





# National Weather Service

## Storm Data and Unusual Weather Phenomena



January 1998

| Location | Date | Time<br>Local/<br>Standard | Path<br>Length<br>(Miles) | Path<br>Width<br>(Yards) | Number of<br>Persons<br>Killed | Injured | Estimated<br>Damage<br>Property | Crops | Character of Storm |
|----------|------|----------------------------|---------------------------|--------------------------|--------------------------------|---------|---------------------------------|-------|--------------------|
|----------|------|----------------------------|---------------------------|--------------------------|--------------------------------|---------|---------------------------------|-------|--------------------|

### MARYLAND, Central

**MDZ002-005>006-009>010**      **Allegany - Carroll - Northern Baltimore - Montgomery - Howard**

|    |                    |  |  |  |   |   |    |  |                       |
|----|--------------------|--|--|--|---|---|----|--|-----------------------|
| 15 | 0800EST<br>1600EST |  |  |  | 0 | 0 | 5K |  | <b>Winter Weather</b> |
|----|--------------------|--|--|--|---|---|----|--|-----------------------|

**MDZ003>004**      **Washington - Frederick**

|    |         |  |  |  |   |   |     |     |                  |
|----|---------|--|--|--|---|---|-----|-----|------------------|
| 15 | 1200EST |  |  |  | 0 | 0 | 15K | 20K | <b>Ice Storm</b> |
| 16 | 0200EST |  |  |  |   |   |     |     |                  |

Warm moist air overrunning a shallow polar surface air mass produced a variety of winter weather beginning around daybreak on the 15th and continuing until just after midnight on the 16th. Precipitation began as a mix of sleet and snow but quickly changed to rain and freezing rain across areas west of the Chesapeake Bay.

The combination of quick action by Maryland State Highway Administration road crews, and the still above freezing subsoil temperatures, kept most main arteries and secondary roads free from accumulation. However, in the ice storm area, free standing structures such as trees, power poles/wires, and exposed bridges received between 1/4 and 1/2 inch of ice accretion. A small area of higher terrain between Hagerstown/Williamsport (MDZ003) and Middletown (MDZ004) received the most icing. In these locations, spotty power outages were noted, and a few large limbs and small trees snapped under the weight of the ice. Allegheny Power reported 150 customers were without power in the Hagerstown/Sharpsburg vicinity during the evening of the 15th and early morning of the 16th. Some wires reportedly burned.

In the winter weather area, mixed precipitation quickly changed to rain during the late morning and early afternoon hours, but not before causing a minor build up of ice, along with an early morning coating of slush on area roadways.

**MDZ002>003**      **Allegany - Washington**

|    |         |  |  |  |   |   |  |  |                       |
|----|---------|--|--|--|---|---|--|--|-----------------------|
| 22 | 2200EST |  |  |  | 0 | 0 |  |  | <b>Winter Weather</b> |
| 23 | 2200EST |  |  |  |   |   |  |  |                       |

Low pressure over the southeastern U.S., combined with weak polar high pressure moving east of New England, produced a small area of light snow and sleet which changed to freezing rain late at night. In Washington Co (MDZ003), snow/sleet accumulations ranged from 1 inch near Hagerstown to 3 inches near Hancock. A broad area of 3 inches of measured snow was observed in Allegany Co, with the highest elevations of the far western portion (Frostburg) receiving around 4 inches. Slushy roads were noted, especially from western Washington Co through Allegany Co. Precipitation changed to a cold rain around dawn on the 23rd.

Though several accidents were noted, few were significant. A notable accident involved a tractor-trailer which flipped along Interstate 70 just east of Hancock (MDZ003). No injuries occurred.

**MDZ004>005**      **Frederick - Carroll**

|    |                    |  |  |  |   |   |  |  |             |
|----|--------------------|--|--|--|---|---|--|--|-------------|
| 24 | 1800EST<br>2200EST |  |  |  | 0 | 0 |  |  | <b>Snow</b> |
|----|--------------------|--|--|--|---|---|--|--|-------------|

A band of light to moderate snow developed over northern and central Maryland during the evening, as a vigorous upper-level disturbance enhanced low- and mid-level lifting of residual moisture left behind from a previous system. The snow, which fell onto relatively warm ground, produced accumulations which varied greatly with elevation. In general, accumulations along the Catoctin Mountains were between 3 and 4 inches. Higher piedmont locations of northern Frederick (MDZ004) and Carroll (MDZ005) Cos averaged 2 to 3 inches, and lower elevations reported generally around 1 inch.

