



# National Weather Service

## Storm Data and Unusual Weather Phenomena



August 1999

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
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### DISTRICT OF COLUMBIA

**DCZ001**

**District Of Columbia**

<b>01</b>	<b>0000EST</b>								
<b>31</b>	<b>2359EST</b>				<b>0</b>	<b>0</b>			<b>Drought</b>

High pressure was the dominant weather feature across the Washington D.C. metropolitan area through the 24th of August. Most rain producing storm systems steered north of the region through the period. This resulted in the continuation of the climatological, meteorological, and hydrological drought which has plagued the area since last summer. Heavy rain fell across the District on the 25th and 26th, helping to fill surface reservoirs. Unfortunately, because most of the rain fell in the form of thunderstorm downpours, most of the moisture ran off into the rivers before it had the chance to seep into the aquifer supply. Groundwater reserves remained unaffected and wells remained short of water. High temperatures were at or above 90 degrees through the 19th then cooled into the 70s and 80s for the remainder of the month. By the 26th of August the Palmer Drought Index, a measure of long term drought conditions, indicated Washington D.C. was in an extreme drought. From September 1998 through August 1999 precipitation was a staggering 16 inches below average. Washington Reagan National Airport reported 5.02 inches of rain in August, 1.11 inches above normal. However, 3.40 inches of this total fell on the 25th and 26th. The lack of rain through the third week of August continued to affect water levels along the Potomac River, the main water source for the Washington area. The flow of water past Washington was below average for the 12th consecutive month. Through the third week of August the average daily flow of the river was only 11% of normal. Water was released from the Jennings Randolph Reservoir in the headwaters of the Potomac River on the 11th to boost water levels.

**District Of Columbia  
Northwest Portion**

<b>14</b>	<b>1630EST</b>								
					<b>0</b>	<b>0</b>	<b>10K</b>		<b>Lightning</b>

Lightning sparked a roof fire on Westminster Street  
A thunderstorm producing frequent cloud to ground lightning moved across the District around 5:30 PM EDT. The roof of a home on Westminster Street in Northwest caught fire after a lightning bolt struck the building.

**District Of Columbia  
Countywide**

<b>25</b>	<b>1700EST</b>								
	<b>2100EST</b>				<b>0</b>	<b>0</b>			<b>Flash Flood</b>

Major streets closed by high water  
A line of thunderstorms produced very heavy rain as it moved across Washington D.C. around 6:00 PM EDT. Washington Reagan National Airport received 2.03 inches of rain from the storms. Dry soil from drought conditions made most of the rainfall run off into low lying areas and roads. Rapidly rising water forced officials to close Rock Creek Parkway and the South Capitol Street entrance to Interstate 395 during the evening rush hour.

### MARYLAND, Central

**MDZ002>007-009>011-013>014-016>018**

**Allegany - Washington - Frederick - Carroll - Northern Baltimore - Harford - Montgomery - Howard - Southern Baltimore - Prince Georges - Anne Arundel - Charles - St. Mary'S - Calvert**

<b>01</b>	<b>0000EST</b>								
<b>31</b>	<b>2359EST</b>				<b>0</b>	<b>0</b>	<b>30M</b>		<b>Drought</b>

High pressure was the dominant weather feature across Maryland through the 24th of August. Most rain producing storm systems steered north of the region through the period. This resulted in the continuation of the climatological, meteorological, and hydrological drought which has plagued the area since last summer. Heavy rain fell over all but Western Maryland between the 24th and 26th, helping to fill surface reservoirs. Unfortunately, because most of the rain fell in the form of thunderstorm downpours, most of the moisture ran off into the rivers before it had the chance to seep into the aquifer supply. Groundwater reserves remained unaffected and wells and springs remained short of water. By the third week of August the Palmer Drought Index, a measure of long term drought conditions, indicated Maryland was in an extreme drought. The drought warning issued by the Maryland Department of the Environment last December remained in effect through the month. The governor issued statewide mandatory water restrictions on the 5th. From September 1998 through August 1999 precipitation was a staggering 12 to 16 inches below average. During August, 6.14 inches of rain fell at Baltimore/Washington International Airport (BWI), 2.22 inches above normal. However, 4.15 inches of this total fell from between the 24th and the 26th. The Maryland Science Center at Inner Harbor Baltimore reported 8.23 inches for the month, but 6.26 inches of this total fell between the 24th and the 26th. Andrews Air Force Base reported 5.71 inches for the month. Additional August rainfall totals included Allegany County at 2.5 inches, Washington County at 2.3 inches, Frederick County at 3.1 inches, Prince Georges County at 5.3 inches, Carroll County at 4.7 inches, Anne Arundel at 6.6 inches, Northern Baltimore County at 5.4 inches, Howard County at 4.3 inches, Montgomery County at 4.6 inches, Charles and Calvert Counties at 5.5 inches, and St. Mary's County at 5.8 inches.

The lack of rainfall through the third week of August continued to affect water levels along the Potomac River and the Chesapeake Bay. Some of the lowest freshwater flows into the Chesapeake Bay were recorded during the month. Some of the worst fish kills in recent memory occurred in the bay and on nearby tributaries. Other forms of wildlife had to adapt to the altered bay environment. Crabs were seen several miles farther upstream in freshwater tributaries, the oyster population was weakened, and bottlenose dolphins were spotted as far north as Pooles Island. Most rivers and streams across the state were running at 30% the normal level. The flow of water in the Potomac River past Washington D.C. during the middle of August was only 11% of the long term monthly average. Water was released from the Jennings Randolph Reservoir in the headwaters of the Potomac River on



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### MARYLAND, Central

the 11th to boost water levels, leaving the reservoir at 78% of capacity. The Monocacy River was running at half its normal level. Liberty Reservoir, one of the main water sources for 1.8 million people in the Baltimore area, was 24 feet below normal and was holding less than half of its 43 billion gallon capacity during the first week of August. To increase the amount of water reserves, Baltimore began withdrawing up to 137 million gallons of water from the Susquhanna River, which was already at a historic low level. In Carroll County, the Westminster city reservoir was down to 65% of capacity on the 18th. The U.S. Army water treatment plant, serving Aberdeen Proving Ground in Harford County was forced to shut down on the 13th after less than 16 cubic feet of water flowed down Winters Run. Piney Dam, Frostburg's main water supply, was 8 inches below normal pool. Cumberland's two reservoirs, Lake Koon and Lake Gordon were down 4 feet and 1 foot respectively. The Mount Savage reservoir was down 3 feet and officials had to shore up its supply by hauling 38 tanker trucks of water. During the first week of August, the USGS reported ground water levels in Central Maryland were 16 feet below the surface, just under the minimum level. Washington County reported the lowest groundwater levels in history on the 4th. Wells on 24 county farms dried up by the 10th. Nearly 60 communities across the state instituted mandatory or voluntary water restrictions. Nineteen Maryland counties were declared federal drought disaster areas on the 11th.

