



National Weather Service

Storm Data and Unusual Weather Phenomena



September 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	01 17	0000EST 2359EST		0	0			Drought
	<p>Rainfall from two land falling hurricanes finally ended the drought that plagued the Washington area since the summer of 1998. Washington Reagan National Airport reported a rainfall total of 10.27 inches for September, 6.96 inches above normal. It was the 4th wettest September on record. From the 20th of August through the end of September, 14.56 inches of rain fell at National Airport, over a third of the average yearly rainfall. DuPont Circle in Northwest Washington received a total of 9.93 inches during September. The much needed precipitation affected rivers and water reservoirs dramatically. Water restrictions were lifted across the entire metropolitan area by the middle of the month.</p>								
District Of Columbia Countywide		05 06	0200EST 1000EST		0	0			Heavy Rain
	<p>Minor street flooding; tree limbs and wires downed</p>								
District Of Columbia Countywide		05 06	0300EST 2000EST		0	0			Storm Surge
	<p>Tides 2 to 3 feet above normal; minor flooding near waterfront The remnants of Hurricane Dennis moved across the Washington D.C. area from late on the 4th through midday on the 6th. Its legacy included periods of heavy rain, minor street flooding, wind gusts to 35 MPH, and minor tidal flooding along the Potomac River. Washington Reagan National Airport received a storm total of 2.31 inches of rain. In Northwest Washington, DuPont Circle reported a total of 2.51 inches. Scattered power outages occurred when winds of up to 35 MPH downed tree limbs which then fell onto power lines. The storm surge from Hurricane Dennis along with persistent southeast winds made tide levels 2 to 3 above normal on the 5th and 6th. On the 5th, officials put up a flood wall along the river to protect Washington Harbor. River levels reached as high as 6.5 feet at the Wisconsin Avenue gauge during the early morning and late afternoon both days. Flooding was reported at Hains Point and in Georgetown during high tide. Flood stage is 7 feet at Wisconsin Avenue, but some low lying areas report flooding at a stage of 5 feet.</p>								
DCZ001	District Of Columbia	16	0800EST 2300EST		0	0	200K		Tropical Storm
	<p>Winds gusted between 40 and 60 MPH, 200 downed trees blocked roads and damaged homes and automobiles</p>								
District Of Columbia Countywide		16	0800EST 1500EST		0	0			Flash Flood
	<p>Roads closed by high water Hurricane Floyd made landfall just east of Cape Fear, North Carolina in the early morning hours of the 16th and moved north-northeast across extreme southeast Virginia to near Ocean City, Maryland by evening on the 16th. Rainbands on the outer edge of the hurricane began to affect the Washington D.C. area shortly after 8:00 AM EDT on the 15th and continued to cross the area through afternoon on the 16th. The eye of Hurricane Floyd passed east of the Chesapeake Bay between 9:00 AM and midnight on the 16th. Gusty winds of 40 to 60 MPH blew across the District between 11:00 AM and midnight on the 16th. Children's Hospital reported a wind gust of 56 MPH at 2:13 PM EDT, and Washington National Airport recorded a gust of 55 MPH at 3:00 PM EDT. Two hundred downed trees blocked roads and damaged houses and cars. Downed power lines resulted in 7000 electrical outages. Four schools remained without power through the 18th. Up to 6 inches of rain fell across the city. High water closed Independence Avenue from 15th to 23rd Street. Rock Creek Parkway was closed from Virginia Avenue to Calvert Street. At 1:45 PM EDT on the 16th, a vacant building in the 600 block of New York Avenue collapsed from rain accumulated on its roof. Rainfall totals included 6.00 inches at Foggy Bottom, 5.57 inches in Upper Northwest, 5.39 inches at Children's Hospital, and 4.57 inches at National Airport.</p>								
District Of Columbia Countywide		30	0010EST 0020EST		0	0	15K		Thunderstorm Wind
	<p>Several trees and power lines downed, minor damage to buildings An area of intense showers moved across the District between midnight and 1:30 AM EDT on the 30th. Winds in excess of 55 MPH blew across the city, downing several trees and power lines. A wind gust of 45 MPH was recorded at Children's Hospital and at Washington Reagan National Airport. A few buildings on Channing Street sustained minor damage from the high winds and 5 trees several feet in diameter and over two stories tall were downed. A tree was also toppled onto a home near the intersection of Warren and 37th Street, and other trees were downed along Rock Creek. National Airport received a total of 1.59 inches of rainfall.</p>								



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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**

01	0000EST	0	0	Drought
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30	2359EST			
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Rainfall from two land falling hurricanes made a tremendous impact on the drought that plagued the region since the summer of 1998. Most of the rain from these systems fell east of Frederick with the highest amounts near the Chesapeake Bay. The water shortage came to an end by mid month in all but Allegany and Washington Counties. By the 30th, conditions in Western Maryland were upgraded from an extreme to moderate drought, and were near normal or slightly wet elsewhere. Baltimore/Washington International Airport (BWI) reported a monthly rainfall total of 11.50 inches, 8.09 inches above normal. It was the 2nd wettest September on record. The Maryland Science Center in downtown Baltimore reported a total of 10.83 inches. Other September rainfall totals included Anne Arundel County at 12.5 inches, Prince Georges County at 11.5 inches, St. Mary's County at 11.2 inches, Montgomery County at 10.9 inches, Carroll County at 10.1 inches, Charles County at 10.0 inches, Howard County at 9.9 inches, Frederick County at 8.7 inches, Washington County at 8.4 inches, and Allegany County at 4.1 inches.

The much needed rainfall affected rivers and water reservoirs dramatically. Carroll County reported a 2.5 foot jump in the groundwater level during September. The governor of Maryland lifted mandatory water restrictions statewide during the first week of the month. The ban on open burning was lifted for all but Western Maryland as well. However, effects of the drought still lingered in the agricultural community. The drought cost Maryland farmers over \$75 million. Across the state by the end of the month, 41% of corn, 17% of soybeans, 13% of sorghum, and 14% of pasture land were still in poor or very poor condition. Farmers reported 33% of subsoil moisture and 11% of topsoil was still short or very short of moisture. The average pumpkin in the fall harvest was on average 3 to 5 pounds smaller than normal. Also, the city of Baltimore reported losing 300 street trees to the drought, and Howard County reported the loss of 165 trees.

Anne Arundel County

North Portion	05 0200EST	0	0	Heavy Rain
	06 1000EST			

Baltimore City (C)

Baltimore	05 0200EST	0	1	Heavy Rain
	06 1000EST			

13 year old boy rescued from swollen Jones Falls

Frederick County

Countywide	05 0200EST	0	0	Heavy Rain
	06 1000EST			

Howard County

Countywide	05 0200EST	0	0	Heavy Rain
	06 1000EST			

Montgomery County

Countywide	05 0200EST	0	0	Heavy Rain
	06 1000EST			

Prince George'S County

Countywide	05 0200EST	0	0	Heavy Rain
	06 1000EST			

Anne Arundel County

East Portion	05 0300EST	0	0	Storm Surge
	06 2000EST			

parking lot on Dock Street in Annapolis flooded; roads near bay under water

Baltimore City (C)

Baltimore	05 0300EST	0	0	Storm Surge
	06 2000EST			

Water rose over seawall onto the Harbor Place promenade at Inner Harbor

Calvert County

East Portion	05 0300EST	0	0	Storm Surge
	06 2000EST			

Halloween Point, Cove Point, and Chesapeake Beach flooded

Allegany County

Frostburg	05 1300EST	0	0	5K	Lightning
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Power poles downed after being hit by lightning
 The remnants of Hurricane Dennis moved across Maryland from late on the 4th through midday on the 6th. Its legacy included heavy rain, especially across Central Maryland, power outages from fallen tree limbs, and tidal flooding along the western shoreline of the Chesapeake Bay. Tides were 2 to 3 feet above normal along the shoreline of Calvert and Anne Arundel Counties. Several locations next to the water were flooded at high tide, including a parking lot on Dock Street in Annapolis and Halloween



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MARYLAND, Central

Point, North Beach, and Cove Point in Calvert County. Chesapeake Beach in Calvert County also reported 2 feet of water over 9th Street and minor damage to 2 businesses. In Baltimore, the persistent east to southeast wind pushed water over the seawall at Inner Harbor and onto the Harbor Place promenade.

