% | 86.6% | **98.8%** | 0.3% | 46.0% | 123 |
| White Sulphur Springs | $53,950 | 0.8% | 18.5% | 78.5% | 90.7% | 1.0% | 44.2% | 127 |
| Marlinton | $32,300 | 8.1% | 23.3% | 55.0% | 89.4% | 6.2% | 42.5% | 132 |
| Richwood | $19,100 | 17.2% | 11.5% | 74.0% | 92.3% | 0.7% | 35.5% | 148 |
| Camden-On-Gauley | $16,700 | 30.8% | 14.3% | 66.7% | 95.3% | 0.0% | 28.0% | 165 |

# CRITICAL INFRASTRUCTURE

## Essential Facilities *(Statewide avg. for incorporated places: 2)*

* **Marlinton** (ranked ***6th*** with 6 in floodplain) is among the ***top 10%*** incorporated places.
* **Richwood** (ranked ***43rd*** with 6 in floodplain) is among the ***top 20%*** incorporated places.

## Roads Inundated Ratio *(Statewide avg. for incorporated places: 15.8%)*

* **Clendenin** (ranked ***4th*** with 51.8% in floodplain) and **Rainelle** (ranked ***16th*** with 39.1% in floodplain) are among the ***top 10%*** incorporated places.
* **Camden-on-Gauley** (ranked ***27th*** with 29.2% in floodplain), **Marlinton** (ranked ***38th*** with 22.8% in floodplain), and **Richwood** (ranked ***42nd*** with 21.5% in floodplain) are among the ***top 20%*** incorporated places.

## *Critical Infrastructure Category Index*

* **Marlinton** (ranked ***5th***), **Clendenin** (ranked ***13th***), **Richwood** (ranked ***17th***), and **Rainelle** (ranked ***21st***) are among the ***top 10%*** incorporated places for combined critical infrastructure indicators.

## *Critical Infrastructure Table:*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Incorporated Place | **CRITICAL INFRASTRUCTURE** | | | |
| Essential Facilities | Roads Inundated Ratio | Category Score  (0 to 100%) | Category Rank in Incorporated Places |
| Marlinton | **6** | 22.8% | **98.2%** | 5 |
| Clendenin | 2 | **51.8%** | **94.7%** | 13 |
| Richwood | 3 | 21.5% | **92.9%** | 17 |
| Rainelle | 2 | **39.1%** | **91.2%** | 21 |
| Camden-On-Gauley | 1 | 29.2% | 72.3% | 64 |
| White Sulphur Springs | 1 | 16.4% | 63.1% | 84 |

# COMMUNITY ASSETS

Historical Community Assets *(Statewide avg. for incorporated places: 14)*

* **Clendenin** (ranked ***5th*** with 54 in floodplain) is among the ***top 10%*** incorporated places.
* **Richwood** (ranked ***23rd*** with 9 in floodplain) and **Marlinton** (ranked ***29th*** with 5 in floodplain) are among the ***top 20%*** incorporated places.

Non-Historical Community Assets *(Statewide avg. for incorporated places: 4)*

* **Clendenin** (ranked ***5th*** with 15 in floodplain), **Marlinton** (ranked ***8th*** with 13 in floodplain), and **Richwood** (ranked ***19th*** with 8 in floodplain) are among ***top 10%*** incorporated places.
* **White Sulphur Springs** (ranked ***22nd*** with 7 in floodplain) and **Rainelle** (ranked ***35th*** with 6 in floodplain) are among the ***top 20%*** incorporated places.

## *Community Assets Category Index*

* **Clendenin** (ranked ***4th***), **Marlinton** (ranked ***12th***), and **Richwood** (ranked ***13th***) are among ***top 10%*** incorporated places for combined community assets indicators.

## *Community Assets Table:*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Incorporated Place | **COMMUNITY ASSETS** | | | |
| Community Assets  Historical | Community Assets Non-Historical | Category Score  (0 to 100%) | Category Rank in Incorporated Places |
| Clendenin | **54** | **15** | **98.6%** | 4 |
| Marlinton | 5 | **13** | **95.1%** | 12 |
| Richwood | 9 | **8** | **94.7%** | 13 |
| White Sulphur Springs | 0 | 7 | 72.8% | 57 |
| Rainelle | 0 | 6 | 68.8% | 64 |
| Camden-On-Gauley | 0 | 1 | 25.8% | 120 |

# BUILDING DAMAGE LOSS

Substantial Damage Count *(Statewide avg. for incorporated places: 7)*

* **Clendenin** (ranked ***5th*** with 46 substantially damaged buildings) is among the ***top 10%*** incorporated places.
* **Marlinton** (ranked ***27th*** with 16 substantially damaged buildings) is among the ***top 20%*** incorporated places.