The worst agricultural drought in Maryland continued to devastate farmers. 55% of pasture land, 45% of corn, 39% of sorghum, 29% of tobacco, and 34% of soybeans across the state were reported in poor or very poor condition by month's end. 42% of topsoil and 84% of subsoil were reported as short or very short of moisture. Frederick County expected to lose 90% of their corn and soybean crop, and \$9 million in lost revenues. Montgomery County expected a 50% loss of soybean and sweet corn and a 60% loss of hay and corn for a loss of \$11 million. Washington County reported a corn crop loss of 60% and \$10 million in lost revenue. St. Mary's County reported a 60% loss of corn and soybean crops. Calvert County farmers reported 30% losses in corn, soybeans, and hay. Statewide, crop losses were expected to exceed \$100 million. In addition to agricultural lands, forests and rural vegetation were also dangerously dry. The Maryland DNR responded to 600 fires that burned over 2500 acres from January to July, a 100% increase from the previous year. The Cumulative Severity Index (CSI), a measure of fire danger which ranges from 1 to 800, ranged from 503 in Allegany County to 629 in Prince Georges County on August 12th.

**MDZ009**

**Montgomery**

<b>05</b>	<b>1445EST</b>								
		<b>0</b>	<b>0</b>	<b>5K</b>					<b>Landspout</b>

Trees, outdoor playset, and iron fence damaged

A dust devil, or landspout, developed from fair weather clouds around 3:45 PM EDT on a 4 acre homestead outside of Laytonsville. As it moved across an acre of the property, it broke tree spikes and bent the trees the spikes were supporting. It also lifted a large outdoor swingset and threw it into an iron fence. The fence was broken and the swingset sustained moderate damage, resulting in \$5000 in losses.

**Montgomery County  
West Portion**

<b>13</b>	<b>2310EST</b>								
		<b>0</b>	<b>0</b>	<b>0.50K</b>					<b>Thunderstorm Wind</b>

Tree downed onto power line

**Calvert County  
Dunkirk**

<b>14</b>	<b>0130EST</b>								
		<b>0</b>	<b>0</b>						<b>Lightning</b>

Two homes struck by lightning

A thunderstorm moved across the Potomac River around 11:45 PM on the 13th and crossed Montgomery County through 12:30 AM EDT on the 14th. The storm produced winds in excess of 55 MPH and frequent lightning, especially across the western portion of the county. At 12:10 AM, county officials reported high winds pushed a tree onto a power line. Another storm producing frequent lightning passed through southern Calvert County around 2:30 AM on the 14th. Two homes in Dunkirk were hit by lightning, but no damage was reported. In addition, 460 residents of Lusby and Solomons experienced power outages when electrical equipment was hit by lightning.

**Frederick County  
Frederick**

<b>14</b>	<b>1245EST 1255EST</b>								
		<b>0</b>	<b>0</b>	<b>21K</b>					<b>Thunderstorm Wind</b>

Trees downed, some onto homes and across roads, glider damaged at airport

**Washington County  
5 S Boonsboro**

<b>14</b>	<b>1245EST</b>								
		<b>0</b>	<b>0</b>	<b>5K</b>					<b>Thunderstorm Wind</b>

Trees downed in Rohersville

**Frederick County  
4 NW Frederick to  
1 N Frederick**

<b>14</b>	<b>1250EST 1254EST</b>		<b>3</b>	<b>50</b>					
		<b>0</b>	<b>0</b>	<b>800K</b>					<b>Tornado (F1)</b>

Moderate damage to buildings, trees downed onto homes and cars

**Baltimore County  
Cockeysville to  
Lutherville**

<b>14</b>	<b>1500EST</b>								
		<b>0</b>	<b>0</b>	<b>5K</b>					<b>Thunderstorm Wind</b>

Trees downed



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### MARYLAND, Central

#### Baltimore City (C)

<b>Baltimore</b>	14	1500EST			0	0	15K		<b>Thunderstorm Wind</b>
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Trees downed throughout city

#### Montgomery County

<b>Rockville</b>	14	1510EST			0	0	2K		<b>Thunderstorm Wind</b>
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2 foot diameter tree limbs downed

#### Montgomery County

<b>Poolesville</b>	14	1520EST			0	0	2.5K		<b>Lightning</b>
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Lightning struck a home and travelled through electrical system, started bedding on fire

#### Harford County

<b>Aberdeen</b>	14	1535EST			0	0	5K		<b>Lightning</b>
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House damaged by lightning strike

#### Anne Arundel County

<b>Crownsville</b>	14	1600EST			0	0			<b>Thunderstorm Wind (G52)</b>
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60 MPH wind gust

#### Harford County

<b>Havre De Grace</b>	14	1600EST			0	0	80K		<b>Lightning</b>
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Lightning strike started house fire

#### Anne Arundel County

<b>Pasadena to Green Haven</b>	14	1615EST 1630EST			0	1	50K		<b>Thunderstorm Wind</b>
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Several trees downed onto homes, cars, roads, and power lines, one young boy injured when tree fell onto home

#### Anne Arundel County

<b>Rivera Beach</b>	14	1615EST			0	1			<b>Lightning</b>
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16 year old girl struck by lightning, house struck by lightning

#### Prince George'S County

<b>Hyattsville to College Park</b>	14	1615EST 1620EST			0	0	10K		<b>Thunderstorm Wind</b>
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Trees downed

#### Anne Arundel County

<b>Rivera Beach</b>	14	1620EST			0	0	15K		<b>Thunderstorm Wind</b>
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Trees downed onto 5 homes, siding stripped from homes

#### Anne Arundel County

<b>Rivera Beach</b>	14	1620EST			0	0			<b>Thunderstorm Wind (G55)</b>
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63 MPH measured wind gust

An area of thunderstorms moved across much of Maryland from 1:15 PM to 5:45 PM EDT, producing damaging wind, frequent lightning, and brief heavy downpours. As the storms moved through Washington County trees were downed in Rohersville, a community 5 miles south of Boonesboro. The thunderstorm complex intensified rapidly as it moved into Frederick County around 1:45 PM EDT, and the northwest side of the city of Frederick took the brunt of the storm. As the storm reached the Abbington Farms area a tornado developed. The tornado was F1 strength with winds between 75 and 112 MPH and ranged from 50 to 200 yards wide as it travelled east for 3 miles. The twister did extensive damage to trees as it moved through the communities of Eastview, Walnut Springs, Shookstown, and Fort Detrick. Some trees fell onto cars and houses, and a few homes under construction were damaged. One home under construction in Walnut Ridge was torn to pieces by the tornado and the debris turned into airborne missiles which heavily damaged two finished homes nearby. Two homes in the Eastview subdivision were condemned after trees fell onto the structures. A chimney was blown off a Willowdale Drive home. Yellow Springs Road had to be closed for several hours until power and telephone poles blocking the road could be cleared. A metal storage building on Rosemont Avenue was crumbled. Part of the roof of the Food Lion grocery store on Rosemont Avenue was torn off and thrown toward the gates of Fort Detrick. The store suffered water damage and the loss of frozen foods and perishables from the resulting power outage. Next, the storm moved across Fort Detrick, causing \$260,000 in damage. The twister moved across Area B, then onto the main post where it uprooted trees, downed power lines, and blew off parts of buildings. The headquarters building and post chapel lost part of its roof. Nearly 30 cars along Rocky Springs Road and near post housing were damaged by downed trees and debris. In addition, the central portion of Frederick was hit by destructive straight line winds estimated between 60 and 70