Heavy rain also caused several problems in the region. Two days of rain made Jones Falls Creek in Baltimore swell, and a 13 year old boy floating down the creek in a makeshift raft was washed downstream. It took an hour for a team of 30 fire fighters to rescue him from a pile of debris snagged by a pillar of a bridge supporting the Jones Falls Expressway. The child was treated for hypothermia. Several other communities including Bowley's Quarters near Middle River and Oella near the Patapsco River reported street flooding. In Howard County, Route 1 at Elkridge was closed for a time on the 5th by 2 feet of water. Rainfall totals from Dennis across Central Maryland included 5.59 inches at Clarksburg, 4.50 inches at Glenmont, 4.41 inches at Gaithersburg, 4.05 inches at Rivera Beach, 3.96 inches at Damascus, 3.84 inches at Rockville, 3.77 inches at Laurel, 3.5 inches at Silver Spring, 3.47 inches at Oxon Hill, 3.30 inches at Thurmont, 3.04 inches at Dawsonville, 2.90 inches at Cooksville, 2.70 inches at Hipsley Mill, 2.52 inches at Baltimore/Washington International Airport (BWI), 2.33 inches at Inner Harbor in Baltimore, and 1.68 inches at Waldorf. In West Central Maryland, 2.46 inches fell at Sharpsburg, 2.45 inches fell at Williamsport, and 2.25 inches fell at Frostburg.

Winds gusting to 35 MPH downed tree limbs onto power lines on the afternoon of the 5th, causing scattered power outages. Nearly 2000 customers in Central Maryland lost power. Lightning also downed two main power poles near Frostburg in Allegany County on the 5th, causing 4700 customers to lose power. The poles were downed at the intersection of Interstate 68 and Route 36, and crews had to shut down Interstate 68 between midnight and 6 AM on the 6th to repair them.

Montgomery County

Gaithersburg	07	1900EST 2100EST			0	0			Heavy Rain
Streets flooded									

Frederick County

South Portion	07	1920EST 1940EST			0	0	3K		Thunderstorm Wind
Trees downed across roads									

Montgomery County

Gaithersburg	07	1945EST			0	0	3K		Thunderstorm Wind
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Trees downed onto power lines
Just a few days after Hurricane Dennis dropped heavy rain over North Central Maryland, another area of thunderstorms moved across the area producing winds in excess of 55 MPH, frequent lightning, and very heavy downpours. The storms affected the area between 8:00 PM and 10:00 PM EDT. High winds downed trees in Frederick and Montgomery Counties. Winds gusted to 50 MPH in Mt. Airy and 0.91 inches of rain fell in 20 minutes. Heavy downpours produced minor street flooding in Gaithersburg around 9:00 PM EDT. Power outages were also reported.

Baltimore County

West Portion	09	1645EST 2000EST			0	0			Flash Flood
Flooding along Jones Creek; roads under water									

Baltimore City (C)

Baltimore	09	1645EST 2000EST			0	0			Flash Flood
Flooding downtown									

Baltimore City (C)

Baltimore	09	1645EST 2000EST			0	0	5K		Thunderstorm Wind
Trees and power lines downed									

Howard County

Columbia to Dorsey	09	1645EST			0	0	3K		Thunderstorm Wind
Trees and power lines downed									

Howard County

Countywide	09	1730EST 2100EST			0	0			Flash Flood
Flooding in Ellicott City, Dorsey, Columbia, and Elkridge									

Montgomery County

Countywide	09	2000EST 2300EST			0	0			Flash Flood
Streets flooded, Rock Creek and Sligo Creek out of their banks									



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MARYLAND, Central

Prince George'S County

Laurel	09	2000EST 2200EST			0	0			Heavy Rain
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Over 3.5 inches of rain at Patuxent River Filtration Plant
 Another round of thunderstorms producing damaging winds and very heavy rainfall moved across Central Maryland between 5:30 PM and 11:00 PM EDT. Several locations reported flooding and downed trees and power lines. In Montgomery County, Sligo Creek along Colesville Road, and Rock Creek went out of their banks. East-West Highway and Beach Drive flooded and a nearby recreational center had to be evacuated. Streets were flooded in Kensington, and a water rescue was reported in Chevy Chase. In Prince Georges County, the Patuxent River Water Filtration Plant at Laurel recorded a total of 3.55 inches of rain. In Howard County, many roads and creeks were flooded in Columbia, Ellicot City, and Elkridge. On Highway 1 between Highway 100 and Montgomery Road, many portions of the roadway were flooded and cars were stalled in hood-high water. A few homes near the community of Dorsey were surrounded by water. Winds also gusted between 50 and 60 MPH in Columbia and Dorsey, knocking down trees and power lines and sending 15,000 county residents into the dark. Rainfall amounts included 7.39 inches just north of Columbia and 5.98 inches just west of Elkridge. In Baltimore County, Jones Creek went out of its banks, and roads were flooded in downtown Baltimore. One location in the Baltimore area received 3.6 inches of rain in 1 hour and 20 minutes. Winds gusting between 50 and 60 MPH also downed trees and power lines in Baltimore, resulting in 23,000 electrical outages.

Frederick County

Countywide	16	0000EST 1400EST			0	0			Heavy Rain
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Small streams flooded secondary roads

Montgomery County

Countywide	16	0000EST 1400EST			0	0			Heavy Rain
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Streets flooded

Baltimore County

Southeast Portion	16	0200EST 2000EST			0	0			Storm Surge
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Tides 2 feet above normal

Baltimore City (C)

Baltimore	16	0200EST 2000EST			0	0			Storm Surge
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Tide 2 feet above normal

Calvert County

East Portion	16	0200EST 2000EST			0	0			Storm Surge
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Tides 2 to 3 feet above normal

Harford County

South Portion	16	0200EST 2000EST			0	0			Storm Surge
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Tides 2 to 3 feet above normal

St. Mary'S County

East Portion	16	0200EST 2000EST			0	0			Storm Surge
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Tides 2 to 3 feet above normal, St. George's Island causeway flooded

Anne Arundel County

Countywide	16	0800EST 1800EST			0	0	2M		Flash Flood
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Over 1000 homes reported flood damage, over 100 roads closed, 2 water rescues

Baltimore County

Countywide	16	0800EST 1800EST			0	0	10K		Flash Flood
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7 swift water rescues, flooded roads

Baltimore City (C)

Countywide	16	0800EST 1800EST			0	0	50K		Flash Flood
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Jones Falls and Western Run overflowed, nearby residents evacuated

Calvert County

Countywide	16	0800EST 1800EST			0	0	500K		Flash Flood
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Roads and homes flooded



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MARYLAND, Central

**Charles County
Countywide**

16	0800EST 1800EST				0	0			Flash Flood
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20 roads closed by high water

**Harford County
Countywide**

16	0800EST 1800EST				0	15	2.6M		Flash Flood
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High water closed 557 roads, 40 bridges washed out; 15 injuries

MDZ003>006-009>010

Washington - Frederick - Carroll - Northern Baltimore - Montgomery - Howard

16	0800EST 2300EST				0	0	547K		High Wind
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MDZ007-011-013>014-016>018

Harford - Southern Baltimore - Prince Georges - Anne Arundel - Charles - St. Mary'S - Calvert

16	0800EST 2300EST				0	0	900K		Tropical Storm
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**Prince George'S County
Countywide**

16	0800EST 1800EST				0	1			Flash Flood
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Boy rescued from drainage ditch; 15 county roads closed by high water

**St. Mary'S County
Countywide**

16	0800EST 1800EST				0	0	500K		Flash Flood
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26 people rescued from high water, many streams including St. Mary's River overflowed

**Carroll County
Countywide**

16	1100EST 1800EST				0	0			Flash Flood
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10 roads closed by high water

**Howard County
Countywide**

16	1100EST 1800EST				0	0			Flash Flood
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10 water rescues from flooded roadways

Hurricane Floyd made landfall just east of Cape Fear, North Carolina in the early morning hours of the 16th and moved north-northeast across extreme southeast Virginia to near Ocean City, Maryland by evening on the 16th. Rainbands on the outer edge of the hurricane began to affect Maryland east of Washington County shortly after 8:00 AM EDT on the 15th and continued to cross the area through afternoon on the 16th. The eye of Hurricane Floyd passed east of the Chesapeake Bay between 9:00 AM and midnight on the 16th. Gusty winds of 30 to 50 MPH blew across the area between 11:00 AM and midnight on the 16th, with localized wind gusts over 50 MPH near the Chesapeake Bay. Hundreds of trees and power lines were downed and over 500,000 customers lost electricity. A total of 2 to 5 inches of rain fell in Frederick, Carroll, Montgomery, and Howard Counties. A total of 5 to 8 inches fell across Baltimore, Prince George's, and Charles Counties. Between 8 and 12 inches fell across St. Mary's, Anne Arundel, and Harford Counties. The amount of damage Anne Arundel, Calvert, Charles, Harford, and St. Mary's Counties received from the storm qualified them for FEMA disaster assistance.