**MDZ003**      **Washington**

|    |         |  |  |  |   |   |  |  |                       |
|----|---------|--|--|--|---|---|--|--|-----------------------|
| 27 | 1500EST |  |  |  | 0 | 0 |  |  | <b>Winter Weather</b> |
| 28 | 1400EST |  |  |  |   |   |  |  |                       |

**MDZ002**      **Allegany**

|    |         |  |  |  |   |   |    |  |                     |
|----|---------|--|--|--|---|---|----|--|---------------------|
| 27 | 1900EST |  |  |  | 0 | 0 | 2K |  | <b>Winter Storm</b> |
| 28 | 1300EST |  |  |  |   |   |    |  |                     |

A winter storm developed along the Georgia coast on the 27th, then intensified as it moved slowly northward along the coast later on the 27th and 28th. The cyclone, which tracked to the Virginia capes by late afternoon on the 28th, spread a variety of winter weather across portions of western Maryland during a 24-hour period. As had been the case with other episodes during the 1997/98 winter, accumulations varied greatly with elevation. In Washington Co (MDZ003), accumulations were generally 1 to 2 inches, with up to 3 inches at higher elevations. Accumulations were even more varied in Allegany Co. Between 2 and 4 inches fell from the Allegany/Washington Co border to just west of Cumberland, at least a foot fell in Frostburg near the Allegheny plateau. Allegheny Power reported 200 customers without power in Allegany Co alone.

**MDZ005>007-009>011-013>014**      **Carroll - Northern Baltimore - Harford - Montgomery - Howard - Southern Baltimore - Prince Georges - Anne Arundel**

|    |                    |  |  |  |   |   |  |  |                   |
|----|--------------------|--|--|--|---|---|--|--|-------------------|
| 28 | 0400EST<br>1600EST |  |  |  | 0 | 0 |  |  | <b>Heavy Rain</b> |
|----|--------------------|--|--|--|---|---|--|--|-------------------|

**MDZ013>014-017>018**      **Prince Georges - Anne Arundel - St. Mary'S - Calvert**

|    |                    |  |  |  |   |   |     |  |                   |
|----|--------------------|--|--|--|---|---|-----|--|-------------------|
| 28 | 0700EST<br>1600EST |  |  |  | 0 | 0 | 75K |  | <b>Gusty Wind</b> |
|----|--------------------|--|--|--|---|---|-----|--|-------------------|



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|----------|------|----------------------------|---------------------------|--------------------------|--------------------------------|---------------------------------|---------------------------------|------------------------------|--------------------|
|----------|------|----------------------------|---------------------------|--------------------------|--------------------------------|---------------------------------|---------------------------------|------------------------------|--------------------|

### MARYLAND, Central

|  |    |                    |  |  |   |   |     |  |       |
|--|----|--------------------|--|--|---|---|-----|--|-------|
| <b>Frederick County</b><br>Countywide  | 28 | 0900EST<br>1600EST |  |  | 0 | 0 | 5K  |  | Flood |
| <b>Calvert County</b><br>Countywide    | 28 | 1100EST<br>1700EST |  |  | 0 | 0 | 5K  |  | Flood |
| <b>Charles County</b><br>East Portion  | 28 | 1100EST<br>1700EST |  |  | 0 | 0 |     |  | Flood |
| <b>St. Mary'S County</b><br>Countywide | 28 | 1100EST<br>1700EST |  |  | 0 | 0 | 10K |  | Flood |

A fairly intense and slow-moving nor'easter produced a large area of moderate to heavy rains across central and lower southern Maryland beginning late on the 27th and continuing through late afternoon on the 28th. The heaviest rain fell while the storm was tracking along the South and North Carolina coastline. Storm totals ranged from 1 1/2 to 2 1/2 inches over the area, except between 3 and 4 inches across lower southern Maryland.

Widespread minor to moderate flooding of small streams, creeks, and low-lying areas occurred over much of lower southern Maryland. Other localized flooding was observed in Frederick Co.

The Maryland State Highway Administration and local emergency management officials reported numerous road closures in these areas. In Frederick Co, fifteen roads were closed due to high water. More pronounced road closures were noted in lower southern Maryland and portions of east-central Maryland.

Nuisance road closures (for instance, Davidsonville Road and Crownsville Road) occurred in the Annapolis area. In St Mary's Co, at least two dozen roads were closed. Most were secondary roads, but two were rural state highways (routes 5, 235, and 238). A local NWS cooperative observer noted nearly 6 1/2 inches in a five-day period, with 3.96 inches from the nor'easter alone. In Charles Co, six secondary roads were closed.

Though no coastal flooding was observed, there was some minor overwash at Annapolis, Chesapeake Beach (Calvert Co), and Breton Beach (St Mary's Co). Channelling northerly winds down the bay reduced the flood threat, especially since tides were astronomically high. These same northerly winds, blowing at gale force, built waves in the Bay to 5 feet or more. Unfortunately, these waves aided in sinking a tugboat 1 1/2 miles northeast of the Thomas Point Lighthouse. The three-man crew was rescued at approximately 0130EST on the 28th.

Gale-force winds extended inland a bit, affecting most of the counties along the western shore of the Bay. Gusts in excess of 30 mph were observed in the piedmont, and over 40 mph along the coastal plain. The combination of gusty winds and saturated soil caused several instances of trees, limbs, and power lines to come down. Baltimore Gas and Electric, and Potomac Electric Power Co reported 3800 and 538 customers without power, respectively, during the peak of the storm (0945EST on the 28th). In Calvert Co (MDZ018), two homes sustained minor damage from fallen trees. At least 20 trees/limbs blocked roads in St Mary's (MDZ017) Co; numerous other trees/limbs and wires were down across Charles, Calvert, and Anne Arundel Cos. Eleven lines were down across Prince Georges Co, and several fell in Anne Arundel.

