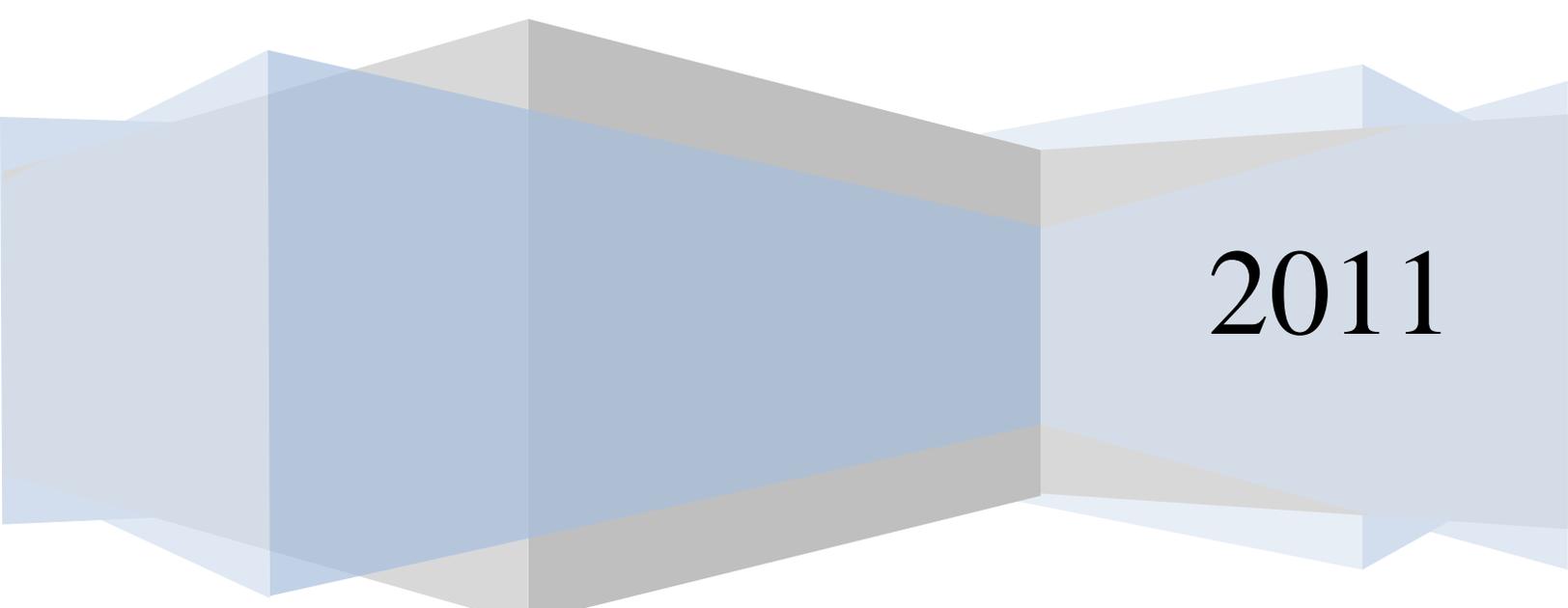


# Hazard Mitigation Plan

*For the Mid-Ohio Valley Region*

**Prepared by**

**Mid-Ohio Valley Regional Council**



2011

## Table of Contents

|  |    |
|--|----|
| Introduction.....  | 1  |
| Regional Profile .....   | 1  |
| Calhoun County .....   | 3  |
| Jackson County .....   | 3  |
| Pleasants County.....  | 4  |
| Ritchie County .....   | 4  |
| Roane County.....  | 4  |
| Tyler County .....   | 5  |
| Wirt County .....  | 5  |
| Wood County .....  | 6  |
| Planning Process .....   | 7  |
| <i>Meetings and Activities</i> .....                             | 7  |
| Hazard Identification and Risk Assessment .....                  | 11 |
| Eliminated Risks .....   | 13 |
| Low Risks .....  | 14 |
| Significant Risk.....  | 17 |
| Assessment of Risk.....  | 18 |
| Winter Storms .....  | 18 |
| Severe Winds .....   | 18 |
| Flooding .....   | 19 |
| Calhoun County .....   | 19 |
| Jackson County .....   | 20 |
| Pleasants County.....  | 21 |
| Ritchie County .....   | 21 |
| Roane County.....  | 23 |
| Tyler County .....   | 24 |
| Wirt County .....  | 25 |
| Wood County .....  | 26 |
| Existing National Flood Insurance Program.....                   | 27 |
| Inventory of Assets .....  | 28 |
| Hazard Mitigation Plan Development: Project Identification ..... | 32 |

|  |    |
|--|----|
| Project Area 1: Database of Special Needs Population .....   | 33 |
| Project Area 2: Mitigate damage to buildings located in areas subject to flooding either through acquisition/demolition or elevation. .... | 34 |
| Project Area 3: Emergency Alert System .....   | 35 |
| Project Area 4: Floodplain Ordinance and Building Codes.....   | 36 |
| Project Area 5: Community Shelters in the identified areas that become isolated by Winter Storms or Floods .....                           | 37 |
| Project Area 6: Stream Dredging and Clean-up .....   | 38 |
| Project Area 7: Severe winds impact mitigation.....  | 39 |
| Project Area 8: Accurate Elevation and Topographical Data Mapping .....  | 40 |
| Project Summary Table.....   | 41 |
| Plan Implementation and Maintenance Procedures .....   | 43 |
| Monitoring and Implementing the Plan .....   | 43 |
| Plan Adoption .....  | 43 |
| Coordinating Body.....   | 43 |
| Facilitator .....  | 44 |
| Implementation through Existing Programs .....   | 44 |
| Economic Analysis of Mitigation Projects .....   | 45 |
| Evaluating and Updating the Mitigation Plan.....   | 45 |
| Formal Review Process.....   | 45 |
| Continued Public Involvement .....   | 46 |
| Appendices.....  | 47 |
| Appendix A - Sample invitation to local officials .....  | 48 |
| Appendix B - Public meetings .....   | 50 |
| Appendix C - Sample newspaper ad for public comments on draft plan. ....   | 79 |
| Appendix D - Distribution list for comments. ....  | 81 |
| Appendix E - Happy Valley Land Use Plan .....  | 83 |
| Appendix F - Climate data.....   | 86 |
| Appendix G - HAZUS reports .....   | 98 |
| Appendix H - Floodplain maps, topographic maps and aerial photographs.....   | 99 |



## Introduction

In 2003, the West Virginia Regional Planning and Development Council (Region V), in cooperation with all counties and municipalities within this jurisdiction, developed pre-hazard mitigation plans to address efforts to lessen the effects of likely natural hazards in the area. This area includes the counties of Calhoun, Jackson, Pleasants, Ritchie, Roane, Tyler, Wood and Wirt. Within these counties are 22 municipalities including the Cities of Belmont, Parkersburg, Paden City, Pennsboro, Ravenswood, Ripley, Sistersville, Spencer, St. Marys, Vienna, and Williamstown. Additionally the Towns of Auburn, Cairo, Ellenboro, Elizabeth, Friendly, Grantsville, Harrisville, Middlebourne, North Hills, Pullman and Reedy also contributed in developing plans for these communities. All together 8 counties and 22 municipalities adopted plans in Region V.

The Federal Emergency Management Agency (FEMA) mandates that communities update their Hazard Mitigation Plan at least every five years in order to remain eligible for certain FEMA programs. Due to funding constraints it was not practical for each county to update its plan independently. Therefore, the Mid-Ohio Valley Regional Council agreed to prepare a regional hazard mitigation plan that each local jurisdiction could adopt. On October 15, 2007 MOVRC entered into an agreement with the Homeland Security and Emergency Services Division of the West Virginia Department of Military Affairs and Public Safety for funding to prepare the plan as an update to the eight county plans.

As described in the Planning Process Section below the update was fairly far along when FEMA came out with new Local Multi-Hazard Mitigation Planning Guidance. As a result, what was intended to be a simple evaluation of progress under the previous plans and an update of mitigation measures from the previous plans has turned into a much more involved reworking of the previously addressed hazard identification and vulnerability assessment so that those elements comply with the new guidance. This more involved process has led to delays in completing the plan.

Additionally, due to a pending mitigation project in Wood County it was determined that a Wood County specific plan would be prepared and adopted first and then incorporated into this regional plan. Time spent on the Wood County plan further delayed the regional plan. The delays notwithstanding, the plan is now ready for adoption.

When adopted by the local jurisdictions it is intended that this plan will meet the eligibility requirements for participation in all FEMA programs that require a local hazard mitigation plan.

## Regional Profile

The Mid-Ohio Valley region of West Virginia occupies over twenty-six hundred square miles, representing an area larger than the state of Rhode Island. It is located in West Virginia between 38° 32" and 39° 36" north latitude and 80° 42" and 81° 55" longitude. The eight counties which comprise the region are situated on the Appalachian Plateau, characterized by relatively level river valleys which abruptly become steeply sloping hills.



Potentially developable sites drastically decrease as one travels eastward in the region. The amount of land with greater than 15-25% slope is the main reason. Thin soils cover the hillsides. This combination results in a high erodability and requires careful management. The upland terrain further constrains development by hindering transportation and the retention of a water supply.

Parkersburg and surrounding communities in West Virginia and Ohio are recognized as a Metropolitan Statistical Area by the US Census Bureau and serves as the market core of the region. In recent years, Parkersburg has edged out Wheeling and other traditional industrial centers to become the third largest city in the state, behind Charleston and Huntington. The region is also close to several major national metropolitan centers that are experiencing a period of positive growth and redevelopment, such as Columbus, Cleveland and Cincinnati, Ohio and Pittsburgh, Pennsylvania. With over half of the US population within a day's drive of the Ohio Valley, the region is well positioned to attract, retain and grow businesses.

### **Calhoun County**

Calhoun County, West Virginia is located in a West Central portion of West Virginia, East of Wirt and Roane Counties, South of Ritchie County, and is further bounded by Gilmer County to the East, Braxton County to the Southeast, and Clay County to the South. West Virginia Route 16 is the main North-South highway and West Virginia Route 5 is the northern most East-West highway (running through Grantsville) and U.S. Routes 33 and 119 are the major east-west southern routes through the county.

Several streams flow into or are in close proximity to the county seat at Grantsville. The Little Kanawha River parallels River Street and Simon Run parallels West Virginia Route 16. The Little Kanawha River is also joined by Philip Run, which parallels West Virginia Route 16 on the South side of The Little Kanawha River. The confluences of Philip Run and Simon Run both occur within the city corporation limits of Grantsville.

The only incorporated municipality within the county is Grantsville, the county seat. Other, unincorporated, areas include Arnoldsburg, Minnora, Chloe, Mt. Nebo, and Cabot Station (area west of Grantsville along WV Route 5). The largest employers in the county are the public school system and Minnie Hamilton Health Center.

### **Jackson County**

Jackson County, West Virginia lays along the Ohio River in west central West Virginia and is bounded by Roane County on the East; Wood County to the North; Kanawha and Putnam to the South; Wirt County to the Northeast; and Mason County and Meigs County (Ohio) to the West. The Ohio River generally flows from the Northeast to Southwest and is joined by Sandy Creek at Ravenswood and Mill Creek at Millwood. These streams flow generally westward through the county. Pocatlico Creek flows southward and is a tributary of the Kanawha River.

The municipalities and commercial centers within the county are Ripley, the county seat and Ravenswood. Unincorporated areas include Murraysville, Sandyville, Evans, Cottageville, Millwood, Fairplains, Kenna, and Goldtown. The main highways are Interstate 77, US Route 33,

WV Route 2, WV Route 68, and WV 21. It should be noted that due to the topography most of the roads in Jackson County parallel steams, creeks, and rivers.

In addition to the two cities, major employment centers include the Alcan Aluminum complex south of Ravenswood and the Jackson County Maritime and Industrial Center near Millwood, and the growing areas around the Interstate interchanges at Silverton and Fairplains.

## **Pleasants County**

Pleasants County West Virginia lies in a Northeastern position relative to Wood County West Virginia bounded on the Northwestern side by the Ohio River. The Ohio River flows from the North East to the South West. Pleasants County is bounded by Ritchie County to the South and Tyler County to the North East.

The two major population centers within the county are The City of Belmont and the county seat, The City of St. Marys. The main upriver and downriver highway is West Virginia Route 2 and it parallels the Ohio River. The CSX Railroad right-of-way and railroad tracks lie between the river and WV Route 2. West Virginia Route 16 is the only other main highway intersecting WV Route 2 in St. Marys within the county.

Major employment centers are located at Willow Island (power plant, Cytec), Waverly (Simex, GAP, power plant) and northern St. Marys (Correctional Center).

## **Ritchie County**

Ritchie County West Virginia lies East of Wood County West Virginia and is bounded by Pleasants County on the Northwest, Tyler County to the North, Doddridge County to the East, Wirt County to the Southwest, Calhoun County to the South, and Gilmer County to the Southeast. The Hughes River generally flows from the East to West and with the North Fork of the Hughes River and its tributaries drains most of the county.

The major population centers within the county are Harrisville the county seat, Pennsboro, Ellenboro, Pullman, Auburn, and Cairo. Other unincorporated areas include Smithville, Berea, Nutters Farm, Macfarlan, Mountain, and Cisco. The main highways are West Virginia Route 16, West Virginia Route 47, West Virginia route 74, West Virginia 31, U.S. Route 50, and Old U.S. Route 50. It should be noted that due to the topography most of the roads in Ritchie parallel steams, creeks, and rivers. The notable exception is U.S. Route 50.

Simonton Building Products, Troy Mills, and the oil and gas industry are the major employers in the county.

## **Roane County**

Roane County lays Southeast of Wood County, West Virginia and is bounded by Wirt County on the Northeast, Calhoun County to the East, Kanawha County to the South, and Jackson County to the West.

Several streams flow into or are in close proximity to the county seat at Spencer. Spring Creek parallels Capital Street and is joined with Goff Run west of Main Street. Spring creek is also joined by Tanner Run on the West side of Front Street opposite the intersection of Elm Street and Front Street.

The major population center within the county is Spencer, the county seat. Other areas include Reedy and Walton. The main highways are US 119 and US 33. It should be noted that due to the topography most of the roads in Roane parallel steams, creeks, and rivers.

In addition to the Spencer commercial district, Mustang Survival, Monarch Rubber and the oil and gas industry are significant employers.

### **Tyler County**

Tyler County West Virginia lies in a Northeastern position relative to Pleasants County West Virginia bounded on the Northwestern side by the Ohio River. The Ohio River flows from the North East to the South West. Tyler County is also bounded by Ritchie and Doddridge County to the South and Wetzel County to the North East.

The major population centers within the county are Middlebourne the county seat, Sistersville, Friendly and the lower part of Paden City. The main upriver and downriver highway is West Virginia Route 2 and it parallels the Ohio River. The Chesapeake and Ohio Railroad right-of-way and railroad tracks lie between the river and WV Route 2. West Virginia Route 18 and West Virginia 23 are the other main highways in the county.

The Tyler County Industrial Park (and surrounding industries such as Bens Run Recycling and Momentive) is the largest employment center in the county.

### **Wirt County**

Wirt County, West Virginia lays Southeast of Wood County and is bordered by Ritchie County on the Northeast, Calhoun County to the East, Roane County to the South, and Jackson County to the West. The Hughes River generally flows from the East to West and joins the Little Kanawha River at Greencastle. The Little Kanawha River flows generally to the Northeast through the county.

The major population center within the county is Elizabeth, the county seat. Other areas include Newark, Greencastle, Palestine, Sonoma, and Creston. The main highways are West Virginia Route 14, West Virginia Route 53, and West Virginia Route 5. It should be noted that, due to the topography, most of the roads in Wirt parallel steams, creeks, and rivers.

## Wood County

Wood County lies on the western border of West Virginia and consists of 365 square miles of territory and an approximate population of 86,204. The terrain consists of medium to wide valleys and rolling to medium steep hills with elevations varying from approximately 590 feet above sea level to a high elevation of approximately 1,300 feet. Wood County has one major interstate highway (I-77) which bisects the County south to north and one major Appalachian highway (US Route 50) which bisects the County west to east. There is one rail line that runs along the western border of the County south to north with a railroad bridge crossing the Ohio River at Parkersburg. The incorporated population centers of the County are as follows:

Parkersburg - 31,611; Vienna - 10,536; Williamstown - 2,982; and North Hills - 857.

Surrounding these incorporated areas are unincorporated communities of Boaz, Waverly, Red Hill, Davisville, Mineral Wells, Pettyville, Lubeck, and Washington Bottom.

The largest manufacturing area is in the Washington Bottom area and consists of two large chemical and plastics plants (DuPont and Sabic) with several smaller industrial and warehouse sites throughout the county such as Coldwater Creek in Parkersburg and Hino Motors in Williamstown. Major commercial areas include Grand Central Mall in Vienna and Patriot Center in south Parkersburg.

## Planning Process

The Federal Emergency Management Agency (FEMA) considers the planning process an essential element of the plan itself. Therefore, documentation of the planning process is a required part of the plan. Specifically, 44 CFR 201.6 requires information about how the plan was prepared, who was involved in the process and how the public was involved. The remainder of this section addresses those requirements.

In 2007 letters were sent to counties and municipalities requesting their willingness to participate in a regional plan. All area governments responded positively and indicated who should be contacted to set up public meetings in each jurisdiction. Once the local meetings were planned in each of the 8 counties, a representative with the MOVRC attended the meeting with the 2003 plan and went through each section with the individuals present.

### *Meetings and Activities*

In order to provide the maximum opportunity for participation a public meeting was held in each county to receive input from interested parties. Additionally, invitations were sent to the County Commission President, the Mayor of each municipality, and potentially interested parties such as the Emergency Services Director, Local Emergency Planning Committee, volunteer fire departments, planning departments and others who took part in the development of the previous county plan. A sample of the invitation is included in Appendix A.

Notice of the meeting was published in the local paper. Public notices of each meeting can be found in Appendix B along with sign-in sheets and notes relating to each meeting. The following meetings were held throughout the region:

- Wood County, March 25, 2008
- Pleasants County, April 10, 2008
- Wirt County, April 17, 2008
- Roane County, April 24, 2008
- Tyler County, May 14, 2008
- Jackson County, September 15, 2008
- Roane County Follow-up Conference Call, September 24, 2008
- Calhoun County, November 13, 2008
- Ritchie County, October 2, 2008

Unfortunately, there was minimal involvement from the general public. However several community volunteers who were involved in the Local Emergency Planning Committee or other emergency services activities were present. Public involvement continues to be a challenge in updating these plans and strategies to improve involvement will be discussed in the Plan Implementation section of this plan.

Government officials, citizens and partnering organizations provided input on how mitigation strategies could be updated, what strategies were still relevant, and considered new hazards that needed to be addressed. Collaborating with such a large and diverse range of individuals and governments proved to be a challenge. Therefore, a core committee was formed which consisted

of the Emergency Services Director from each of the eight counties and Mid-Ohio Valley Regional Council staff.

The general public was given opportunities to participate in development of this plan both during the planning process, as described above, and during the review period. Copies of the draft plans were made available for continued access and review by the public at the following locations:

- Each County Courthouse
- Local public libraries
- MOVRC website

A copy of the notice published in the local newspaper seeking public comments is included in Appendix C.

A variety of people were involved in various aspects of preparing this plan. However, the Project Coordinator from the Mid-Ohio Valley Regional Council (MOVRC) played a major role in coordinating meetings, communicating with committee members and drafting the original document. The Community Development Director for MOVRC, incorporated the changes necessitated by the new FEMA guidance issued in 2008 as well as changes based on input from federal, state and local parties. [Additionally, he coordinated distribution of the final draft for comment by committee members and the public and finally, adoption of the plan by each of the local jurisdictions.]

In addition to soliciting input from those within the region, each of the neighboring regions was also asked for their input. An email or letter notified them that the plan was available for review on our web site and that we welcomed comments regarding coordination with planning efforts in the areas adjacent to the Mid-Ohio Valley Region. Appendix D contains a copy of the list of recipients.

Guidance from FEMA also requires coordination with other plans, such as comprehensive development plans. Recently updated plans were available for Wood County and the cities of Parkersburg, Vienna, and Williamstown. All of these were consulted to determine whether potential development might be impacted by future disasters. The other counties and municipalities are smaller and do not have current comprehensive plans.

It must be pointed out that development is not a major issue throughout most of the region. Population has been stagnant to declining for the past twenty years. As a result; regulation of new construction is not as significant as it might be elsewhere in the country.

Other plans consulted include the LEPC plans and the Emergency Operations plans for the counties. The LEPC plans relate to man-made issues such as hazardous materials incidents, while Emergency Operations plans are utilized to respond to disasters. Coordination with these plans is essential since preparation for response is in itself a mitigation activity. Considerable discussion centered on where to draw the line between pre-disaster mitigation planning and emergency response planning. Ultimately the decision was made to limit inclusion of activities preparing for emergency response to specifically agreed upon situations.

One other plan considered was the Wood County Commission's plan for acquisition of repetitively flooded structures in the Happy Valley area. This is a very basic document that calls for acquisition as home owners volunteer and funds become available. It also outlines opportunities for public recreational uses of property acquired when sufficient parcels are accumulated. A copy of plan is included in Appendix E.

In order for FEMA to approve this plan for any local government jurisdiction not only must the plan be adopted by the local jurisdiction, but the plan must also demonstrate how that jurisdiction participated in the development of the plan. We have previously explained in general terms how government representatives and organizations contributed to the planning process. Below is a description of each jurisdiction's involvement in the process of developing this plan.

Members of the Calhoun County Commission, the Mayor of Grantsville, the Director of Emergency Services, and members of the LEPC provided helpful input regarding the updated plan, particularly regarding progress with implementing mitigation measures, either through participation in the public meeting or through subsequent phone conversations.

The Jackson County Emergency Services Director, a member of the Jackson County Commission and LEPC members provided input at the public meeting regarding the status of mitigation measure in the previous plan. Neither Ravenswood nor Ripley was able to send representatives to the public meeting. Subsequent conversations with the Mayor of each municipality gave the cities' perspective on relevant risks and implementation measures.

During the plan development input from Pleasants County came from multiple sources. The Town of Belmont was ably represented by Councilman Bob Doty . St. Marys Mayor Paul Ingram and Councilman Mike Hendricks took part in the process as did County Commissioners Larry Barnhart and Jim Cotrill. Additionally, the LEPC, volunteer fire departments and County Administrator Tina Oldfield provided input.

Representatives of local volunteer fire departments, ambulance service, and the Director of Emergency Services attended the public meeting in Ritchie County and offered valuable feedback on updating the hazard mitigation plan. Ensuing conversations with the Mayor of Harrisville, Pennsboro, Cairo, Ellenboro, Pullman and Auburn addressed issues in these small towns.

Due to a scheduling mix-up, only one person attended the public meeting in Roane County. Consequently another meeting was held with the LEPC that MOVRC staff attended by conference call. The LEPC meeting included participation by a member of the Roane County Commission, Spencer public works, and Reedy council. Progress realizing the goals of the previous plan was the major point of discussion. Hazard risks and integration with other plans were also addressed.

Tyler County Emergency Services Director provided the greatest detail regarding the status of the current plan. Further input came from interviews with LEPC members, the Mayors of Sistersville, Paden City, Middlebourne and Friendly and members of the Tyler County Commission.

Both the Wirt County Commission and the Mayor of Elizabeth, as well as county emergency services personnel, presented information on implementation of the mitigation measures from the existing plan, both during the public meeting and in one on one discussions. The Emergency Services Director provided additional follow-up information.