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### MARYLAND, Central

MPH. Thirty Bradford pear trees were downed on Heather Ridge Drive. Sixteen city streets were closed by fallen trees. A one mile stretch of Route 40 west of the Golden Mile had to be closed for an hour to clear fallen trees. A glider valued at \$11,000 was ripped from its mooring at the airport and totalled. The storm downed a total of 300 trees across Frederick, and resulted in outages for 8,000 power customers. High winds also downed trees in Brunswick, leaving 100 customers without power.

As the area of thunderstorms moved across Montgomery County, large limbs were downed in Rockville and White Oak. A lightning strike also damaged a home in Poolesville. The bolt travelled through the electrical system of the home, shot flames out of an outlet and caught bedding on fire, resulting in \$2500 in damage. When the storms moved across Prince Georges County, winds in excess of 55 MPH downed trees from College Park to Hyattsville. Tobacco crops in the southern half of the county were flattened. Nearly 8,000 customers lost power in Prince Georges and Montgomery Counties. High winds also crossed Baltimore County. Trees were downed from Cockeysville to Lutherville, and across the city of Baltimore. About 18,000 Baltimore city and 11,500 Baltimore County customers lost power as a direct result of the storm. Over 1.5 inches of rain fell in Baltimore and 2.0 inches fell in Cockeysville in less than one hour. Lightning knocked out phone service at the Cockeysville police precinct. A lightning strike in Harford County caused \$5000 damage to a home. Another strike in Havre de Grace started a house fire which resulted in \$80,000 in damage. Heavy downpours of rain between 4:30 PM and 6:00 PM EDT temporarily flooded the intersection of Route 24 and Jarrettsville Road in Forest Hill. Lightning was also blamed for 1000 power outages.

Anne Arundel County reported 26,000 storm related power outages and over 80 downed trees after the storm crossed the northern part of the county. Winds gusted to 60 MPH in Crownsville around 5:00 PM EDT. Pea sized hail and 2 inches of rain also accompanied the storm. Winds estimated at 60 to 80 MPH blew through the northern side of Pasadena. Marble sized hail and 2.5 inches of rain also fell in the city. Several roads, including Bay Harbor and Bayview Vista in Cape St. Claire were closed by fallen trees. Heavy tree damage occurred through the communities of Willow Run, Green Haven, and Highpoint. The community of Silver Sands reported damage to roof trip, sheds, chimneys, and trees. The path of the most intense winds was roughly two miles long and a half mile wide along Catherine Avenue and Duval Highway including Outing Avenue and 201st through 215th Streets. Downed trees seriously damaged 5 homes and closed Duval Highway. A young boy inside one home near Catherine Avenue received minor cuts after an 80 year old tree fell onto the structure. The home was deemed a total loss by county officials and had to be torn down. A brief power outage caused 100 sewage stations to send untreated water in Marley Creek. Lightning strikes and power surges also damaged home appliances across the county and started a garage fire in Glen Burnie. A wind gust of 63 MPH was recorded in Rivera Beach, resulting in downed trees and power lines. A 16 year old girl was struck by lightning in Rivera Beach, and a home was also hit by the frequent cloud to ground strikes.

**Anne Arundel County  
Annapolis**

<b>20</b>	<b>2110EST</b>	<b>0</b>	<b>0</b>	<b>5K</b>	<b>Lightning</b>
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Tree downed onto home after being hit by lightning

**Anne Arundel County  
Arnold**

<b>20</b>	<b>2110EST</b>	<b>0</b>	<b>0</b>	<b>0.50K</b>	<b>Lightning</b>
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Tree downed after being hit by lightning

A thunderstorm moved across Anne Arundel County, producing brief heavy rainfall and frequent cloud to ground lightning. In Annapolis, a tree hit by lightning fell onto a home, causing minor damage. Another tree was downed by lightning across a yard in Arnold around 9:10 PM EDT.

**Charles County  
Countywide**

<b>25</b>	<b>1200EST 1800EST</b>	<b>0</b>	<b>0</b>	<b>200K</b>	<b>Flash Flood</b>
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Several streets flooded, homes damaged by flood waters, residents in low lying areas evacuated

**Prince George'S County  
Countywide**

<b>25</b>	<b>1200EST</b>	<b>0</b>	<b>0</b>		<b>Heavy Rain</b>
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Over 3 inches of rain in many areas

**St. Mary'S County  
North Portion**

<b>25</b>	<b>1200EST 1800EST</b>	<b>0</b>	<b>0</b>	<b>20K</b>	<b>Flash Flood</b>
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20 roads flooded, earth retaining wall destroyed, basements flooded, trees downed

Showers producing very heavy rain moved very slowly very slowly across South Central Maryland during the afternoon. The deluge caused several streets and creeks to become rapidly flowing rivers. Rainfall totals in Charles County ranged from around 2.0 inches on the west side of Waldorf to 5.7 inches about 5 miles east of town. Several portions of Action Lane near the Mattawoman Creek were closed due to high water. The Lynnbrook subdivision in Waldorf had several homes surrounded and flooded by water, and some residents had to be rescued by firefighters. Over \$100,000 damage was reported in the neighborhood. Hamilton Drive had water flowing over it like a waterfall. One car caught in the rapidly rising water was submerged up its windows. A work vehicle valued over \$40,000 was totalled after being overcome by quickly rising water up to the steering wheel. Near the intersection of Acton Lane and Highway 301 in Waldorf, water became so deep a hotel had to be evacuated. The northern and central portions of St. Mary's County also reported flooding. Morganza reported a rainfall total of 5.13 inches, Leonardtown received 7.7 inches, Hollywood received up to 7.2 inches, Tall Timbers received 2.45 inches, and Scotland in the extreme southern



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### MARYLAND, Central

part of the county reported 1.7 inches. Several creeks and small streams were out of their banks, and roads in low lying areas were covered by water. An earth wall along Washington Street in Leonardtown collapsed and the water level of Town Run rose 8 feet. Nearly 20 county roads were covered by 4 to 6 inches of water and debris. Route 243 was blocked by floodwaters. Limbs and other debris were washed into the Highway 5 and Route 4 intersection. County road crews were out until the following morning clearing debris and making repairs. Trees were also downed across Millstone Landing Road in California and Joy Chapel Road in Hollywood. Rainfall amounts over 3 inches were common in Prince Georges County as well, temporarily flooding some city streets and creeks. Wet pavement was a contributing factor in a fatal accident near Brandywine. A 16 year old girl was killed when her car went out of control and collided with two other cars.