|                                 |   |    |                    |  |   |   |  |  |           |
|---------------------------------|---|----|--------------------|--|---|---|--|--|-----------|
| <b>MDZ009&gt;011-013&gt;014</b> | <b>Montgomery - Howard - Southern Baltimore - Prince Georges - Anne Arundel</b> | 29 | 0500EST<br>0900EST |  | 0 | 0 |  |  | Black Ice |
|---------------------------------|---|----|--------------------|--|---|---|--|--|-----------|

Residual moisture from rainfall of the previous evening combined with clear calm conditions to produce abundant black ice in the Maryland suburbs of Washington, DC and Baltimore during the morning commute. Dozens of accidents occurred as motorists travelled at unsuitable rates of speed considering the untreated roads. Sixty accidents were reported in northern Anne Arundel Co alone, and one bridge in the Annapolis area was briefly closed. No serious injuries were reported.

### VIRGINIA, North

|  |   |          |                    |  |   |   |  |  |                   |
|--|---|----------|--------------------|--|---|---|--|--|-------------------|
| <b>VAZ021-025&gt;031-036&gt;042-050&gt;057</b> | <b>Highland - Augusta - Rockingham - Shenandoah - Frederick - Page - Warren - Clarke - Nelson - Albemarle - Greene - Madison - Rappahannock - Fauquier - Loudoun - Orange - Culpeper - Prince William - Fairfax - Arlington - Stafford - Spotsylvania - King George</b> | 06<br>09 | 0000EST<br>1200EST |  | 0 | 0 |  |  | Unseasonably Warm |
|--|---|----------|--------------------|--|---|---|--|--|-------------------|

A sprawling area of high atmospheric pressure became anchored over the western Atlantic for several days. Circulation around the high brought an unencumbered flow of tropical air from the Caribbean region into all of Virginia for a 2 1/2 day period beginning around midnight on the 6th and continuing until around noon on the 9th. New record high temperatures were set at Dulles Airport (VAZ042) on these days. More interestingly, temperatures remained above 60 degrees across much of western Virginia for over



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|----------|------|----------------------------|---------------------------|--------------------------|--------------------------------|---------------------------------|---------------------------------|------------------------------|--------------------|
|----------|------|----------------------------|---------------------------|--------------------------|--------------------------------|---------------------------------|---------------------------------|------------------------------|--------------------|

### VIRGINIA, North

48 hours, spanning two mornings when the normal low temperatures were some 40 degrees colder!

In fact, there was one cooling degree day recorded during the the period (January 8). After nine days, the mean temperatures across northern Virginia were between 15 and 20 degrees above normal - more like April than early January.

|                            |    |                    |  |  |   |   |     |  |             |
|----------------------------|----|--------------------|--|--|---|---|-----|--|-------------|
| <b>Augusta County</b>      |    |                    |  |  |   |   |     |  |             |
| East Portion               | 08 | 0530EST<br>1200EST |  |  | 0 | 0 | 20K |  | Flash Flood |
| <b>Highland County</b>     |    |                    |  |  |   |   |     |  |             |
| Countywide                 | 08 | 0530EST<br>1100EST |  |  | 0 | 0 | 5K  |  | Flash Flood |
| <b>Nelson County</b>       |    |                    |  |  |   |   |     |  |             |
| Countywide                 | 08 | 0530EST<br>1200EST |  |  | 0 | 0 |     |  | Flash Flood |
| <b>Albemarle County</b>    |    |                    |  |  |   |   |     |  |             |
| West Portion               | 08 | 0600EST<br>1200EST |  |  | 0 | 0 |     |  | Flash Flood |
| <b>Greene County</b>       |    |                    |  |  |   |   |     |  |             |
| Countywide                 | 08 | 0600EST<br>1200EST |  |  | 0 | 0 | 10K |  | Flash Flood |
| <b>Page County</b>         |    |                    |  |  |   |   |     |  |             |
| Countywide                 | 08 | 0600EST<br>1200EST |  |  | 0 | 0 | 5K  |  | Flash Flood |
| <b>Rockingham County</b>   |    |                    |  |  |   |   |     |  |             |
| East Portion               | 08 | 0600EST<br>1200EST |  |  | 0 | 0 | 20K |  | Flash Flood |
| <b>Shenandoah County</b>   |    |                    |  |  |   |   |     |  |             |
| Countywide                 | 08 | 0600EST<br>1200EST |  |  | 0 | 0 | 20K |  | Flash Flood |
| <b>Clarke County</b>       |    |                    |  |  |   |   |     |  |             |
| Countywide                 | 08 | 0700EST<br>1200EST |  |  | 0 | 0 | 15K |  | Flash Flood |
| <b>Culpeper County</b>     |    |                    |  |  |   |   |     |  |             |
| West Portion               | 08 | 0700EST<br>1200EST |  |  | 0 | 0 |     |  | Flash Flood |
| <b>Loudoun County</b>      |    |                    |  |  |   |   |     |  |             |
| West Portion               | 08 | 0700EST<br>1200EST |  |  | 0 | 0 | 20K |  | Flash Flood |
| <b>Madison County</b>      |    |                    |  |  |   |   |     |  |             |
| Countywide                 | 08 | 0700EST<br>1200EST |  |  | 0 | 0 | 5K  |  | Flash Flood |
| <b>Rappahannock County</b> |    |                    |  |  |   |   |     |  |             |
| Countywide                 | 08 | 0700EST<br>1200EST |  |  | 0 | 0 | 5K  |  | Flash Flood |
| <b>Warren County</b>       |    |                    |  |  |   |   |     |  |             |
| Countywide                 | 08 | 0700EST<br>1200EST |  |  | 0 | 0 | 5K  |  | Flash Flood |
| <b>Fauquier County</b>     |    |                    |  |  |   |   |     |  |             |
| North Portion              | 08 | 0800EST<br>1200EST |  |  | 0 | 0 |     |  | Flash Flood |