Tidal flooding was reported along the Chesapeake Bay. Strong southerly winds ahead of the hurricane pushed tides 2 to 3 feet above normal, flooding several low lying areas in St. Mary's, Calvert, Harford, and Anne Arundel Counties. Erosion was reported on the South River and Broad Creek. High water destroyed 5 homes, caused major damage to 23 homes, and minor damage to 1000 homes in the eastern portion of Anne Arundel County. In Calvert County, numerous shoreline homes between 2 and 4 feet above sea level were flooded. In St. Mary's County, the only causeway to St. George Island went underwater, trapping a half dozen residents. Tropical downpours also led to flooding. The highest rainfall reports included 11.60 inches in Annapolis, 11.11 inches in Ridge, 11.10 inches at Cape St. Claire in Anne Arundel County, 9.76 inches in California, 9.67 inches in Hollywood, 9.52 inches at Brown Landfill in Prince George's County, 8.64 inches in Bel Air, 8.62 inches at Fort McHenry, 8.30 inches in Pasadena, 8.27 inches in La Plata, 8.07 inches at Jug Bay Wetlands in Anne Arundel County, 7.82 inches in Tall Timbers, 7.78 inches in South Bowie, 7.25 inches in Millersville, 7.00 inches in Camp Springs, 6.96 inches in Marlboro, 6.83 inches in Morganza, 6.75 inches in Bowie, 6.13 inches in Brooklyn Park, 5.92 inches at Perry Hall, 5.78 inches at Baltimore/Washington International Airport, 5.33 inches in College Park, 5.26 inches in Bryans Road, 5.25 inches in Parkton, 5.19 inches at Inner Harbor Baltimore, 5.18 inches in Oraville, 5.16 inches at Lake Roland in Baltimore County, 5.12 inches in Elkridge, 5.10 inches in Millers, and 5.04 inches in Ellicott City.

In St. Mary's County, high winds blew a cross bar off a church steeple and knocked out power to 5000 customers. Winds gusted to 71 MPH at Tall Timbers, 43 MPH at St. Indigoes, and 45 MPH at Hollywood. A wind gust of 65 MPH was recorded at Patuxent River Naval Air Station at 11:45 AM EDT. One location reported 10.6 inches of rain between 6 AM and 4 PM EDT on the 16th. County officials rescued 28 people by boat from a trailer park, homes, and stranded cars after the St. Mary's River and other waterways flooded. Nine other people were rescued from an apartment building near Great Mills. In Charles County, over 20



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MARYLAND, Central

roads were closed by flooding. Several trees and power lines were downed, resulting in 5000 power outages. In Waldorf, a wind gust of 54 MPH downed a tree onto a home. In Calvert County, hundreds of large trees were downed onto roads, homes, and power lines. Over 11,000 electrical outages were reported. Winds gusted to 69 MPH at Mid Bay buoy offshore of Calvert Cliffs. A wind survey showed ribbons of tree damage from microburst winds estimated between 70 and 80 MPH. In Prince George's County, road crews cleared 500 trees from roadways. More than 60,000 customers lost power. Two people were injured and one person was killed by carbon monoxide fumes after losing power and running a generator inside their home. Winds gusted to 54 MPH at Andrews Air Force Base at 1:22 PM EDT and 46 MPH in College Park at 3:39 PM EDT. Downed trees blocked 33 streets and flooding closed 15 county roads. A 12 year old boy was caught in flood waters and was swept a half mile down a drainage ditch before being rescued and treated for hypothermia. A branch of the Patuxent River flooded onto Walter Street in Upper Marlboro. Forty buses could not be dispatched because of flooded lots.

In Anne Arundel County, 5 trains with over 1000 passengers were stranded up to 7 hours just north of BWI airport by a mudslide, water, and trees covering the tracks. At 9:30 AM EDT on the 16th, a tractor-trailer was blown over on the Chesapeake Bay Bridge. A wind sensor on the bridge recorded a gust of 81 MPH at 11:55 AM. Winds gusted to 66 MPH at Thomas Point Lighthouse, 56 MPH at the Naval Academy in Annapolis, 48 MPH at Brooklyn Park, and 43 MPH at Baltimore/Washington International Airport. Over 77,000 customers lost power after hundreds of trees and power lines were downed. It took over a week to restore power to all customers. Several hundred roads were closed by downed trees and high water. County officials reported 350 flooded basements and 2 water rescues. Some basement walls collapsed, including one in a 15 unit townhouse structure. Shady Side and Bay Side beaches along the Patapsco River were flooded by torrential rains. The county fair was shut down for the first time in its 47 year history. An ailing historical landmark, the Liberty Tree at St. John's College in Annapolis, was also dealt a final blow by the hurricane. In Baltimore, evacuation orders were issued for businesses near the confluence of Jones Falls and Western Run after both streams overflowed their banks. The water submerged a used car lot and washed out a bridge on Maisel Street near Morrell Park. Winds gusted to 62 MPH on Television Hill. Officials reported 750 downed trees across the city, including 35 which damaged homes. Up to 91,000 customers lost power, and the outage led to the release of 24 million gallons of raw sewage into Jones Falls.

Across Baltimore County, 57,000 customers lost power. Winds gusted to 69 MPH at Martin State Airport at 3:05 PM EDT, 56 MPH in Bowie, and 52 MPH in Towson and Parkton. Hundreds of trees fell in Gunpowder State Park. Countywide, fallen trees damaged homes, sheds, fences, and cars, and closed 125 roads. Officials reported 6 rapid water rescues and 350 flooded basements. A 10 year old boy was swept into a storm drain and carried 300 feet in a buried pipe before fire fighters opened a manhole cover and rescued him uninjured. In Harford County, Lilly Run flowed out of its banks and closed all roads in Havre de Grace, isolating the city hospital. Nearly 560 other county roads were closed by high water and downed trees. Around 53,000 customers lost power, and some residents waited a week for service to return. North Bay buoy recorded a wind gust of 55 MPH. High water damaged 40 bridges, washed out 250 feet of roadway, and washed away 125 feet of a 2 ft diameter sewer line. Seventeen homes reported major damage and 26 homes sustained minor damage. Officials reported 12 evacuations, 300 flooded basements, and 15 injuries. Numerous travellers took shelter at the Interstate 95 Chesapeake House rest stop when heavy rain reduced visibility to 200 feet.

In Carroll County, 10 roads in the eastern half of the county were closed by small stream flooding and downed trees. Downed power lines resulted in 7100 electrical outages. In Howard County, 35,000 customers lost power and some waited 4 days for power to return. A wind gust of 46 MPH was reported in Laurel. Downed trees and high water closed 200 roads and intersections, including a portion of Route 1. Two homes were damaged by fallen trees and one downed tree blocked Interstate 70. In Patapsco Valley State Park, 40 trees fell onto park roads. Most tree damage occurred east of a line from Ellicott City to Elkridge. County officials rescued 10 motorists who drove into flood waters. In Montgomery County, hundreds of trees were downed and 20 roads were closed. At least 5000 customers lost power after trees fell onto power lines. Several roads were water covered and a few roads were closed by high water. Frederick County reported several downed trees and 3000 power outages. Some roads were flooded by swollen streams in the eastern portion of the county. In the city of Hagerstown in Washington County, a large tree limb was downed onto a home, tearing off the gutter and screen door. A wind gust of 42 MPH was recorded in Hagerstown at 7:03 PM EDT.