As the largest county in the region Wood County has the most development and the most active local government agencies both in terms of regulating development and emergency services. The Wood County Commission and the municipalities of Parkersburg, Vienna, and Williamstown have code enforcement staff that provides vigorous enforcement of regulations to ensure public health and safety. In addition to these agencies the LEPC was well represented at the public meeting and provided thoughts on integrating plans to avoid duplication.

The Director of Wood County Emergency Services provided valuable input throughout the process and the Development Director for the City of Parkersburg helped integrate the City's plan into the process.

Representatives from the City of Vienna and Town of North Hills were unable to attend the public meeting, but input was provided in subsequent conversations with the City of Vienna Mayor and Public Works Director and the North Hills Mayor.

All of this input was used to update each of the sections of the plan. The public meetings and subsequent conversations with local government representatives reinforced the earlier hazard mitigation plans' emphasis on flooding, winter storms and severe winds. Additional analysis was done on some of the moderate risks, but ultimately the focus for mitigation strategies remained on those risk areas previously identified. Most of the planning effort centered on mitigation strategies. Both at the public meeting and in individual interviews the mitigation strategy section of the existing plan was reviewed and each strategy was evaluated in terms of how well it had been addressed and whether it was complete or was an on-going measure. Additionally, new strategies were discussed and added to the plan as needed.

Assessing the plan maintenance section was interesting. We found that while many of the mitigation strategies have largely been implemented, it was done in the absence of any formal plan maintenance meetings. Therefore, this plan will contain more detailed and realistic plan maintenance steps, with one party responsible for initiating each activity to insure that plan maintenance measures are carried out.

Lastly, each local government from throughout the region contributed to the final plan by reviewing the draft and, as needed, making comments and suggestions for changes. Each County Commission, City Council and Town Council that adopted the plan satisfied itself that the plan fairly represented desires and needs of its jurisdiction.

## Hazard Identification and Risk Assessment

All natural hazards were considered by the core planning team during the initial plan development in 2003 for each community. Many of the natural hazards identified were subsequently ruled out based on the perceived insignificance of the threat due to geography, topography, and climate. An assessment matrix was developed in an effort to prioritize and assign risk to each natural hazard identified. Table I-1 demonstrates a model of this matrix, followed by tables I -2, I-3 and I-4 which give greater detail of the assessment criteria. This same identification and risk assessment process was used during the update in 2008 as well.

|                    |              | Risk Exposure |          |            |          |          |   |
|--------------------|--------------|---------------|----------|------------|----------|----------|---|
|                    |              | Frequent      | Likely   | Occasional | Remote   | Unlikely |   |
|                    |              | <i>A</i>      | <i>B</i> | <i>C</i>   | <i>D</i> | <i>E</i> |   |
| E - Extremely High |              |               |          |            |          |          |   |
| H - High           |              |               |          |            |          |          |   |
| M - Moderate       |              |               |          |            |          |          |   |
| L - Low            |              |               |          |            |          |          |   |
| SEVERITY           | Catastrophic | <i>I</i>      | E        | E          | H        | H        | M |
|                    | Critical     | <i>II</i>     | E        | H          | H        | M        | L |
|                    | Moderate     | <i>III</i>    | H        | M          | M        | L        | L |
|                    | Negligible   | <i>IV</i>     | M        | L          | L        | L        | L |

| <b>Table I-2: Severity Criteria and Descriptions</b> |  |
|--|--|
| <b>I. Catastrophic</b>                               | Death or permanent area system/infrastructure destruction, major property damage (total assets/building losses).       |
| <b>II. Critical</b>                                  | Permanent partial or temporary infrastructure loss or disability, major damage, or significant assets/property damage. |
| <b>III. Marginal</b>                                 | Temporary outages, isolated areas of marginal loss, minor infrastructure damage, minor property damage.                |
| <b>IV. Negligible</b>                                | First aid or minor supportive medical treatment, minor system impairment. Little or no impact on production.           |

| <b>Table I-3: Probability Criteria and Descriptions</b> |                                      |                                   |                           |                              |                            |
|---|--------------------------------------|-----------------------------------|---------------------------|------------------------------|----------------------------|
|   | <b>A. Frequent</b>                   | <b>B. Likely</b>                  | <b>C. Occasional</b>      | <b>D. Remote</b>             | <b>E. Unlikely</b>         |
| <b>Individual Property</b>                              | Occurs often or several times a year | Expect at least once a year or... | Expect once every 5 years | Possible once every 50 years | Assume 100 year occurrence |
| <b>Individual Business Property</b>                     | Continuously experienced             | Numerous cases, but intermittent  | Expect once every 5 years | Isolated incidents           | Assume 100 year occurrence |
| <b>Commercial or Industrial</b>                         | Occurs often or several times a year | Expect at least once a year or... | Expect once every 5 years | Possible once every 50 years | Assume 100 year occurrence |
| <b>All Areas exposed</b>                                | Continuously experienced             | Numerous, but intermittent        | Expect once every 5 years | Isolated incidents           | Assume 100 year occurrence |

| <b>Table I-4: Risk Levels</b> |   |
|-------------------------------|---|
| <b>Extremely High</b>         | Loss of life, Infrastructure, major property damage/destruction, NOT recoverable.         |
| <b>High</b>                   | Significant property loss, temporary Infrastructure loss, inability to recover completely |
| <b>Medium</b>                 | Area degradation, property loss, moderate recovery causes business to relocate            |
| <b>Low</b>                    | Isolated areas of medium to low impact, nuisance damage, reoccurring damage.              |

### Eliminated Risks

The following listed risks and accompanying narrative are those determined by the Core Planning Team to be either not relevant to the local area or to be of such a small frequency (likelihood) of ever occurring (based on historical research) determining the impact for these events is not practical for the purposes of this effort.

**Avalanche:** an avalanche is not a threat in our region for two reasons. First, the terrain of the region is not conducive to avalanches. Although the general contour of the land in the county is mostly hills, they are not steep enough to cause any avalanche activity. The second factor is the amount of snowfall in the area. The amount of snowfall this region receives is insufficient for any kind of avalanche.

**Coastal Erosion:** the Region is 450 miles from the Atlantic Ocean. Due to the distance from the coast, coastal erosion is not a significant risk for our Region.

**Coastal Storm:** coastal storms are not a threat to the Region. The only hazard associated with coastal storms is rain, which will be addressed later.

**Hurricane:** hurricanes primarily affect coastal towns. Our region’s distance from the Ocean acts as a buffer, diminishing the force of a hurricane. The only threats associated with a hurricane are rains or flooding, which will be addressed later.

**Land Subsidence:** historically there have been no problems in our area associated with land subsidence. There has been no active coal mining in the area and the geology of the area does not contain any Karst geologic conditions.

**Tsunami:** the distance between the ocean and the Region, and the Appalachian Mountains, protect us from any chance of a tsunami.

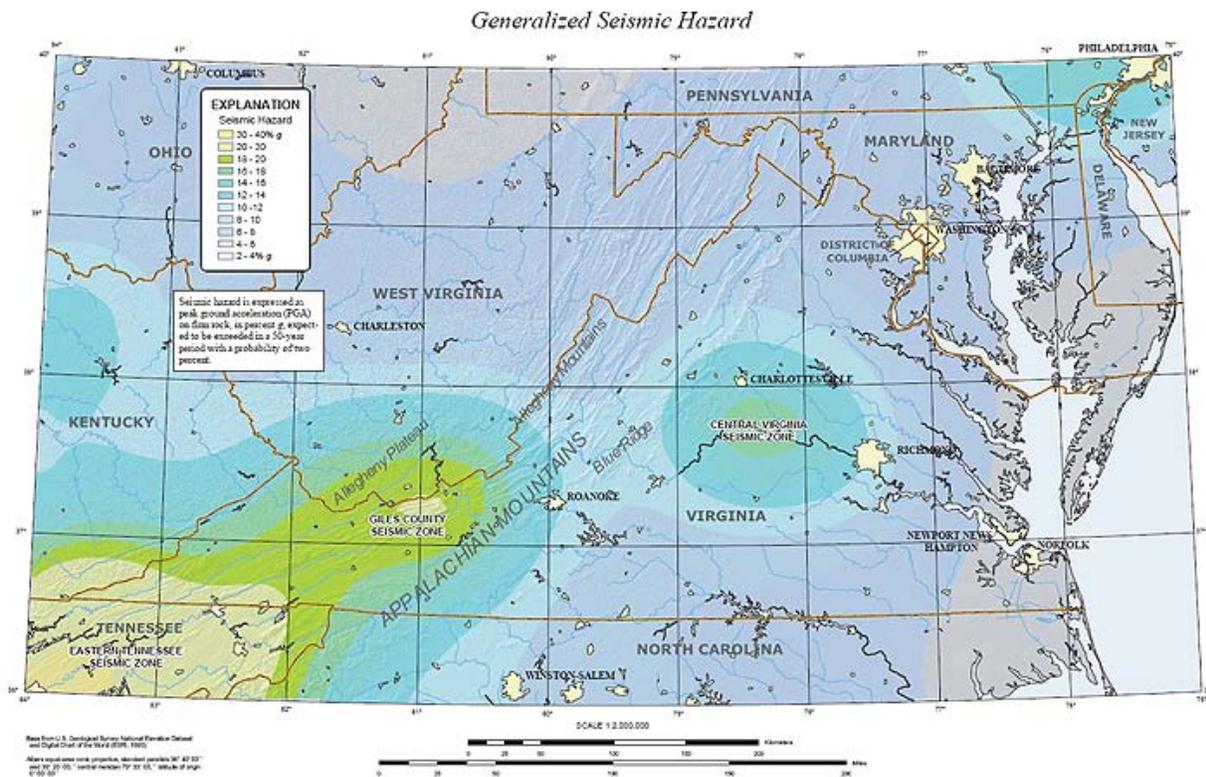
**Volcano:** no active volcanoes exist on the east coast. The chances of the Region being affected directly by any volcano are practically non-existent.

## Low Risks

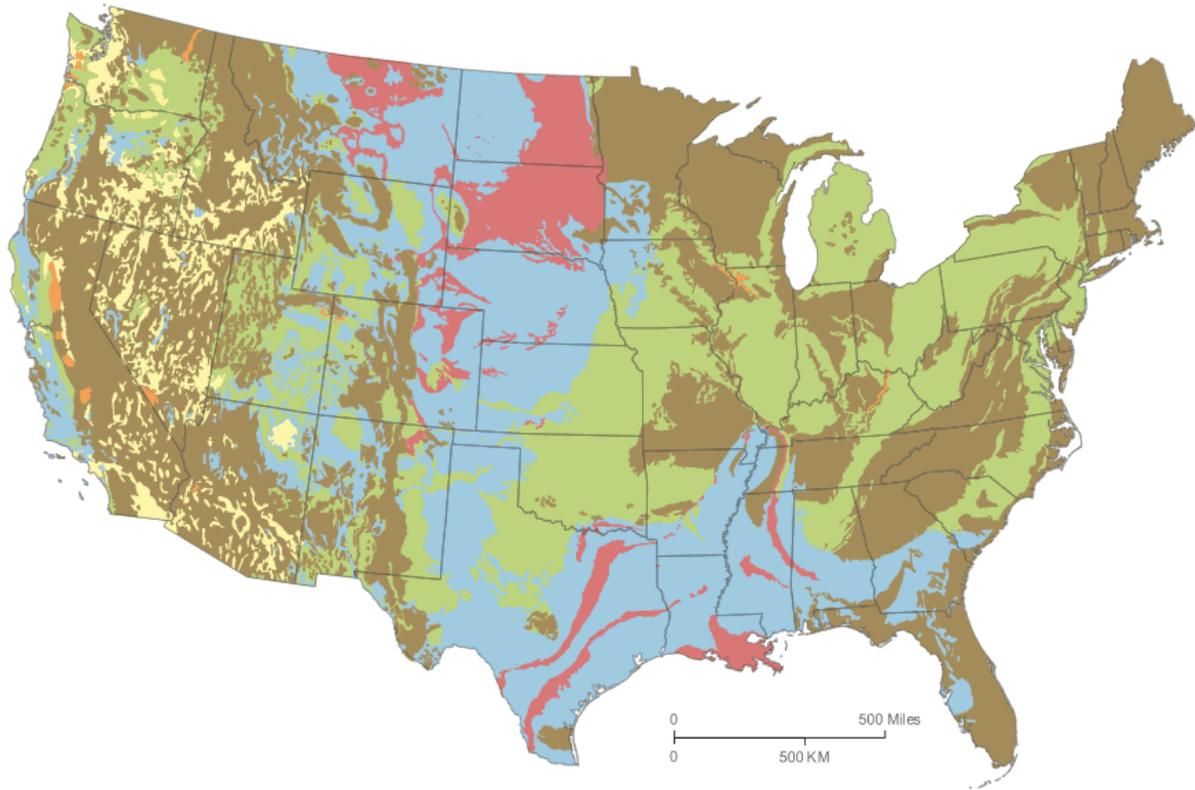
**Dam Failure:** With a history that includes the Buffalo Creek disaster, dam failure is a serious issue in West Virginia. However, the Mid-Ohio Valley has no coal mining nor the dams associated with it. There are several large impoundments in the region, most notably North Fork Hughes River Lake, O'Brien Lake, Woodrum Lake, Charles Fork Lake, Conaway Lake, Pond Run, Mountwood Lake and Lake Washington. Most are located in rural areas with no development immediately downstream, thereby lessening the potential impact of a dam failure. North Fork Hughes River Lake and Charles Fork Lake are the most conspicuous exceptions. The Town of Cairo and the City of Spencer are downstream of these reservoirs.

Dam safety is not a local government responsibility; therefore, none of the County Commissions nor any of the cities in the region have inspection programs. The West Virginia Department of Environmental Protection does have primary responsibility for dam safety. The best mitigation measure is to insure that a quality inspection program continues.

**Earthquake:** The map below indicates a very low risk of noteworthy earthquake damage and history supports this conclusion. Only a few times have tremors been recorded in the region and none have been strong enough to cause structural damage.



**Expansive Soils:** the map below shows the Mid-Ohio Valley in the lowest risk category for damage from expansive soils.



© Geology.com

- Over 50 percent of these areas are underlain by soils with abundant clays of high swelling potential.
- Less than 50 percent of these areas are underlain by soils with clays of high swelling potential.
- Over 50 percent of these areas are underlain by soils with abundant clays of slight to moderate swelling potential.
- Less than 50 percent of these areas are underlain by soils with abundant clays of slight to moderate swelling potential.
- These areas are underlain by soils with little to no clays with swelling potential.
- Data insufficient to indicate the clay content or the swelling potential of soils.

The map above is based upon "Swelling Clays Map of the Conterminous United States" by W. Olive, A. Chleborad, C. Frahme, J. Shlocker, R. Schneider and R. Schuster. It was published in 1989 as Map I-1940 in the USGS Miscellaneous Investigations Series. Land areas were assigned to map soil categories based upon the type of bedrock that exists beneath them as shown on a geologic map. In most areas, where soils are produced "in situ", this method of assignment was reasonable. However, some areas are underlain by soils which have been transported by wind, water or ice. The map soil categories would not apply for these locations.

**Extreme Heat:** Although temperatures occasionally reach dangerous levels, historically they have not remained at those levels for extended periods of time.

**Tornado:** The data below is from the Tornado History Project web site and indicates that few tornadoes have touched down in the region – only eleven in nearly sixty years, all a 2 or less on the Fujita scale . Only two tornados have resulted in injury.

Additionally, the Core Planning Team retained Severe Winds as a significant risk. Many of the mitigation measures for Tornados would be similar.

| <u>SPC #</u> | <u>Date</u> | <u>Fujita</u> | <u>Fatalities</u> | <u>Injuries</u> | Affected Counties |
|--------------|-------------|---------------|-------------------|-----------------|-------------------|
| 361          | 7/19/1963   | 1             | 0                 | 0               | Jackson           |
| 644          | 7/28/1981   | 2             | 0                 | 3               | Pleasants         |
| 560          | 6/12/1989   | 1             | 0                 | 0               | Roane             |
| 205          | 5/23/2000   | 1             | 0                 | 0               | Tyler             |
| 182          | 8/9/1950    | 1             | 0                 | 0               | Wood              |
| 169          | 6/26/1951   | 1             | 0                 | 1               | Wood              |
| 335          | 6/12/1968   | 0             | 0                 | 0               | Wood              |
| 561          | 6/12/1989   | 0             | 0                 | 0               | Wood              |
| 14           | 1/8/1998    | 2             | 0                 | 0               | Wood              |
| 149          | 5/21/2001   | 0             | 0                 | 0               | Wood              |
| 531          | 7/10/2003   | 2             | 0                 | 0               | Wood              |

TornadoHistoryProject.com Copyright © Joshua Lietz 2005-2009  
[Contact](#) | [Terms and Conditions](#) | [Privacy Policy](#)

\*Data within this database has been pulled from the [Storm Prediction Center's \(SPC\) historical tornado data file](#). Thus, the data included here is only as accurate as the data in the official SPC archive.

**Landslides:** According to the United States Geologic Survey nearly all of West Virginia is located in a zone of high incidence of landslides. Generally these are small, localized land movements. Highways are the resource most affected by landslides. Rainfall is a contributing factor to destabilizing slopes. Therefore, landslides impacts often occur as a result of storms that also produce flooding. Outside of impacts on highways the region has not historically sustained major damage from landslides.

Damages to highways are a concern of the West Virginia Department of Transportation, not local units of government and, therefore, cannot be addressed by the local governments in the region. Mitigating potential landslide damage to highways would involve enormous sums of money to stabilize slopes in proximity to highways.

## Significant Risk

Natural hazards identified in the region that represent significant risk include flooding, winter storms, and severe winds. These are defined as the following:

- **Flooding:** flooding is defined as the accumulation of water within a water body and the overflow of excess water onto adjacent floodplain lands. The floodplain is the land adjoining the channel of a river, stream, ocean, lake or other watercourse or water body that is susceptible to flooding. Flooding can be separated into several types: riverine flooding including overflow from a river channel, flash floods, alluvial fan floods, ice-jam floods, riverine flooding including dam-break floods; local drainage or high groundwater levels; fluctuating lake levels; coastal flooding including storm surges and tsunamis; debris flow; and subsidence.

The region has been subject to, and continues to be at a high risk for flooding that would be considered to be catastrophic as defined in Table I-2: Severity Criteria and Descriptions. The degree of risk varies for structures throughout the floodplain due to differing elevations of each structure. However, a significant number of structures, mostly residential with a few commercial, are exposed to occasional risk as shown on Table I-3: Probability Criteria and Descriptions.

- **Winter Storm:** winter storm is defined as a storm with significant snowfall, ice and/or freezing rain; the quantity of precipitation varies by elevation. Heavy snowfall is four or more inches in a 12-hour period, or six or more inches in a 12-hour period, or six or more inches in non-mountainous areas.

The Mid-Ohio Valley region is at a high risk of critical damage from winter storms as defined in Table I-2: Severity Criteria and Descriptions. Public infrastructure and residential and commercial structures face an occasional risk as defined by Table I-3: Probability Criteria and Descriptions.

- **Severe Winds:** severe winds are defined as winds sustained at 25 to 39 mph and/or gusts to 57 mph. Issuance is normally site specific.

The Mid-Ohio Valley region is at a high risk of critical damage from severe winds as defined in Table I-2: Severity Criteria and Descriptions. Residential and commercial structures, as well as utilities (especially electric) face a likely risk as defined by Table I-3: Probability Criteria and Descriptions.

## Assessment of Risk

During the Hazard Identification process three significant risks were identified – flooding, winter storm, and severe winds. This section will assess these risks in order to help evaluate and prioritize potential mitigation activities. Consideration will be given to past disaster declarations, historical data, and an inventory of assets at risk.

### Winter Storms

There have been few federal disaster declarations for winter storms in the Mid-Ohio Valley region. However, the region does have a history of winter storms that are severe enough to require emergency response. The risk from winter storms is fairly uniform throughout all of the counties and each municipality. Risks associated and identified with Severe Winter Storms include, but are not limited to, the following:

- emergency medical evacuation of the sick, elderly, and infirm to shelters.
- power outages to those on life support systems.
- communication interruptions.
- emergency fire/rescue accessibility.
- the ability to heat homes.
- interruption of home supplies and foodstuffs

Above described events fall within two general categories: road closures due to snowdrifts and/or ice, and utilities failures (due to damaged supply lines). Additionally, data indicates that structural damage has occurred in several instances in the past, because of extremely heavy snowfall. Structures damaged were usually out buildings such as barns, garages, carports, etc.

National Climatic Data Center records show an extreme low temperature of -34 degrees at Middlebourne (Tyler County) in January, 1994. The records vary by station, but many go back nearly 100 years. Snowfall records were not as readily available. The NCDC did have records for the period 1971 to 2000. During that period the greatest three day snowfall event was recorded at Bens Run (also in Tyler County) with a depth of 30 inches. These records are included in Appendix F.

Despite the existence of these records, defining the extent of potential damage is difficult. The greatest risk from winter storms is not the extreme temperature or snow. Instead it is damage from falling trees, especially damage to power lines that interrupts service. Ten inches of “dry” snow is not nearly as problematic as 5 inches of “wet” snow. The wet, heavy snow causes more damage. Freezing rain or “ice storms” have a similarly devastating effect.

### Severe Winds

As previously discussed, the Mid-Ohio Valley is not a high risk area for tornados. Therefore, tornadoes, straight line winds and wind damage in general are considered together as severe winds. There have been few federal disaster declarations for severe wind events in the Mid-Ohio Valley. However, the region does have a history of severe winds that are strong enough to cause

significant property damage. Most damage is caused by trees or tree limbs being blown over and damaging property or disrupting electric service and telephone land line service. Downed trees also block highways, thus impacting emergency response. Additionally, winds damage mobile homes, houses and other structures, particularly roofs. Severe winds tend to be localized with each occurrence. However, the risk of an occurrence is region wide, including each municipality.

Just as this plan was being completed the worst severe wind event in memory occurred in Belleville (Wood County) and surrounding communities. On the evening of September 16, 2010 an F3 tornado (in excess of 160 mph winds) struck the Belleville area of Wood County. The results of this tornado were one death and approximately ten injuries (not requiring hospitalization), 16 destroyed or severely damaged structures and 28 other structures receiving lesser damage. A tornado also touched down in Wirt County causing additional damage.

## Flooding

The Mid-Ohio Valley has a history of significant flooding. The counties in the region have been included in numerous federal disaster declarations over the years. Flooding is the most frequent and the most damaging natural hazard which the region faces.

Below is information on some of the flooding levels that have been reached in each of the counties. It is not an all encompassing list, but does give some idea of the frequency and extent of the flooding problem faced by the region.

### Calhoun County

Streams within the county that were identified as problematic and that have a history of running out of their banks include:

|                                   |               |
|-----------------------------------|---------------|
| Little Kanawha River              | Bull Creek    |
| West Fork of Little Kanawha River | Walker Creek  |
| Steer Creek                       | Leading Creek |
| Left Fork Run                     |               |

Notable floods in Calhoun County (Grantsville) with the Flood Stage at Glenville at 23 ft. include the following:

| DATE           | FLOOD STAGE |
|----------------|-------------|
| • Mar 13, 1918 | 42.7 ft     |
| • Nov 16, 1926 | 39.9 ft     |
| • Jan 30, 1932 | 36.5 ft     |
| • Feb 4, 1939  | 37.03 ft    |
| • Apr 16, 1939 | 43.1 ft     |
| • Apr 13, 1948 | 36.84 ft    |
| • Dec 16, 1948 | 39.5 ft     |

- Feb 2, 1951 39.47 ft
- Dec 15, 1956 36.42 ft
- Mar 7, 1967 43.7 ft
- Jan 26, 1978 39.3 ft
- Nov 5, 1985 42.72 ft
- Mar 7, 1989 36.1 ft
- Feb 9, 1994 39.35 ft
- Mar 2, 1997 40.33 ft
- Feb 18, 2000 39.5 ft
- Mar 21, 2002 36.5 ft

Record Stage at Grantsville: 43.9 feet  
 Flood Stage at Grantsville: 36 feet  
 Action Stage at Grantsville: 24.1 feet

Gage datum 652.83 feet above sea level

At 36 ft or “Flood Stage” Houses and Businesses along River Street in Grantsville are flooded.