Unseasonably warm and humid air plus developing low pressure over the Ohio Valley produced bands of heavy rain across much of the Shenandoah Valley. The combination of tropical rainfall, saturated soil (due to recent snow melt) and time of year led to flash flooding of numerous small streams, creeks, and low lying areas. Two areas were hit particularly hard: the northern edge of the Blue Ridge and a small area just west of Skyline Drive.

In western Loudoun Co, over 3 inches of rain in a 5-hour period flooded between 25 and 30 roads, including state route 9 northwest of Leesburg, state route 7 near Purcellville, and state route 287. Each road was closed during the morning commute. Several cars were abandoned on local secondary roads, and one person had to climb to safety when his truck became nearly submerged. Some school buses were unable to reach students in rural areas. In Clarke Co, at least 20 secondary roads were



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|----------|------|----------------------------|---------------------------|--------------------------|--------------------------------|---------|----------|------------------------------|--------------------|
|----------|------|----------------------------|---------------------------|--------------------------|--------------------------------|---------|----------|------------------------------|--------------------|

### VIRGINIA, North

closed, and federal highway 50 was down to 1 lane at the base of Paris Mountain. Gravel runoff from secondary roads caused minor property damage in the form of fouled springs and dirty ponds used for local drinking water.

In an area encompassing Page, eastern Rockingham, and eastern Augusta Cos, dozens of secondary roads were deemed impassable. Flooding was more acute in Sherando (Augusta Co) where a local dam neared its release point. In Craigsville, several homes were slightly inundated along the Little Calfpasture River along state route 42. In Rockingham Co, 25 roads were closed, including one with pavement failure. Rainfall totals at the highest elevation along Skyline Drive were as much as 6 to 7 inches, with one report of 7.80 inches at Lewis Camp Mountain (Page Co). Adjacent counties such as Warren, Rappahannock, and Greene sustained varying amounts of flooding. Fifteen secondary roads closed in Rappahannock Co; in Greene Co, a few secondary roads which had been rebuilt in the wake of the 1996 floods were washed out once again. In Warren Co, several low-water bridges flooded.

Farther west, 39 secondary roads were closed in Shenandoah Co, where schools did not open. At least one low water bridge collapsed. In the other affected counties, closed roads numbered less than 10 on average.

The rain tapered off shortly before noon, and conditions improved rapidly during the afternoon as creeks and streams receded.

**VAZ036>037-041-051>053**

**Nelson - Albemarle - Fauquier - Culpeper - Prince William - Fairfax**

|    |                    |  |   |   |     |  |                       |
|----|--------------------|--|---|---|-----|--|-----------------------|
| 15 | 0700EST<br>1300EST |  | 0 | 0 | 10K |  | <b>Winter Weather</b> |
|----|--------------------|--|---|---|-----|--|-----------------------|

**VAZ025>031-038>040-042**

**Augusta - Rockingham - Shenandoah - Frederick - Page - Warren - Clarke - Greene - Madison - Rappahannock - Loudoun**

|    |         |  |   |   |     |     |                  |
|----|---------|--|---|---|-----|-----|------------------|
| 15 | 1000EST |  | 0 | 0 | 50K | 75K | <b>Ice Storm</b> |
| 16 | 0200EST |  |   |   |     |     |                  |

Warm moist air overrunning shallow polar surface air produced a variety of winter weather, starting around daybreak on the 15th and continuing just after midnight on the 16th. Precipitation began as a mix of sleet and snow but quickly changed to rain and freezing rain across much of the state.

The combination of quick action by Virginia Department of Transportation road crews, and the still above freezing subsoil temperatures, kept most main arteries and secondary roads free from accumulation. However, in the ice storm area, free standing structures such as trees, power poles/wires, and exposed bridges received between 1/4 and 1/2 inch of ice accretion. A small section of higher elevation areas along and just west of the Blue Ridge received the most icing. In these areas, spotty power outages were noted, and several large limbs and small trees snapped under the weight of the ice. In forested areas of the northern Shenandoah Valley, specifically between 500 and 1000 feet above sea level, hundreds of trees sustained limb damage. Portions of the following counties were hit hardest: western Loudoun (VAZ042), Clarke (VAZ031), northern Warren (VAZ030), northern Shenandoah (VAZ027), and Frederick (VAZ028). Other pockets of substantial ice accretion likely occurred in Page, eastern Rockingham, and eastern Augusta Cos (VAZ025>026; 029).

