



National Weather Service

Storm Data and Unusual Weather Phenomena



September 1996

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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DISTRICT OF COLUMBIA

DCZ001

District Of Columbia

06	1000EST 1300EST				0	0	15K		High Wind
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The remnants of Hurricane Fran produced intense rain bands accompanied by wind gusts in excess of 40 mph. These gusts, combined with the saturated soil, knocked down several trees and large limbs across upper Northwest Washington.

District Of Columbia

Downtown

06	1200EST 1800EST				0	0	50K		Flash Flood
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Feeder bands of torrential tropical rains associated with the remnants of Hurricane Fran produced localized flash flooding and widespread power outages in the metropolitan area. The heaviest rains fell from the city west, with totals ranging from 1.5 to 3.5 inches. Minor flash flooding occurred downtown, and Beach Drive was closed for the afternoon as Rock Creek overflowed its banks.

District Of Columbia

Downtown

06	1200EST 1830EST				0	0	75K		Storm Surge
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A storm surge of 5.1 feet associated with strong southeasterly flow ahead of the remnants of Hurricane Fran created moderate tidal flooding along Washington Harbor. Floodgates were raised farther north near the Kennedy Center, preventing damage to businesses in a portion of Foggy Bottom. Nonetheless, some areas in lower Georgetown and along the marina reported flooding.

DCZ001

District Of Columbia

07 10	2330EST 0045EST				0	0	150K		River Flooding
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If a coastal surge weren't enough, a river flood rivaling that of January 1996 struck the city from late on the 7th through early on the 10th, the result of heavy rains in excess of a foot in the upper reaches of the Potomac River basin while the remnants of Hurricane Fran moved through on the 6th.

As the crest moved downstream, major flooding increased downtown, peaking on the 8th and continuing into the 9th. Flooding on the 9th created havoc with the morning commute into town, as numerous thoroughfares were closed due to high water. Several buildings sustained minor damage as well. Included in the list of closed roads were those south of M street (Foggy Bottom/Georgetown), and portions of Constitution and Independence Avenues.

MARYLAND, Central

Anne Arundel County

Along The Chesapeake

06	1000EST 1700EST				0	0	1.4M		Storm Surge
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Baltimore County

Along The Chesapeake

06	1000EST 1700EST				0	0	250K		Storm Surge
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Calvert County

Along The Chesapeake

06	1000EST 1700EST				0	0	750K		Storm Surge
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Charles County

Along The Potomac

06	1000EST 1700EST				0	0	1.6M	5K	Storm Surge
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St. Mary'S County

Along The Chesapeake

06	1000EST 1700EST				0	0	100K		Storm Surge
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The track of Tropical Storm Fran from south-central through western Virginia allowed gusty southeast winds at and just above the surface to channel water up the Chesapeake Bay and its main tributaries. This became a small-scale storm surge, containing 6 foot waves and tides which ran in some places nearly 6 feet above normal.

Damage was fairly heavy along the immediate shore of the Chesapeake Bay and tidal Potomac River in Charles, St Mary's, Calvert, and Anne Arundel Counties. In Charles Co, property damage was estimated at \$1.6 million with Cobb Island suffering substantial losses. Approximately 75 homes were flooded; between 100 and 200 piers and bulkheads were damaged or destroyed. Affected Charles Co residents believed this to be a flood of memory rivaling that of Hurricane Hazel in 1954. Substantial damage was also noted at newly developed land along the shore in northern Calvert and southern Anne Arundel Counties (North Beach/Chesapeake Beach). In all, \$1.4 million in damage was incurred in Anne Arundel Co, including 83 homes, 7 commercial properties, and a total of 100 bulkheads and piers. Twenty homes were flooded along the northern Calvert Co shoreline. Farther north, in southeastern Baltimore Co, 100 people were evacuated in the Bowley's Quarter area.



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MARYLAND, Central

sand and mud also covered some streets, in some cases (such as Point-of-Rocks) higher than one level of residents and businesses. Needless to say, the river flooding produced several electric and telephone outages.

Please refer to the narrative on flash flooding for further information and damage estimate breakdowns.

St. Mary'S County

Patuxent River Nas	08	1435EST			0	0	15K		Thunderstorm Wind
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A 60 mph gust was reported at Patuxent River NAS. Nearby, several trees were knocked down, and a few windows were blown out, at area residences.

St. Mary'S County

Leonardtown	08	1515EST			0	0	3K		Thunderstorm Wind
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Several trees and/or large limbs were knocked down.