### Jackson County

Streams within the county that were identified as problematic and that have a history of running out of their banks include:

- Ohio River (Ravenswood, Millwood)
- Mill Creek (Ripley)
- Sandy Creek (Sandyville)
- Pocatalico Creek (Goldtown)

The most notable recent flood was in 1996, which resulted in many evacuations throughout the county and crested at 47.7 ft on January 22, 1995.

Notable floods in the last 25 years include the following:

- The 1978 flood crested at 41.6 ft. at Racine Locks (1/28)
- The 1978 flood crested at 45.4 ft. at Racine Locks (12/10)
- The 1986 flood crested at 40.1 ft. at Racine Locks
- The 1990 flood crested at 43.3 ft. at Racine Locks
- The 1991 flood crested at 46.5 ft. at Racine Locks
- The 1994 flood crested at 46.9 ft. at Racine Locks
- The 1996 flood crested at 47.7 ft. at Racine Locks
- The 1997 flood crested at 47.0 ft. at Racine Locks
- The 1998 flood crested at 42.7 ft. at Racine Locks (1/11)
- The 1998 flood crested at 42.7 ft. at Racine Locks (6/30)

Backwater flood elevations for the above listed streams are directly affected by the level of the Ohio River and in turn the ability to discharge into the pool from upstream sources. Mill Creek

and Sandy Creek have structures and residences in close proximity to the streams. Mill Creek is controlled to some extent by a series of small dams but the combination of a rapid run-off and flooding in the Ohio River will create problems from Ripley to Millwood. A rapid run-off on Sandy Creek and flooding on the Ohio River will cause problems from Sandyville through Silverton and on to Ravenswood.

## Pleasants County

Extensive flood plain lands along the Ohio River and areas lying along tributary streams are subject to Ohio River flooding through the effects of backwater flooding. These streams include Middle Island Creek, French Creek, and Bull Run, the latter of which forms the Pleasants/Wood County line at the down stream end of the county.

Several floods have reached levels that put OES and other entities within the community on alert. The most notable of these was the 1995, which resulted in the evacuation of Wrights Mobile Home Park at the confluence of French Creek and the Ohio River and flooding of the upper portion of Raven Rock.

Major notable floods have occurred along the Ohio River in the 20<sup>th</sup> Century. For this assessment the 1913 flood profile will be viewed as the "reasonable" upper limit for probable future flooding. This upper limit is consistent with data and documents prepared by the U.S. Army Corps of Engineers in their 1974 report "Flood Plain Information: Ohio River, Pleasants County West Virginia". The flood level recorded in the 1913 flood was 631.1. Using the 631.1 level as a reasonable upper limit, the U.S. Army Corps of Engineers also established an Intermediate Regional Flood level of 625.1, which corresponds to a "frequency of occurrence" on the order of once in 100 years. For purposes of this assessment the frequency of occurrence elevation will be referred to as the 100-Year flood plain elevation.

Past flood crest elevations for crest elevations above El. 615.0 include:

- February 1884 El. 627.3
- March 1907 El. 625.3
- March 1913 El. 631.1
- January 1937 El. 626.9
- March 1964 El. 619.6
- June 1972 El. 615.4

## Ritchie County

The new Hughes River Dam project was designed, in part, to address some of the local flooding concerns as well as provide a recreational area within the county.

The completion of the dam has neither benefited nor adversely affected the frequency of local flooding to this date. However data indicates that the smaller and more frequent floods caused by heavy rains and rapid spring snowmelts will be diminished at various up stream and down

stream locations. It is anticipated that the dam will provide a buffer for occasional heavy rains and snow "melt off" in a significant portion of the drainage area.

Streams within the county that were identified as problematic and that have a history of running out of their banks include:

- Goose Creek (Nutter Farm Area)
- Goose Creek (Petroleum Area)
- Bonds Creek (Pike Area)
- Horners Run (Pennsboro Area)
- Bunnels Run (Pennsboro Area)
- North Fork of The Hughes River (Cairo)
- Right Fork of Bone Creek (Auburn)
- Hushers Run (Ellenboro)
- Left Fork of Slab Creek (Pullman)
- South Fork of Hughes River (Smithville and Westward)

Major notable floods have occurred along the Hughes River in the 20<sup>th</sup> Century. For this assessment the flood profiles will be viewed as the "reasonable" based on past histories and probabilities of future flooding. Flooding in Ritchie County differs from neighboring counties along the Ohio River in that the floods tend to be very localized and do not last as long. Another characteristic of localized flooding in this area is that the damage caused would be consistent with higher velocity stream discharges. In contrast the Ohio River, for example, rises rather slowly and remains out of banks for longer periods of time and the higher stream velocities tend to be in the main channel area.

The flood level noted on the FIRM maps and data collected by the Core Team will be used for the assessment of risk for the local listed areas.

Past flood events:

| Date | Location    | Property Type          | Stream               |  |
|------|-------------|------------------------|----------------------|--|
| 1950 | Cairo       | 50 Homes /<br>Business | N. Fork of<br>Hughes |  |
| 1994 | Cairo       | 20 Home /<br>Business  | N. Fork of<br>Hughes |  |
| 1996 | Cairo       | 20 Home /<br>Business  | N. Fork of<br>Hughes |  |
| 1998 | Cairo       | 20 Home /<br>Business  | N. Fork of<br>Hughes |  |
| 2000 | Cairo       | 20 Home /<br>Business  | N. Fork of<br>Hughes |  |
| 1998 | Nutter Farm | 5 Homes                | Goose Creek          |  |
| 1975 | Beatrice    | 3 Homes                | S. Fork of Hughes    |  |
| 1994 | Beatrice    | 3 Homes                | S. Fork of Hughes    |  |
| 1999 | Beatrice    | 3 Homes                | S. Fork of Hughes    |  |
| 1998 | Toll Gate   | 7 Homes                | N. Fork of<br>Hughes |  |
| 1950 | Pullman     | 2 Businesses           | Left Fork Slab       |  |

|      |             |                         |   |                                    |
|------|-------------|-------------------------|---|------------------------------------|
|      |             |                         | Creek                                       |                                    |
| 1950 | Smithville  | 7 Homes /<br>business   | S. Fork of Hughes                           |                                    |
| 1991 | Ellenboro   | 10 Houses /<br>Business | Hushers Run                                 |                                    |
| 1998 | Ellenboro   | 10 Houses /<br>Business | Hushers Run                                 |                                    |
| 1998 | Petroleum   | 5 Deaths                | Goose Creek                                 | High Water<br>Bridge               |
| 1998 | Upper Cairo | 5 Houses                | Addis Run                                   |                                    |
| 1998 | Macfarland  | 9 Houses/<br>Business   | S. Fork of Hughes                           |                                    |
| 1998 | Pennsboro   | 6 Businesses            | Bunnells Run                                |                                    |
| 1998 | Pennsboro   | 21 Homes /<br>Church    | Bunnells Run                                | Blocked<br>Culvert<br>Frame Street |
| 1950 | Auburn      | 16 Homes /<br>Church    | Bone Creek                                  |                                    |
| 1950 | Berea       | 15 Home /<br>Church     | South and Middle<br>Fork of Hughes<br>River |                                    |

## Roane County

Streams within the county that were identified as problematic and those that have a history of running out of their banks include:

| <u>Stream Name</u>     | <u>Location</u>              |
|------------------------|------------------------------|
| • Reedy Creek          | Reedy                        |
| • Spring Creek         | Spencer                      |
| • Left-hand Run        | US 119                       |
| • Cottontree Run       | Cottontree Road @ Walton     |
| • Little Left-hand Run | Little Left-hand Road @ Amma |
| • Slate Run            | Slate Road                   |
| • Laural Run           | US 33 east of Spencer        |
| • Right Fork (@US 119) |                              |
| • Silcott Run          |                              |
| • Roost Run            |                              |
| • Dog Creek (@Rt. 36)  | Clay Road (Rt. 36)           |
| • Granny Creek         | Newton                       |

- Little Pigeon Run
  - Pigeon Run
  - Goff Run
  - Pocatalico River
  - Big Lick Run
  - Boggs Run
  - Tanner Creek
  - Tucker Run
- Little Pigeon Road  
Big Pigeon Road
- Spencer and surrounding areas

Several streams flow into or are in close proximity to the county seat at Spencer. Spring Creek parallels Capital Street and is joined with Goff Run west of Main Street. Spring creek is also joined by Tanner Run on the West side of Front Street opposite the intersection of Elm Street and Front Street.

The major population center within the county is Spencer, the county seat. Other areas include Reedy and Walton. The main highways are US 119 and US 33. It should be noted that due to the topography most of the roads in Roane parallel steams, creeks, and rivers.

Major notable floods have occurred along Reedy Creek, Spring Creek, Goff Run, Hurricane Creek, Big Sandy and Tanner Run. For this assessment the flood profiles will be viewed as "reasonable" based on past histories and probabilities of future flooding. Flooding in Roane County differs from neighboring counties along the Ohio River in that the floods tend to be at times very intense and of short duration. Characteristics of localized flooding in this area are that the damage caused would be consistent with higher velocity stream discharges. In contrast the Ohio River, for example, rises rather slowly and remains out of banks for longer periods of time and the higher stream velocities tend to be in the main channel area.

## Tyler County

Major notable floods have occurred along the Ohio River in the 20<sup>th</sup> Century. For this assessment the 1913 flood profile will be viewed as the "reasonable" upper limit for probable future flooding. This upper limit is consistent with data and documents prepared by the Federal Emergency Management Agency on November 4, 1988. The flood level recorded in the 1913 flood was 642.3. Using the 642.3 level as a reasonable upper limit, the U.S. Army Corps of Engineers also established an Intermediate Regional Flood level of 625.1 which corresponds to a "frequency of occurrence" on the order of once in 100 years. For purposes of this assessment the frequency of occurrence elevation will be referred to as the 100-Year flood plain elevation.

Several floods have reached levels that put OES and other entities within the community on alert. The following is a list of creeks in Tyler County that tend to flow out of their respective banks during torrential rains and rapid snow melts. Damage records from these streams are incomplete.

- Point Pleasant Creek
- Indian Creek
- Buffalo Run
- Elk Fork
- Sancho Creek

- Middle Island Creek
- Pursley Creek
- Gorrell Run
- McElroy Creek
- Sugar Creek

Notable floods occurred above Middlebourne on Middle Island Creek in the mid 1980's at Blue. Middle Island Creek at the confluence of Gorrell Run created high water problem in 2000. Floods in around these creeks range from nuisance events to intermediate property loss events and are relatively short in duration.

Bens Run, Huffman Run, and Sugar Camp Run are controlled by the water levels on the Ohio River and are therefore considered part of the 100-year flood plain for that basin.

Major notable floods have occurred along the Ohio River in the 20<sup>th</sup> Century. For this assessment the 1913 flood profile will be viewed as the "reasonable" upper limit for probable future flooding.

Past flood crest elevations for crest elevations above El. 630.0 include:

|         |      |           |
|---------|------|-----------|
| March   | 1913 | El. 642.3 |
| March   | 1936 | El. 640.8 |
| January | 1937 | El. 638.2 |
| January | 1943 | El. 638.8 |
| March   | 1964 | El. 635.7 |
| June    | 1972 | El 631.7  |

## Wirt County

Streams within the county that were identified as problematic and that have a history of running out of their banks include:

- Hughes River/Little Kanawha River (Greencastle)
- Little Kanawha River (Newark/Newark Road)
- Little Kanawha River (Elizabeth)
- West Fork (Creston)
- Spring Creek (Sonoma)

Flood stage is 36 feet on the Little Kanawha River. The ten highest known flood crests are shown below:

### Top 10 Historical Crests

- (1) 40.04 ft on 03/03/1997
- (2) 39.14 ft on 03/07/1967
- (3) 36.44 ft on 02/24/2003
- (4) 36.37 ft on 12/10/1978
- (4) 36.37 ft on 12/10/1979
- (6) 36.04 ft on 02/19/2000
- (7) 35.00 ft on 01/26/1978
- (8) 34.43 ft on 11/06/1985

- (9) 34.22 ft on 02/02/1951
- (10) 33.56 ft on 01/12/1974

Major notable floods have occurred along the Little Kanawha River in the 20<sup>th</sup> Century. For this assessment and further study the flood profiles will be viewed as the "reasonable", elevations based on past history and probabilities of future flooding. Flooding in Wirt County differs from neighboring counties along the Ohio River in that the floods tend to be, at times, very localized but can be affected by back waters of the Ohio River when a large Flood event occurs. Another characteristic of localized flooding in this area is that the damage caused would be consistent with higher velocity stream discharges. In contrast, the Ohio River, for example, rises rather slowly and remains out of banks for longer periods of time with higher stream velocities in the main channel area.

## Wood County

Notable past floods include the following:

- 1907 Flood - In 1907, there were two floods.
  - January 21, 1907, the first flood crested at Marietta at 38.8 feet. March 15, the second flood crested at 50.5 feet at Marietta."
- 1913 Flood - The 1913 flood was the biggest one of them all.
  - The flood crested at 58.7 feet in Marietta on March 29.
- 1936 and 1937 Floods - From February 1936 to December 1937, there were five floods.
  - The first crested Feb. 29 at an unimpressive 35.0 feet in Marietta. However, March 20 reached 48.1 feet and March 28 reached 40.4.
- Record flooding for the two-year period was on Jan. 27, 1937, when the crest at Marietta was 55.0 which was 51.5 at Beavertown Lock No. 16.

Notable recent floods include the following:

- The 1966 flood crested at 38.9 ft. at Parkersburg
- The 1967 flood crested at 39.2 ft. at Parkersburg
- The 1972 flood crested at 36.8 ft. at Parkersburg
- The 1978 flood crested at 36.5 ft. at Parkersburg
- The 1979 flood crested at 40.0 ft. at Parkersburg
- The 1990 flood crested at 36.8 ft. at Parkersburg
- The 1994 flood crested at 39.4 ft. at Parkersburg
- The 1996 flood crested at 40.7 ft. at Parkersburg
- The 1997 flood crested at 37.0 ft. at Parkersburg
- The 2004 flood crested at 43.7 ft. at Parkersburg, the highest in 40 years. 19 homes destroyed and hundreds affected.

- The 2005 flood crested at 42.4 ft. at Parkersburg.

Major notable floods have occurred along the Little Kanawha River and the Ohio River System in the 20th Century. For this assessment the flood profiles will be viewed as "reasonable" based on past histories and probabilities of future flooding. Flooding in Wood County differs from neighboring counties along the Ohio River in that the floods tend to be at times very localized, but can be also be affected by back waters of the Ohio River when a large flood event occurs. In contrast the Ohio River, for example, rises rather slowly and remains out of banks for longer periods of time and the higher stream velocities tend to be in the main channel area. Backwaters from these extended periods of "out-of-bank" conditions create localized problems such as road access (inaccessible roads), population isolation (homes and businesses not accessible), and water damage to buildings in the flood zone.

The backwater areas include Bull Creek at the northern end of the county at Waverly, Williamstown wetlands area, Briscoe Run at Vienna, Little Kanawha River from Parkersburg through Worthington Creek, Tygart Creek, Walker Creek, Slate Creek, and the Hughes River confluence.

At Belleville the Ohio River Datum "Gage Zero" elevation is 548.0 ft. Pool elevation for the Ohio River at Parkersburg is at or about 582.0 ft and "Gage Zero" is at 561.9 ft. This data represents a normal pool gage at 20.1. The following examples will illustrate the relevance of these numbers to each other and their relevance to the flood plain area.

Flood stage at 36 ft (considered minimal) will cause problem on the Little Kanawha River from Parkersburg up river past Tygart Creek at Mineral Wells. Floodwalls protect most areas and structures within the city of Parkersburg however a flood stage of 41 ft. will inundate the C & O Rail Road tracks within the city. Flood stage of between 36 ft and 41 ft (El. 597.8 and 602.8 respectively) will flood Neal Creek at South Parkersburg and Worthington Creek at North Parkersburg. Critical facilities within Parkersburg are effectively protected by the floodwall or are at an elevation that only a flood of Biblical proportions would reach. The highest flood level recorded in the 20th Century was the 1913 flood at 58.9 feet or El. 620.7 ft. This level would put water in Parkersburg on Market Street up to between 5th and 6th Streets.

The 100-year event level is arbitrarily set at 48 ft or El. 609.8 ft. because the Zero Gage Datum is arbitrarily set by the Army Corps of Engineers. This number is important as it provides a reference for other cities in the area (Vienna and Williamstown). This number can also vary due to crest characteristics and obstacles that affect velocities. For purposes of this document any structure or road that was determined to be at or near (within plus or minus 4 ft. of) the El. 605.0 ft. was considered to be in the flood plain.

### **Existing National Flood Insurance Program**

The Town of Grantsville, Calhoun County, City of Ravenswood, City of Ripley, Jackson County, Town of Belmont, City of St.Marys, Pleasants County, Town of Auburn, Town of Cairo, Town of Ellenboro, City of Pennsboro, Town of Pullman, Ritchie County, Town of Reedy, City of Spencer, Roane County, Town of Friendly, Town of Middlebourne, City of Paden

City, City of Sistersville, Tyler County, Town of Elizabeth, Wirt County, City of Parkersburg, City of Vienna, City of Williamstown and Wood County participate in the National Flood Insurance Program (NFIP). Each has an ordinance regarding flood plain development that is enforced through its building permit process and/or by code enforcement inspections. The Town of Auburn and the Town of Pullman rely on Ritchie County to enforce their floodplain ordinance. In 2007 Wood County enacted a revised ordinance that includes a provision for two feet of free board above the 100 year flood plain for all new building permits. The Town of North Hills and the Town of Harrisville do not participate in the flood insurance program since there is a low risk of flooding.

As of April 1<sup>st</sup>, 2003, communities across West Virginia were required to utilize the new West Virginia State Building Code, based on the International Building Code. The International Code incorporates many of the requirements of the National Flood Insurance Program (NFIP) regulations. This means that for the first time, NFIP requirements are part of the building code in addition to being incorporated into local laws required for participation in the NFIP.

Additionally, the State Building Code has requirements structural requirements that will lessen the likelihood of damage from winter storms or severe winds. The State Fire Marshall is responsible for enforcing the State Building Code in those communities that do not have their own code enforcement.

Each entity will continue to evaluate its program and determine if enhancements, such as Wood County's new ordinance, are warranted. Wood County, in particular, is analyzing the necessary steps to qualify for reduced flood insurance rates through the Community Rating System.

### **Inventory of Assets**

In assessing the potential risk associated with flooding it is beneficial to inventory those assets that are at risk. The Federal Emergency Management Administration has developed a software program named HAZUS that estimates the number of buildings located in the floodplain and forecasts the amount of damage that would occur in a given flood. For these purposes we are utilizing HAZUS data for a 100 year flood. The data were compiled by Michael Baker Inc. serving as a consultant to West Virginia Department of Military Affairs and Public Safety, Division of Homeland Security and Emergency Services.

A complete report for each of the following counties is contained in Appendix G: Calhoun, Pleasants, Ritchie, Roane, Wirt, and Wood. Michael Baker, Inc. has not completed its activities for all counties in West Virginia. The data for Tyler County is not currently available. When it becomes available it will be added to this document.

A summary of the data for each county is provided below. However, to see the entire report and the disclaimers associated therewith please see the Appendix. The disclaimers are important to the reader's knowledge of the utility of the data.

The table below indicates the forecast impact for each of the counties in the region:

|           | Number of Structures | Economic Loss      |
|-----------|----------------------|--------------------|
| Calhoun   | 28                   | \$ 34,050,000      |
| Jackson   | 680                  | \$ 309,930,000     |
| Pleasants | 267                  | \$ 118,380,000     |
| Ritchie   | 49                   | \$ 30,580,000      |
| Roane     | 107                  | \$ 38,760,000      |
| Tyler     |                      | Data not available |
| Wirt      | 56                   | \$ 21,050,000      |
| Wood      | 1,808                | \$ 979,660,000     |
| Total     | 2,995                | \$ 1,532,410,000   |

Source: Michael Baker, Inc. HAZUS reports.

It is also important to evaluate whether any critical facilities are at risk from future flood damage. A critical facility is defined as a building or site that will constitute a major impact to the community if flooded. Three types are identified: First, facilities that will increase the hazard if flooded, such as a hazardous materials storage site; second, facilities that are vital to the flood fighting effort such as the community's emergency operations center; and third, facilities that are essential to returning to normal.

The HAZUS data reflects a number of critical facilities that will be affected by a 100 year flood. In all, twelve facilities (mostly schools) are forecast to suffer moderate to substantial damage.

Even if critical facilities are not directly flooded, there are areas where emergency shelters, utility services, some industrial complexes, and various state highways and county roads may be cut off or isolated during periods of high water or severe winter storms. Every attempt has been made to identify and address these entities and provide mitigation suggestions for eliminating the hazard potentials.

These structures, infrastructure and critical facilities are at risk and are not currently protected from flood damage. There are other facilities that are protected from flood damage, most notably all of downtown Parkersburg is protected by a flood wall. Flood hazard areas often contain wetland and undeveloped areas, which carry the majority of floodwaters and provide "natural and beneficial functions". It is also important to ascertain if any of these natural areas

are at risk. Currently there are no known issues that would put any natural areas at risk. In fact, implementation of the plan for the Happy Valley Recreation Area would potentially increase the amount of natural area available for flood assimilation.

Additionally it is imperative to evaluate how future development might impact flood risk. Development is not a major issue throughout the region. Population has been stagnant to declining for the past twenty years. What little development there has been is reflective of population shifts, mostly away from existing cities into unincorporated areas, such as Mineral Wells, Lubeck, Washington, Boaz and Waverly (in Wood County) and Kenna, Fairplains, Evans and Cottageville in Jackson County. Existing floodplain management ordinances should reduce the risk associated with the limited development occurring within local jurisdictions.

Structures that have suffered repetitive losses are most likely to face future damage. Hence, analyzing repetitive loss data is a fundamental part of determining mitigation actions. Unfortunately there are some limitations to the repetitive loss data. The data comes from insurance claims and, therefore, does not include data about structures that are not insured. Additionally, the data is private information and can only be disclosed in aggregate form.