Power outages were rather scattered. In Clarke and Frederick Cos (VAZ028-031), three transformers blew due to ice accretion; several lines fell from the combination of fallen tree limbs and the weight of the ice. An estimated 200 Allegheny Power customers lost electricity.

In the winter weather area, mixed precipitation quickly changed to rain during the late morning and early afternoon hours, but not before causing a minor build up of ice, along with early morning light coatings on area roadways.

**VAZ028**

**Frederick**

|    |         |  |   |   |  |                       |
|----|---------|--|---|---|--|-----------------------|
| 22 | 2200EST |  | 0 | 0 |  | <b>Winter Weather</b> |
| 23 | 0600EST |  |   |   |  |                       |

Low pressure over the southeastern U.S., combined with weak polar high pressure moving east of New England, produced a small area of light snow and sleet which changed to freezing rain late at night. Accumulations of snow ranged from 1 to 2 inches across the county, with some icing on top of that. Minor road problems were noted. Precipitation changed to a cold rain around dawn on the 23rd.

**VAZ025>026-029>031-036>037-040>042-051>054**

**Augusta - Rockingham - Page - Warren - Clarke - Nelson - Albemarle - Rappahannock - Fauquier - Loudoun - Culpeper - Prince William - Fairfax - Arlington**

|    |                    |  |   |   |  |                   |
|----|--------------------|--|---|---|--|-------------------|
| 23 | 0400EST<br>1300EST |  | 0 | 0 |  | <b>Heavy Rain</b> |
|----|--------------------|--|---|---|--|-------------------|

**Greene County  
Countywide**

|    |                    |  |   |   |      |              |
|----|--------------------|--|---|---|------|--------------|
| 23 | 0600EST<br>1000EST |  | 0 | 0 | 2.5K | <b>Flood</b> |
|----|--------------------|--|---|---|------|--------------|

**Madison County  
Countywide**

|    |                    |  |   |   |      |              |
|----|--------------------|--|---|---|------|--------------|
| 23 | 0600EST<br>1000EST |  | 0 | 0 | 2.5K | <b>Flood</b> |
|----|--------------------|--|---|---|------|--------------|



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|----------|------|----------------------------|---------------------------|--------------------------|----------------------|---------|---------------------|-------|--------------------|
|          |      |                            |                           |                          | Killed               | Injured | Property            | Crops |                    |

### VIRGINIA, North

Low- and mid-level flow of deep moisture, overrunning a chilly surface air mass, produced a prolonged period of moderate to heavy rain across north central Virginia during the morning of the 23rd. Rainfall totals across the area ranged from 1 to 2 inches; a record daily total (1.46 inches) fell at Dulles Airport (VAZ042). The long duration allowed a slow rise among area streams and creeks. Most remained in their banks. However, several locations in Madison and Greene Co reported closed roads from high water and creek overflows. Elsewhere, nuisance ponding and local high standing water was observed.

**VAZ021-025>027-029>030**

**Highland - Augusta - Rockingham - Shenandoah - Page - Warren**

|    |         |  |  |  |   |   |     |     |              |
|----|---------|--|--|--|---|---|-----|-----|--------------|
| 27 | 1500EST |  |  |  |   |   |     |     |              |
| 28 | 1400EST |  |  |  | 0 | 0 | 12K | 10K | Winter Storm |

**VAZ028-031**

**Frederick - Clarke**

|    |         |  |  |  |   |   |  |  |                |
|----|---------|--|--|--|---|---|--|--|----------------|
| 27 | 1500EST |  |  |  |   |   |  |  |                |
| 28 | 1400EST |  |  |  | 0 | 0 |  |  | Winter Weather |

A winter storm developed along the Georgia coast on the 27th, then intensified as it moved slowly northward along the coast later on the 27th and 28th. The cyclone, which tracked to the Virginia capes by late afternoon on the 28th, spread a variety of winter weather across the northern and central Shenandoah Valley during a 24-hour period. As had been the case with other episodes during the 1997/98 winter, accumulations varied greatly with elevation. From the Skyline Drive to the Shenandoah Mountain and North Mountain range, accumulations ranged from around 4 inches in the valleys to 8 inches above 1500 feet. West of the Shenandoah Range, in the plateau region of Highland Co (VAZ021), accumulations ranged from 12 to 18 inches.

The weight of the snow caused numerous tree limbs and some trees to fall in areas where more than one foot of snow accumulated, mainly in Highland Co.

Warmer air circulating around the storm caused a rain/sleet/snow mix over the northern Shenandoah Valley, where between 1 and 3 inches of wet snow accumulated. Similar accumulations were noted along the foothills just east of the Blue Ridge.