Washington County Sharpsburg	29	2130EST 2330EST			0	0			Heavy Rain
			Over 2 inches in 2 hours						
Frederick County Countywide	29	2200EST 2355EST			0	0			Heavy Rain
			Over 2 inches in 2 hours						
Washington County Clear Spg to Hagerstown	29	2235EST 2250EST			0	0	5K		Thunderstorm Wind
			Trees and power lines downed						
Washington County Hancock	29	2240EST			0	0	5K		Thunderstorm Wind



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MARYLAND, Central

2 buildings damaged on Willow Road									
Frederick County Countywide	29	2300EST 2320EST			0	0	10K		Thunderstorm Wind
Numerous trees and power lines downed									
Montgomery County Damascus	29	2330EST			0	0	3K		Thunderstorm Wind
Several trees downed on Brink Road at Route 108									
Montgomery County Laytonsville	29	2330EST			0	0	0.50K		Thunderstorm Wind
Tree downed									
Carroll County Taneytown	29	2345EST			0	0	3K		Thunderstorm Wind
12 trees downed									
Carroll County Westminster	29	2345EST			0	0			Thunderstorm Wind (G52)
Estimated 60 MPH wind gust									
Prince George'S County Mitchellville	30	0003EST			0	0	2K		Thunderstorm Wind
4 feet diameter oak trees downed									
Howard County Columbia	30	0005EST			0	0	3K		Thunderstorm Wind
Power lines downed									
Baltimore City (C) Baltimore	30	0025EST			0	0	15K		Thunderstorm Wind
60 trees downed									
Anne Arundel County North Portion	30	0030EST			0	0	10K		Thunderstorm Wind
Several trees downed, concentrated in the Annapolis area									
<p>An area of intense showers moved across much of Maryland from 10:00 PM EDT on the 29th through 2:00 AM EDT on the 30th, producing winds in excess of 55 MPH and very heavy downpours. Minor flooding was reported in a few locations, and high winds knocked numerous trees and power lines down. In Washington County, high winds damaged 2 buildings on Willow Road in Hancock. Trees and power lines were downed from Clear Springs to Hagerstown. A wind gust of 51 MPH was recorded in Hagerstown at 11:53 PM EDT. Sharpsburg recorded 2.49 inches of rainfall. In Frederick County, rainfall amounts included 2.80 inches at Wolfsville, 2.5 inches at Thurmont, and 2.45 inches at Catoctin Mountain Park. Trees and power lines were downed in Libertytown, Urbana, Emmitsburg, Yellow Springs, Meyersville, Frederick, and Brunswick. 6000 county customers lost power as a direct result of the storm. Four roads were closed by fallen trees, and the MARC train was delayed by debris on the tracks in Brunswick. Trees and power lines were downed in Montgomery County, resulting in 6600 electrical outages. Trees blocked Route 108 at Brink Road in Damascus. Three trees were downed, loose items were thrown about, and leaves were plastered against one side of a home in Laytonsville. In Carroll County, winds gusted to 65 MPH in Westminster around 12:45 AM EDT. A wind gust of 53 MPH was recorded in Millers at around 1:00 AM EDT. A dozen large trees were downed in Taneytown. Howard County reported downed trees and power outages near Route 32 and 39 in Columbia. In Prince George's County, 4200 customers lost power. Trees were downed in Mitchelsville around 1:00 AM EDT. Winds gusted to 43 MPH at Andrews Air Force Base at 1:03 AM EDT and 41 MPH at the University of Maryland in College Park. Oxon Hill reported 1.47 inches of rainfall. Anne Arundel County reported several downed trees in the northern half of the county. Winds gusted to 44 MPH at Baltimore/Washington International Airport (BWI) at 1:12 AM EDT. Annapolis reported 2.30 inches of rainfall and BWI received 1.16 inches. Over 60 trees and many power lines were downed in the city of Baltimore. 14,000 city customers lost power.</p>									



National Weather Service

Storm Data and Unusual Weather Phenomena



September 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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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

01	0000EST								
30	2359EST				0	0	5M	Drought	

Rainfall from two land falling hurricanes made a tremendous impact on the drought that plagued the region since the summer of 1998. Across Northern Virginia, the greatest amount of rain fell north of a line from Staunton to Fredericksburg. The water shortage came to an end in this area by mid month. Locations to the south recorded a major increase in water supplies, upgrading their condition from an extreme drought to a mild drought, but not enough rain fell to completely wipe out the shortage. Washington Reagan National Airport in Arlington reported a rainfall total of 10.27 inches for September, 6.96 inches above normal. It was the 4th wettest September on record. Dulles International Airport received 9.32 inches of rain, 5.96 inches above normal. Other monthly rainfall totals included Rappahannock County at 14.8 inches, Clarke County at 13.0 inches, Page County at 12.8 inches, Warren County at 12.5 inches, Culpeper County at 11.9 inches, Greene County at 11.3 inches, Fauquier County at 11.0 inches, Spotsylvania County at 10.0 inches, Loudoun County at 9.9 inches, Fairfax County at 9.7 inches, Orange County at 9.4 inches, Shenandoah County at 9.1 inches, Augusta County at 9.0 inches, Frederick County at 8.3 inches, Prince William County at 7.7 inches, Rockingham County at 7.5 inches, and Albemarle County at 7.0 inches.

The much needed rainfall affected rivers and water reservoirs dramatically. In Shenandoah County, 30 ponds that went dry during the past 12 months were rejuvenated by the 8th. Orange County lifted its water restrictions on the 10th. The Ni River Reservoir returned to 71% of its capacity by the end of the month, allowing officials in Spotsylvania County to lift mandatory water restrictions that were in effect for 13 months. Streamflow at Goose Creek in Loudoun County increased from 3.8 million gallons during the last week of August to 20 million gallons by the 8th. The South Fork of the Shenandoah River in Front Royal finally rose to a sufficient level to allow water to rush over the dam, following a several month absence. The Charlottesville urban water ring recorded a reservoir level increase from 80% to 94% of capacity by mid month. Mandatory water restrictions continued in Highland County through the end of the month.

Effects of the drought still lingered in the agricultural community. Across the state by the end of the month, 27% of pasture land, 40% of corn, 16% of soybeans, and 12% of apples remained in poor or very poor condition. Rockingham County, Virginia's top agriculture county, reported 90% of the corn crop and 85% of the soybean crop were lost due to the drought. Loudoun County increased their estimate of drought crop losses from \$15 to \$20 million by the end of the month. The apple harvest in Nelson County yielded a crop smaller than the 2.5 inch minimum standard. Farmers had to sell the crop to apple juice suppliers instead of wholesale markets, significantly reducing profit. Statewide by the 26th, 25% of topsoil remained short or very short of moisture. In addition, harvests were made difficult by heavy rains from the tropical systems. Effects such as shortages of hay and pasture land for livestock, stunted tree growth at orchards and tree farms, and low prices for meagre harvests continued to plague farmers, even after water supplies rebounded.

Clarke County									
Countywide	05	0200EST			0	0			Heavy Rain
	06	1000EST							
Culpeper County									
Countywide	05	0200EST			0	0			Heavy Rain
	06	1000EST							
Fauquier County									
Countywide	05	0200EST			0	0			Heavy Rain
	06	1000EST							
Frederick County									
Countywide	05	0200EST			0	0			Heavy Rain
	06	1000EST							
Greene County									
Countywide	05	0200EST			0	0			Heavy Rain
	06	1000EST							
Madison County									
Countywide	05	0200EST			0	0			Heavy Rain
	06	1000EST							
Orange County									
Countywide	05	0200EST			0	0			Heavy Rain
	06	1000EST							
Rappahannock County									
Countywide	05	0200EST			0	0			Heavy Rain
	06	1000EST							



National Weather Service

Storm Data and Unusual Weather Phenomena



September 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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VIRGINIA, North

Winchester (C)

Winchester	05 06	0200EST 1000EST			0	0			Heavy Rain
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Alexandria (C)

Alexandria	05 06	0300EST 2000EST			0	0			Storm Surge
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2 feet rise in tide levels on Potomac River, minor flooding near waterfront

Highland County

Monterey	05	0300EST 0930EST			0	0			Flash Flood
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Tropical rainfall up to 5 inches

Albemarle County

Countywide	05	0400EST 1030EST			0	0			Flash Flood
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Tropical rainfall up to 4 inches

Augusta County

Countywide	05	0400EST 1030EST			0	0	20K		Flash Flood
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Tropical rains flooded roads, felled trees, and forced creeks out of their banks

Charlottesville (C)

Charlottesville	05	0400EST 1030EST			0	0			Flash Flood
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Tropical rainfall up to 4 inches

Harrisonburg (C)

Harrisonburg	05	0400EST 1030EST			0	1	10K		Flash Flood
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Flooded roads, collapsed roof

Nelson County

Countywide	05	0400EST 1030EST			0	0			Flash Flood
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Tropical rainfall up to 6 inches

Page County

East Portion	05	0400EST 1030EST			0	0			Flash Flood
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Tropical rainfall up to 5 inches along Skyline Drive

Rockingham County

Countywide	05	0400EST 1030EST			0	0			Flash Flood
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Tropical rainfall up to 5 inches, standing water in low lying areas

Shenandoah County

Countywide	05	0400EST 1030EST			0	0			Flash Flood
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Tropical rainfall up to 4 inches, low water crossings flooded

Staunton (C)

Staunton	05	0400EST 1030EST			0	0	7K		Flash Flood
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Saturated soil allowed trees to topple onto 4 vehicles

Warren County

East Portion	05	0400EST 1030EST			0	0			Flash Flood
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Tropical rainfall up to 6 inches along Skyline Drive

Waynesboro (C)

Waynesboro	05	0400EST 1030EST			0	0	5K		Flash Flood
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Saturated soil allowed trees and power lines to topple

VAZ037

Albemarle	05	1130EST 1600EST			0	0			Strong Wind
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Winds gusting over 40 MPH and saturated soil combined to down trees and power lines
The remnants of Hurricane Dennis moved across the northern half of Virginia from midday on the 4th through midday on the 6th.