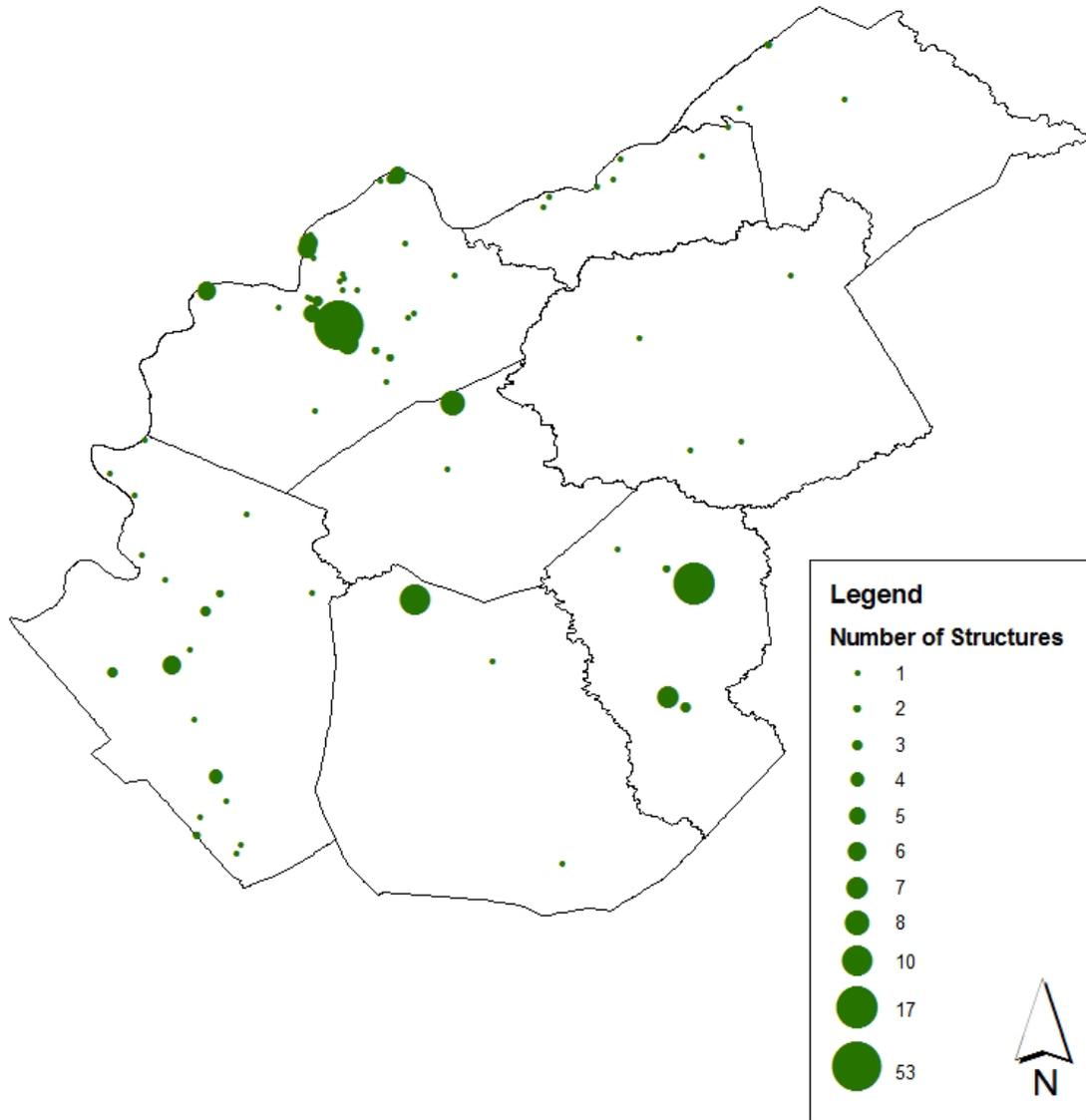
A total of 226 structures are on the repetitive loss list for the region. Wood County has the highest number of repetitive loss structures and they are located as follows: Wood County (outside municipalities) 96, Parkersburg 17, Vienna 8 and Williamstown 10. A large number of the structures (39) are located in the Happy Valley area of the county. Jackson County (26), the Town of Grantsville (15), Calhoun County (13), and the Town of Reedy (10) also have double digit numbers of repetitive loss structures, mostly residential.

Twenty-seven of the structures identified are commercial or public. In Wood County there are 17 located outside the municipalities and one in the City of Parkersburg. Grantsville has five, Calhoun County two, and Ripley, Ritchie County and Jackson County one each.

The map on the next page shows the pattern of frequently flooded structures in the region.

Floodplain maps, topographic maps and aerial photographs that show areas of the region that are subject to flooding are included in Appendix H.

# MOVRC Region Repetitively Flooded Structures



Prepared by: Mid-Ohio Valley Regional Council  
For Planning Use Only, Not to Scale

## Hazard Mitigation Plan Development: Project Identification

Flooding is unquestionably the highest risk to human health and to property. Therefore, flood mitigation is the highest priority for projects. Flood mitigation priority is determined by cost-benefit ratio, i.e. projects that eliminate the most expected flood damage for the dollars spent to mitigate the expected damage will have the highest priority.

A secondary factor in the ranking is if a property with a lower cost/benefit ratio is part of an area-wide mitigation plan. Currently the Happy Valley area is the only area of the region with an area-wide mitigation plan.

Strategies in the following goals and objectives for the listed measures are in part or whole integral to the above assessment activities. To a certain extent some activities listed in the Mitigation Plan have been previously initiated by other existing programs and are included in the strategies narratives to both summarize the activities and provide a foundation for the overall plan.

All of the significant risks are common to all local jurisdictions with the exception that the Town of North Hills and the Town of Harrisville have very low risk of damage from flooding. Therefore, it stands to reason that the mitigation strategies would be similar, as well.

While all but two jurisdictions share flooding risk, the degree of risk varies from county to county. This is illustrated by the difference in the number of structures that HAZUS forecasts to be impacted by a 100 year flood. Perhaps even more telling is the number of repetitively loss structures in each jurisdiction.

All of the identified projects listed below are projects for each jurisdiction, with the exception of project 2 and project 4 which are not applicable to the Town of Harrisville and the Town of North Hills.

Additionally, a few of the projects identified below may be technically considered preparedness rather than mitigation, and therefore, not eligible for FEMA mitigation funding. However, they are considered important by the communities in lessening the impact of a storm and are, therefore, included in the plan. For instance, the communities know of no way to stop it from snowing and thereby putting certain households at risk to due isolation from food, working utilities, etc. However, establishing permanent emergency shelters will lessen the risk to these vulnerable households.

## Project Area 1: Database of Special Needs Population

**Status:** Ongoing

**Goal:** To insure that all citizens and critical populations can be readily provided for during emergency events.

**Objective:** To insure that all “shut-ins”, special care, and elderly residents in identified risk areas are either evacuated or provided with required care and necessary equipment prior to and during emergency events.

**Strategy:**

1. Designate, equip, and train local emergency responders for the purpose of maintaining lifelines for residents with special needs.
  - a. Require home alert providers to register at the 911 Service.
  - b. Review and update list annually.

Implementation

|  |                             |
|--|-----------------------------|
| <b>Assigned Activities</b>               |                             |
| <b>County Coordinating Agency/Person</b> | Emergency Services Director |
| <b>Start Date</b>                        | 1/15/11                     |
| <b>Complete Date</b>                     | Ongoing                     |
| <b>Follow-up Intervals</b>               | Annually                    |
| <b>Follow-up Agency/Person</b>           | Emergency Services Director |

| <b>Re-evaluation Criteria<br/>(Check all that apply at time of review)</b> | <b>Funding Resources</b>                     |
|--|--|
| <input type="checkbox"/> Recent Related Events                             | <input type="checkbox"/> Federal             |
| <input type="checkbox"/> New Technology                                    | <input type="checkbox"/> State               |
| <input type="checkbox"/> New Leadership                                    | <input type="checkbox"/> Local               |
| <input type="checkbox"/> Risk Eliminated                                   | <input type="checkbox"/> Private             |
| <input checked="" type="checkbox"/> Original Goals and Objectives          | Amount: Varies by jurisdiction and solution. |
| <input checked="" type="checkbox"/> Other (explain below)                  | Resources: Local, OES, 911 Service, grants   |

Wood County will coordinate with the ARC of Wood County. Pleasants County is coordinating with the Committee on Aging. Tyler County OES is developing its own database with funding from a multi-county grant. Other counties have informal programs based on local knowledge, but have not developed a formal mechanism to continuously update the information.

Project Area 2: Mitigate damage to buildings located in areas subject to flooding either through acquisition/demolition or elevation.

Priority will be based on benefit/cost ratio. An exception will be made for areas that have an area-wide acquisition and reuse plan, such as the current Happy Valley plan. In those areas properties with lower benefit/cost ratios may be included in a buy-out program in order to provide complete projects.

Status: Ongoing

Goal: Remove or elevate structures that have significant risk of damage due to flooding.

Objectives:

1. To provide an equitable buy-out program to interested owners of those properties located in the identified floodplain that have experienced recurrent damages.
2. To elevate structures which have experienced damages and have a potential for being refurbished to become more resistant to flooding.

Strategies:

1. Provide relocation assistance during construction and or rebuilding of dwellings located in the identified flood plain.
2. Provide equitable alternatives to land owners located in the identified flood plain.

Implementation

|  |                        |
|--|------------------------|
| <b>Assigned Activities</b>               |                        |
| <b>County Coordinating Agency/Person</b> | OES, County Commission |
| <b>Start Date</b>                        | 7/1/10                 |
| <b>Complete Date</b>                     | On-going               |
| <b>Follow-up Intervals</b>               | Annually               |
| <b>Follow-up Agency/Person</b>           | OES Director           |

| <b>Re-evaluation Criteria<br/>(Check all that apply at time of review)</b> | <b>Funding Resources</b>                  |
|--|---|
| <input type="checkbox"/> Recent Related Events                             | <input type="checkbox"/> Federal          |
| <input type="checkbox"/> New Technology                                    | <input checked="" type="checkbox"/> State |
| <input type="checkbox"/> New Leadership                                    | <input type="checkbox"/> Local            |
| <input type="checkbox"/> Risk Eliminated                                   | <input type="checkbox"/> Private          |
| <input checked="" type="checkbox"/> Original Goals and Objectives          | Amount: \$6,200,000                       |
| <input type="checkbox"/> Other (explain below)                             | Resources: WVDMAPS, FEMA, HUD DRI         |

Update: A buyout program is currently being implemented in two counties. Four properties have been acquired in the Happy Valley area. Funding has been obtained to acquire six properties in Calhoun County. An application is pending to acquire an additional fifteen properties in the Happy Valley area. Previous projects have occurred in Reedy, Jackson County, Tyler County, and Grantsville.

## Project Area 3: Emergency Alert System

**Status:** Ongoing

**Goal:** To insure that residents can be readily alerted to impending or on-going emergency events .

**Objectives:**

1. To provide a reliable means of warning communication for residents in identified high hazard areas and to insure that all special populations in identified risk areas are provided with the means to reliably communicate with emergency services.

**Strategies:**

1. Encourage acquisition of radios for residents in identified areas.
2. Implement reverse 911 notification system.
3. Review needs and concerns every 12 months.

Implementation

|  |                                    |
|--|------------------------------------|
| <b>Assigned Activities</b>               |                                    |
| <b>County Coordinating Agency/Person</b> | OES, County Commission, 911 Center |
| <b>Start Date</b>                        | 7/1/10                             |
| <b>Complete date</b>                     | Varies by county                   |
| <b>Follow-up Intervals</b>               | annually                           |
| <b>Follow-up Agency/Person</b>           | OES Director                       |

| <b>Re-evaluation Criteria<br/>(Check all that apply at time of review)</b> | <b>Funding Resources</b>                  |
|--|---|
| <input type="checkbox"/> Recent Related Events                             | <input type="checkbox"/> Federal          |
| <input checked="" type="checkbox"/> New Technology                         | <input type="checkbox"/> State            |
| <input type="checkbox"/> New Leadership                                    | <input checked="" type="checkbox"/> Local |
| <input type="checkbox"/> Risk Eliminated                                   | <input type="checkbox"/> Private          |
| <input checked="" type="checkbox"/> Original Goals and Objectives          | Amount: \$20,000 plus per county.         |
| <input type="checkbox"/> Other (explain below)                             | Resources: Local, OES, grants             |

*Update:* Wood County is implementing a reverse 911 notification system to alert residents of flash floods and other emergency events. Public service announcements encouraging procurement of NOAA radios and an educational campaign are planned throughout the region. Wirt County participates in the Wood County 911 system. Tyler County is also implementing a reverse 911 system. Jackson County has similar capabilities through the WARN system.

## Project Area 4: Floodplain Ordinance and Building Codes

**Status:** Ongoing

**Goal:** Is to insure that all building and dwellings meet FEMA, IBC and Insurance regulations regarding structure location and structure construction.

**Objectives:**

1. To develop regulations, standards, and ordinances within local jurisdictions consistent with documented national standards and regulations.

**Strategies:**

1. Each local jurisdiction will continue to enforce and update existing floodplain ordinances.
2. Establish new or reinforce existing building codes and code enforcement within those jurisdictions where it is deemed appropriate, especially where new developments are being planned whether or not the developments are in identified flood zones. Use IBC as a standard.

**Implementation**

|  |                             |
|--|-----------------------------|
| <b>Assigned Activities</b>               |                             |
| <b>County Coordinating Agency/Person</b> | Local governments           |
| <b>Start Date</b>                        | 7/1/10                      |
| <b>Complete Date</b>                     | On-going                    |
| <b>Follow-up Intervals</b>               | Annually                    |
| <b>Follow-up Agency/Person</b>           | Emergency services director |

| <b>Re-evaluation Criteria<br/>(Check all that apply at time of review)</b> | <b>Funding Resources</b>                  |
|--|---|
| <input type="checkbox"/> Recent Related Events                             | <input type="checkbox"/> Federal          |
| <input type="checkbox"/> New Technology                                    | <input type="checkbox"/> State            |
| <input type="checkbox"/> New Leadership                                    | <input checked="" type="checkbox"/> Local |
| <input type="checkbox"/> Risk Eliminated                                   | <input type="checkbox"/> Private          |
| <input checked="" type="checkbox"/> Original Goals and Objectives          | Amount: No additional funding required.   |
| <input type="checkbox"/> Other (explain below)                             | Resources: FEMA, WVDMAPS for training     |

Wood County Commission recently adopted floodplain regulations that are above and beyond FEMA standards. The Town of North Hills and the Town of Harrisville have low or no risk of flooding and therefore do not participate in the NFIP. Other building codes are covered under state building codes and are enforced by state officials such as the Fire Marshall, Dept. of Labor, the Health Dept., etc. In addition, a few of the municipalities have their own building inspectors.

The Town of Pullman and the Town of Auburn rely on the Ritchie County floodplain manager to enforce the Town floodplain ordinance. Both communities have less than two hundred residents.

## Project Are 5: Community Shelters in the identified areas that become isolated by Winter Storms or Floods

**Status:** Ongoing

**Goal:** Is to insure that local community shelters are capable of providing comfort and shelter to local residents for extended periods of time during Winter Storms and Floods.

**Objectives:**

1. Provide electric generators at each community shelter.
2. Develop emergency access to shelters plans and establish criteria for community use.
3. Provide basic stores and supplies at each community shelter.

**Strategies:**

1. Continue to coordinate emergency shelter plans with the American Red Cross
2. Install and maintain electric generators at each shelter location for lighting, communication, cooking, and heating.

Implementation

|  |                             |
|--|-----------------------------|
| <b>Assigned Activities</b>               |                             |
| <b>County Coordinating Agency/Person</b> | Emergency Services Director |
| <b>Start Date</b>                        | 1/1/11                      |
| <b>Complete Date</b>                     | 12/31/14                    |
| <b>Follow-up Intervals</b>               | Annually                    |
| <b>Follow-up Agency/Person</b>           | Emergency Services Director |

| <b>Re-evaluation Criteria<br/>(Check all that apply at time of review)</b> | <b>Funding Resources</b>           |
|--|------------------------------------|
| <input type="checkbox"/> Recent Related Events                             | <input type="checkbox"/> Federal   |
| <input type="checkbox"/> New Technology                                    | <input type="checkbox"/> State     |
| <input type="checkbox"/> New Leadership                                    | <input type="checkbox"/> Local     |
| <input type="checkbox"/> Risk Eliminated                                   | <input type="checkbox"/> Private   |
| <input checked="" type="checkbox"/> Original Goals and Objectives          | Amount: Varies by local situation. |
| <input type="checkbox"/> Other (explain below)                             | Resources: WVDMAPS, Local          |

Funding for emergency generators is an on-going need in many jurisdictions. While this is fundamentally a preparedness activity rather than a mitigation activity, it is nonetheless a priority throughout the region

## Project Area 6: Stream Dredging and Clean-up

**Status:** Deferred

**Goal:** Is to clean and clear all streams that repeatedly flood or become blocked in order to prevent local flood event intensification.

**Objectives:**

1. To remove all abandon structures and equipment in and around stream and creek banks.
2. To clean and dredge streams whose flow channels have been partially blocked or re-routed by past events.

**Strategies:**

1. Provide opportunities and incentives for local groups and organizations to participate and work with government agencies in community stream clean-ups.
2. Provide the public education, training, and access to all information.
3. Review needs and concerns annually.

Implementation

|  |                                  |
|--|----------------------------------|
| <b>Assigned Activities</b>               |                                  |
| <b>County Coordinating Agency/Person</b> | OES, Wood County Commission, DNR |
| <b>Start Date</b>                        | 04/01/09                         |
| <b>Complete Date</b>                     | On-going                         |
| <b>Follow-up Intervals</b>               | Annually                         |
| <b>Follow-up Agency/Person</b>           | OES Director                     |

| <b>Re-evaluation Criteria<br/>(Check all that apply at time of review)</b> | <b>Funding Resources</b>                     |
|--|--|
| <input type="checkbox"/> Recent Related Events                             | <input type="checkbox"/> Federal             |
| <input type="checkbox"/> New Technology                                    | <input type="checkbox"/> State               |
| <input type="checkbox"/> New Leadership                                    | <input type="checkbox"/> Local               |
| <input type="checkbox"/> Risk Eliminated                                   | <input type="checkbox"/> Private             |
| <input checked="" type="checkbox"/> Original Goals and Objectives          | Amount:                                      |
| <input type="checkbox"/> Other (explain below)                             | Resources: DNR, NRCS, Department of Highways |

There are competing regulatory agencies that make it difficult when dealing with stream dredging and clean-up. However Wood County is currently working on cleaning up Pond Creek, a recurring problem stream in the area. Other focus streams in Wood County include Walker Creek, Tygart Creek, Bull Creek, Lee Creek, Slate Creek, and Worthington Creek.

The Town of Auburn considers Bone Creek a priority, while the City of Pennsboro is concerned with Bunnells Run. Other include: Ellenboro – Hurshers Run; Spencer – Spring Creek; Reedy – Reedy Creek; and Calhoun County – West Fork Little Kanawha.

## Project Area 7: Severe winds impact mitigation

**Status:** On-going

**Goal:** To reduce impact from severe wind events.

**Objectives:**

1. To encourage compliance with West Virginia regulations that require anchoring for mobile homes.
2. To prepare for the efficient and cost effective removal of debris in the wake of a severe wind event.

**Strategies:**

1. Work with utilities to require proof of proper installation prior to utility hook-ups.
2. Work with the County Emergency Services, Solid Waste Authority, and state agencies to develop a protocol for debris disposal.

**Implementation**

|  |                                     |
|--|-------------------------------------|
| <b>Assigned Activities</b>               |                                     |
| <b>County Coordinating Agency/Person</b> | ES Director, Code enforcement , SWA |
| <b>Start Date</b>                        | 1/1/10                              |
| <b>Complete Date</b>                     | On-going                            |
| <b>Follow-up Intervals</b>               | Annually                            |
| <b>Follow-up Agency/Person</b>           | ES                                  |

| <b>Re-evaluation Criteria<br/>(Check all that apply at time of review)</b> | <b>Funding Resources</b>                |
|--|---|
| <input type="checkbox"/> Recent Related Events                             | <input type="checkbox"/> Federal        |
| <input type="checkbox"/> New Technology                                    | <input type="checkbox"/> State          |
| <input type="checkbox"/> New Leadership                                    | <input type="checkbox"/> Local          |
| <input type="checkbox"/> Risk Eliminated                                   | <input type="checkbox"/> Private        |
| <input checked="" type="checkbox"/> Original Goals and Objectives          | Amount: No additional funding required. |
| <input type="checkbox"/> Other (explain below)                             | Resources: Utilities, SWA, WV DOH       |

This is an ongoing activity that appears to be successful in ensuring that new installations are according to code.

## Project Area 8: Accurate Elevation and Topographical Data Mapping

**Status:** On-going

**Goal:** Provide accurate and detailed mapping and information regarding the 100 year floodplain.

**Objectives:**

1. Updated flood insurance rate maps.

**Strategies:**

1. Encourage FEMA to complete updating of flood insurance rate maps for those jurisdictions that have not been updated.

Implementation

|  |   |
|--|---|
| <b>Assigned Activities</b>               |   |
| <b>County Coordinating Agency/Person</b> | Emergency Services Directors, floodplain managers |
| <b>Start Date</b>                        | 1/1/11  |
| <b>Complete Date</b>                     | 12/31/14  |
| <b>Follow-up Intervals</b>               | Annually  |
| <b>Follow-up Agency/Person</b>           | Emergency Services Directors                      |

| <b>Re-evaluation Criteria<br/>(Check all that apply at time of review)</b> | <b>Funding Resources</b>         |
|--|----------------------------------|
| <input type="checkbox"/> Recent Related Events                             | <input type="checkbox"/> Federal |
| <input type="checkbox"/> New Technology                                    | <input type="checkbox"/> State   |
| <input type="checkbox"/> New Leadership                                    | <input type="checkbox"/> Local   |
| <input type="checkbox"/> Risk Eliminated                                   | <input type="checkbox"/> Private |
| <input checked="" type="checkbox"/> Original Goals and Objectives          | Amount: To be determined by FEMA |
| <input type="checkbox"/> Other (explain below)                             | Resources: FEMA                  |

Updated mapping has been completed in Jackson County. FEMA has a schedule for updating mapping.

## Project Summary Table

| <b>Project</b> | <b>Hazard</b>             | <b>How Identified</b>  | <b>Why Identified</b>   |
|----------------|---------------------------|--|---|
| 1.             | Special Needs Database    | Core team and public input<br>Review of past disaster events           | Frequent need to assist “shut-ins”<br>911 inquiries by family members   |
| 2.             | Buy-Out Program           | Core Team<br>Public/Property Owner input                               | Frequent flooding<br>Extensive property damage  |
| 3.             | Emergency Warning         | Core team and public input<br>Past events in County                    | Events have occurred involving a very localized areas within county<br>Local residents have called 911 after event that no one else was aware of. |
| 4.             | Flooding – Building Codes | Core team and public input   | Regulatory requirement  |
| 5.             | Community Shelters        | Core team and public input<br>Community Associations repeated requests | Local community buildings exist but are not equipped to provide shelter during storm events   |
| 6.             | Stream Clean-Up           | Core team and public input   | Events have occurred where stream blockage has intensified flooding.  |
| 7.             | Severe winds response     | Core team and public input   | History of severe wind damage   |
| 8.             | Mapping                   | Core team.   | Many local floodplain maps were developed in the 1980’s and do not provide adequate information.  |



## **Plan Implementation and Maintenance Procedures**

The plan maintenance section of this document details the formal process that will ensure that the Mid-Ohio Valley Regional Hazard Mitigation Plan (the Plan) remains an active and relevant document.

The plan maintenance process details how the Plan will be reviewed annually and updated every five years. This section describes how the counties and municipalities will integrate public participation throughout the plan maintenance process. Finally, this section includes an explanation of how local governments intend to incorporate the mitigation strategies outlined in this Plan into existing planning mechanisms such as Comprehensive Plans and Building Codes.

## **Monitoring and Implementing the Plan**

### **Plan Adoption**

Each County Commission and municipality in the region has indicated a desire to adopt the Hazard Mitigation Plan and each will be responsible for implementing measures related to their respective jurisdictions.

### **Coordinating Body**

In each county a Hazard Mitigation Committee (Core Team), led by the Director of the County Office of Emergency Services, will be responsible for coordinating implementation of plan action items and undertaking the formal review process. The MOVRC will provide technical assistance. The Core Team may consist of, but is not limited to, representatives from the following agencies.