**VAZ053>054**

**Fairfax - Arlington**

|    |                    |  |  |  |   |   |  |  |            |
|----|--------------------|--|--|--|---|---|--|--|------------|
| 28 | 0400EST<br>1600EST |  |  |  |   |   |  |  |            |
|    |                    |  |  |  | 0 | 0 |  |  | Heavy Rain |

**Albemarle County**

**North Portion**

|    |                    |  |  |  |   |   |  |  |       |
|----|--------------------|--|--|--|---|---|--|--|-------|
| 28 | 0900EST<br>1600EST |  |  |  |   |   |  |  |       |
|    |                    |  |  |  | 0 | 0 |  |  | Flood |

**Clarke County**

**Countywide**

|    |                    |  |  |  |   |   |  |  |       |
|----|--------------------|--|--|--|---|---|--|--|-------|
| 28 | 0900EST<br>1600EST |  |  |  |   |   |  |  |       |
|    |                    |  |  |  | 0 | 0 |  |  | Flood |

**Fauquier County**

**Countywide**

|    |                    |  |  |  |   |   |  |  |       |
|----|--------------------|--|--|--|---|---|--|--|-------|
| 28 | 0900EST<br>1600EST |  |  |  |   |   |  |  |       |
|    |                    |  |  |  | 0 | 0 |  |  | Flood |

**Frederick County**

**Countywide**

|    |                    |  |  |  |   |   |    |  |       |
|----|--------------------|--|--|--|---|---|----|--|-------|
| 28 | 0900EST<br>1600EST |  |  |  |   |   |    |  |       |
|    |                    |  |  |  | 0 | 0 | 2K |  | Flood |

**Greene County**

**Countywide**

|    |                    |  |  |  |   |   |  |  |       |
|----|--------------------|--|--|--|---|---|--|--|-------|
| 28 | 0900EST<br>1600EST |  |  |  |   |   |  |  |       |
|    |                    |  |  |  | 0 | 0 |  |  | Flood |

**Loudoun County**

**West Portion**

|    |                    |  |  |  |   |   |    |  |       |
|----|--------------------|--|--|--|---|---|----|--|-------|
| 28 | 0900EST<br>1600EST |  |  |  |   |   |    |  |       |
|    |                    |  |  |  | 0 | 0 | 5K |  | Flood |

**Madison County**

**Countywide**

|    |                    |  |  |  |   |   |  |  |       |
|----|--------------------|--|--|--|---|---|--|--|-------|
| 28 | 0900EST<br>1600EST |  |  |  |   |   |  |  |       |
|    |                    |  |  |  | 0 | 0 |  |  | Flood |

**Rappahannock County**

**Countywide**

|    |                    |  |  |  |   |   |  |  |       |
|----|--------------------|--|--|--|---|---|--|--|-------|
| 28 | 0900EST<br>1600EST |  |  |  |   |   |  |  |       |
|    |                    |  |  |  | 0 | 0 |  |  | Flood |

**Shenandoah County**

**Countywide**

|    |                    |  |  |  |   |   |    |  |       |
|----|--------------------|--|--|--|---|---|----|--|-------|
| 28 | 0900EST<br>1600EST |  |  |  |   |   |    |  |       |
|    |                    |  |  |  | 0 | 0 | 5K |  | Flood |

**Warren County**

**Countywide**

|    |                    |  |  |  |   |   |  |  |       |
|----|--------------------|--|--|--|---|---|--|--|-------|
| 28 | 0900EST<br>1600EST |  |  |  |   |   |  |  |       |
|    |                    |  |  |  | 0 | 0 |  |  | Flood |



# National Weather Service

## Storm Data and Unusual Weather Phenomena



January 1998

| Location | Date | Time<br>Local/<br>Standard | Path<br>Length<br>(Miles) | Path<br>Width<br>(Yards) | Number of<br>Persons<br>Killed    Injured |  | Estimated<br>Damage<br>Property    Crops |  | Character of Storm |
|----------|------|----------------------------|---------------------------|--------------------------|---|--|--|--|--------------------|
|----------|------|----------------------------|---------------------------|--------------------------|---|--|--|--|--------------------|

### VIRGINIA, North

|  |    |                    |  |  |   |   |      |  |             |
|--|----|--------------------|--|--|---|---|------|--|-------------|
| <b>Culpeper County</b><br>Countywide       | 28 | 1000EST<br>1600EST |  |  | 0 | 0 |      |  | Flood       |
| <b>Orange County</b><br>Countywide         | 28 | 1000EST<br>1600EST |  |  | 0 | 0 |      |  | Flood       |
| <b>Prince William County</b><br>Countywide | 28 | 1000EST<br>1600EST |  |  | 0 | 0 |      |  | Flood       |
| <b>King George County</b><br>Countywide    | 28 | 1100EST<br>1700EST |  |  | 0 | 0 | 2.5K |  | Flood       |
| <b>Spotsylvania County</b><br>Countywide   | 28 | 1100EST<br>1700EST |  |  | 0 | 0 | 2.5K |  | Flood       |
| <b>Stafford County</b><br>Countywide       | 28 | 1100EST<br>1700EST |  |  | 0 | 0 |      |  | Flood       |
| <b>VAZ057</b><br>King George               | 28 | 1100EST<br>1700EST |  |  | 0 | 0 | 2K   |  | Gusty Winds |

A fairly intense and slow-moving nor'easter produced a large area of moderate to heavy rains across central and northeastern Virginia beginning late on the 27th and continuing through late afternoon on the 28th. The heaviest rains fell while the storm tracked along the South and North Carolina coastline. Storm totals ranged from 1 1/2 to 2 1/2 inches, with isolated totals of over 3 inches at higher elevations along the foothills, as well as portions of the Northern Neck region.