National Weather Service

Storm Data and Unusual Weather Phenomena



September 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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VIRGINIA, North

Its legacy included very heavy rain, especially in the Virginia Highlands and the Central and Southern Shenandoah Valley, and wind gusts in excess of 45 MPH. The heaviest period of rain in this region occurred between 3:00 AM and 8:00 AM on the 5th. Portions of Highland County received up to 5 inches of rain during this period. Rainfall totals across the county from Dennis included 8.40 inches at Monterey, 4.08 inches at Hightown, 3.39 inches at McDowell, and 2.64 inches at Back Creek. In Staunton, the soil became so saturated that an 18 inch diameter tree toppled onto a fence and 4 parked cars, resulting in \$7000 damage. In Waynesboro, trees and power lines in saturated soil fell causing power outages. Extremely heavy rain fell in the Sherando area of Augusta County, causing widespread flooding. Much of the 6.52 inches of rain Sherando and 9.25 inches of rain Upper Sherando received from the tropical system fell during this time. Back Creek flooded, sending a high volume of water downstream toward Lyndhurst. Several trees fell in the Sherando and Stewarts Draft area after soil became too wet to secure the roots. Route 624 near Stewarts Draft was closed by high water. Other rainfall totals from Dennis around the county included Mills Creek Dam at 9.48 inches, Tom's Branch at 8.10 inches, Spottswood at 5.48 inches, Robinson's Hollow at 5.32 inches, Stewart's Draft at 5.10 inches, Staunton at 4.85 inches, Waynesboro at 4.47 inches, and Stokesville at 4.24 inches. Heavy rain also fell across Albemarle County and the city of Charlottesville, closing the county fair a day early. Free Union reported a storm total of 4.60 inches.

Across Nelson County, Dennis dropped 9.51 inches in Montebello, 6.87 inches in Lovingson, 6.68 inches at Brent Gap, 5.08 inches at Bent Creek, and 4.80 inches in Rockfish. Rockingham County and the city of Harrisonburg reported several low lying areas and roads covered by water after the deluge. A roof collapsed in Harrisonburg around 10:00 AM EDT, injuring one occupant. Rainfall totals included 6.50 inches at Briery Branch, 6.32 inches at Dundore Mountain, 5.92 inches at Bergton, and 5.40 inches at Lynwood. Across Shenandoah County, Zepp reported 6.80 inches, Camp Roosevelt reported 5.76 inches, Strasburg reported 5.03 inches, Fetzer Gap reported 4.51 inches, and Bryce Mountain reported 4.28 inches. Several low water crossings were closed by high water. Along Skyline Drive in extreme eastern Page and Warren Counties, rainfall amounts between 4 and 6 inches fell during the morning of the 5th. Storm total rainfall along the Blue Ridge Mountains included 8.57 inches at Lewis Mountain, 7.00 inches at Matthews Arm, 6.96 inches at Limeton, and 6.16 inches at Rocky Branch.

On the afternoon of the 5th, winds occasionally gusted over 40 MPH in the Southern Shenandoah Valley. Saturated soil from the morning's heavy rainfall made it very easy for strong winds to blow down several trees and power lines in the city of Charlottesville and Albemarle County. Nearly 10,000 customers lost power. At 2500 feet on the top of Flattop Mountain in Greene County, a wind gust of 62 MPH was recorded around 1:10 PM EDT.

Other locations across Northern Virginia received periods of heavy rain from late on the 4th through early on the 6th. Rainfall totals in Madison County included 3.80 inches at Syria, 2.84 inches at Madison, and 2.72 inches at Nethers. Standardsville in Greene County reported 3.62 inches. In Orange County, 2.94 inches fell at Somerset and 2.83 inches fell at Orange. 2.72 inches fell at Boston in Culpeper County. In Rappahannock County, 3.87 inches fell at Sperryville and 3.50 inches fell at Castleton. In Fauquier County, The Plains reported 3.53 inches and Remington received 2.30 inches. The town of Gore in Frederick County received 3.94 inches. The city of Winchester had rainfall totals ranging from 4.52 inches south to 2.27 inches north. A rain gauge near Berryville in Clarke County received 2.52 inches.

The city of Alexandria along the tidal Potomac River also reported minor problems with flooding. The storm surge from Hurricane Dennis along with persistent southeast winds made tide levels 2 to 3 feet above normal on the 5th and 6th. At high tide portions of the city near the waterfront were invaded by water which subsided again with each low tide. The 100 block of King and Union Streets was flooded for a time on Sunday. River levels reached as high as 6.5 feet at the Wisconsin Avenue gauge during the early morning and late afternoon both days.

Frederick County

Countywide	07	1800EST 2200EST		0	0				Flash Flood
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Quickly rising water closed several roads and caused mudslides

Clarke County

Countywide	07	1830EST 2200EST		0	0				Flash Flood
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Quickly rising water flooded roads in Berryville and Boyce

Orange County

Gordonsville	07	1945EST		0	0	3K			Thunderstorm Wind
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Several trees downed

Shenandoah County

North Portion	07	2000EST 2300EST		0	0				Flash Flood
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Roads closed by high water in Strasburg, flooding in north portion of county

Frederick County

Stephens City	07	2015EST		0	0				Hail (0.75)
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National Weather Service

Storm Data and Unusual Weather Phenomena



September 1999

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VIRGINIA, North

Dime sized hail									
Clarke County Countywide	07	2100EST			0	0	5K		Thunderstorm Wind

Trees downed across roads countywide

Warren County Front Royal	07	2200EST			0	0			Lightning
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House struck by lightning

Warren County Front Royal	07	2200EST			0	0	20K		Thunderstorm Wind
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Winds estimated between 70 and 80 MPH downed trees and damaged structures

Loudoun County Countywide	07	2230EST			0	0	2K		Thunderstorm Wind
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Trees downed across roads countywide

Only a few days after Northern Virginia received rains from the remnants of Hurricane Dennis, an area of thunderstorms moved through the area producing damaging winds, large hail, frequent lightning, and very heavy downpours. The storms affected the region between 5:30 PM EDT and midnight. Frederick and Clarke Counties received the heaviest rainfall, and suffered from significant flash flooding. An observer in Clearbrook reported a rain gauges that held 5 inches overflowed during the storm. Another observer in the eastern half of Frederick County received a total of 5.3 inches, with 3.5 inches of the total recorded in 1 hour. One location in Clarke County reported 3.8 inches of rain in 1 hour. A portion of Highway 7 was closed by high water near Berryville. Both Boyce and Berryville reported street flooding. The communities of Greenwood and Stephens City reported several flooded roads and basements. Severe flooding and mudslides blocked roads between Highway 7 and Route 50, and another mudslide affected Route 50. In addition, Route 635, 657, 255, 621, 620, 651, and 761 were all closed for a short period of time due to high water in Clarke County. Shenandoah County also received heavy rain and reported minor flooding. Just south of Strasburg, 1.5 inches fell. County officials reported a low lying bridge on Highway 744 was covered with water in the Deer Rapids area near Massanutten Mountain. A low water bridge at Black Bear Crossing east of Maurertown and at Chapman's Landing south of Woodstock were also flooded and impassable. Several basements and roads were flooded in Strasburg. In addition, winds in excess of 55 MPH downed trees and power lines in several locations. Several trees were downed in the eastern part of Frederick County. Power lines were downed and lightning started several tree fires in the Greenwood area. Trees were downed across Clarke County with a concentration in the Berryville area. Utility crews had to clear downed trees in Waterford and Leesburg in Loudoun County. In Orange County, several trees were downed by high wind in Gordonsville. Dime sized hail fell in Stephens City, and pea sized hail fell in Leesburg. Winds estimated between 70 and 80 MPH pummelled Front Royal around 11:00 PM EDT. The area of town east of Route 350, south of Main Street, west of Route 522, and north of Route 55 was hardest hit. Part of a roof was torn off a home and a few chimneys were blown down. Other homes had roof, siding, and trim damage. At least a dozen trees were uprooted and many more were snapped. Numerous trees lost large limbs. Two houses had large trees fall on them and one car was crushed by a tree. Two sheds were damaged. Two stores in a shopping center south of Route 522 and south of Route 55 had trim damage. Another portion of town north of Route 55 and east of Route 522 around Jamestown and Marshall Streets also had several large hardwood trees that were snapped by winds in excess of 55 MPH. One home in the Lake Front Royal subdivision was hit by lightning. Many residents in the southern part of the city lost power after trees fell onto power lines.