- County Emergency Management/ Office of Emergency Services
- County Commission
- Municipalities
- County Floodplain Officers
- County Emergency Squads
- Local Fire Departments
- Local Police Departments
- LEPC
- West Virginia Department of Highways
- Social Services Agencies
- Committees on Aging

- Local Churches
- Youth Groups
- Extension Offices
- Little Kanawha Conservation District
- Federal Emergency Management Agency
- West Virginia Emergency Management

The Director of the County OES will coordinate meetings of the Core Team to annually review the Plan. These meetings will provide an opportunity to discuss the progress of the action items and maintain the partnerships that are essential for the sustainability of the mitigation plan.

### **Facilitator**

The County OES Director will serve as a Facilitator in order to manage, maintain, and ensure active participation for Core Team meetings, and will assign tasks such as updating and presenting the Plan to the members of the Team. Plan implementation and evaluation will be a shared responsibility among all of the Core Team. The Mid Ohio Valley Regional Council (MOVRC) will provide assistance as the counties and municipalities take responsibility for plan implementation in their respective jurisdictions.

### **Implementation through Existing Programs**

The Plan provides a series of recommendations – many of which are closely related to the goals and objectives of existing programs, such as the Code Enforcement Office, the 911 Center, and the Local Emergency Planning Committee.

The Plan Goals will assist communities in protecting life and property from natural disasters and hazards through planning strategies that regulate development in areas of known hazards. Plan Goals will require that jurisdictional elements base development plans on inventories of known areas of natural disasters and hazards and that the intensity of development should be limited by the degree to which the natural hazard occurs within the areas of proposed development. Municipalities and the counties will use periodic reviews as avenues to update the goals of the plan and to integrate mitigation into comprehensives where applicable.

Currently only a handful of jurisdictions in the region have comprehensive plans. These include the cities of Parkersburg, Vienna, and Williamstown and the Wood County Commission. Due to little or no growth pressure and the independent attitude of many West Virginians, there is no zoning or other land use regulations in any of the unincorporated areas of the region. The flood plain ordinances in each community are primary mechanism for regulating development.

The meetings of the committee will provide an opportunity for team members and the team facilitator to report back on the progress made on the integration of mitigation planning elements into local planning documents and procedures.

### **Economic Analysis of Mitigation Projects**

FEMA's approach to identify the costs and benefits associated with natural hazard mitigation strategies, measures, or projects fall into two general categories: benefit/cost analysis and cost-effectiveness analysis. Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating natural hazards can provide decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects.

The counties in the region rely on FEMA to provide the benefit analysis for flood mitigation projects. As funding becomes available elevation surveys and appraisals are completed for structures whose owners have expressed an interest in mitigation and have demonstrated repetitive flooding. Recently surveys and appraisals were completed for fifteen structures in the Happy Valley area and four in Calhoun County. Acquisition of these structures is a high priority for the respective counties.

The majority of the other mitigation measures require more of a commitment of time from local entities rather than a commitment of resources. Therefore, a traditional cost/benefit analysis is not relevant. Over time, as owners of at-risk properties express interest, additional flood prone properties may be added to the county's priority list.

Projects defined in the preceding section are considered by the core team to be the most cost effective given the past event experiences and available documentation. As more information becomes available to the Core Team priorities will be realigned and a cost benefit analysis will be performed on each major identified project.

### **Evaluating and Updating the Mitigation Plan**

#### **Formal Review Process**

The Plan will be evaluated on an annual basis to determine the effectiveness of programs, and to reflect changes in land development or programs that may affect mitigation priorities. The evaluation process includes a firm schedule and timeline, and identifies the local agencies and organizations participating in plan evaluation. This is all identified in the implementation section of each identified project. The facilitator or designee will be responsible for contacting the Core Team members and organizing the annual meeting.

Core Team members will be responsible for monitoring and evaluating the progress of the mitigation strategies in the Plan. The Core Team will review the goals and action items to determine their relevance to changing situations in the jurisdiction, as well as changes in State or Federal policy, and to ensure they are addressing current and expected conditions. The committee will also review the risk assessment portion of the Plan to determine if this information should be updated or modified, given any new available data. The coordinating

organizations responsible for the various action items will report on the status of their projects, the success of various implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised.

The facilitator will assign the duty of updating the plan to one or more of the committee members. The designated committee members will have three months to make appropriate changes to the Plan before submitting it to the Core Team members, and presenting it to the local governments. The Core Team will also notify all holders of the county plan when changes have been made. Every five years the updated plan will be submitted to the State Hazard Mitigation Office and the Federal Emergency Management Agency for review.

Additionally the facilitator will contact each planning commission regarding scheduled updates to the County and each City's comprehensive plan and will ask to be included as a stakeholder in that update process. The City of Parkersburg is in the process of updating their comprehensive plan at the current time. This is an ideal opportunity for their consultant to review the Hazard Mitigation Plan with an eye to incorporating appropriate measures in the Comprehensive Plan.

### **Continued Public Involvement**

The Counties in the region are dedicated to involving the public directly in review and updates of the Plan. The Core Team members are responsible for the annual review and update of the plan.

The public will also have the opportunity to provide feedback about the Plan. Copies of the Plan will be catalogued and kept at all of the appropriate agencies and libraries in the county. The existence and location of these copies will be publicized in the local papers, which reach the majority of readers in the region. The plan also includes the address and the phone number of the MOVRC, responsible for keeping track of public comments on the Plan.

In addition, copies of the plan and any proposed changes will be posted on the MOVRC website. This site will also contain an email address and phone number to which people can direct their comments and concerns.

A public meeting will also be held at the time of each annual evaluation or when deemed necessary by the Core Team. The meetings will provide the public a forum in which they can express concerns, opinions, or ideas about the Plan.

### ***Acknowledgements***

Parts of the information contained in this document were excerpted from the Local Offices of Emergency Services, Local Emergency Planning Commissions, the Army Corps of Engineers, National Oceanographic Atmospheric Association, Local media, United States Census Bureau, other sources as identified, members of various community organizations, and interested individual volunteers within the communities.

We gratefully acknowledge the efforts put forth by those in the development of this plan which in turn will aid in the preparation and provide long range benefits for communities in our State and more particularly in our region.

# Appendices

**Appendix A**

Sample invitation to local officials

November 15, 2007

Mr. Robert Tebay  
Wood County Commissioner  
Route 3, Box 311  
Parkersburg, WV 26101

Dear Bob:

In 2003 the Mid-Ohio Valley Regional Council assisted in the preparation of a Hazard Mitigation Plan for Wood County. The municipalities in the county participated in that process and both the county and the municipalities adopted the county-wide plan. It is now time to update that plan. In order for Wood County to be eligible for the Hazard Mitigation Grant Program and other FEMA funding programs you must have a Hazard Mitigation Plan that has been adopted the County and approved by the state and FEMA.

Due to funding constraints WV Division of Homeland Security and Emergency Management is recommending that a regional hazard mitigation plan be prepared in lieu of individual county plans. They have offered a small planning grant to MOVRC for that purpose and the MOVRC Board has voted to prepare the regional plan.

Each county and municipality in the region has the right to participate in the regional planning process and at the conclusion of the process to adopt the plan. Each local jurisdiction has the option of preparing your own plan. However it is unlikely that much, if any, funding will be available for individual plans.

If you wish to participate in the regional plan please fill out and return the enclosed form. If you have questions regarding the hazard mitigation planning process please contact me at (304) 422-4993.

Sincerely,

Fred L. Rader  
Community Development Director

## **Appendix B**

Public meeting notes, sign-in sheets, and newspaper ads and articles.

## Calhoun County

### Public Meeting November 13, 2008

#### Participants:

- Kathryn Wood, Emergency Services Director
- Chip Westfall, Calhoun County Commission
- Clyde Knotts, Private Citizen
- Harry Carpenter, Arnoldsburg VFD
- Erin Thacker, MOVRC

Participants at the meeting reviewed both the identified risks and the implementations measures spelled out in the previous. The consensus was that the risk history had not changed and, therefore, risked addressed would be the same.

Implementation measures discussed include:

Isolated populations: Emergency service organizations in the county maintain an informal knowledge base of those residents that might need special attention in a disaster. However, no cost effective method has been devised to create and, importantly, keep up to date a formal database.

Floodplain maps: FEMA has a schedule for updating the county and municipality maps.

Stream clearing: Nothing has been accomplished with this item. Getting funding and regulatory approval appears unlikely.

Community shelters: American Red Cross coordinates emergency shelters in the county. The Methodist Church in Grantsville has remodeled its basement to include showers and a more substantial kitchen to improve its shelter capabilities.

Highway Flooding: West Virginia Department of Highways has limited funding for these type of improvements and has not, to date, scheduled any such improvements.

Severe winds impact mitigation: Licensed installers are required to provide ground anchors in accordance with federal standards.

## Hazard Mitigation Update Meeting Planned

According to Erin Thacker, grants coordinator with Mid-Ohio Valley Regional Council, Calhoun County officials are invited to attend a meeting on Thursday, Nov. 13, 6 p.m., at Arnoldsburg Community Building to discuss updates to current hazard mitigation plans. The purpose of the meeting is to re-visit the county's plan for pre-disaster activities and mitigation and of natural disasters, such as repetitive flooding. This update is a Federal Emergency Management Agency (FEMA) requirement, and counties must update their plans to secure funding should a natural disaster occur. The public is also invited to attend and provide input during this process.

Callhoun County Hazard Mitigation Update Meeting

November 13, 2008

|    | Name             | Organization    | E-mail                      | Phone    |
|----|------------------|-----------------|-----------------------------|----------|
| 1  | Chip Weath       | C.O. Comm       | chip@frontier.net.vt        | 351-6424 |
| 2  | Kathryn Deane    | Blount PBS      | calhoun@scfevents.net.vt    | 455-7594 |
| 3  | Colleen H. Smith | Private Citizen | cknoth5@citlink.net         | 655-7227 |
| 4  | Harvey Carpenter | ANDOVER VFD     | H.CARP@162EFFORTMANAGER.NET | 655-6919 |
| 5  |                  |                 |                             |          |
| 6  |                  |                 |                             |          |
| 7  |                  |                 |                             |          |
| -8 |                  |                 |                             |          |
| 9  |                  |                 |                             |          |
| 10 |                  |                 |                             |          |
| 11 |                  |                 |                             |          |
| 12 |                  |                 |                             |          |
| 13 |                  |                 |                             |          |
| 14 |                  |                 |                             |          |
| 15 |                  |                 |                             |          |

## **Jackson County**

### **Public Meeting September 15, 2008**

#### **Participants:**

- Walter Smittle, Emergency Services Director
- Jim Waybright, Jackson County Commissioner
- Ed Osbourne, JCARC
- David W. Bradley, Citizen
- Jeff Hardy, JH Consulting, LLC
- Robert Frame, CERT of Jackson Co.
- Jim Payne, Jackson General Hospital
- Wendy Casto, Jackson Co. Health Dept.
- Fred Rader, MOVRC



Local Emergency Planning Committee Meeting  
September 15, 2008

Ripley VFD  
6:30 PM

**Meeting** called to order by Chair Smittle at 6:34 PM

**Members and Guest Present:** See Attendance Sheet

**Agenda** – Chairman Smittle announced the election of officers will be held at the December meeting. Pursuant the By-laws officers are elected for two years.

**Minutes** of the previous meeting: Motion by Mr. Waybright to approved the minutes as submitted. Motion seconded by Mr. Frame. Motion adopted.

**Old Business**

HMEP Vulnerability Study

Jeff Harvey, Contractor presented the draft plan. The plan needs modifications and corrections before grant deadline. Functions within the plan follow the emergency operations plan and the matrix required by the State Emergency Response Commission. Chair Smittle has submitted comments and suggestions for revision. Mr. Bradley noted the transportation data, railroad and Rt. 68 concerns. Mr. Waybright advised the river traffic should be noted. Mr. Harvey indicated the river data will be in the revisions. Mr. Harvey provided information regarding the continuance of the plan is needed if a fixed facility has a large amount of hazardous materials on site. Ms. Casto advised the Health Department does not conduct air or soil contamination reviews. Mr. Smittle advised DEP will monitor air and soil. Mr. Jim Payne made the motion to accept the plan with the modifeiations and revisions so the deadline can be meet pending approval of the County Commission during an October meeting. Mr. Bradley seconded the motion. Ms. Casto suggested a deadline for comments. Mr. Smittle designated September 22, 2008 as the deadline for comments. Motion adopted.

**New Business**

Jackson County Flood Mitigation Plan

Fred Radar, Mid Ohio Valley Regional Planning Council, reviewed and discussed the Regional Flood Mitigation Plan. It was noted there has not been any major flooding since plan was adopted five years ago. Most county plans in the region need to update the Mitigation Plan; however, Jackson County updated their own and has two more years remaining in their five year approval. All eight counties will be covered by plan FEMA requires all

## Pleasants County

**Public Meeting April 10, 2008**

### **Participants:**

- Robert N. Doty, Belmont VFD
- Craig Pritchett, Belmont Council
- Paul Ingram, Mayor of St. Marys
- Allen Thacker, private citizen
- Bill Israel, St. Marys Council
- Mike Hendricks, St. Marys Council
- Tom Painter, St. Marys City Manager
- Bill Stull, St. Marys Police Chief
- Fred Rader, MOVRC

Participants at the meeting reviewed the identified risks in the existing plan and found it to still be accurate. Next the group reviewed implementation measures from the plan.

Measures discussed include:

**List of Isolated Populations:** Under the Senior Watch program, anyone who lives with special needs within the county may volunteer to have their names and addresses put on a list through the Senior Citizens Center. The City of St. Marys and Pleasants County Sheriff's office conduct checks during bad weather events. The list is also housed at the 911 Center.

**Flash Flood Alert System:** Alerts come through from the National Weather Service to the 911 Center. At the time of the review session, the county was getting ready to install a reverse 911 alert system in order to more reliably alert residents of coming weather events.

**Building Codes:** Local governments don't have the resources for code enforcement staff. Accordingly, they rely on state building code requirements.

**Mobile Homes in the identified flood zones:** Local floodplain ordinances require that mobile homes be installed in accordance with federal standards.

**Emergency shelters:** While those in attendance admitted there could be better coordination and organization between the agencies, emergency shelters have been planned out and stocked and drills have been performed. The county has access to 5-6 generators to power up emergency shelters and has an emergency food program planned through the Senior Center Nutrition Program for shelter-in-place.

**Stream Dredging and Clean-up:** Due to lack of funds and regulatory issues, there has been no activity regarding this project area.

Pleasants County Hazard Mitigation Update Meeting

April 10, 2008

|    | Name                | Organization                        | E-mail                        | Phone                       |
|----|---------------------|-------------------------------------|-------------------------------|-----------------------------|
| 1  | ROBERT M. DODD      | BELMONT VFD                         | SMCOTY 2003@yahoo             | 665-2038<br>266-0969 (cell) |
| 2  | Craig A. Pritchett  | Belmont City Council<br>Belmont VFD | Craigpritchett@yahoo.com      | 266-2981                    |
| 3  | Tom Painter         | Cty of St. Marys                    | ST.MARYS@MCHARRS.FRONTIER.NET | 684-2441                    |
| 4  | Bill Stoll          | St Marys Police                     | STPOLICE@FRONTIER.NET         | 684-7011                    |
| 5  | Bill Israel         | " " Council                         | billisrael@state.illinois.gov | 304-681-3090                |
| 6  | A. THACHER          | ST. MARYS                           | ALLEN.THACHER@MAIL.MILLI.ED   | 504-210-3582                |
| 7  | Mayor Paul Thompson | City of St. Marys                   |                               |                             |
| 8  | Mike Hendricks      | " "                                 |                               |                             |
| 9  | Fred Barber         | MOVRC                               |                               |                             |
| 10 |                     |                                     |                               |                             |
| 11 |                     |                                     |                               |                             |
| 12 |                     |                                     |                               |                             |
| 13 |                     |                                     |                               |                             |
| 14 |                     |                                     |                               |                             |
| 15 |                     |                                     |                               |                             |

## Meeting to discuss hazard mitigation updates April 10

Officials throughout Pleasants County are gathering Thursday, April 10, at 7 p.m. at the Pleasants County Senior Center to discuss updates to current hazard mitigation plans.

The purpose of the meeting is to re-visit the county's plan for pre-disaster activities and mitigation and of natural disasters such as flooding. This update is a Federal Emergency Management Agency (FEMA) requirement, and counties must update their plans to secure funding should a natural disaster occur.

The public is encouraged to attend and provide input during this process.

## Ritchie County

### Public Meeting October 2, 2008

#### Participants:

- James White, Emergency Services Director
- Chuck Mapes, Mid-Ohio Valley Health Dept.
- Bill Bayless, Ellenboro VFD and LEPC Chair
- Charles Dotson, Pennsboro Fire Amateur Radio
- Tim DeLancey, Ritchie Co. Ambulance Authority
- Erin Thacker, MOVRC

Erin Thacker described the process for updating the local plans as part of a regional hazard mitigation plan. Given the small size of the communities the emergency services agencies have fairly good knowledge of which households need special attention during a disaster. No formal process exists. It would be good to have public service announcements encouraging residents to acquire NOAA radios. The Towns of Pullman and Auburn have arranged with Ritchie County to implement their floodplain ordinances. Emergency shelters are coordinated by the American Red Cross.

# October 2008



## **LEPC Having Special Meeting**

The Local Emergency Planning Committee is having a special meeting on Thursday, Oct. 2nd, 7:00 p.m., at the new 911 Center in Peensboro. The purpose of the meeting will be to discuss updates to current hazard mitigation plans and to re-visit the county's plan for pre-disaster activities (such as flooding). This update is a FEMA requirement and counties must update their plans to secure funding should a natural disaster occur. The public is encouraged to attend and provide input during this process.

Ritchie County Haz-Mit Meeting 10/2/08

Name Organization Phone #

1. Chuck Wages And Okelly H.D. 304.643.2917

2. Bill Boyless <sup>Excelsior VFD Chief</sup>  
LEPC Chair. 304.869.3231

3. CHARLES DOTSON AMATEUR RADIO (304) 659-3962

4. Tim DeLancey <sup>Ritchie Co. Ambulance Authority</sup>  
Ritchie Co. OES (304) 869-3160

5. James White <sup>Pennsboro, W.V.</sup>  
304-659-2539

## Roane County

### Public Meeting April 24, 2008

Only one person attended the scheduled public meeting. It was agreed to utilize an LEPC meeting to gather additional input. MOVRC subsequently attended an LEPC meeting by conference call.

### Conference Call October 2, 2008

#### Roane County:

##### Participants:

- Martha Hardman
- Ray Dietz, Reedy
- Brent Wilson, City of Spencer
- Steve Hughes
- Don Williams
- John Greathouse, County Commissioner
- Dan Dial
- Ken Lewis
- Daniel Goodwin, Roane General Hospital
- Tim Fouty
- Woody Wilson
- Pete Prescott
- Erin Thacker, MOVRC

List of Isolated Populations: Home alert providers have registered with the county 911 service, but due to understaffing issues, no further update to this project is available.

Flash Flood Alert System: The County relies on National Weather Service alerts and cooperates with schools as far as alerting citizens to bad weather events.

Critical facilities: Additional generators are needed to insure power to all critical facilities.

Stream Dredging and Clean-up: Although obstructions in streams are a significant concern, regulatory issues and a lack of funding have prohibited any action on this item.

Road Access during Emergency Events: Reedy applied for funding without success.

Severe winds impact mitigation: State building code and mobile home regulations address this element.

Accurate Elevation and Topographical Data Generation: FEMA has a schedule to update floodplain maps.

## Spotlight



### Luis Perez Gandeeverville

**Occupation:** construction  
**Hobbies:** stamp and coin collecting  
**Favorite group:** The Beatles  
**Favorite TV show:** The O'Reilly Factor  
**Person most admired:** Ollie North  
**Secret ambition:** to live to see a hemispheric union  
**Pet peeve:** negligence

## COMMUNITY CALENDAR

April

24

### THURSDAY

**RUMMAGE AND BAKE SALE,** 9 a.m. to 2 p.m. at Shady Dale Farms; also Friday and Saturday. Sponsored by Gandeeverville CEOS.

**ROANE HISTORICAL SOCIETY,** 7 p.m. at Roane County Library, lower level.

**PUBLIC MEETING,** 7 p.m. at Heritage Park Community Building concerning updating the county's hazard mitigation plan. Sponsored by the Mid-Ohio Valley Regional Council.

Roane County Hazard Mitigation Update Meeting

April 24, 2008

|    | Name                | Organization                  | E-mail                     | Phone                |
|----|---------------------|-------------------------------|----------------------------|----------------------|
| 1  | <i>David Gordon</i> | <i>Roane General Hospital</i> | <i>dgordon@roanoke.org</i> | <i>1804/907-2350</i> |
| 2  |                     |                               |                            |                      |
| 3  |                     |                               |                            |                      |
| 4  |                     |                               |                            |                      |
| 5  |                     |                               |                            |                      |
| 6  |                     |                               |                            |                      |
| 7  |                     |                               |                            |                      |
| 8  |                     |                               |                            |                      |
| 9  |                     |                               |                            |                      |
| 10 |                     |                               |                            |                      |
| 11 |                     |                               |                            |                      |
| 12 |                     |                               |                            |                      |
| 13 |                     |                               |                            |                      |
| 14 |                     |                               |                            |                      |
| 15 |                     |                               |                            |                      |

**Erin Thacker**

---

**From:** Daniel R. Goodwin [drgoodwin@RGHWV.org]  
**Sent:** Friday, September 26, 2008 4:08 PM  
**To:** 'erin.thacker@movrc.org'  
**Subject:** Conference Call Attendees

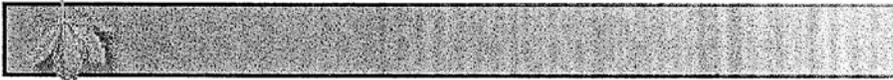
Erin,

Here is a list of names of those that sat in on the Hazard Mitigation Plan conference call:

Martha Hardman, Ray Dietz, Brent Wilson, Steve Hughes, Don Williams, John Greathouse, Dan Dial, Ken Lewis, Daniel Goodwin, Tim Fouty, Woody Wilson, and Pete Prescott (visitor to meeting)

*Daniel R. Goodwin, GSP*

**Environment of Care Coordinator**  
Roane General Hospital  
200 Hospital Drive  
Spencer, WV 25276  
(304) 927-6335 or Fax: (304) 927-6840



This E-mail and any attachments are intended only for use of the individual or entity to which it is addressed. It may contain information that is privileged, or Protected Health Information as defined by The Health Insurance Portability and Accountability Act, and is confidential and exempt from disclosure under applicable law. If the reader of this E-mail is not the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and may be a violation of Federal or State Law.

# Tyler County

## Public Meeting May 14, 2008

### Participants:

- Tom Cooper, Emergency Services Director
- Don Collins
- Bud Weigle, Tyler County Commission

List of Isolated Populations: Tyler County is participating in a multi-county grant project that funding development of the software for a special needs registry. It is expected to be operational by September, 2010.

Flash Flood Alert System: Tyler County is participating in a multi-county reverse 911 system that is housed in Marshall County. It is expected to be completely operational for Tyler County by the end of 2010.

Mobile Homes in the identified flood zones: Floodplain management regulations require elevation above the 100 year floodplain. This discourages mobile homes from locating in areas of severe flooding. State installation requirements include anchoring.

Community Shelters in the identified areas that become isolated by Winter Storms or Floods: coordinated by the American Red Cross.

High Water Signs in the identified areas that frequently become Flooded isolated by Winter Storms or Floods: This practice has been abandoned as it might inadvertently encourage motorist to attempt fording areas where water was across the road. The OES has a definite do not cross policy any time water is across the road, regardless of depth.

Accurate Elevation and Topographical Data Generation: FEMA has a schedule for updating flood maps.

Stream Dredging and Clean-up: No progress.

Severe winds impact mitigation: Mobile homes are a concern. State installation requirements include anchoring.