#### Washington County

<b>2 S Hagerstown</b>	<b>26</b>	<b>1415EST</b>			<b>0</b>	<b>0</b>	<b>2K</b>		<b>Thunderstorm Wind</b>
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Eight trees downed onto Spielman Road

#### Washington County

<b>South Portion</b>	<b>26</b>	<b>1415EST 1445EST</b>			<b>0</b>	<b>0</b>	<b>8K</b>		<b>Thunderstorm Wind</b>
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Trees downed

#### Washington County

<b>3 SW Boonsboro to 3 SE Boonsboro</b>	<b>26</b>	<b>1435EST 1440EST</b>			<b>0</b>	<b>0</b>	<b>5K</b>		<b>Thunderstorm Wind</b>
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Concentrated downburst wind damage in a path 2 miles long and one mile wide

#### Washington County

<b>2 S Boonsboro</b>	<b>26</b>	<b>1438EST 1440EST</b>	<b>1.5</b>	<b>60</b>	<b>0</b>	<b>0</b>	<b>75K</b>		<b>Tornado (F1)</b>
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Damage to farm buildings and equipment, three homes, several trees snapped or uprooted

#### Frederick County

<b>Wolfsville to Middletown</b>	<b>26</b>	<b>1500EST</b>			<b>0</b>	<b>0</b>	<b>8K</b>		<b>Thunderstorm Wind</b>
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Trees downed

#### Carroll County

<b>4 NE Millers</b>	<b>26</b>	<b>1610EST</b>			<b>0</b>	<b>0</b>			<b>Thunderstorm Wind (G75)</b>
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86 MPH measured wind gust

#### Carroll County

<b>4 N Westminster</b>	<b>26</b>	<b>1610EST</b>			<b>0</b>	<b>0</b>	<b>30K</b>		<b>Thunderstorm Wind</b>
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Several trees and power lines downed, some damaging homes

#### Carroll County

<b>Union Mills</b>	<b>26</b>	<b>1615EST</b>			<b>0</b>	<b>0</b>	<b>5K</b>		<b>Thunderstorm Wind</b>
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Trees downed, Union Mills Homestead damaged by fallen trees

#### Anne Arundel County

<b>Countywide</b>	<b>26</b>	<b>1700EST 2300EST</b>			<b>0</b>	<b>0</b>	<b>100K</b>		<b>Flash Flood</b>
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Significant flooding of low lying areas and streams, cars and roads submerged

#### Baltimore County

<b>South Portion</b>	<b>26</b>	<b>1700EST 2300EST</b>			<b>0</b>	<b>0</b>	<b>2.5M</b>		<b>Flash Flood</b>
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Significant flooding, damage to over a hundred cars in Woodlawn, water rescues in Owings Mills and Randalstown

#### Baltimore City (C)

<b>Baltimore</b>	<b>26</b>	<b>1700EST 2300EST</b>			<b>0</b>	<b>0</b>	<b>100K</b>		<b>Flash Flood</b>
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Major flooding of low lying areas and streams, cars and roads submerged, several water rescues

#### Montgomery County

<b>Countywide</b>	<b>26</b>	<b>1700EST 2200EST</b>			<b>0</b>	<b>0</b>			<b>Heavy Rain</b>
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Streets flooded in Poolesville and Gaithersburg

#### Prince George'S County

<b>Countywide</b>	<b>26</b>	<b>1700EST 2300EST</b>			<b>0</b>	<b>0</b>	<b>20K</b>		<b>Flash Flood</b>
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Flooding of low lying areas and streams, especially near Upper Marlboro

A line of intense thunderstorms moved across much of Maryland during the afternoon, producing damaging winds and frequent



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### MARYLAND, Central

lightning. Storm winds weakened and the speed of the line slowed as it moved south and east of Frederick and Carroll Counties. The resulting line of showers that moved into Prince Georges, Anne Arundel, and Baltimore Counties produced copious amounts of rainfall and led to flash flooding. South of Hagerstown in Washington County, winds in excess of 55 MPH downed several trees. Eight trees were downed onto Spielman Road, blocking the street for 90 minutes. Power lines were downed onto Sharpsburg Pike and Tilghmanton Road. A one mile wide and two mile long area just south of Boonsboro bore the brunt of concentrated downburst winds between 60 and 70 MPH. Numerous trees were snapped and uprooted, a satellite dish was damaged, a tree fell onto a home causing minor damage, and tin roof sheets were torn from a barn, resulting in \$5000 in losses. Up to 100 customers lost power as a direct result of the storm, including residents of Sharpsburg and Keedysville. A gustnado, or squall line tornado, formed just north of the this path of concentrated damage, about 2 miles south of Boonsboro. The gustnado had a damage path which was 1.5 miles long and 60 yards wide, produced \$75,000 in damage, and was of F1 strength. Most of the damage from the gustnado was concentrated in the Route 67, Appleton road, and Netz Road area, knocking out power to 500 residents. The twister passed across a dairy farm along Appleton Road and ripped a third of the roof off a milking barn, stripped siding and trim from farm buildings, and carried 8 calf igloos and other debris up to one quarter mile away. Some of the beams from the milking barn roof were driven up to 2 feet into the ground after coming to rest on the next farm. An estimated \$5000 damage was done to the farm. Farther down Appleton Road, the gustnado inflicted minor damage to a barn, a garage, and a home. Two pine trees were uprooted nearby. Along Netz Road, two homes lost shutters and another had damage to a storm door. Trees were snapped or uprooted, and a trampoline standing up sideways was wrapped around a tree. The gustnado also peeled back the metal roof of a Dogstreet Road house, allowing rain water to damage furniture and electronics.

Next, the line of thunderstorms moved into southwest Frederick County. Trees were downed in the Wolfsville and Middletown area. Heavy downpours flooded low lying roads and farmland throughout the county. Heavy downpours were a contributing factor in several accidents in Frederick County. Two accidents occurred on Braddock Mountain at Interstate 70, three accidents occurred on Route 340, and one accident was reported on both Highway 17 and 85. The storm moved into Carroll County and downed several trees and power lines, sending 8000 residents into the dark. In the Westminster area, tree debris and telephone lines covered northbound Highway 97, closing it for 2 hours. Cows got loose along the road after a fence was damaged, forcing county police to stage a roundup. Over two inches of rain fell in Westminster in one hour. Trees and power lines were also downed on Highway 97 near Union Mills. The Union Mills Homestead was damaged after two red maple trees dating back to the Civil War fell onto the miller's house. Maple and apple trees surrounding the property were split or uprooted. Downed trees and power lines blocked Saw Mill Road for several hours. Finksburg reported 2.7 inches of rain and 50 MPH winds. Winds gusted to 86 MPH near Millers at 5:10 PM EDT.