Nelson County Afton	09	1350EST			0	0			Hail (0.75)
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Dime sized hail on Afton Mountain

Waynesboro (C) Waynesboro	09	1500EST 1700EST			0	0			Flash Flood
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Small streams out of banks, Kirby Avenue and A Street flooded

Waynesboro (C) Waynesboro	09	1510EST			0	0	5K		Thunderstorm Wind
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Trees and power lines downed

Albemarle County Countywide	09	1600EST 1745EST			0	0			Flash Flood
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Flooding concentrated between Charlottesville and Afton Mountain

Greene County Countywide	09	1645EST 1800EST			0	0			Flash Flood
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National Weather Service

Storm Data and Unusual Weather Phenomena



September 1999

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VIRGINIA, North

Flooding along North Fork of Rivana River

**Nelson County
Countywide**

09	1700EST 1900EST				0	0	15K		Flash Flood
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Mudslide on Highway 29 near Route 617, water over roads in Lovingston and Faber, trees and power lines downed

**Madison County
Countywide**

09	1715EST 1730EST				0	0	10K		Thunderstorm Wind
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Trees downed

**Fairfax County
Mc Lean**

09	1720EST				0	0	0.50K		Thunderstorm Wind
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Tree downed

**Albemarle County
Free Union**

09	1730EST				0	0	2K		Thunderstorm Wind
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Trees downed

**Culpeper County
Culpeper**

09	1800EST 2000EST				0	0			Heavy Rain
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Streets flooded

**Loudoun County
Countywide**

09	1800EST 1830EST				0	0			Heavy Rain
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Streets flooded in Leesburg and Arcola

**Loudoun County
Arcola**

09	1810EST				0	0	2K		Thunderstorm Wind
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Trees downed along Route 621 and 659

**Rappahannock County
Sperryville**

09	1900EST 2000EST				0	0			Flash Flood
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Streets and creeks flooded

A round of thunderstorms producing damaging winds, hail, and very heavy rainfall moved across Northern Virginia between 2:30 PM and 9:00 PM EDT. The city of Waynesboro reported downed trees and power lines after winds between 50 and 60 MPH moved through. A quick 1.79 inches of rain flooded many roads including Kirby and A Streets, and sent small creeks out of their banks. Nelson County reported a long period of stormy weather. Pea to dime sized hail fell on Afton Mountain between 2:45 PM and 2:50 PM EDT. Heavy rains fell across the remainder of the county for the following two hours, flooding roadways and causing a mudslide that blocked Highway 29 near Route 617. Streets were flooded in Lovingston and Faber. A gauge at Rockfish recorded 1.77 inches of rain in 60 minutes, and another gauge 10 miles south of Schuyler reported a total of 2.44 inches. High winds also knocked down a number of trees and power lines across Nelson County. Albemarle County reported 227 power outages after high winds downed trees onto power lines in the Free Union area. Heavy rain also pounded the county, flooding roads between Charlottesville and Afton Mountain. In Greene County, the North Fork of the Rivana River swelled out of its banks. High winds across Madison County downed several trees between 6:15 PM and 6:30 PM EDT. The city of Madison received 2.59 inches of rain, and a gauge northwest of town on the edge of Shenandoah National Park reported 1.93 inches. In Culpeper County, several streets in the city of Culpeper flooded. The city of Sperryville in Rappahannock County also reported flooded roadways. Castleton reported 2.2 inches of rain and Massie's Corner reported 1.52 inches. Nearby in Front Royal, 2.38 inches fell. In Loudoun County, city streets were flooded in Leesburg and Arcola. Dulles International Airport received a total of 1.33 inches. The community of Arcola was also hit by 50 to 60 MPH winds which downed trees onto Route 621 and 659. Fairfax County also reported high winds which downed trees between McLean and the city of Fairfax.

**Fredericksburg (C)
Fredericksburg**

16	0800EST 1500EST				0	0			Flash Flood
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High water closed some roads

**King George County
Countywide**

16	0800EST 1500EST				0	0			Flash Flood
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High water closed numerous roads

**Spotsylvania County
Countywide**

16	0800EST 1500EST				0	0			Flash Flood
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National Weather Service

Storm Data and Unusual Weather Phenomena



September 1999

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VIRGINIA, North

High water closed some roads									
Stafford County									
Countywide	16	0800EST 1500EST			0	0			Flash Flood
High water closed some roads									
VAZ028-030>031-042-056	Frederick - Warren - Clarke - Loudoun - Spotsylvania								
	16	0800EST 2300EST			0	0	42K		High Wind
VAZ052>055-057	Prince William - Fairfax - Arlington - Stafford - King George								
	16	0800EST 2300EST			1	0	220K		Tropical Storm
F61UT									
Warren County									
East Portion	16	0800EST 1500EST			0	0			Heavy Rain
Rainfall in highest elevations between 3 and 4 inches									
Alexandria (C)									
Alexandria	16	1100EST 1500EST			0	0			Flash Flood
Arlington County									
Countywide	16	1100EST 1500EST			0	0			Flash Flood
Fairfax County									
Countywide	16	1100EST 1500EST			0	0			Flash Flood
7 major intersections and 20 secondary roads affected by flooding									
Fairfax (C)									
Fairfax	16	1100EST 1500EST			0	0			Flash Flood
Roads closed by high water									
Falls Church (C)									
Falls Church	16	1100EST 1500EST			0	0			Flash Flood
Manassas (C)									
Manassas	16	1100EST 1500EST			0	0			Flash Flood
Some secondary roads flooded									
Manassas Park (C)									
Manassas Park	16	1100EST 1500EST			0	0			Flash Flood
Some secondary roads flooded									
Prince William County									
Countywide	16	1100EST 1500EST			0	0			Flash Flood
Some secondary roads flooded									
Hurricane Floyd made landfall just east of Cape Fear, North Carolina in the early morning hours of the 16th and moved north-northeast across extreme southeast Virginia to near Ocean City, Maryland by evening on the 16th. Rainbands on the outer edge of the hurricane began to affect northern Virginia shortly after 8:00 AM EDT on the 15th and continued to cross the area through afternoon on the 16th. The eye of Hurricane Floyd passed east of the Chesapeake Bay between 9:00 AM and midnight on the 16th. Gusty winds of 30 to 50 MPH blew north and east of a line from Spotsylvania County to Frederick County between 11:00 AM and midnight on the 16th. Hundreds of trees were downed from the combination of very heavy rain and strong winds. A total of 2 to 5 inches of rain fell in this area and 16,000 power outages were reported. Rainfall reports of over 3 inches included 5.97 inches in Spotsylvania, 4.57 inches at Washington National Airport, 4.55 inches in Annandale, 4.03 inches in Fairfax Station, 3.55 inches in Reston, 3.38 inches in Herndon, 3.36 inches in Great Falls and Chester Gap, and 3.32 inches at Hogback Mountain. Peak wind gusts included 55 MPH at National Airport at 3:00 PM EDT, 45 MPH in Herndon at 4:01 PM EDT, 43 MPH in Manassas at 4:09 PM EDT, 41 MPH in Alexandria at 3:55 PM EDT, 40 MPH in Chantilly at 3:47 PM EDT, and 39 MPH at Dulles Airport at 3:43 PM EDT.									
In Spotsylvania County, several trees were downed and high water closed several roads in the eastern portion of the county. King George County and Stafford County reported numerous downed trees and several roads closed by high water. In Prince William County, 17 trees came down on roads and power lines, and two homes were slightly damaged by fallen trees. In the Montclair									