Tyler County Hazard Mitigation Update Meeting

May 14, 2009

|    | Name           | Organization                   | E-mail                      | Phone        |
|----|----------------|--------------------------------|-----------------------------|--------------|
| 1  | James Robinson | Bedford City                   | Michael@bedfordnc.us        | 304-771-9275 |
| 2  | Don Collins    | TELEPE                         |                             | 337-8964     |
| 3  | Standa Seeger  | CERT                           | WV DMU 45 @ yahoo.com       | 304-758-5017 |
| 4  | Sharrad Quich  | WV Stormwater Security - Teoga | Sharrad@sharrad.com         | 304-288-288  |
| 5  | Don Williams   | WCHV 105 (news)                | News@wchv105.com            | 304-375-7200 |
| 6  | Tom Cooper     | OSM                            |                             |              |
| 7  | Bob DeBele     | Tyler Co. Comm.                |                             |              |
| 8  | Fanny Howard   | Red Cross                      | spedlopej8003@yahoo.com     | 800-653-7979 |
| 9  | Erin Thacker   | MOVRC                          | erin.thacker@monticello.org | 422-4993     |
| 10 |                |                                |                             |              |
| 11 |                |                                |                             |              |
| 12 |                |                                |                             |              |
| 13 |                |                                |                             |              |
| 14 |                |                                |                             |              |
| 15 |                |                                |                             |              |

## Wirt County

### Public Meeting April 17, 2008

#### Participants:

- Stephen Settle, Emergency Services Director
- Leslie Maze, Prosecuting Attorney
- David Roberts, Magistrate
- Doug Hill, Elizabeth-Wirt VFD
- Lew Peck, Sheriff's Dept.
- Roy Copen, County Commission
- Erin Thacker, MOVRC

The Core Team noted several projects in progress throughout the county that would be beneficial when completed.

A project is currently under way by the U.S. Army Corps of Engineers studying refurbishing the Wells Lock Dam on the Little Kanawha River. The dam's function at one point was mainly navigational and over the years has fallen into disrepair. The project will insure that the structure will not become a hazard for the area and will have the ability to withstand future flooding events.

A second project is underway to the West Virginia Department of Highways to raise a portion of WV Rt. 14 out of the flood zone in the area just outside of Palestine. The Little Kanawha River covers the road frequently during flooding events. This project will ensure continuous access to Palestine and Elizabeth during flooding events.

Another project is in progress to remove and replace a "Submarine" bridge with a "Culvert" type bridge on Reedy Creek at Garfield Road. This project will allow resident to have access to the area during flooding events.

# County Journal

ALLEY REG COUNCIL  
ES  
ST HW 26101  
CG

1908-2008

*Celebrating*

100 Years

VOLUME 101, NUMBER 3 WEDNESDAY, APRIL 16, 2008, ELIZABETH, WEST VIRGINIA

## Public meeting set for Thursday to discuss hazard mitigation updates

Officials throughout Wirt County are gathering on April 17 at 6 p.m. at the 911 Mapping and Addressing Office in Elizabeth to discuss updates to current hazard mitigation plans.

The purpose of the meeting is to re-visit the county's plan for prevention of natural disasters such as flooding. This update is a Federal Emergency Management Agency (FEMA) requirement, and counties must update their plans to secure funding should a natural disaster occur.

The public is encouraged to attend and provide input during this process.

**Inside:**

- letters to editor p. 3
- author p. 6
- Silver Haired Legislature p. 7
- sports p. 8

## Wirt County Hazard Mitigation Update Meeting

April 17, 2008

|    | Name           | Organization            | E-mail                | Phone    |
|----|----------------|-------------------------|-----------------------|----------|
| 1  | Leslie Maze    | Prosecuting Attorney    | leslie.maze@gmail.com | 275-8901 |
| 2  | David Roberts  | Magistrate              | fox4637@aol.com       | 275-4637 |
| 3  | Stephen Settle | Wirt Co. OES            | wirtfire@aol.com      | 981-7012 |
| 4  | Doug Hill      | EMER-ELIZ-CORNF         | schill@k12.wv.us      | 588-1209 |
| 5  | Lew Peck       | SGT. WIRCO SHERIFF DEPT | sgtjpeck@yahoo.com    | 588-3564 |
| 6  | Roy Copen      | Wirt Co. Commission     | RACOPEN@yahoo.com     | 228-8846 |
| 7  |                |                         |                       |          |
| 8  |                |                         |                       |          |
| 9  |                |                         |                       |          |
| 10 |                |                         |                       |          |
| 11 |                |                         |                       |          |
| 12 |                |                         |                       |          |
| 13 |                |                         |                       |          |
| 14 |                |                         |                       |          |
| 15 |                |                         |                       |          |

## Wood County

### Public Meeting March 26, 2008

#### Participants:

- Ed Hupp, Wood County OEM
- Steve Johnk, Public Debt (LEPC Member)
- Terry Moore, Mid-Ohio Valley Regional Airport
- Don Williams, Citizens Conservation Corps
- Bob Kimble, City of Williamstown Public Works
- Steve Adams, Results Radio/The Parkersburg Register
- Roger Adkins, Parkersburg News
- Doug Hess, Wood County LEPC

### Project Area 1: A List of Isolated Populations

Wood Co./Parkersburg/Vienna/Williamstown

- Hasn't been done, addresses are difficult to attain for special needs populations
- In regards to developing a list, need an easy way to keep it up to date
- Christina Smith is with the Arc and sits on the LEPC, she noted in a previous meeting that there are privacy concerns. There is an existing MOU with the Arc, but it needs updated
- In Williamstown they are not aware of a specific list, but they know of several shut-ins and other vulnerable populations. Nothing is formally written down.
- The LEPC has planned for the event in which people with animals may not leave them during an emergency evacuation by drafting a MOU with the local 4-H campgrounds as a place to evacuate animals.

#### *Action Items:*

1. Get in touch with Christina at the Arc as well as local ministerial associations regarding a list of isolated and/or vulnerable populations
2. Establish educational campaign to inform people of the importance of registering with the authorities (or the Arc) if they are isolated.
3. Establish educational campaign to inform people of the arrangements made for their animals at the 4-H grounds.

### Project Area 2: Buy-Out Program for Happy Valley and Nicolette areas along the Little Kanawha River identified flood plain

- We can report on that (summarize Happy Valley)

- Floodplain regulations have been updated to be above FEMA standards.

*Action Items:*

1. Talk to Ed Hupp about including any other areas
2. Get updated floodplain regulations from Ed Hupp

### **Project Area 3: Flash Flood Alert System**

- Discussion about if there really is an issue with flash flooding resulted in identification of certain areas in Parkersburg that definitely need to include flash flooding in their updated plan. The cities of Williamstown and Vienna have flash flooding included in their mitigation plans, but may not need it like areas of Parkersburg do.
- County is working on an emergency notification system based on the reverse 911 system.
- NOAA radios are silent until there is an alert issued, residents and businesses in these identified areas should be notified of these radios and encouraged to buy them (\$20-\$30).

*Action Item:*

1. Educational campaign to encourage the use of NOAA radios for flash flooding notification.

### **Project Area 4: Building Codes**

- The county is covered by the state building codes which are enforced by the state even though the code hasn't been adopted by the county.
- Enforced by the Fire Marshall, Department of Labor, Department of Environmental Protection, and the Health Department.
- Each municipality has their own building inspector.
- North Hills floodplain development in old sewer plant area.

*Action Items:*

1. Contact North Hills to see if they have their own building inspector and to investigate the development going in the floodplain.

### **Project Area 5: Mobile Homes**

- County will allow a mobile home to go into a floodplain, but has really strict rules and codes. For instance it must be on a permanent foundation, bought from a licensed dealer, anchored, etc. All of the rules are more than FEMA's minimum standards.

- Williamstown has required mobile home owners in the floodplain to jack the homes up, which really discourages folks from settling in the floodplain.

*Action Items:*

1. Check with Williamstown on their regulation/ordinance in regards to mobile homes.

**Project Area 6: Community Shelters**

- Pretty much under control by the Red Cross. There is an old MOU between the Red Cross and the LEPC that may need updated
- The county may need a power survey to check if emergency shelters have generators and find out how to serve those needs once identified.

*Action Items:*

1. Contact the Red Cross regarding updates to community shelters to include in plan.
2. Work with LEPC or county on power survey.

**Project Area 7: Stream Dredging and Clean-up**

- County Commission is working on cleaning up Pond Run
- DEP watches for construction projects and enforces clean up and dredging when streams are affected.
- The local Soil & Conservation District also periodically cleans and dredges, they're now working on Dry Run.
- DEP is responsible for ponds and dike failures.

*Action Items:*

1. Check with municipalities on their roles in local stream clean ups.
2. Check with Marty Seufer about the County and Pond Run efforts.

**Project Area: Accurate Elevation and Topographical Data Generation**

*Action Item:*

1. MOVRC will speak with the City of Parkersburg about this.

**New Program Areas:**

1. Repetitive Road Flooding: Most of the areas are “repeat offenders”, such as Gihon Road, Core Road, etc.
  - a. Explore markers along the side of these roads to demonstrate how deep the water actually is for motorists and to work as a flood gauge.
  - b. Identify all of these areas and get elevation markers.
2. Counties have made great strides with regulations in the utility, permit, and 911 addressing loop.
  - a. Explore this as a work item, it seems that utilities trigger the enforcement of regulations.
3. Designated evacuation routes.
4. Last time the 100-year floodplain was calculated was in 1985, perhaps this needs to be re-visited.

Wood County Hazard Mitigation Update Meeting

March 26, 2008

|    | Name          | Organization                                 | E-mail                        | Phone             |
|----|---------------|--|-------------------------------|-------------------|
| 1  | Ed. Napp      | Wood County CEM                              | chnapp@woodcountymn.gov 911   | 480-0411          |
| 2  | STEVE SCHMIDT | ALBANY DEBT                                  | STORHURK@ALBANYDEBT.TREAS.GOV | 480-8785          |
| 3  | Terry Moore   | M. d Ohio Valley Reg Airport                 | tm@flymov.com                 | 464-5113          |
| 4  | Don Williams  | WV CitizensCare                              | ndavis@hotmail.com            | 375-7600          |
| 5  | Bob Smith     | CITY of WilliamsTown                         | williamstownwater@hotmail.com | 375-5900          |
| 6  | Steve Adams   | Results Radio (www) The Parkersburg Register | sadams@marlettsregister.com   | 994-1982          |
| 7  | Roger Adkins  | Parkersburg News                             | radkins@newsandsearch.com     | 495-1891 x216     |
| 8  | Ding Hess     | WOOD CO LFPC                                 | chairman@woodcolepc@yahoo.com | 295-6090 ext. 134 |
| 9  |               |  |                               |                   |
| 10 |               |  |                               |                   |
| 11 |               |  |                               |                   |
| 12 |               |  |                               |                   |
| 13 |               |  |                               |                   |
| 14 |               |  |                               |                   |
| 15 |               |  |                               |                   |

# REGIO

FRIDAY, MARCH 21, 2008

WWW.NEWSANDSENTINEL.COM

## AROUND THE REGION



### ELIZABETH

#### Outages reported throughout region

Electricity was knocked out for 134 Elizabeth residents around noon Thursday after a tree fell and knocked down a power line pole on West Virginia 14, said Todd Meyers, spokesman with Allegheny Power.

More than 100 customers had electricity restored by 1:40 p.m.

"Right now, we don't know what caused the tree to fall," Meyers said. "We have been having problems with trees because of weather; they are falling because the ground is so wet."

Nearly 1,700 Allegheny Power customers in Vienna were without electricity for five minutes, from 3:42 to 3:47 p.m. Thursday after an equipment failure at the North Vienna Substation.

"The outage occurred as everyone was being moved to another circuit," Meyers said.



Members of the Edison Junior High School Jazz Band practice Thursday in the school. The band recently took top honors in regional and state competitions.

# A Top Band

## Edison band members earn high honors

By MICHAEL ERB  
merb@newsandsentinel.com

PARKERSBURG — Edison Junior High School's instrumental music students have been hard at work this winter and have a variety of awards and recognitions to show for their efforts.

Band Director Randy Brannon announced the Edison Jazz Band was named one of the top bands in the West Virginia Jazz Band Contest. After receiving a superior rating at the Regional Festival held March 1 at West Virginia State University, a recording of Edison's performance was forwarded to a committee of music educators who met to choose West Virginia's top high school and junior high jazz band.



### PARKERSBURG

#### Hazard mitigation meeting planned

Officials throughout Wood County are gathering on March 26 at 7 p.m. in the Judge Black Annex Conference Room to discuss updates to hazard mitigation plans.

The meeting is to revisit the county's plan for disaster activities and mitigation and of natural disasters.

### CHARLESTON

#### W.Va. preschools receive high marks

A national study gives West Virginia high marks

Rate

US

PERS  
IOR  
STER

ER

ate

Pkby News 3/27/08

# County officials discuss disaster plan

By **ROGER ADKINS**  
radkins@newsandsentinel.com

**PARKERSBURG** — Wood County officials are updating the county's natural disaster mitigation plan.

The plan was discussed during a meeting Wednesday night at the Judge Donald F. Black Courthouse Annex on Market Street. Local emergency managers and others attended the public meeting.

Erin Thacker, grants coordinator for the Mid-Ohio Valley Regional Council,

said updating the plan is required by the Federal Emergency Management Agency and must be done to secure funding should a natural disaster occur.

Wednesday's meeting was led by Thacker and Fred Rader, community development director for the MOVRC.

Officials discussed areas of the natural disaster mitigation plan.

One topic of discussion was the potential need to develop a list of "special



Thacker

Rader

individuals who may need additional consideration should a large natural disaster occur. It could be beneficial to identify and plan for the evacuation of individuals who have special

needs. Officials said special needs could range from individuals with handicaps to those who refuse to evacuate without their animals. Churches and church organizations would be a useful resource for identifying individuals who may have special needs, planners said. It may be a good idea to contact these organizations to find out if they can help.

The federal property buy-out program was discussed. The government can provide

options for buying property in flood-prone areas.

"There has been some progress. Three properties have been bought in the Happy Valley area. Much more work needs to be done," Rader said.

It may be important to identify other areas that are prone to flooding and determine if they should be included in the program, Rader said.

There is local interest in developing a flash-flood warning system. Ed Hupp, director of the Wood County Office of Emergency Services, said flash flooding is always a possibility in the area. There have been cases in the past.

A flash-flood alert system would work like "reverse 911," Hupp said. Automated calls could be made to individuals in flood-prone areas to alert them that a storm is coming with potential to produce flash flooding.

## Camp Copperhead Campground

**YEAR ROUND**  
 Campsites, tents, RVing  
 Camping Package (fuel, food, and more) available for emergency evacuees  
 Parkersburg, 15 miles south of New Martinsville, OH Rt. 18  
 4 miles from Tyler County Fairgrounds and Speedway  
 Check out NEW website: <http://www.campcopperhead.net>



## Appendix C

Sample newspaper ad for public comments on draft plan.

Public Comments Requested  
on  
Mid-Ohio Valley Regional Hazard Mitigation Plan

The counties and municipalities in the eight county Mid-Ohio Valley region have cooperatively developed a DRAFT Hazard Mitigation Plan for the region. The plan identifies potential risks from natural disasters and identifies proposed actions to reduce the risk to human life and safety and to reduce the risk to private property and public infrastructure.

The plan is available for review at the following locations: Calhoun County Courthouse; Jackson County Courthouse; Pleasants County Courthouse; Ritchie County Courthouse; Roane County Courthouse; Tyler County Courthouse; Wirt County Courthouse; the County Administrator's Office in the Wood County Courthouse; public libraries in the region; and the website of the Mid-Ohio Valley Regional Council ([movrc.org](http://movrc.org)).

Comments may be submitted to the attention of Fred Rader at MOVRC, P.O. Box 247, Parkersburg, WV 26102.

*Affidavit of publication will be included in this appendix when it is received.*

## Appendix D

Distribution list for comments.

Distribution list of Request for Comments to neighboring jurisdictions :

Misty Casto, Buckeye Hills-Hocking Valley Development District

Michele Craig, Region II Planning and Development Council

Mark Felton, RIC

Rosemary Wagner, Region VII Planning and Development Council

Jim Hall, Region VI Planning and Development Council

Bill Phipps, Region Ten Planning and Development Council

## Appendix E

Happy Valley Land Use Plan

# Happy Valley Recreation Area

## Wood County Commission

Many residents of the Happy Valley area have expressed to the Wood County Commission their desire to sell their property and move from this flood prone area. In an effort to accommodate these citizens, the County Commission has determined that a long range plan for creation of the Happy Valley Recreation Area is in the public interest. Ultimately a thirty acre recreation area will be created along the Little Kanawha River. Properties will be acquired on a voluntary basis over a number of years.

The Happy Valley area is located on the north bank of the Little Kanawha River, approximately four miles upstream from its confluence with the Ohio River. It is accessible from WV Route 47, near the campus of WVU-Parkersburg. Adjacent to the area is the North Bend Rail Trail.

Homes in this area are subject to repeated flooding. Some residents are simply tired of the repeated clean-up process and financial losses associated with flood after flood. Others had been willing to live with the inconvenience in exchange for the benefits of riverfront living. The most recent series of floods changed that for many, however.

Flooding in September 2004 was the highest in forty years. In January 2005 another flood of near equal devastation occurred. What followed the January flood, however, was the last straw for many. During the flood escaped barges lodged in the Belleville Lock and Dam, preventing closure of gates. Water levels were dropped for an extended period of time. The river bank, saturated from the flood, collapsed when water levels dropped, reducing the hydrostatic pressure that had held them in place.

Many homes had large, well- manicured yards leading to boat docks and other riverfront amenities. Now those riverfront amenities are in the middle of the river and the yards are no longer so large and enjoyable. Instead, steep, unstable banks threaten the foundations of homes. These newly exposed riverbanks continue to erode with even moderate rises in the water level after any significant rainfall. It will be many years before Mother Nature establishes a new, more permanent, semi-stable riverbank.

Given the desire of residents to move from harm's way, the Wood County Commission recognizes the need to pursue all possible funding sources to acquire property in Happy Valley, such as the Hazard Mitigation Grant Program. The Commission also recognizes the need to create a long term plan for utilization of any land acquired in the area.

It is apparent that it will be a long term process to acquire significant blocks of land in Happy Valley. The entire area consists of more than thirty acres and is currently valued in the millions of dollars. Therefore, it is not essential for the Commission to determine, at this time, the type of recreation area that will ultimately be developed.

In the early phases of land acquisition the Commission will offer to lease parcels to adjoining property owners. In this way the land can be maintained in concert with neighboring private

property. Lessors could use the land for additional yard, a garden, etc., however, they could not build any permanent structures.

As significant blocks of parcels are accumulated they could be allowed to “return to nature,” awaiting ultimate development of the recreation area. It would not be necessary, though, for all the property in Happy Valley to be acquired before the recreation area could be utilized. The upper and lower end of the area tend to flood more frequently, therefore, it is likely that more parcels will be acquired in these areas first. Whenever a useable chunk of land has been acquired development in accordance with the recreation plan could begin.

As stated earlier, decisions regarding the planned use of the area do not have to be made today. It will be several years before sufficient land is acquired to begin implementing the plan. Therefore, the Wood County Commission intends to take advantage of the time and utilize a thorough stakeholder involvement process to determine the future of Happy Valley.

In the end the Recreation Area could take one of many forms. Options could include: an unmanaged nature preserve; constructed wetlands or other flood friendly environmental enhancements; river access day-use park; or campground and river access. Stakeholders would include resource agencies such as the Army Corps of Engineers, WVDEP, WVDNR, Little Kanawha RC & D, NRCS, tourism officials, North Bend Rail Trail, and most importantly, adjacent private landowners and the general public.

The Wood County Commission sees creation of Happy Valley Recreation Area as a long term, multi-phase solution to the needs of property owners who suffer repeated flooded that will also benefit the entire community. It is an ambitious idea that will take many years to mature given known financial resources, but is planned in such a way that it can effectively mature over time.

**Appendix F**

Climate data

U.S. Department of Commerce  
National Oceanic & Atmospheric Administration  
National Environmental Satellite, Data,  
and Information Service

**Climatography  
of the United States**

**No. 20  
1971-2000**

National Climatic Data Center  
Federal Building  
151 Patton Avenue  
Asheville, North Carolina 28801  
www.ncdc.noaa.gov

**COOP ID: 462054**

**Station: CRESTON, WV**

**Climate Division: WV 2**

**Elevation: 650 Feet**

**Lat: 38° 58'N**

**Lon: 81° 16'W**

**NWS Call Sign:**

| Temperature (°F) |           |           |      |                  |      |     |                  |      |                                 |      |     |                 |                         |         |         |            |           |           |           |           |          |
|------------------|-----------|-----------|------|------------------|------|-----|------------------|------|---------------------------------|------|-----|-----------------|-------------------------|---------|---------|------------|-----------|-----------|-----------|-----------|----------|
| Mean (1)         |           |           |      | Extremes         |      |     |                  |      | Degree Days (1)<br>Base Temp 65 |      |     |                 | Mean Number of Days (3) |         |         |            |           |           |           |           |          |
| Month            | Daily Max | Daily Min | Mean | Highest Daily(2) | Year | Day | Highest Month(1) | Year | Lowest Daily(2)                 | Year | Day | Lowest Month(1) | Year                    | Heating | Cooling | Max >= 100 | Max >= 90 | Max >= 50 | Max <= 32 | Min <= 32 | Min <= 0 |
| Jan              | 41.0      | 19.7      | 30.4 | 80               | 1950 | 26  | 40.5             | 1989 | -30                             | 1994 | 20  | 16.0            | 1977                    | 1075    | 0       | .0         | .0        | 8.2       | 7.8       | 26.6      | 2.7      |
| Feb              | 45.5      | 21.3      | 33.4 | 80               | 2000 | 27  | 40.6             | 1998 | -20                             | 1996 | 6   | 20.1            | 1978                    | 885     | 0       | .0         | .0        | 10.6      | 5.0       | 23.6      | 2.0      |
| Mar              | 55.9      | 28.3      | 42.1 | 90               | 1989 | 29  | 50.9             | 1973 | -6+                             | 1993 | 15  | 34.5            | 1984                    | 709     | 0       | .0         | @         | 20.4      | 1.0       | 21.5      | .2       |
| Apr              | 66.7      | 36.2      | 51.5 | 95               | 1986 | 29  | 58.9             | 1986 | 12                              | 1969 | 1   | 46.1            | 1975                    | 409     | 4       | .0         | .4        | 27.3      | @         | 11.9      | .0       |
| May              | 75.9      | 46.5      | 61.2 | 97               | 1949 | 20  | 69.2             | 1991 | 21+                             | 1966 | 10  | 56.2            | 1997                    | 191     | 74      | .0         | 1.7       | 30.9      | .0        | 2.0       | .0       |
| Jun              | 83.4      | 56.0      | 69.7 | 103              | 1988 | 26  | 75.4             | 1987 | 32+                             | 1966 | 2   | 62.7            | 1972                    | 35      | 176     | .1         | 5.3       | 30.0      | .0        | .0        | .0       |
| Jul              | 86.6      | 61.1      | 73.9 | 106              | 1988 | 17  | 79.8             | 1987 | 42+                             | 1963 | 9   | 68.7            | 1984                    | 11      | 285     | .5         | 9.4       | 31.0      | .0        | .0        | .0       |
| Aug              | 85.1      | 60.3      | 72.7 | 105              | 1988 | 18  | 79.6             | 1988 | 37+                             | 1965 | 29  | 68.0            | 1982                    | 16      | 255     | .2         | 6.6       | 31.0      | .0        | .0        | .0       |
| Sep              | 78.9      | 52.9      | 65.9 | 104+             | 1953 | 2   | 70.8             | 1986 | 29                              | 1983 | 24  | 60.3            | 1984                    | 78      | 105     | .0         | 2.0       | 30.0      | .0        | .1        | .0       |
| Oct              | 68.2      | 39.6      | 53.9 | 94               | 1953 | 1   | 60.9             | 1984 | 14                              | 1952 | 21  | 47.8            | 1976                    | 360     | 16      | .0         | @         | 30.3      | .0        | 8.2       | .0       |
| Nov              | 56.4      | 30.8      | 43.6 | 86               | 1961 | 4   | 55.5             | 1985 | 2                               | 1958 | 30  | 35.6            | 1976                    | 642     | 0       | .0         | .0        | 20.4      | .2        | 18.1      | .0       |
| Dec              | 45.6      | 24.1      | 34.9 | 80               | 1982 | 4   | 42.0             | 1984 | -19+                            | 1989 | 22  | 21.1            | 1989                    | 934     | 0       | .0         | .0        | 11.2      | 4.4       | 24.0      | .6       |
| Ann              | 65.8      | 39.7      | 52.8 | 106              | 1988 | 17  | 79.8             | 1987 | -30                             | 1994 | 20  | 16.0            | 1977                    | 5345    | 915     | .8         | 25.4      | 281.3     | 18.4      | 136.0     | 5.5      |