Winds diminished as the storms moved into Montgomery, Howard, and Baltimore Counties. The storms also slowed down and started to drop copious amounts of rainfall. Major flooding occurred because the area was still recovering from heavy rains that fell over the region the night before. Montgomery County reported street flooding in Poolesville and Gaithersburg. Over 10,000 customers lost power in Howard County. Elkridge received 2.81 inches of rain and Columbia received 1.55 inches. A total of 1.60 inches fell at Hipsley Mill, about 2 inches fell in Bowie, 2.35 inches fell at Laurel, and up to 4.5 inches fell southeast of Highway 301 in Prince Georges County. Over 5 inches accumulated near Upper Marlboro, causing flooding in low lying areas. Southern Baltimore County and the city of Baltimore reported major flash flooding and Anne Arundel County reported significant flooding after 2 to 7 inches of rain fell in less than 4 hours. Rainfall reports included 3.85 inches in Arnold, 2.24 inches in Davidsonville, 1.63 inches in Rivera Beach, 1.75 inches in Upperco, 7 inches in Woodlawn, 5 inches in Annapolis, and 4.77 inches in downtown Baltimore. Between 6:30 PM and 8:30 PM EDT, 4.6 inches of rain fell at Fort McHenry.

In Southern Baltimore County, streets and streams flooded in Owings Mills and Randallstown. Several motorists had to be rescued from quickly rising water. The deluge of rain closed the Maryland State Fair at Timonium on its first night of business. In Woodlawn, a storm drain and culvert near Dead Run Creek swelled with water and overflowed into the parking lot of a car dealership on Security Boulevard. In less than 9 minutes, four feet of water poured onto 70 trucks, totalling 30 cars and resulting in \$30 million in damages. Dried mud and twigs were found inside the automobiles after the water subsided. Flooding closed sections of Interstate 83 in Baltimore County and in the city of Baltimore. Water poured off Interstate 83 and quickly reached a depth of 6 feet in a health club parking lot off Clipper Mill Road. Forty cars in the parking lot were damaged, and most of the cars were moved several yards by the force of the water. In Arbutus, occupants of 4 cars at the intersection of Leeds Avenue and Maiden Choice Lane had to be rescued after 4 feet of water poured into the street. Eight people were rescued at the intersection of Security Boulevard and Gwynn Oak Avenue around 7:00 PM EDT after cars became stalled in rapidly moving flood waters. Boston and Aliceanna Streets in Canton and Clipper Mill Road in Woodbury were also impassable. Several flights were delayed or cancelled at Baltimore Washington International Airport (BWI). The city of Baltimore reported numerous roads under water and several stalled vehicles and water rescues. So many streets flooded that officials asked drivers to stay put until the water receded. Over 17,000 residents of the city lost power as a direct result of the storm, and hundreds of basements flooded. Hardest hit were areas near Jones Falls along Interstate 83. An apartment complex next to Jones Falls was inundated with water and cars in the parking lot were floating. The Northwest Ice Rink was inundated with water, and motorists near Camden yards waited on the roofs of their cars to be rescued from waist-high water. A building collapsed around 9:00 PM EDT on Wicomico Street, and rushing water blasted a hole in another home. Rain and mud on railroad tracks and water in the Howard Street tunnel two miles south of Baltimore's Penn Station delayed MARC and Amtrack commuter trains between Washington and Baltimore. It rained so hard that medevac helicopters from the Shock Trauma Center at University Hospital had to be grounded. In Anne Arundel County, Brock Bridge, Mill Creek, Race, River, Rideout, and Severn Side Roads were closed by high water. Part of the Baltimore-Washington Parkway was also closed. During the height of the storm, 1600 county residents lost power. Homes on Potomac Road in Edgewater had knee-deep water flowing inside which ruined furniture on the first floor and flooded basements and



# National Weather Service

## Storm Data and Unusual Weather Phenomena



August 1999

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Injured	Property	Estimated Damage Crops	Character of Storm
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### MARYLAND, Central

garages. High water closed a part of Route 450 between South Haven Road and Eagle Boulevard, Mayo and Washington Road, and several roads in the London Towne area. Heavy rains also caused a failure of erosion control measures at an Annapolis construction site on Gibraltar Avenue, sending muddy water streaming down city streets toward Weems Creek. Four inches of rain fell in Annapolis in only 90 minutes.

### VIRGINIA, North

VAZ021-025>031-  
036>042-050>057

**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>01</b>	<b>0000EST</b>	<b>0</b>	<b>0</b>	<b>41.7M</b>	<b>Drought</b>
<b>31</b>	<b>2359EST</b>				

High pressure was the dominant weather feature across Northern Virginia through the 24th of August. Most rain producing storm systems steered north of the region through the period. This resulted in the continuation of the climatological, meteorological, and hydrological drought which has plagued the area since last summer. Heavy rain fell east of the Blue Ridge Mountains on the 25th and 27th, helping to fill surface reservoirs. Unfortunately, because most of the rain fell in the form of thunderstorm downpours, most of the moisture ran off into rivers before it had the chance to seep into the aquifer supply. Groundwater reserves remained unaffected and wells and springs remained short of water. High temperatures were at or above 90 degrees through the 19th then cooled into the 70s and 80s for the remainder of the month. By the 26th of August the Palmer Drought Index, a measure of long term drought conditions, indicated Northern Virginia was in an extreme drought. From September 1998 through August 1999 precipitation was a staggering 8 to 14 inches below average. August rainfall totalled 5.46 inches at Dulles Airport in Loudoun County, 1.49 inches above normal. However 4.38 inches of this total fell on the 25th and 26th. Reagan National Airport in Arlington reported a monthly total of 5.02 inches, 1.11 inches above normal. However, 3.40 inches of this total fell on the 25th and 26th. Charlottesville reported a monthly total of 4.01 inches. Additional August rainfall totals included Fairfax County at 4.5 inches, Albemarle County at 3.3 inches, Shenandoah and Spotsylvania Counties at 2.7 inches, Clarke County at 3.6 inches, Warren County at 2.0 inches, Rockingham and Frederick Counties at 2.7 inches, Orange County at 3.1 inches, Augusta and Nelson Counties at 2.5 inches, Page County at 3.0 inches, and Culpeper County at 2.4 inches.