National Weather Service

Storm Data and Unusual Weather Phenomena



September 1999

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VIRGINIA, North

area, 1000 residents lost power. Some secondary roads were also flooded. A few trees were downed in the Manassas area. In Fairfax County, a 61 year old woman was killed when a tree fell onto her car and crushed it on Fair Lakes Drive. One business was destroyed by fallen trees and another in Falls Church was damaged. A 70 ft oak tree fell onto a home and tore a hole in the 2nd floor, shattering windows and tearing off rain gutters. The tree also damaged a detached garage and a swingset. The Mason Neck area saw several large trees downed, including a 100 ft poplar that put a hole through a bedroom of a two story home. Mt. Vernon and Vienna also reported several downed trees, including one which damaged a car. The county had to hire 16 tree trimming contractors to clear downed trees that blocked roadways. Flooding caused problems at 7 major intersections and on 20 secondary roads. Winds and rain combined to topple 130 trees in Arlington County and Alexandria. One tree damaged a home and 4500 power outages were reported. In Loudoun County, a handful of trees were downed and a road was blocked near Mt. Weather. Siding was also torn off the side of a few homes. Clarke County reported downed trees and power outages along the ridge at the Loudoun County border. Trees were also downed on the top of Blue Mountain in the southern portion of the county, knocking out power and phone service. In Warren County, a few trees and power lines were downed at higher elevations. In Winchester, a home was damaged by a fallen tree and a few customers lost power.

Augusta County Countywide

	29	1900EST 2100EST			0	0			Heavy Rain
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1.5 to 2.5 inches of rainfall in 2 hours

Nelson County Countywide

	29	1900EST 2245EST			0	0	40K		Flash Flood
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20 roads closed by high water, mudslide near Colleen along Route 29

Albemarle County Countywide

	29	1945EST 2340EST			0	0			Flash Flood
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Several roads and low water crossings flooded

Greene County Countywide

	29	1945EST 2340EST			0	0			Flash Flood
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20 roads closed by high water, motorist rescued on Route 605, up to 8 inches of rain in Gladstone area

Madison County Countywide

	29	1945EST 2340EST			0	0			Flash Flood
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Route 600 and 638 closed by high water, 6 inches of rain in Syria, streams near Old Rag Mountain out of their banks

Page County Countywide

	29	1945EST 2340EST			0	0			Flash Flood
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Roads and low water crossings flooded

Culpeper County Culpeper to Countywide

	29	2000EST 2300EST			0	0			Heavy Rain
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Nearly 4 inches of rainfall in 3 hours

Orange County Countywide

	29	2000EST 2300EST			0	0			Heavy Rain
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2 to 3 inches of rainfall in 3 hours

Clarke County Countywide

	29	2100EST 2345EST			0	0			Flash Flood
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Bridges across Opekin Creek closed by high water, Route 604 and 723 washed out

Warren County Countywide

	29	2100EST 2345EST			0	0			Flash Flood
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Dismal Road and lindon area flooded

Fauquier County Countywide

	29	2130EST 2330EST			0	0			Heavy Rain
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Over 2 inches of rain in 2 hours



National Weather Service

Storm Data and Unusual Weather Phenomena



September 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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VIRGINIA, North

Rappahannock County

Countywide	29	2145EST 2359EST			0	0			Flash Flood
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Hazel River out of its banks, Route 522 closed by high water

Fairfax County

Countywide	29	2200EST 2359EST			0	0			Heavy Rain
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Rainfall up to 3 inches in 3 hours

Manassas (C)

Manassas	29	2200EST 2359EST			0	0			Heavy Rain
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Several streets flooded

Rockingham County

Bridgewater to Elkton	29	2200EST 2215EST			0	0	8K		Thunderstorm Wind
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Power lines downed

Frederick County

Hayfield	29	2210EST			0	0			Thunderstorm Wind (G52)
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60 MPH wind gust, store roof damaged

Frederick County

North Portion	29	2210EST 2220EST			0	0	5K		Thunderstorm Wind
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Trees downed, metal canopy damaged along Route 50 east of Winchester

Clarke County

Countywide	29	2220EST 2240EST			0	0	10K		Thunderstorm Wind
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25 roads blocked by downed trees, 1 acre of trees flattened on Blue Ridge Mountain

Greene County

Countywide	29	2220EST 2230EST			0	0	2K		Thunderstorm Wind
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Trees and power lines downed

Winchester (C)

Winchester	29	2223EST			0	0	3K		Thunderstorm Wind
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Trees snapped and downed, 1 lane of Interstate 81 South blocked between Route 7 and Route 50

Warren County

5 NE Front Royal	29	2230EST			0	0	0.50K		Thunderstorm Wind
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Tree downed across Morgan's Ford Road (Route 624)

Loudoun County

Countywide	29	2250EST 2310EST			0	0	10K		Thunderstorm Wind
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Numerous trees downed

Fairfax County

Countywide	29	2310EST 2330EST			0	0	10K		Thunderstorm Wind
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Trees downed in Herndon, Fair Lakes, and Springfield; tree on home in Chantilly

Manassas (C)

Manassas	29	2315EST			0	0	2K		Thunderstorm Wind
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Trees downed

Fairfax (C)

Fairfax	29	2340EST			0	0	2K		Thunderstorm Wind
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Trees downed

Falls Church (C)

Falls Church	29	2340EST			0	0	2K		Thunderstorm Wind
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Trees downed



National Weather Service

Storm Data and Unusual Weather Phenomena



September 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

Alexandria (C)

Alexandria	29	2350EST			0	0	2K		Thunderstorm Wind
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Trees downed

Arlington County

Countywide	29	2350EST			0	0	2K		Thunderstorm Wind
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Trees downed

An area of intense showers moved across Northern Virginia from 7:00 PM on the 29th through 1:00 AM EDT on the 30th, producing winds in excess of 55 MPH and very heavy downpours. Flash flooding was reported in several counties, and high winds knocked numerous trees and power lines down. Rainfall totals from Nelson County included 5.52 inches at Lovingston, 4.87 inches at Devils Knob, 3.68 inches at Tye River, 3.22 inches at Afton Mountain, and 2.01 inches at Montebello. A mudslide closed Route 29 at Colleen. Routes 641, 634, 617, 722, 662, and 605 (River Road) were closed due to high water. Up to 20 roads were closed at one time across the county overnight, and schools were closed on the 30th because several roads were still impassable by morning. One family had to be evacuated from their home because surrounded by water and several homeowners reported flooded basements. Damages countywide were estimated around \$50,000. Albemarle County reported parts of Route 776, 667, 250W, Sharon Road, and dozens of other roads under water. The community of Free Union reported 4.37 inches of rainfall. In Augusta County, rainfall amounts included Waynesboro at 2.72 inches, Robinson Hollow at 2.62 inches, and Upper Sherando at 2.44 inches. Strong winds knocked down power lines in Rockingham County, sending 4000 residents into the dark. Lines were downed across Route 981 near Elkton, on Route 33 and Judy Lane near McGaheysville and on Mt. Crawford Avenue in Bridgewater. Greene County reported more than 20 roads covered by high water. One woman was rescued from her vehicle after she unknowingly drove into a flooded portion of Route 604 (South River Road) around 9:45 PM EDT. Standardsville reported 2.98 inches of rainfall. Trees and power lines were also downed across the county, leading to scattered power outages. Page County reported 4.68 inches of rainfall at Lewis Mountain Camp, 4.28 inches at Big Meadows, 2.75 inches at Ida, 2.36 inches at Rocky Branch, and 2.09 inches at Luray. Several low lying bridges and Longs Road were water covered after the deluge.