+ Also occurred on an earlier date(s)

@ Denotes mean number of days greater than 0 but less than .05

Complete documentation available from: [www.ncdc.noaa.gov/oa/climate/normal/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normal/usnormals.html)

Issue Date: February 2004

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1948-2001

(3) Derived from 1971-2000 serially complete daily data

U.S. Department of Commerce  
National Oceanic & Atmospheric Administration  
National Environmental Satellite, Data,  
and Information Service

**Climatography  
of the United States**

**No. 20**

**1971-2000**

National Climatic Data Center  
Federal Building  
151 Patton Avenue  
Asheville, North Carolina 28801  
www.ncdc.noaa.gov

**COOP ID: 465963**

**Station: MIDDLEBOURNE 3 ESE, WV**

**Climate Division: WV 2**

**NWS Call Sign:**

**Elevation: 782 Feet**

**Lat: 39° 28N**

**Lon: 80° 52W**

| Temperature (°F) |           |           |      |                  |      |     |                       |      |                 |      |     |                      |                         |         |         |            |           |           |           |           |          |
|------------------|-----------|-----------|------|------------------|------|-----|-----------------------|------|-----------------|------|-----|----------------------|-------------------------|---------|---------|------------|-----------|-----------|-----------|-----------|----------|
| Mean (1)         |           |           |      | Extremes         |      |     |                       |      |                 |      |     | Degree Days (1)      | Mean Number of Days (3) |         |         |            |           |           |           |           |          |
| Month            | Daily Max | Daily Min | Mean | Highest Daily(2) | Year | Day | Highest Month(1) Mean | Year | Lowest Daily(2) | Year | Day | Lowest Month(1) Mean | Year                    | Heating | Cooling | Max >= 100 | Max >= 90 | Max >= 50 | Max <= 32 | Min <= 32 | Min <= 0 |
| Jan              | 38.5      | 19.0      | 28.8 | 79               | 1950 | 26  | 38.1                  | 1974 | -34+            | 1974 | 19  | 14.2                 | 1977                    | 1124    | 0       | 0          | 0         | 6.8       | 9.2       | 26.2      | 2.4      |
| Feb              | 43.0      | 20.6      | 31.8 | 78               | 2000 | 27  | 40.4                  | 1976 | -18             | 1976 | 6   | 17.9                 | 1978                    | 930     | 0       | 0          | 0         | 9.5       | 5.6       | 23.1      | 1.8      |
| Mar              | 53.4      | 28.1      | 40.8 | 87               | 1950 | 28  | 49.9                  | 1973 | -8              | 1980 | 3   | 33.4                 | 1996                    | 732     | 0       | 0          | 0         | 19.5      | 1.3       | 19.6      | 2        |
| Apr              | 64.1      | 36.5      | 50.3 | 91               | 1986 | 28  | 55.1                  | 1985 | 10              | 1964 | 1   | 44.9                 | 1997                    | 441     | 1       | 0          | 0         | 27.1      | 0         | 10.5      | 0        |
| May              | 73.1      | 47.4      | 60.3 | 94               | 1962 | 18  | 68.4                  | 1991 | 22+             | 1966 | 10  | 54.0                 | 1997                    | 193     | 45      | 0          | 0         | 30.9      | 0         | 1.8       | 0        |
| Jun              | 80.5      | 56.6      | 68.6 | 98+              | 1952 | 27  | 72.0                  | 1987 | 31              | 1966 | 2   | 63.4                 | 1992                    | 32      | 139     | 0          | 1.5       | 30.0      | 0         | @         | 0        |
| Jul              | 84.0      | 61.9      | 73.0 | 103              | 1988 | 16  | 76.0+                 | 1999 | 37              | 1988 | 1   | 69.5                 | 2000                    | 2       | 248     | 2          | 5.3       | 31.0      | 0         | 0         | 0        |
| Aug              | 82.4      | 60.2      | 71.3 | 101              | 1955 | 5   | 75.5+                 | 1995 | 38+             | 1965 | 29  | 68.0                 | 1982                    | 11      | 206     | @          | 3.4       | 31.0      | 0         | 0         | 0        |
| Sep              | 76.4      | 53.2      | 64.8 | 103              | 1953 | 4   | 68.6                  | 1978 | 29              | 1966 | 16  | 61.6                 | 1995                    | 75      | 69      | 0          | 9         | 30.0      | 0         | 0         | 0        |
| Oct              | 65.7      | 39.7      | 52.7 | 93+              | 1951 | 4   | 60.7                  | 1971 | 15              | 1952 | 21  | 44.9                 | 1988                    | 392     | 10      | 0          | 0         | 29.6      | 0         | 7.0       | 0        |
| Nov              | 53.7      | 31.2      | 42.5 | 85+              | 1948 | 6   | 48.9                  | 1985 | -1              | 1958 | 30  | 34.5                 | 1976                    | 676     | 0       | 0          | 0         | 19.0      | 0         | 16.3      | 0        |
| Dec              | 43.1      | 24.1      | 33.6 | 78               | 1982 | 3   | 42.2                  | 1982 | -21             | 1989 | 22  | 19.6                 | 1989                    | 973     | 0       | 0          | 0         | 9.6       | 5.4       | 23.7      | 9        |
| Ann              | 63.2      | 39.9      | 51.5 | 103+             | 1988 | 16  | 76.0+                 | 1999 | -34+            | 1994 | 19  | 14.2                 | 1977                    | 5601    | 718     | 2          | 11.5      | 274.0     | 21.8      | 128.3     | 5.3      |

+ Also occurred on an earlier date(s)

@ Denotes mean number of days greater than 0 but less than .05

Complete documentation available from: [www.ncdc.noaa.gov/oa/climate/normal/asnormals.html](http://www.ncdc.noaa.gov/oa/climate/normal/asnormals.html)

Issue Date: February 2004

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1948-2001

(3) Derived from 1971-2000 serially complete daily data

031-A

U.S. Department of Commerce  
National Oceanic & Atmospheric Administration  
National Environmental Satellite, Data,  
and Information Service

**Climatography  
of the United States**

**No. 20  
1971-2000**

National Climatic Data Center  
Federal Building  
151 Patton Avenue  
Asheville, North Carolina 28801  
www.ncdc.noaa.gov

**COOP ID: 466849**

**Station: PARKERSBURG AP, WV**

**Climate Division: WV 1**

**NWS Call Sign: PKB**

**Elevation: 831 Feet Lat: 39° 21N**

**Lon: 81° 26W**

| Mean (1) |      | Extremes  |           |      |                  |      |      |                       |      |                 |      | Degree Days (1)<br>Base Temp 65 |                      |      | Mean Number of Days (3) |         |            |           |           |           |           |          |     |
|----------|------|-----------|-----------|------|------------------|------|------|-----------------------|------|-----------------|------|---------------------------------|----------------------|------|-------------------------|---------|------------|-----------|-----------|-----------|-----------|----------|-----|
|          |      | Daily Max | Daily Min | Mean | Highest Daily(2) | Year | Day  | Highest Month(1) Mean | Year | Lowest Daily(2) | Year | Day                             | Lowest Month(1) Mean | Year | Heating                 | Cooling | Max >= 100 | Max >= 90 | Max >= 50 | Max <= 32 | Min <= 32 | Min <= 0 |     |
| Jan      | 39.1 | 23.0      | 31.1      | 76   | 1950             | 25   | 40.3 | 1990                  | -24  | 1994            | 19   | 17.4                            | 1977                 | 1052 | 0                       | 0       | 0          | 0         | 0         | 0         | 0         | 0        | 0   |
| Feb      | 43.4 | 25.4      | 34.4      | 74   | 1976             | 29   | 42.9 | 1976                  | -10+ | 1951            | 3    | 21.2                            | 1978                 | 856  | 0                       | 0       | 0          | 0         | 0         | 0         | 0         | 0        | 0   |
| Mar      | 54.2 | 33.7      | 44.0      | 86   | 1950             | 27   | 51.8 | 1976                  | -5   | 1980            | 3    | 37.5                            | 1978                 | 654  | 0                       | 0       | 0          | 0         | 0         | 0         | 0         | 0        | 0   |
| Apr      | 64.8 | 42.1      | 53.5      | 94   | 1976             | 18   | 59.2 | 1985                  | 17   | 1972            | 9    | 48.1                            | 1997                 | 352  | 6                       | 6       | 0          | 0         | 0         | 0         | 0         | 0        | 0   |
| May      | 73.9 | 51.6      | 62.8      | 94+  | 1949             | 4    | 70.3 | 1991                  | 24   | 1966            | 10   | 56.8                            | 1997                 | 157  | 86                      | 0       | 0          | 0         | 0         | 0         | 0         | 0        | 0   |
| Jun      | 81.4 | 60.1      | 70.8      | 100  | 1988             | 25   | 74.9 | 1984                  | 36   | 1966            | 2    | 67.0                            | 1980                 | 15   | 189                     | @       | 2.8        | 30.0      | 0         | 0         | 0         | 0        | 0   |
| Jul      | 84.5 | 64.7      | 74.6      | 102+ | 1988             | 8    | 78.2 | 1999                  | 44   | 1988            | 1    | 71.1                            | 1996                 | 0    | 298                     | 2       | 6.2        | 31.0      | 0         | 0         | 0         | 0        | 0   |
| Aug      | 83.0 | 63.5      | 73.3      | 101  | 1988             | 17   | 78.4 | 1995                  | 40   | 1986            | 29   | 69.3                            | 1992                 | 6    | 263                     | @       | 3.9        | 31.0      | 0         | 0         | 0         | 0        | 0   |
| Sep      | 76.6 | 56.3      | 66.5      | 102  | 1953             | 3    | 72.1 | 1978                  | 32+  | 1956            | 21   | 62.0                            | 1975                 | 58   | 102                     | 0       | 0          | 0         | 0         | 0         | @         | 0        | 0   |
| Oct      | 66.0 | 44.8      | 55.4      | 90   | 1951             | 3    | 63.6 | 1984                  | 21   | 1952            | 21   | 48.3                            | 1988                 | 321  | 22                      | 0       | 0          | 0         | 0         | 0         | 0         | 0        | 0   |
| Nov      | 54.4 | 36.3      | 45.4      | 84   | 1961             | 3    | 51.0 | 1985                  | 1    | 1958            | 30   | 37.4                            | 1976                 | 591  | 0                       | 0       | 0          | 0         | 0         | 0         | 0         | 0        | 0   |
| Dec      | 43.8 | 27.9      | 35.9      | 79   | 1971             | 10   | 44.6 | 1982                  | -16  | 1989            | 23   | 21.3                            | 1989                 | 904  | 0                       | 0       | 0          | 0         | 0         | 0         | 0         | 0        | 0   |
| Ann      | 63.8 | 44.1      | 54.0      | 102+ | 1988             | 8    | 78.4 | 1995                  | -24  | 1994            | 19   | 17.4                            | 1977                 | 4966 | 966                     | 2       | 14.4       | 272.8     | 22.8      | 103.4     | 22.8      | 103.4    | 2.4 |

+ Also occurred on an earlier date(s)

@ Denotes mean number of days greater than 0 but less than .05

Complete documentation available from: [www.ncdc.noaa.gov/oa/climate/normal/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normal/usnormals.html)

Issue Date: February 2004

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1948-2001

(3) Derived from 1971-2000 serially complete daily data

038-A

U.S. Department of Commerce  
National Oceanic & Atmospheric Administration  
National Environmental Satellite, Data,  
and Information Service

**Climatography  
of the United States**

**No. 20  
1971-2000**

National Climatic Data Center  
Federal Building  
151 Patton Avenue  
Asheville, North Carolina 28801  
www.ncdc.noaa.gov

**COOP ID: 466859**

**Station: PARKERSBURG, WV**

**Climate Division: WV 1      NWS Call Sign: PKB      Elevation: 620 Feet      Lat: 39° 17'N      Lon: 81° 33'W**

| Mean (1) |           | Extremes  |      |                 |      |     |                       |      |                |      |     | Degree Days (1)<br>Base Temp 65 |      |         | Mean Number of Days (3) |            |           |           |           |           |          |
|----------|-----------|-----------|------|-----------------|------|-----|-----------------------|------|----------------|------|-----|---------------------------------|------|---------|-------------------------|------------|-----------|-----------|-----------|-----------|----------|
| Month    | Daily Max | Daily Min | Mean | Highest Dash(2) | Year | Day | Highest Month(1) Mean | Year | Lowest Dash(2) | Year | Day | Lowest Month(1) Mean            | Year | Heating | Cooling                 | Max >= 100 | Max >= 90 | Max >= 50 | Max <= 32 | Min <= 32 | Min <= 0 |
| Jan      | 39.0      | 22.3      | 30.7 | 78              | 1950 | 25  | 40.1                  | 1990 | -26            | 1994 | 20  | 16.4                            | 1977 | 1064    | 0                       | .0         | .0        | 6.6       | 9.5       | 25.4      | 1.2      |
| Feb      | 43.4      | 24.1      | 33.8 | 78+             | 1999 | 12  | 42.0                  | 1976 | -8             | 1936 | 19  | 20.7                            | 1978 | 875     | 0                       | .0         | .0        | 9.4       | 6.5       | 21.5      | .3       |
| Mar      | 54.0      | 31.6      | 42.8 | 89              | 1929 | 25  | 51.4                  | 1973 | -3             | 1943 | 4   | 36.3                            | 1984 | 690     | 0                       | .0         | .0        | 19.0      | 1.4       | 17.1      | .0       |
| Apr      | 64.8      | 40.4      | 52.6 | 94              | 1986 | 28  | 58.6                  | 1985 | 17             | 1985 | 10  | 48.2                            | 1982 | 375     | 4                       | .0         | .3        | 26.4      | .0        | 5.8       | .0       |
| May      | 74.4      | 51.5      | 63.0 | 96              | 1988 | 31  | 71.8                  | 1991 | 29+            | 1947 | 10  | 57.5                            | 1997 | 155     | 92                      | .0         | .9        | 30.9      | .0        | .2        | .0       |
| Jun      | 82.2      | 60.3      | 71.3 | 102             | 1988 | 26  | 75.6                  | 1984 | 36             | 1972 | 11  | 65.7                            | 1972 | 21      | 208                     | .1         | 4.0       | 30.0      | .0        | .0        | .0       |
| Jul      | 85.8      | 64.9      | 75.4 | 105             | 1988 | 18  | 80.0                  | 1999 | 45+            | 1984 | 8   | 71.8                            | 1976 | 3       | 325                     | .3         | 8.6       | 31.0      | .0        | .0        | .0       |
| Aug      | 84.6      | 63.0      | 73.8 | 103             | 1988 | 18  | 79.1                  | 1995 | 42+            | 1965 | 29  | 69.4                            | 1992 | 8       | 280                     | 2          | 6.7       | 31.0      | .0        | .0        | .0       |
| Sep      | 77.9      | 55.8      | 66.9 | 102             | 1953 | 3   | 70.9                  | 1998 | 32             | 1942 | 29  | 62.1                            | 1975 | 52      | 107                     | .0         | 1.9       | 30.0      | .0        | .0        | .0       |
| Oct      | 66.5      | 43.4      | 55.0 | 91              | 1927 | 1   | 62.4                  | 1971 | 20             | 2000 | 31  | 47.9                            | 1988 | 333     | 22                      | .0         | @         | 29.5      | .0        | 3.6       | .0       |
| Nov      | 54.5      | 35.0      | 44.8 | 86              | 1961 | 3   | 52.6                  | 1985 | 4              | 1929 | 30  | 37.1                            | 1976 | 607     | 0                       | .0         | .0        | 18.8      | .5        | 13.5      | .0       |
| Dec      | 43.9      | 27.5      | 35.7 | 78              | 1982 | 4   | 43.9                  | 1984 | -10+           | 1983 | 25  | 23.3                            | 1989 | 908     | 0                       | .0         | .0        | 10.1      | 5.3       | 22.0      | .4       |
| Ann      | 64.3      | 43.3      | 53.8 | 105             | 1988 | 18  | 80.0                  | 1999 | -26            | 1994 | 20  | 16.4                            | 1977 | 5091    | 1038                    | .6         | 22.4      | 272.7     | 23.2      | 109.1     | 1.9      |

+ Also occurred on an earlier date(s)

@ Denotes mean number of days greater than 0 but less than .05

Complete documentation available from: [www.ncdc.noaa.gov/oa/climate/normals/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normals/usnormals.html)

Issue Date: February 2004

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1926-2001

(3) Derived from 1971-2000 serially complete daily data

U.S. Department of Commerce  
National Oceanic & Atmospheric Administration  
National Environmental Satellite, Data,  
and Information Service

**Climatography  
of the United States**

**No. 20  
1971-2000**

National Climatic Data Center  
Federal Building  
151 Patton Avenue  
Asheville, North Carolina 28801  
www.ncdc.noaa.gov

**Station: RIPLEY, WV**

**COOP ID: 467552**

**Climate Division: WV 3**

**NWS Call Sign:**

**Elevation: 590 Feet**

**Lat: 38° 49N**

**Lon: 81° 43W**

| Temperature (°F) |           |           |          |                  |      |     |                       |      |                                 |      |     |                      |                         |         |         |            |           |           |           |           |             |          |
|------------------|-----------|-----------|----------|------------------|------|-----|-----------------------|------|---------------------------------|------|-----|----------------------|-------------------------|---------|---------|------------|-----------|-----------|-----------|-----------|-------------|----------|
| Mean (1)         |           |           | Extremes |                  |      |     |                       |      | Degree Days (1)<br>Base Temp 65 |      |     |                      | Mean Number of Days (3) |         |         |            |           |           |           |           |             |          |
| Month            | Daily Max | Daily Min | Mean     | Highest Daily(2) | Year | Day | Highest Month(1) Mean | Year | Lowest Daily(2)                 | Year | Day | Lowest Month(1) Mean | Year                    | Heating | Cooling | Max >= 100 | Max >= 90 | Max >= 50 | Max <= 32 | Min <= 32 | Min <= 25.4 | Min <= 0 |
| Jan              | 40.7      | 19.9      | 30.3     | 80               | 1950 | 25  | 39.7                  | 1974 | -28+                            | 1974 | 19  | 16.2                 | 1977                    | 1076    | 0       | .0         | .0        | 8.2       | 7.1       | 25.4      | 1.7         | 0        |
| Feb              | 45.5      | 21.8      | 33.7     | 78+              | 1957 | 26  | 40.9                  | 1976 | -16                             | 1976 | 4   | 20.7                 | 1978                    | 879     | 0       | .0         | .0        | 11.2      | 3.9       | 21.7      | 1.2         | 0        |
| Mar              | 55.7      | 29.5      | 42.6     | 89+              | 1952 | 21  | 51.4                  | 1973 | -11                             | 1980 | 3   | 36.9                 | 1986                    | 694     | 0       | .0         | .0        | 22.1      | .7        | 17.4      | .1          | 0        |
| Apr              | 66.3      | 38.1      | 52.2     | 95               | 1985 | 22  | 56.9                  | 1999 | 11                              | 1982 | 7   | 48.2                 | 1982                    | 386     | 2       | .0         | .5        | 27.9      | .0        | 7.9       | .0          | 0        |
| May              | 75.8      | 49.0      | 62.4     | 97               | 1962 | 19  | 69.6                  | 1991 | 23                              | 1966 | 10  | 57.2                 | 1997                    | 149     | 68      | .0         | 1.6       | 31.0      | .0        | 1.2       | .0          | 0        |
| Jun              | 82.9      | 57.8      | 70.4     | 102              | 1988 | 25  | 73.9                  | 1971 | 35+                             | 1966 | 2   | 66.1                 | 1977                    | 20      | 180     | .1         | 5.5       | 30.0      | .0        | .0        | .0          | 0        |
| Jul              | 86.6      | 62.6      | 74.6     | 107              | 1988 | 16  | 79.0                  | 1999 | 39                              | 1988 | 1   | 71.4                 | 2000                    | 0       | 298     | .4         | 10.3      | 31.0      | .0        | .0        | .0          | 0        |
| Aug              | 84.8      | 60.5      | 72.7     | 103+             | 1983 | 20  | 77.8                  | 1995 | 35                              | 1965 | 29  | 66.5                 | 1982                    | 14      | 250     | .3         | 7.3       | 31.0      | .0        | .0        | .0          | 0        |
| Sep              | 78.9      | 53.2      | 66.1     | 102              | 1953 | 3   | 70.6                  | 1998 | 29+                             | 1981 | 24  | 61.0                 | 1982                    | 70      | 102     | .1         | 2.6       | 30.0      | .0        | .2        | .0          | 0        |
| Oct              | 68.0      | 40.3      | 54.2     | 92+              | 1949 | 10  | 61.5                  | 1971 | 14                              | 1962 | 27  | 46.8                 | 1976                    | 354     | 17      | .0         | .0        | 30.2      | .0        | 6.0       | .0          | 0        |
| Nov              | 56.1      | 31.8      | 44.0     | 86+              | 1948 | 5   | 51.5                  | 1985 | 0                               | 1958 | 30  | 34.6                 | 1976                    | 631     | 0       | .0         | .0        | 21.1      | .2        | 15.1      | .0          | 0        |
| Dec              | 45.7      | 25.1      | 35.4     | 82               | 1982 | 2   | 44.0                  | 1971 | -17+                            | 1989 | 22  | 22.1                 | 1989                    | 917     | 0       | .0         | .0        | 12.5      | 3.9       | 22.3      | .7          | 0        |
| Ann              | 65.6      | 40.8      | 53.2     | 107              | 1988 | 16  | 79.0                  | 1999 | -28+                            | 1994 | 19  | 16.2                 | 1977                    | 5190    | 917     | .9         | 27.8      | 286.2     | 15.8      | 117.2     | 3.7         | 0        |

+ Also occurred on an earlier date(s)

@ Denotes mean number of days greater than 0 but less than .05

Complete documentation available from: [www.ncdc.noaa.gov/oa/climate/normal/asnormals.html](http://www.ncdc.noaa.gov/oa/climate/normal/asnormals.html)

Issue Date: February 2004

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1948-2001

(3) Derived from 1971-2000 serially complete daily data

042-A

U.S. Department of Commerce  
National Oceanic & Atmospheric Administration  
National Environmental Satellite, Data,  
and Information Service

**Climatography  
of the United States**

**No. 20  
1971-2000**

National Climatic Data Center  
Federal Building  
151 Patton Avenue  
Asheville, North Carolina 28801  
www.ncdc.noaa.gov