The lack of rainfall through the third week of August continued to affect water levels along the Potomac River, the main water source for extreme northern Virginia. The flow of water past Washington D.C. was below average for the 12th consecutive month. During August, the average daily flow of the river was only 11% of average. Many upstream tributaries also reported extremely low water levels. Stations in several other watersheds reported streamflow of 10 to 30 percent below normal. Water was released from the Jennings Randolph Reservoir in the headwaters of the Potomac River on the 11th to boost water levels, leaving the reservoir at 78% of capacity. The Shenandoah River dropped to less than 15% of its normal flow equalling 10 year flow levels. Happy Creek, which usually fulfils 30% of the water demand in Front Royal, and Holman's Creek in Southern Shenandoah County from Forestville to Quicksburg ran dry. The water level in Charlottesville's urban ring supply was 77% of capacity. The water level at Lake Manassas was 5 feet below capacity. Lake Pelham in Culpeper County was 1 foot below normal. Warrenton's two reservoirs were at 71% of capacity. Frederick County's main water supply, a quarry west of Stephens City was down 30 feet from the level recorded one year ago. The Ni Reservoir, main water source of Spotsylvania County, was 37% below capacity. Harrisonburg's main water source, Switzer Dam, was 12 feet below capacity and Beaverdam Reservoir in Loudoun County was 13 feet below capacity. The Staunton city dam reported water levels down 6 feet. In Rockingham County, 400 wells went dry and Grottoes municipal wells reported a 3 foot drop during the month. With such low water tables, many communities continued voluntary water restrictions. Some locations such as Eastern Loudoun, Madison, Spotsylvania, and Greene Counties instituted mandatory restrictions. Many residents away from the Washington D.C. suburbs and larger cities became dependent on water deliveries after wells dried up.

The lack of precipitation continued to devastate the agricultural community. Augusta, Bath, Clarke, Frederick, Highland, Rockingham, Madison, Orange, Greene, Loudoun, and Shenandoah Counties were declared federal drought disaster areas during the month. Across Northern Virginia several crops such as corn and soybeans never reached maturity, trees prematurely shed leaves and fruit in orchards, pasture land became nearly non-existent, and watering holes and irrigation sources dried up. 55% of pasture land, 39% of corn, 23% of soybeans, 28% of apples, and 71% of non-alfalfa hay crops across the state were reported in poor or very poor condition. Corn that should have been over 6 feet high was only chest-high at best. Farmers reduced herd sizes in many cases in order to stretch hay and water supplies. Nelson County reported the drought cost farmers \$855,000, citing 50-70% losses in corn, hay, and pasture land. Madison County reported \$4 million in losses, and Albemarle County reported \$8.4 million in damages. Other county losses included Orange at \$10 million, Highland at \$7 million, Rockingham at \$2 million, Warren at \$1.7 million, Greene at \$1.5 million, and Stafford at \$1 million. Culpeper County reported \$3.2 million in crop losses and \$2 million in livestock losses. Hay production in Prince William County was cut by 65%. Fauquier County lost 50 to 75% of corn and alfalfa crops. Stafford County lost 80% of pastures, 75% of hay, 65% of corn, and 40% of soybeans to the drought. Frederick and Warren Counties estimated pasture land losses of up to 70%. Warren County also reported a 20% loss of the peach and apple harvest, a 20% loss of Christmas tree acreage, and significant losses of corn and hay. Shenandoah County lost 77% of their corn crop, Loudoun and Culpeper Counties lost 50%, Page County lost 73%, and Rockingham County lost 68%. Augusta County reported a near loss of soybeans and an 85% reduction in pasture lands. In addition, Frederick County Parks and Recreation Department lost 75 mature white pine trees at a park on U.S. 11 North because of the drought.



# National Weather Service

## Storm Data and Unusual Weather Phenomena



August 1999

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Injured	Estimated Damage Property	Crops	Character of Storm
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### VIRGINIA, North

In addition to agricultural lands, forests and rural vegetation was also dangerously dry. The Virginia Department of Forestry reported a record fire season January through August, 1444 fires burning 9373 acres. Spotsylvania, Orange, Clarke, and Stafford Counties instituted mandatory burning bans during the month. Madison County recorded 31 fires since January 1st, double the normal recorded during a "bad" year. The Cumulative Severity Index, a measure of fire danger which ranges from 1 to 800, listed Northern Virginia a rating of 650 prior to the 26th of August and 500 by month's end.

#### VAZ026

#### Rockingham

**11 1430EST**

**0**

**0**

**2K**

**Landspout**

Damage to tin roof on store, loosened shingles on home

A landspout, or dust devil, developed from fair weather clouds around 3:30 PM EDT over the city of Harrisonburg. It only lasted one minute, but it caused about \$2000 in damage to a store on High Street. The landspout produced very localized winds strong enough to push an employee of the store back inside. The wind also ripped and buckled the southwest corner of the store's tin roof. Free standing flowers 20 yards away from the structure were left untouched. In addition, the wind loosened shingles on a home nearby.

#### Shenandoah County Countywide

**13 2030EST  
2050EST**

**0**

**0**

**15K**

**Thunderstorm Wind**

Trees downed

#### Rockingham County Penn Laird

**13 2115EST**

**0**

**0**

**2K**

**Thunderstorm Wind**

Trees and power lines downed

#### Shenandoah County Strasburg

**13 2120EST**

**0**

**0**

**2K**

**Thunderstorm Wind**

Trees downed

#### Rockingham County Mc Gaheysville

**13 2125EST**

**0**

**0**

**2K**

**Thunderstorm Wind**

Trees and power lines downed

#### Warren County 2 NW Waterlick

**13 2125EST**

**0**

**0**

**2K**

**Thunderstorm Wind**

Trees downed

#### Fauquier County Delaplane

**13 2200EST**

**0**

**0**

**4K**

**Thunderstorm Wind**

Trees downed

#### Fauquier County Marshall

**13 2210EST**

**0**

**0**

**4K**

**Thunderstorm Wind**

Trees downed

#### Orange County Gordonsville

**13 2310EST**

**0**

**0**

**2K**

**Thunderstorm Wind**

Trees downed

An area of thunderstorms that developed across West Virginia moved across Northern Virginia between 9:00 PM EDT on the 13th and 12:30 AM EDT on the 14th. The strongest storms produced wind gusts in excess of 55 MPH, frequent lightning, and heavy downpours. Downed trees were reported across Shenandoah County between 9:30 PM and 10:30 PM EDT. Trees were also downed just east of Strasburg in Warren County at 10:25 PM EDT. Lightning started two small brush fires near McGaheysville and Penn Laird between 10:15 PM and 10:25 PM EDT. In northwest Fauquier County, the storms downed trees in Delaplane and Marshall between 11:00 PM and 11:10 PM EDT. At 12:05 AM EDT on the 14th, tree branches were blown onto Interstate 66 in the city of Fairfax. Orange County officials reported high wind downing trees in Gordonsville at 12:10 AM EDT.

#### Charlottesville (C) Charlottesville

**14 1315EST**

**0**

**0**

**6K**

**Thunderstorm Wind**

Trees downed on Route 250 between the University of VA and Ivy Rd.