Substantial Damage Ratio *(Statewide avg. for incorporated places: 5.9%)*

* **Camden-On-Gauley** (ranked ***18th*** with 19.0%) is among the ***top 10%*** incorporated places.
* **Clendenin** (ranked ***27th*** with 15.2%) is among the ***top 20%*** incorporated places.

Previous Damage Claims *(Statewide avg. for incorporated places: 71)*

* **Marlinton** (ranked ***2nd*** with 585 claims) and **Rainelle** (ranked ***21st*** with 154 claims) are among the ***top 10%*** incorporated places.
* **Richwood** (ranked ***23rd*** with 144 claims), **Clendenin** (ranked ***28th*** with 122 claims), and **White Sulphur Springs** (ranked ***32nd*** with 89 claims) are among the ***top 20%*** incorporated places.

Repetitive Loss Structures *(Statewide avg. for incorporated places: 27)*

* **Marlinton** (ranked ***2nd*** with 252 structures) and **Richwood** (ranked ***19th*** with 66 structures) are among the ***top 10%*** incorporated places.
* **Rainelle** (ranked ***29th*** with 35 structures) and **Clendenin** (ranked ***39th*** with 624 structures) are among the ***top 20%*** incorporated places.

## *Building Damage Loss Category Index*

* **Marlinton** (ranked ***8th***) and **Clendenin** (ranked ***9th***) are among the ***top 10%*** incorporated places for combined building damage loss indicators.
* **Camden-On-Gauley** (ranked ***40th***) is among the ***top 20%*** incorporated places for combined building damage loss indicators.

## *Building Damage Loss Table:*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Incorporated Place | **BUILDING DAMAGE LOSS** | | | | | |
| Substantial Damage Count | Substantial Damage Ratio | Previous Damage Claims | Repetitive Loss Structures | Category Score  (0 to 100%) | Category Rank in Incorporated Places |
| Marlinton | 16 | 4.3% | **585** | **252** | **96.9%** | 8 |
| Clendenin | **46** | 15.2% | 122 | 24 | **96.4%** | 9 |
| Camden-On-Gauley | 4 | **19.0%** | 21 | 11 | 82.8% | 40 |
| Richwood | 1 | 0.3% | 144 | **66** | 78.5% | 50 |
| Rainelle | 1 | 0.3% | **154** | 35 | 78.0% | 51 |
| White Sulphur Springs | 0 | 0.0% | 89 | 2 | 44.7% | 127 |

# PEOPLE / SOCIAL VULNERABILITIES

Population in Floodplain Ratio *(Statewide avg. for incorporated places: 23.3%)*

* **Marlinton** (ranked ***8th*** with 84.6%) and **Clendenin** (ranked ***13th*** with 66.8%) are among the ***top 10%*** incorporated places.
* **Rainelle**  (ranked ***31st*** with 45.6%) is among the ***top 20%*** incorporated places.

Population Displacement Ratio *(Statewide avg. for incorporated places: 16.1%)*

* **Marlinton** (ranked ***5th*** with 76.0%), **Clendenin** (ranked ***8th*** with 63.0%), and Rainelle (ranked ***22nd*** with 38.3%) are among the ***top 10%*** incorporated places.

WV Social Vulnerability Index *(Statewide avg. for incorporated places: 53.3%)*

* **Richwood** (ranked ***18th*** with 92.5%) is among the ***top 10%*** incorporated places.
* **Rainelle** (ranked ***36th*** with 84.6%) is among the ***top 20%*** incorporated places.

## *People / Social Vulnerabilities Category Index*

* **Rainelle** (ranked ***17th***) and **Marlinton** (ranked ***23rd***) are among the ***top 10%*** incorporated places for combined people / social vulnerabilities indicators.
* **Richwood** (ranked ***33rd***) and **Clendenin** (ranked ***45th***) are among the ***top 20%*** incorporated places for combined people / social vulnerabilities indicators.

## *People / Social Vulnerabilities Table:*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Incorporated Place | **PEOPLE / SOCIAL VULNERABILITIES** | | | | |
| Population in Floodplain Ratio | Population Displaced Ratio | WV Social Vulnerability Index | Category Score  (0 to 100%) | Category Rank in Incorporated Places |
| Rainelle | 45.6% | **38.3%** | 84.6% | **92.9%** | 17 |
| Marlinton | **84.6%** | **76.0%** | 60.4% | **90.3%** | 23 |
| Richwood | 23.8% | 16.9% | **92.5%** | 85.9% | 33 |
| Clendenin | **66.8%** | **63.0%** | 36.6% | 80.7% | 45 |
| Camden-On-Gauley | 23.3% | 15.9% | 27.3% | 60.5% | 91 |
| White Sulphur Springs | 25.8% | 17.5% | 21.1% | 59.6% | 93 |