**Station: SPENCER, WV**

**COOP ID: 468384**

**Climate Division: WV 3**

**NWS Call Sign:**

**Elevation: 943 Feet**

**Lat: 38° 48N**

**Lon: 81° 22W**

| Temperature (° F) |           |           |      |                  |      |     |                       |      |                 |      |     |                                 |                         |         |         |            |           |           |           |          |            |
|-------------------|-----------|-----------|------|------------------|------|-----|-----------------------|------|-----------------|------|-----|---------------------------------|-------------------------|---------|---------|------------|-----------|-----------|-----------|----------|------------|
| Mean (1)          |           |           |      | Extremes         |      |     |                       |      |                 |      |     | Degree Days (1)<br>Base Temp 65 | Mean Number of Days (3) |         |         |            |           |           |           |          |            |
| Month             | Daily Max | Daily Min | Mean | Highest Daily(2) | Year | Day | Highest Month(1) Mean | Year | Lowest Daily(2) | Year | Day | Lowest Month(1) Mean            | Year                    | Heating | Cooling | Max >= 100 | Max >= 90 | Max >= 50 | Max <= 32 | Min <= 0 | Min <= 3.0 |
| Jan               | 40.7      | 19.5      | 30.1 | 80               | 1939 | 5   | 39.8                  | 1974 | -31+            | 1994 | 19  | 16.8                            | 1977                    | 1081    | 0       | .0         | .0        | 8.4       | 7.8       | 26.3     | 3.0        |
| Feb               | 45.4      | 20.4      | 32.9 | 81               | 2000 | 27  | 41.7                  | 2000 | -22             | 1996 | 6   | 21.7                            | 1978                    | 899     | 0       | .0         | .0        | 10.7      | 4.5       | 23.1     | 1.6        |
| Mar               | 55.7      | 27.9      | 41.8 | 90               | 1929 | 26  | 50.5                  | 1973 | -13             | 1943 | 4   | 34.2                            | 1996                    | 718     | 0       | .0         | .0        | 20.8      | .9        | 20.2     | .3         |
| Apr               | 66.4      | 36.1      | 51.3 | 92+              | 1986 | 28  | 56.5+                 | 1985 | 13+             | 1982 | 7   | 45.2                            | 1997                    | 416     | 2       | .0         | .3        | 27.3      | .1        | 10.1     | .0         |
| May               | 75.1      | 46.8      | 61.0 | 98               | 1934 | 1   | 69.0                  | 1991 | 21              | 1947 | 10  | 54.7                            | 1997                    | 185     | 60      | .0         | .9        | 31.0      | .0        | 2.3      | .0         |
| Jun               | 82.3      | 56.2      | 69.3 | 101              | 1944 | 19  | 73.3                  | 1984 | 31              | 1972 | 11  | 64.5                            | 1972                    | 27      | 154     | .0         | 3.7       | 30.0      | .0        | @        | .0         |
| Jul               | 85.9      | 61.1      | 73.5 | 105              | 1934 | 26  | 77.4                  | 1999 | 38              | 1988 | 1   | 70.1+                           | 2000                    | 4       | 268     | .2         | 8.3       | 31.0      | .0        | .0       | .0         |
| Aug               | 84.4      | 58.9      | 71.7 | 104              | 1930 | 5   | 76.9                  | 1995 | 35              | 1986 | 29  | 67.9                            | 1992                    | 13      | 219     | @          | 5.4       | 31.0      | .0        | .0       | .0         |
| Sep               | 78.3      | 51.3      | 64.8 | 103              | 1932 | 2   | 68.6                  | 1973 | 29+             | 1942 | 29  | 61.7                            | 1997                    | 71      | 65      | .0         | 1.6       | 30.0      | .0        | .5       | .0         |
| Oct               | 67.6      | 38.9      | 53.3 | 92               | 1927 | 2   | 61.0                  | 1971 | 13+             | 1952 | 21  | 46.1                            | 1988                    | 379     | 15      | .0         | .0        | 30.1      | .0        | 8.7      | .0         |
| Nov               | 55.7      | 30.8      | 43.3 | 85               | 1933 | 2   | 53.1                  | 1985 | -1              | 1958 | 30  | 35.4                            | 1976                    | 653     | 0       | .0         | .0        | 20.2      | .4        | 16.8     | .0         |
| Dec               | 45.1      | 24.2      | 34.7 | 81               | 1982 | 4   | 44.6                  | 1971 | -22             | 1989 | 22  | 20.1                            | 1989                    | 940     | 0       | .0         | .0        | 11.3      | 4.3       | 23.4     | .8         |
| Ann               | 65.2      | 39.3      | 52.3 | 105              | 1934 | 26  | 77.4                  | 1999 | -31+            | 1994 | 19  | 16.8                            | 1977                    | 5386    | 783     | .2         | 20.2      | 281.8     | 18.0      | 131.4    | 5.7        |

+ Also occurred on an earlier date(s)

@ Denotes mean number of days greater than 0 but less than .05

Complete documentation available from: [www.ncdc.noaa.gov/oa/climate/normals/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normals/usnormals.html)  
Issue Date: February 2004

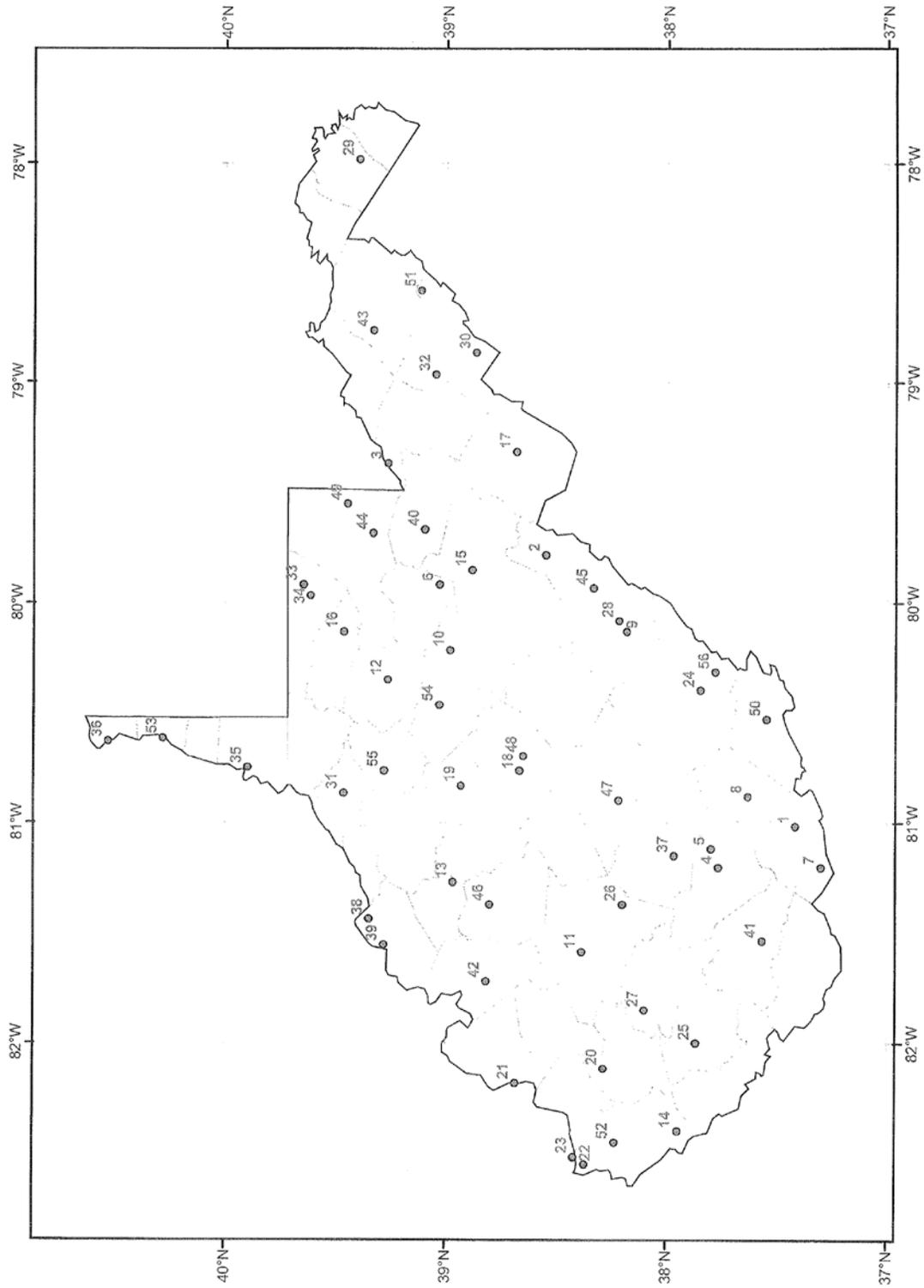
(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1926-2001

(3) Derived from 1971-2000 serially complete daily data

046-A

# West Virginia Station Locations





**NOAA Satellite and Information Service**  
National Environmental Satellite, Data, and Information Service (NESDIS)



**National Climatic Data Center**  
U.S. Department of Commerce

[DOC](#) > [NOAA](#) > [NESDIS](#) > [NCDC](#)

Search Field:

Search NCDC

[Snow Climatology](#) > [State Selection](#) > [Options](#) > [County SF](#) > 1,2,3 Day Snowfall (County)

## West Virginia

### Record 1-Day, 2-Day, and 3-Day Snowfall for Annual for stations sorted by county.

| County name | Station name          | 1-Day Snowfall | 2-Day Snowfall | 3-Day Snowfall | NYRS |
|-------------|-----------------------|----------------|----------------|----------------|------|
| BARBOUR     | BELINGTON             | 22.0           | 22.0           | 22.0           | 69   |
| BARBOUR     | PHILIPPI              | 19.5           | 23.0           | 23.5           | 110  |
| BERKELEY    | MARTINSBURG (1)       | 18.0           | 18.0           | 18.2           | 50   |
| BERKELEY    | MARTINSBURG FAA AP    | 14.0           | 15.0           | 15.0           | 76   |
| BOONE       | MADISON               | 14.8           | 21.0           | 26.0           | 88   |
| BRAXTON     | BURNSVILLE            | 14.0           | 17.0           | 17.0           | 58   |
| BRAXTON     | CENTRALIA             | 17.0           | 21.0           | 21.0           | 43   |
| BRAXTON     | GASSAWAY              | 11.0           | 20.0           | 20.0           | 56   |
| BRAXTON     | SUTTON LAKE           | 27.0           | 32.0           | 34.0           | 67   |
| BROOKE      | WELLSBURG WTR TRMT PL | 24.0           | 28.0           | 31.0           | 104  |
| CLAY        | CLAY                  | 19.0           | 25.9           | 25.9           | 89   |
| DODDRIDGE   | WEST UNION 2          | 14.0           | 24.0           | 24.5           | 35   |
| FAYETTE     | HICO                  | 25.1           | 25.1           | 25.2           | 42   |
| FAYETTE     | OAK HILL              | 20.0           | 24.0           | 24.0           | 66   |
| GILMER      | GLENVILLE 1 ENE       | 28.0           | 36.0           | 40.0           | 115  |
| GRANT       | BAYARD                | 31.0           | 38.0           | 38.5           | 102  |
| GREENBRIER  | LEWISBURG 3 N         | 20.0           | 26.0           | 27.0           | 111  |
| GREENBRIER  | MCROSS                | 13.0           | 15.0           | 18.0           | 34   |
| GREENBRIER  | WHITE SULPHUR SPRINGS | 16.0           | 23.0           | 25.0           | 99   |
| HAMPSHIRE   | ROMNEY 3 NNE          | 26.0           | 34.0           | 34.0           | 108  |
| HANCOCK     | NEW CUMBERLAND        | 12.0           | 17.5           | 17.5           | 92   |
| HANCOCK     | WEIRTON               | 16.0           | 22.0           | 26.0           | 27   |
| HARDY       | MATHIAS               | 22.0           | 29.0           | 36.0           | 51   |
| HARDY       | MOOREFIELD            | 24.0           | 32.0           | 32.0           | 98   |
| HARDY       | WARDENSVILLE R M FARM | 28.0           | 36.0           | 36.0           | 86   |
| HARRISON    | BENSON                | 22.0           | 30.0           | 40.0           | 41   |
| HARRISON    | CLARKSBURG 1          | 24.0           | 30.0           | 33.0           | 84   |
| HARRISON    | LOST CREEK NEAR       | 13.0           | 14.5           | 14.5           | 47   |
| JACKSON     | RAVENSWOOD DAM 22     | 13.0           | 13.0           | 13.0           | 61   |
| JACKSON     | RIPLEY                | 11.5           | 18.0           | 18.0           | 65   |

|            |                          |      |      |      |     |
|------------|--------------------------|------|------|------|-----|
| JEFFERSON  | HARPERS FERRY            | 16.0 | 17.0 | 18.0 | 78  |
| JEFFERSON  | KEARNEYSVILLE            | 20.1 | 27.1 | 27.1 | 58  |
| KANAWHA    | CHARLESTON 1             | 14.4 | 16.6 | 18.7 | 70  |
| KANAWHA    | CHARLESTON AP            | 17.1 | 18.8 | 21.1 | 52  |
| KANAWHA    | CLENDENIN                | 18.0 | 23.0 | 23.0 | 55  |
| KANAWHA    | LONDON LOCKS             | 14.0 | 15.0 | 15.4 | 50  |
| LEWIS      | HORNER                   | 20.5 | 26.0 | 29.0 | 41  |
| LEWIS      | IRELAND                  | 14.0 | 16.0 | 16.0 | 35  |
| LEWIS      | JANE LEW                 | 21.0 | 36.0 | 43.0 | 52  |
| LEWIS      | VANDALIA                 | 16.0 | 27.6 | 27.6 | 57  |
| LEWIS      | WESTON                   | 25.0 | 32.0 | 37.5 | 108 |
| LINCOLN    | BRANCHLAND 1 N           | 14.7 | 20.8 | 21.1 | 66  |
| LINCOLN    | HAMLIN                   | 12.0 | 18.0 | 18.8 | 67  |
| LOGAN      | LOGAN                    | 18.0 | 19.0 | 19.5 | 97  |
| LOGAN      | MAN                      | 13.0 | 13.5 | 13.5 | 44  |
| MARION     | FAIRMONT                 | 24.0 | 30.0 | 36.0 | 115 |
| MARION     | HOULT LOCK 15            | 20.0 | 23.0 | 26.0 | 46  |
| MARION     | MANNINGTON 1 N           | 20.6 | 32.6 | 41.0 | 79  |
| MARION     | MANNINGTON 8 WNW         | 28.0 | 36.0 | 36.3 | 61  |
| MARSHALL   | MC MECHEM DAM 13         | 14.0 | 14.0 | 19.0 | 43  |
| MARSHALL   | MOUNDSVILLE              | 20.0 | 21.2 | 21.2 | 40  |
| MASON      | HOGSETT GALLIPOLIS DAM   | 20.0 | 22.0 | 22.0 | 76  |
| MCDOWELL   | ELKHORN                  | 14.0 | 14.7 | 14.7 | 43  |
| MCDOWELL   | GARY                     | 14.0 | 16.1 | 16.1 | 73  |
| MCDOWELL   | IAEGER                   | 18.0 | 21.0 | 21.0 | 60  |
| MERCER     | ATHENS CONCORD COLLEGE   | 22.0 | 25.0 | 25.0 | 63  |
| MERCER     | BLUEFIELD FAA AP         | 16.3 | 18.9 | 18.9 | 42  |
| MERCER     | PRINCETON                | 16.5 | 20.5 | 23.0 | 82  |
| MINERAL    | PIEDMONT 1 SE            | 24.0 | 24.7 | 24.7 | 53  |
| MINGO      | KERMIT                   | 14.0 | 19.0 | 21.7 | 50  |
| MINGO      | WILLIAMSON               | 14.0 | 23.0 | 23.0 | 81  |
| MINGO      | WILLIAMSON               | 12.0 | 14.5 | 16.5 | 54  |
| MONONGALIA | LAKE LYNN                | 13.0 | 16.5 | 16.5 | 75  |
| MONONGALIA | MORGANTOWN FAA AIRPORT   | 20.0 | 20.0 | 20.7 | 55  |
| MONONGALIA | MORGANTOWN LOCK & DAM    | 22.0 | 26.2 | 27.2 | 74  |
| MONROE     | UNION                    | 19.0 | 21.3 | 23.9 | 101 |
| MORGAN     | BERKELEY SPRINGS         | 20.5 | 22.0 | 23.5 | 37  |
| NICHOLAS   | BELVA                    | 16.1 | 18.2 | 19.9 | 31  |
| NICHOLAS   | SUMMERSVILLE 2           | 17.0 | 22.0 | 26.0 | 37  |
| NICHOLAS   | SUMMERSVILLE LAKE        | 15.0 | 21.0 | 21.0 | 40  |
| OHIO       | PIKE ISLAND LOCK AND DAM | 14.0 | 16.0 | 19.0 | 26  |
| OHIO       | WHEELING (1)             | 15.3 | 18.5 | 22.5 | 40  |

|            |                         |      |      |      |     |
|------------|-------------------------|------|------|------|-----|
| OHIO       | WHEELING WARWOOD DAM 12 | 19.0 | 26.0 | 29.0 | 52  |
| PENDLETON  | BRANDYWINE              | 18.0 | 18.0 | 18.0 | 34  |
| PENDLETON  | BRUSHY RUN              | 23.1 | 27.9 | 28.6 | 47  |
| PENDLETON  | FRANKLIN 2 NE           | 22.0 | 31.0 | 35.5 | 75  |
| PENDLETON  | UPPER TRACT             | 20.5 | 24.0 | 24.0 | 52  |
| PLEASANTS  | ST MARYS                | 14.0 | 21.0 | 23.0 | 56  |
| POCAHONTAS | ARBOVALE                | 17.0 | 19.0 | 21.0 | 53  |
| POCAHONTAS | BUCKEYE                 | 15.0 | 22.5 | 24.0 | 54  |
| POCAHONTAS | MARLINTON               | 15.0 | 22.7 | 24.3 | 71  |
| POCAHONTAS | SENECA STATE FOREST IN  | 20.2 | 23.6 | 23.6 | 42  |
| PRESTON    | ALBRIGHT                | 18.0 | 22.0 | 22.0 | 54  |
| PRESTON    | BRANDONVILLE            | 18.0 | 33.0 | 33.0 | 57  |
| PRESTON    | ROWLESBURG 1            | 18.0 | 21.0 | 23.8 | 104 |
| PRESTON    | TERRA ALTA NO 1         | 27.0 | 33.0 | 39.0 | 46  |
| PUTMAN     | BANCROFT                | 12.0 | 16.0 | 16.0 | 38  |
| PUTNAM     | WINFIELD LOCKS          | 24.0 | 27.0 | 27.0 | 68  |
| RALEIGH    | BECKLEY VA HOSPITAL     | 28.0 | 28.5 | 31.0 | 108 |
| RALEIGH    | DRY CREEK               | 13.0 | 17.7 | 17.7 | 40  |
| RANDOLPH   | ALPENA                  | 33.0 | 34.0 | 35.0 | 40  |
| RANDOLPH   | DAILEY                  | 17.0 | 20.0 | 23.0 | 55  |
| RANDOLPH   | ELKINS 1 SE             | 17.8 | 19.4 | 21.1 | 74  |
| RANDOLPH   | GLADY 1 N               | 15.2 | 21.0 | 22.9 | 34  |
| RANDOLPH   | PICKENS 1               | 30.0 | 40.0 | 46.0 | 84  |
| RANDOLPH   | VALLEY HEAD             | 18.0 | 25.5 | 26.5 | 69  |
| RITCHIE    | CAIRO 3 S               | 15.0 | 20.0 | 20.2 | 76  |
| ROANE      | RYAN                    | 19.4 | 19.9 | 19.9 | 43  |
| ROANE      | SPENCER 4 S             | 16.0 | 20.0 | 20.7 | 110 |
| SUMMERS    | ALDERSON                | 12.0 | 13.0 | 13.0 | 63  |
| SUMMERS    | BLUESTONE LAKE          | 16.0 | 23.0 | 24.0 | 64  |
| SUMMERS    | FLAT TOP                | 30.0 | 38.0 | 38.0 | 69  |
| TAYLOR     | GRAFTON                 | 17.0 | 20.0 | 24.0 | 74  |
| TUCKER     | CANAAN VALLEY           | 24.0 | 30.0 | 32.0 | 53  |
| TUCKER     | PARSONS 1 NE            | 19.0 | 26.0 | 28.0 | 101 |
| TUCKER     | THOMAS                  | 19.0 | 22.6 | 25.0 | 66  |
| TYLER      | BENS RUN 1 SSE          | 18.0 | 24.0 | 30.0 | 80  |
| TYLER      | MIDDLEBOURNE 3 ESE      | 13.0 | 17.0 | 18.6 | 80  |
| UPSHUR     | BUCKHANNON              | 20.0 | 28.0 | 31.5 | 111 |
| WAYNE      | HUNTINGTON SEWAGE PLNT  | 10.0 | 13.0 | 13.2 | 38  |
| WAYNE      | HUNTINGTON WSO AP       | 21.1 | 21.8 | 22.3 | 41  |
| WEBSTER    | CAMDEN ON GAULEY 2 S    | 25.0 | 27.0 | 27.0 | 83  |
| WEBSTER    | HACKER VALLEY           | 16.3 | 22.5 | 23.7 | 47  |
| WEBSTER    | WEBSTER SPRINGS 1 E     | 16.0 | 18.7 | 19.0 | 62  |
| WETZEL     | HASTINGS                | 22.0 | 25.0 | 35.0 | 42  |
| WETZEL     | NEW MARTINSVILLE 4 NNE  | 16.0 | 20.0 | 26.0 | 83  |
| WIRT       | CRESTON                 | 16.0 | 17.9 | 17.9 | 106 |

|         |                    |      |      |      |    |
|---------|--------------------|------|------|------|----|
| WOOD    | BELLEVILLE DAM 20  | 14.0 | 14.0 | 14.0 | 48 |
| WOOD    | PARKERSBURG        | 15.7 | 25.0 | 25.0 | 80 |
| WOOD    | PARKERSBURG FAA AP | 20.1 | 20.2 | 20.8 | 50 |
| WOOD    | WASHINGTON DAM 19  | 13.0 | 13.0 | 13.0 | 52 |
| WYOMING | PINEVILLE          | 14.0 | 21.0 | 21.0 | 63 |

Whether or Not snow fell on each day.  
 All snowfall amounts are in inches.  
 NYRS = Number of Years with non-missing data.  
 NA = Not Applicable, or insufficient data to compute.  
 \* = value > 0 but less than units resolution.

---

|                                |                                     |  |                            |
|--------------------------------|-------------------------------------|--|----------------------------|
| <a href="#">Privacy Policy</a> | <a href="#">Open Access to Data</a> |  | <a href="#">Disclaimer</a> |
|--------------------------------|-------------------------------------|--|----------------------------|

---

*Downloaded Monday, 29-Nov-2010 15:36:36 EST*  
 Climate Services and Monitoring Division  
 NOAA/National Climatic Data Center  
 151 Patton Avenue  
 Asheville, NC 28801-5001  
 fax: +1-828-271-4876  
 phone: +1-828-271-4800  
 E-mail: [ncdc.info@noaa.gov](mailto:ncdc.info@noaa.gov)  
 To request climate data, please E-mail: [ncdc.orders@noaa.gov](mailto:ncdc.orders@noaa.gov)

## Appendix G

HAZUS reports for each county in the region. Tyler County was not available and will be added when it does become available.

## Appendix H

Contains floodplain maps, topographic maps and aerial photographs that show areas of the region that are subject to flooding.