# National Weather Service

## Storm Data and Unusual Weather Phenomena



August 1999

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### VIRGINIA, North

<b>Clarke County</b> Countywide	14	1400EST			0	0	15K		<b>Thunderstorm Wind</b>
Trees downed across Route 50 and other parts of the county, a shed destroyed near White Post									
<b>Loudoun County</b> Bluemont to Round Hill	14	1415EST 1420EST			0	0	12K		<b>Thunderstorm Wind</b>
Trees downed along Route 7 corridor in Bluemont and Round Hill areas									
<b>Warren County</b> Front Royal	14	1415EST			0	0	4K		<b>Thunderstorm Wind</b>
Trees downed									
<b>Fauquier County</b> Rectortown	14	1420EST			0	0	2K		<b>Thunderstorm Wind</b>
Trees downed									
<b>Loudoun County</b> Purcellville to 4 S Purcellville	14	1425EST			0	0	10K		<b>Thunderstorm Wind</b>
Tree downed on house in Purcellville and several trees downed onto roads and power lines south of town									
<b>Loudoun County</b> Round Hill	14	1425EST			0	0	2K		<b>Lightning</b>
20 bales of hay caught fire after being struck by lightning									
<b>Loudoun County</b> Leesburg to 5 S Leesburg	14	1430EST			0	0	300K		<b>Thunderstorm Wind</b>
Several trees downed in south part of town, planes flipped and buildings damaged at airport, homes under construction demolished, several historic trees downed and buildings damaged at Oatlands Plantation									
<b>Loudoun County</b> Leesburg Muni	14	1430EST			0	0			<b>Thunderstorm Wind (G68)</b>
Measured wind gust of 78 MPH at Leesburg Municipal Airport									
<b>Fauquier County</b> Warrenton	14	1459EST			0	0			<b>Thunderstorm Wind (G52)</b>
Measured wind gust of 60 MPH									
<b>Fairfax County</b> West Portion	14	1520EST			0	0	8K		<b>Thunderstorm Wind</b>
Trees downed on Fairfax County Parkway north of Popes Head Rd.									
<b>Fairfax (C)</b> Fairfax	14	1525EST			0	0	4K		<b>Thunderstorm Wind</b>
Trees downed in western half of city									
<b>Fauquier County</b> Warrenton	14	1640EST			0	0	2K		<b>Thunderstorm Wind</b>
Trees downed									
An area of intense thunderstorms producing damaging winds, frequent lightning, and heavy downpours moved across extreme Northern Virginia between 3:00 PM and 6:00 PM EDT. As the storms moved across Clarke County, straight line winds in excess of 55 MPH demolished a shed on a farm near White Post. The shed's heavy roof was lifted off and set down 50 feet away from the rest of the structure. A tree nearby was also toppled. County officials reported several other trees down across the county, including some across Route 50 at 3:00 PM EDT. In Warren County, strong winds downed several trees in Front Royal around 3:15 PM EDT. As the storms crossed Fauquier County, a wind gust of 60 MPH was measured in Warrenton at 3:59 PM EDT. Trees were also downed in Rectortown around 3:20 PM EDT. Loudoun County was hardest hit by the storms. Trees and power lines were downed along the Route 7 corridor from Bluemont to Leesburg between 3:10 PM and 3:40 PM EDT. Over 10,000 customers in the Ashburn, Lucketts, Purcellville, and Leesburg areas lost power as a direct result of the storm. Lightning struck several homes, and one bolt set 20 bales of hay near Round Hill on fire. South of Purcellville, several trees and power lines were downed across Route 610 and 611, making parts of the roads impassable. One tree fell onto a home in Purcellville, causing minor damage. A wind gust of 78 MPH was recorded around 3:30 PM at the Leesburg Municipal Airport. Extensive wind damage									



# National Weather Service

## Storm Data and Unusual Weather Phenomena



August 1999

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### VIRGINIA, North

occurred in and around the airport. A construction trailer on airport grounds was lifted off its foundation and smashed into pieces as it came to rest on Sycolin Road. Several other airport buildings reported minor roof damage. A Cessna and a Piper single-engine aircraft anchored on the airport tarmac were flipped by the sudden downburst of wind. One of the planes went cartwheeling over 200 feet, flying over the tops of other moored planes onto a nearby grass field. Six other planes reported minor damage because high winds blew backwards across wing surfaces and a few were hit by debris. Just east of the airport, framing for two homes under construction were blown over and a construction trailer was also damaged. Dog kennels were moved and a satellite dish was damaged at the Leesburg Fire-Rescue Training Center. Several homes near Country Club Drive and Evergreen Mills Road were damaged by fallen trees, and reported damaged trim and roof shingles. One resident on Evergreen Mills Road reported the wind blew with such strength that it forced open locked, double doors. Nearby signs were blown over on the Dulles Toll Road, and some barns, sheds, and tin roofs were damaged in the vicinity. The historic Oatlands Plantation about 5 miles south of Leesburg reported extensive tree and building damage. As many as 20 trees, over a third of the plantation's collection between 150 and 300 years of age, were downed in the Oak Grove. Several other trees including the oldest known English Oak in Virginia and a rare European Larch were damaged. Fallen trees caused moderate damage to the Chauffeur's Cottage, and outhouse, and the Carriage House. Centuries old trees were also downed on the historic property of Rokeby's Farm just outside of Leesburg. The storms also downed trees in the western portion of Fairfax County and in the city of Fairfax around 4:30 PM EDT. Fallen trees blocked the Fairfax County Parkway from Popes Head Road northward during the evening rush hour. Following the first batch of storms, an isolated thunderstorm producing damaging winds moved across Fauquier County between 5:30 PM and 6:00 PM EDT. Trees were downed around 5:40 PM EDT in Warrenton.

#### **Rockingham County** Countywide

19	1600EST 2000EST		0	0		<b>Heavy Rain</b>
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#### **Shenandoah County** Countywide

19	1600EST 2000EST		0	0		<b>Heavy Rain</b>
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Thunderstorms producing very heavy rain and strong winds moved across Rockingham and Shenandoah Counties between 5:00 PM and 9:00 PM EDT. Winds gusted to 44 MPH in Timberville, knocking out power around 7:00 PM EDT. The community received 2.2 inches of rainfall. Other rainfall reports included 3.27 inches at Bergton, 2.66 inches at Smith Creek, 1.90 inches at Cootes Store, and 1.54 inches at Camp Roosevelt.