Widespread minor to moderate flooding of small streams, creeks, and low-lying areas occurred over all of the Piedmont, stretching east to King George Co in the Northern Neck. The Virginia Department of Transportation reported over 150 roads closed in the area due to high standing water, or creeks that exceeded bankful. Some of the larger number of road closures included: Shenandoah Co (32 - a combination of runoff, poor drainage, and some river flooding); Loudoun Co (27); Frederick Co (15); Orange Co (13); Albemarle Co (12). Drainage flooding occurred in Waynesboro (Augusta Co) when the combination of slowly melting snow and runoff closed six roads.

The storm also produced wind gusts in excess of 30 mph from the eastern Piedmont through the coastal plain. The combination of gusty winds and saturated soil caused isolated instances of trees, limbs, and power lines to come down. Two trees fell in a yard in Mt Vernon (VAZ053) during the afternoon of the 28th.

|  |    |                    |  |  |   |   |  |  |           |
|--|----|--------------------|--|--|---|---|--|--|-----------|
| <b>VAZ042-052&gt;053</b><br>Loudoun - Prince William - Fairfax | 29 | 0500EST<br>0900EST |  |  | 0 | 0 |  |  | Black Ice |
|--|----|--------------------|--|--|---|---|--|--|-----------|

Residual moisture from rainfall of the previous evening combined with clear calm conditions to produce abundant black ice in the Virginia suburbs of Washington, DC, during the morning commute. Dozens of accidents occurred as motorists travelled at unsuitable rates of speed considering the untreated roads. No serious injuries were reported.

### WEST VIRGINIA, East

|   |          |                    |  |  |   |   |  |  |                   |
|---|----------|--------------------|--|--|---|---|--|--|-------------------|
| <b>WVZ051&gt;053</b><br>Morgan - Berkeley - Jefferson | 06<br>09 | 0700EST<br>1200EST |  |  | 0 | 0 |  |  | Unseasonably Warm |
|---|----------|--------------------|--|--|---|---|--|--|-------------------|

A sprawling area of high atmospheric pressure became anchored over the western Atlantic for several days. Circulation around the high brought an unencumbered flow of tropical air from the Caribbean region into the eastern West Virginia panhandle for a 2 1/2 day period beginning around dawn on the 6th and continuing until around noon on the 9th. Interestingly, temperatures remained above 55 degrees for over 48 hours, spanning two mornings when the normal low temperatures were some 35 degrees colder!

After nine days, the mean temperatures across central and western Maryland were between 15 and 20 degrees above normal - more like April than early January.

|                                       |    |                    |  |  |   |   |    |  |             |
|---------------------------------------|----|--------------------|--|--|---|---|----|--|-------------|
| <b>Jefferson County</b><br>Countywide | 08 | 0800EST<br>1200EST |  |  | 0 | 0 | 5K |  | Flash Flood |
|---------------------------------------|----|--------------------|--|--|---|---|----|--|-------------|

Unseasonably warm and humid air combined with developing low pressure over the Ohio Valley to produce bands of heavy rain



# National Weather Service

## Storm Data and Unusual Weather Phenomena



January 1998

| Location | Date | Time<br>Local/<br>Standard | Path<br>Length<br>(Miles) | Path<br>Width<br>(Yards) | Number of<br>Persons<br>Killed | Number of<br>Persons<br>Injured | Estimated<br>Damage<br>Property | Estimated<br>Damage<br>Crops | Character of Storm |
|----------|------|----------------------------|---------------------------|--------------------------|--------------------------------|---------------------------------|---------------------------------|------------------------------|--------------------|
|----------|------|----------------------------|---------------------------|--------------------------|--------------------------------|---------------------------------|---------------------------------|------------------------------|--------------------|

### WEST VIRGINIA, East

across portions of the eastern panhandle. The combination of tropical rainfall, saturated soil (due to recent snow melt) and time of year led to flash flooding of several small streams, creeks, and low lying areas.

In Jefferson Co, several secondary roads were closed due to high water, and many creeks were at or just above bankful. A portion of federal highway 340 was closed briefly just west of Harpers Ferry. Rainfall totals in the affected area ranged from 2 to 3 inches.

|                      |                          |         |  |  |   |   |  |  |                |
|----------------------|--------------------------|---------|--|--|---|---|--|--|----------------|
| <b>WVZ051&gt;052</b> | <b>Morgan - Berkeley</b> |         |  |  |   |   |  |  |                |
|                      | 15                       | 0900EST |  |  | 0 | 0 |  |  | Winter Weather |
|                      |                          | 1300EST |  |  |   |   |  |  |                |

|                       |                                      |         |  |  |   |   |     |  |           |
|-----------------------|--------------------------------------|---------|--|--|---|---|-----|--|-----------|
| <b>WVZ050-053-055</b> | <b>Hampshire - Jefferson - Hardy</b> |         |  |  |   |   |     |  |           |
|                       | 15                                   | 1000EST |  |  | 0 | 0 | 13K |  | Ice Storm |
|                       | 16                                   | 0200EST |  |  |   |   |     |  |           |

Warm moist air overrunning a shallow polar surface air mass produced a variety of winter weather starting around daybreak on the 15th and continuing until just after midnight on the 16th. Precipitation began as a mix of sleet and snow but quickly changed to rain and freezing rain across much of the area.