In Madison County, Route 600 and 638 were closed at Criglersville by high water. Streams near Old Rag Mountain overflowed. Rainfall reports included Fork Mountain at 4.56 inches, Syria at 4.45 inches, Hood at 4.20 inches, Madison at 4.1 inches, Robinson at 3.51 inches, and 3.00 inches along Route 29 at the Rapidan River. In Orange County, Somerset reported 3.05 inches of rain, and the city of Orange reported 2.25 inches. The city of Culpeper in Culpeper County reported 3.92 inches of rainfall. Rainfall amounts in Rappahannock County included 4.48 inches at Sperryville, 3.90 inches at Castleton, and 3.65 inches at Massie's Corner. The Hazel River went out of its banks by 10:15 PM EDT. High water closed Route 522 between Huntly and Chester Gap and portions of Route 729, 628, 622, and 626. Schools were closed on the 30th because several roads remained under water overnight. In Warren County, 4.64 inches of rain fell at Chester Gap, 4.56 inches fell at Manassas Gap, 4.52 inches fell at Limeton, 3.43 inches fell at Hogback Mountain, and 2.16 inches fell at Browntown. Dismal Road and the Linton area were flooded. High winds also downed a tree across Morgan's Ford Road (Route 624). Nearly 2.4 inches of rain fell at Warrenton in Fauquier County between 10:30 PM EDT on the 29th and 12:30 AM EDT on the 30th. The community of Opal received 2.37 inches and the The Plains recorded 2.40 inches. In Frederick County, winds gusted to 60 MPH at Hayfield. An old convenience store along Route 50 in the Hayfield area had sections of its roof ripped off and thrown into the parking lot. Trees and power lines were downed across the northern half of the county and the city of Winchester, resulting in power outages for 1400 customers. Fallen trees blocked 1 1/2 lanes of Interstate 81 southbound between Route 50 and Route 7. High winds blew a metal canopy off a building along Route 50 east of Winchester and brought trees down across the highway. Winds gusted to 47 MPH at the Winchester Airport at 11:23 PM EDT.

Clarke County reported wind damage and flooding. Trees and power lines were downed countywide blocking 25 roads, including Route 540, 955, and 1513. An acre of trees on Blue Ridge Mountain was flattened. Flash flood waters washed out a culvert on Route 723 and a bridge on Route 604. High water covered portions of Route 761 and 655 along Opequon Creek. Mt. Weather received 3.80 inches of rain. In Loudoun County, winds gusted to 53 MPH at Round Hill at 11:55 PM EDT and numerous trees were downed in the western portion of the county. Trees were also reported downed in Waterford, Lucketts, and Cascades. Rainfall amounts included Middleburg at 1.95 inches, Leesburg at 1.92 inches, Sterling at 1.69 inches, and Dulles International Airport at 1.56 inches. In the city of Manassas, several trees were downed and a quick 1.98 inches of rain flooded city streets. Liberia Avenue, Braddock Road, and Compton Road were temporarily covered with water. Water also covered Route 28 in southern Prince William County near the Fauquier County line. In Fairfax County, trees were downed in Herndon and the city of Fairfax. Other trees fell onto Interstate 66 at the Fairfax County Parkway and Interstate 95 at Route 644 in Springfield. Winds gusted to 54 MPH in Chantilly at 12:15 AM EDT and 50 MPH at Springfield. Rainfall amounts included Bull Run Mountain at 2.80 inches and Mt. Vernon at 1.6 inches. Washington Reagan National Airport received 1.59 inches and a wind gust of 45 MPH at 11:49 PM EDT. Scattered trees were downed in Falls Church, Alexandria, and Arlington. 3000 customers across Northern Virginia lost power as a direct result of the storm.

Culpeper County

Rapidan	30	0930EST			0	0			Flood
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Agricultural land flooded along Remington River near Rapidan



National Weather Service

Storm Data and Unusual Weather Phenomena



September 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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VIRGINIA, North

Fauquier County

Remington	30	0930EST 2359EST			0	0			Flood
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2 feet of water from Rappahannock River invaded southern portion of Remington. Heavy rains between 2 and 6 inches fell across the headwaters of the Rappahannock River basin on the 29th. This caused river levels to surge over flood stage on the Rapidan River near the community of Rapidan and on the Rappahannock River at Remington. The Rapidan River rose above the 14 feet flood stage around noon on the 30th and remained above 14.0 feet through 1:30 AM EDT on the 1st of October. The river crested at 17.51 feet around 7:30 PM EDT on the 30th. Agricultural lands near the community of Rapidan were flooded. The Rappahannock River rose above the 15.0 feet flood stage around 11:45 AM EDT on the 30th and remained above 15.0 feet through 8:15 AM EDT. The river crested at 19.14 feet around 10:30 PM EDT on the 30th. Between 2 and 3 feet of water flowed into the southern portion of Remington.

WEST VIRGINIA, East

WVZ048>055

Grant - Mineral - Hampshire - Morgan - Berkeley - Jefferson - Pendleton - Hardy									
		01			0	0			Drought
		30	0000EST 2359EST						

Rainfall from two tropical storms and a handful of low pressure systems made an impact in the drought that plagued the region since the summer of 1998. By the end of the month, conditions across the Eastern Panhandle were upgraded from an extreme to a moderate drought because rainfall was above average during September. Rainfall totals included 7.9 inches in Jefferson County, 6.6 inches in Hardy County, 6.4 inches in Pendleton County, 6.0 inches in Hampshire County, 5.9 inches in Morgan County, 4.3 inches in Grant County, and 3.8 inches in Mineral County.

Effects of the drought still lingered in the agricultural community. Across the state by the end of the month, 81% of topsoil was reported short or very short of moisture. 32% of apples, 67% of corn, 69% of hay, 77% of pasture land, 30% of soybeans, and 33% of tobacco crops were in poor or very poor condition. By month's end, 28% of farmers were still hauling water for livestock, and 25% of wells were dry or had an extremely low water reserve.

Grant County

Countywide	05	0200EST 0800EST			0	0			Flash Flood
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Tropical rains up to 4 inches

Hampshire County

Countywide	05	0200EST 0800EST			0	0			Heavy Rain
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Hardy County

Countywide	05	0200EST 0800EST			0	0			Heavy Rain
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Pendleton County

Countywide	05	0200EST 0800EST			0	0			Flash Flood
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Tropical rains up to 5 inches

The remnants of Hurricane Dennis moved across the Eastern Panhandle from the afternoon of the 4th through early on the 6th. Heavy rain fell across Hampshire, Hardy, Grant, and Pendleton Counties. The heaviest downpours occurred between 3:00 AM and 9:00 AM EDT on the 5th, when portions of Grant and Pendleton Counties received up to 5 inches. Storm total rainfall across Pendleton County included 7.32 inches at Sugar Grove, 5.52 inches at Shenandoah Mountain, 5.04 inches at Cow Knob, 4.60 inches at Franklin, and 3.79 inches at Spruce Knob. In Grant County, 5.63 inches fell at Red Creek, 4.53 inches fell at Mt. Storm, 3.60 inches fell at Pigeon Roost, 3.40 inches fell at Cave Mountain, 3.01 inches fell at Bayard, and 2.67 inches fell at Knobly. In Hardy County, rainfall totals included 3.67 inches at Wardensville, 3.03 inches at Mathias, 2.68 inches at Moorefield, 2.36 inches at South Branch Mountain, and 2.32 inches at Bald Knob. Romney in Hampshire County reported a total of 3.12 inches and Slate Lick Knob reported 1.80 inches.

Grant County

Mt Storm to Scherr	29	2030EST 2050EST			0	0	5K		Thunderstorm Wind
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Numerous trees and power lines downed

Jefferson County

Charles Town	29	2100EST 2300EST			0	0			Heavy Rain
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Over 2 inches in 2 hours

Hampshire County

High View	29	2150EST			0	0			Thunderstorm Wind (G52)
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National Weather Service

Storm Data and Unusual Weather Phenomena



September 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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WEST VIRGINIA, East

60 MPH wind gusts, trees and power lines downed

Jefferson County
Countywide

29	2240EST	2300EST	0	1	40K	Thunderstorm Wind
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Trees and power lines downed along Route 340 corridor from CharlesTown to Harpers Ferry; moderate structural damage in Ranson

An area of intense showers moved across the Eastern Panhandle from 9:30 PM to midnight, producing winds in excess of 55 MPH and very heavy downpours. In Grant County, numerous trees and power lines were downed from Mt. Storm to Scheer. Winds gusted to 60 MPH at Highview in Hampshire County, knocking down trees and power lines. Jefferson County was hardest hit. In Ranson, wind gusts estimated at 70 MPH blew a flat roof off an apartment building in the Park and 14th Avenue area, showering debris on a nearby trailer park. One person in the trailer park sustained a leg injury, and 6 others were evacuated after their homes were moderately damaged. Many trees and power lines were downed across the city. The storms also toppled trees and power lines along the Route 340 corridor from Charles Town to Harpers Ferry. The KOA campground in Harpers Ferry was littered with oak and spruce trees snapped 10 feet above the base. Power outages were widespread across the eastern half of the county. A total of 2.17 inches of rain fell in Charles Town. Highview in Hampshire County and Red Creek in Grant County reported just over an inch of rainfall.