#### **Fairfax County** South Portion

25	1200EST 1700EST		0	0		<b>Heavy Rain</b>
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#### **Highland County** 2 SW Patna

25	1200EST		0	0		<b>Heavy Rain</b>
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#### **Loudoun County** East Portion

25	1200EST 1700EST		0	0		<b>Heavy Rain</b>
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Slow moving thundershowers crossed Loudoun and Fairfax Counties during the afternoon and early evening, dropping between 1.5 and 3.0 inches of rain. Measurements included Dulles International Airport at 3.03 inches, Sterling at 2.93 inches, Occoquan at 2.05 inches, Herndon at 1.88 inches, and Vienna at 1.75 inches. Most of the rain ran off into low lying areas because drought conditions made the soil so dry. The standing water led to minor street flooding. Lightning caused 5000 customers in Northern Virginia to lose power. Another slow moving shower crossed Highland County, dropping 2.50 inches of rain near Williamsville.

#### **Augusta County** Sangerville

25	1430EST		0	0	170K	<b>Lightning</b>
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Lightning strike started fire which burned down a barn and damaged \$150,000 in equipment

#### **Charlottesville (C)** Charlottesville

25	1700EST		0	0	30K	<b>Thunderstorm Wind</b>
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Numerous trees and power lines downed, damage to cars and homes from fallen trees  
An area of thunderstorms producing gusty winds, frequent lightning, and heavy downpours moved across Augusta and Albemarle County and the city of Charlottesville between 3:00 PM and 6:30 PM EDT. A lightning strike from one storm around 3:30 PM EDT started a barn fire near Sangerville. The barn burned to the ground and \$150,000 of equipment inside was damaged. Another storm producing winds in excess of 55 MPH moved across Charlottesville around 6:00 PM EDT. Several trees and power lines were downed in the city. Over 50,000 customers lost power as a direct result of the storm. One tree fell onto a moving car on East Rio Road near Brookway Drive, smashing the windshield and hood. The three occupants of the car were uninjured. The road was closed for several hours while utility crews cleared trees and power lines. Another tree on Ninth Street fell onto a home and left a hole through the roof and upstairs ceiling of a bathroom.

#### **Alexandria (C)** North Portion

26	1700EST 2100EST		0	0	10K	<b>Flash Flood</b>
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# National Weather Service

## Storm Data and Unusual Weather Phenomena



August 1999

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### VIRGINIA, North

Rapidly rising water closed the George Washington Memorial Parkway and stranded 40 cars

**Loudoun County**  
**Philomont**

26	1700EST								<b>Thunderstorm Wind</b>
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Tree downed across Snickersville Turnpike at the intersection of Jeb Stuart Road

**Loudoun County**  
**7 NW Middleburg**

26	1710EST								<b>Thunderstorm Wind</b>
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Trees downed across Green Garden Road and Piney Swamp Road  
A line of thunderstorms moved across extreme northern Virginia from 5:00 PM to 7:00 PM EDT, producing damaging winds and very heavy rain. Winds in excess of 55 MPH blew across Loudoun County, downing trees. A fallen tree blocked Snickersville Turnpike at the intersection of Jeb Stuart Road in Philomont. Several trees were downed across Green Garden Road and Piney Swamp near Middleburg. Dulles International Airport picked up 1.35 inches of rain from the storm. These same thunderstorms dumped a quick 2 inches of rain in Reagan National Airport in Arlington, and flooded the George Washington Memorial Parkway between Old Town Alexandria and the 14th Street Bridge. Park police had to hire tow trucks to remove 40 stranded vehicles from the flooded roadway.

### WEST VIRGINIA, East

**WVZ048>055**

**Grant - Mineral - Hampshire - Morgan - Berkeley - Jefferson - Pendleton - Hardy**

01	0000EST								<b>7M Drought</b>
31	2359EST								

High pressure was the dominant weather feature across the Eastern Panhandle through the 24th of August. Most rain producing storm systems steered north of the region through the period. This resulted in the continuation of the climatological, meteorological, and hydrological drought which has plagued the area since last summer. By mid-August the Palmer Drought Index, a measure of long term drought conditions, indicated the Eastern Panhandle was in an extreme drought. More than half of the month's rain fell on the 25th and 26th, helping to ease the drought slightly. However, because most of the rain fell in the form of thunderstorm downpours, most of the moisture ran off into the rivers before it had the chance to seep into the aquifer supply. Groundwater reserves remained unaffected and wells and springs remained short of water. From September 1998 through August of 1999 precipitation was a staggering 10 to 16 inches below normal. Rainfall totals across the Eastern Panhandle during the month of August included 3.9 inches in Pendleton County, 3.7 inches in Jefferson County, 2.8 inches in Hardy County, 2.7 inches in Mineral County, 2.6 inches in Grant County, and 2.1 inches in Morgan and Hampshire Counties. Area rivers and streams continued to show drought stress, most running at 10 to 30% of the normal level. Several points recorded new record daily minimum flows during August. The flow of water on the South Branch of the Potomac River past Springfield during the middle of August was only 12% of the long term monthly average. Water was released from the Jennings Randolph Reservoir on the 11th to boost the Potomac's water level, leaving the reservoir at 78% of capacity. On the Shenandoah River, the flow of water past Millville was only 15% of normal through mid-month.

The lack of precipitation through the third week of the month continued to devastate the agricultural community. The entire state of West Virginia was declared a disaster area during the first week of the month. Several crops such as corn and soybeans never reached maturity, trees prematurely shed leaves and fruit in orchards, pasture land became nearly non-existent, and watering holes and irrigation sources dried up. Hay had to be trucked in from other parts of the country to supplement loss of pasture for livestock. Hardy County farmers had to sell one third of their cow herd because of low feed and water supplies. Across the state, 32% of farmers had to haul water for livestock and 26% of wells dried up or were in danger of drying up. The West Virginia Agricultural Statistics Service reported 80% of pasture land, 69% of corn, 57% of soybeans, 45% of tobacco, 39% of apples, 41% of peaches, and 75% of hay crops in poor or very poor condition. 86% of topsoil was reported short or very short of moisture across the state by the last week of the month. Jefferson County expected to lose 90% of corn crops to the drought. Berkeley and Morgan Counties expected a 50% loss of soybean crops. Mineral County estimated drought production losses of \$7 million. In addition to agricultural lands, forest and rural vegetation were also dangerously dry. The Cumulative Severity Index (CSI), a measure of fire danger which ranges from 1 to 800, measured in the low to mid 500s during the month.

**Berkeley County**  
**4 SW Martinsburg**

26	1345EST								<b>Thunderstorm Wind</b>
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Trees downed on top of mountain off Highway 45

**Jefferson County**  
**Shepherdstown**

26	1400EST								<b>Thunderstorm Wind</b>
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Downed trees blocked roads along the Potomac River  
A line of thunderstorms moved across Berkeley and Jefferson Counties between 2:30 PM and 3:30 PM EDT, producing winds in excess of 55 MPH, frequent lightning, and heavy downpours. Just south of Martinsburg, high winds downed trees on top of a mountain off Highway 45. Trees were also downed across roads lining the Potomac River on the east side of Shepherdstown. Shepherdstown received 1.70 inches of rain from the storms.