The combination of still above freezing subsoil temperatures and low traffic volume kept most main arteries and secondary roads free from accumulation. However, in the ice storm area, free standing structures such as trees, power poles/wires, and exposed bridges received between 1/4 and 1/2 inch of ice accretion. A strip of higher elevation areas (roughly between 500 and 1000 feet above sea level) in Jefferson Co received the most icing. In this area, spotty power outages were noted, and a few large limbs and small trees snapped under the weight of the ice. Allegheny Power reported 150 customers were without power in Jefferson Co.

In the winter weather area, mixed precipitation quickly changed to rain during the late morning and early afternoon hours, but not before causing a minor build up of sleet and ice (up to 3/4 inches of sleet followed by some freezing rain), some of which coated area roadways.

|                          |   |         |  |  |   |   |  |  |                |
|--------------------------|---|---------|--|--|---|---|--|--|----------------|
| <b>WVZ049&gt;051-055</b> | <b>Mineral - Hampshire - Morgan - Hardy</b> |         |  |  |   |   |  |  |                |
|                          | 22  | 2200EST |  |  | 0 | 0 |  |  | Winter Weather |
|                          | 23  | 0600EST |  |  |   |   |  |  |                |

Low pressure over the southeastern U.S., combined with weak polar high pressure moving east of New England, produced a small area of light snow and sleet which changed to freezing rain late at night across the POTomac Highlands. Accumulations of snow/sleet ranged from 2 to 3 inches across Mineral, Hampshire, and Morgan Co (WVZ049>051). Around 1 inch of snow fell in hardy Co (WVZ055) before a prolonged period of freezing rain and sleet caused some icing problems. Slushy roads were the main culprit of the precipitation before a changeover to cold rain occurred around dawn on the 23rd.

|               |                  |         |  |  |   |   |  |  |            |
|---------------|------------------|---------|--|--|---|---|--|--|------------|
| <b>WVZ053</b> | <b>Jefferson</b> |         |  |  |   |   |  |  |            |
|               | 23               | 0500EST |  |  | 0 | 0 |  |  | Heavy Rain |
|               |                  | 1200EST |  |  |   |   |  |  |            |

Low- and mid-level flow of deep moisture, overrunning a chilly surface air mass, produced a prolonged period of moderate to heavy rain across extreme eastern West Virginia during the morning of the 23rd. Rainfall totals across the area were approximately 1.5 inches. The relatively long duration allowed a slow rise among area streams and creeks, and all remained just below bankful. However, many areas reported high standing water due to ponding.

|               |                  |         |  |  |   |   |  |  |      |
|---------------|------------------|---------|--|--|---|---|--|--|------|
| <b>WVZ053</b> | <b>Jefferson</b> |         |  |  |   |   |  |  |      |
|               | 24               | 1800EST |  |  | 0 | 0 |  |  | Snow |
|               |                  | 2200EST |  |  |   |   |  |  |      |

A band of light of moderate snow developed over the eastern panhandle of West Virginia during the evening, as a vigorous upper-level disturbance enhanced low- and mid-level lifting of residual moisture left behind from a previous system. The snow, which fell onto relatively warm ground, produced accumulations which varied greatly with elevation. In general, accumulations along the ridges near Harpers Ferry were around 3 inches. Areas to the west received a general accumulation of 1 or 2 inches.

|                      |                                      |         |  |  |   |   |  |  |                |
|----------------------|--------------------------------------|---------|--|--|---|---|--|--|----------------|
| <b>WVZ051&gt;053</b> | <b>Morgan - Berkeley - Jefferson</b> |         |  |  |   |   |  |  |                |
|                      | 27                                   | 1500EST |  |  | 0 | 0 |  |  | Winter Weather |
|                      | 28                                   | 1400EST |  |  |   |   |  |  |                |

|                                 |  |         |  |  |   |   |     |     |              |
|---------------------------------|--|---------|--|--|---|---|-----|-----|--------------|
| <b>WVZ048&gt;050-054&gt;055</b> | <b>Grant - Mineral - Hampshire - Pendleton - Hardy</b> |         |  |  |   |   |     |     |              |
|                                 | 27   | 1600EST |  |  | 0 | 0 | 15K | 10K | Winter Storm |
|                                 | 28   | 1300EST |  |  |   |   |     |     |              |

A winter storm developed along the Georgia coast on the 27th, then intensified as it moved slowly northward along the eastern seaboard later on the 27th and 28th. The cyclone, which tracked to the Virginia capes by late afternoon on the 28th, spread a variety of winter weather across eastern West Virginia during a 24-hour period. As had been the case with other episodes during the 1997/98 winter, accumulations varied greatly with elevation. In the eastern panhandle, 1 to 2 inches of mixed snow, sleet, and rain fell. Over the lower elevations of the Potomac Highlands, roughly 2 to 6 inches accumulated. Some of the highest accumulations were noted across western Pendleton, Grant, and Mineral Cos (WVZ048>049-054), where 8 to 16 inches were noted. The largest individual totals reported were in Elk Garden (Mineral Co - 15 inches) and Hardy Co (20 inches).

The weight of the snow likely caused tree limbs, some trees, and power lines to fall on the 28th, especially where more than 1 foot of snow accumulated.