Harford County

Countywide	08	1715EST 1800EST			0	0	10K		Lightning
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Nearly 10,000 Baltimore Gas and Electric customers were without power during and after a strong thunderstorm moved through. The majority of outages were in Harford Co.

Harford County

Joppatowne	08	1740EST 1830EST			0	0	40K		Flash Flood
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Baltimore County

Se Portion	08	1755EST 1830EST			0	0	10K		Flash Flood
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Downpours associated with slow-moving thunderstorms dumped an estimated 6 inches of rain in less than 4 hours, causing substantial flash flooding along interstate 95 in southeastern Baltimore and Harford Counties. In Joppatowne, numerous vehicles were reported under water, with several streets closed. A large section of Joppa Farm road collapsed. Numerous roads were flooded across the line in Baltimore Co as well. Federal highway 40 (Pulaski Highway) was closed for 2 hours.

Prince George'S County

N Half	11	0805EST 1000EST			0	0			Flash Flood
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Montgomery County

S Portion	11	0815EST 0930EST			0	0			Flash Flood
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Anne Arundel County

Glen Burnie	11	0900EST 1015EST			0	0			Flash Flood
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A nearly stationary line of showers and thunderstorms dumped between 1.5 and 2.5 inches of rain over the northern and eastern suburbs of Washington, and the southern suburbs of Baltimore, during the morning rush. Localized flash flooding was common, bringing several creeks out of their banks and closing numerous roads. In southern Montgomery Co, Beach Drive was closed between Bethesda and Kensington, as was a portion of Rockville Pike. The Cabin John Creek overflowed its banks along Tuckerman Lane in Bethesda. In Laurel (Prince Georges Co), several roads were flooded.

Carroll County

Silver Run	28	1700EST 1701EST	0.5	75	0	0	75K		Tornado (F0)
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A brief gustnado touched down in northern Carroll Co, causing substantial damage to a barn, garage, and outbuilding, and blew out windows at an adjacent farm house. Several trees and limbs were also down, and power was knocked out to local residents. A neighbor witnessed the tornado, and ducked for cover as it approached. His property had debris strewn about - twisted "like pasta". A 20-foot piece of sheet metal was found on his property. Another neighbor reported smaller pieces of sheet metal on her property.

VIRGINIA, North

Madison County

Madison	04	0930EST 1100EST			0	0	10K		Flash Flood
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An isolated thunderstorm dumped between 4 and 5 inches on central Madison Co, bringing creeks out of their banks and closing a few roads.



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					Killed	Injured	Property	Crops	

VIRGINIA, North

Stafford County

6 SE Widewater to
4 SE Widewater

04	1520EST 1524EST				0	0			Waterspout
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An isolated low-topped thunderstorm produced a waterspout along the tidal Potomac River between Stafford and King George Counties, and west of Charles Co in Maryland. The waterspout was seen by two persons; one in the Widewater community in Stafford Co, and another at a marina in northwest King George Co. No damage was reported.

Greene County

Countywide

04	1800EST 2000EST				0	0	10K		Flash Flood
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Fairfax County

Tysons Corner to
Mc Lean

04	1830EST 2000EST				0	0			Flash Flood
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Madison County

Countywide

04	1830EST 2000EST				0	0	30K		Flash Flood
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Rappahannock County

Countywide

04	1830EST 2000EST				0	0	20K		Flash Flood
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Fauquier County

N Portion

04	1900EST 2030EST				0	0	30K		Flash Flood
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A line of stationary thunderstorms, containing copious amounts of rainfall, caused several streams and creeks to come out of their banks, closing several roads and a few highways during the late evening of the 4th. A daily rain total of over 7 inches was reported by a spotter in the town of Madison. An estimated 5 inches fell in portions of Rappahannock and northern Fauquier Counties during the evening, causing the majority of problems. Fauquier County was particularly hard hit; several major roads were closed, including state route 28 between Blue Ridge Christian Home road and federal highway 17.

Farther east, in Fairfax Co, the Difficult Run overflowed its banks along state route 7; minor flash flooding was reported a few miles to the east in McLean.

Nelson County

Countywide

06	0300EST 1200EST				0	0	1M	50K	Flash Flood
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Albemarle County

Countywide

06	0400EST 1300EST				0	0	120K	900K	Flash Flood
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Augusta County

Countywide

06	0400EST 1300EST				2	0	2M	500K	Flash Flood
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M18VE, M21VE

Highland County

Countywide

06	0500EST 1400EST				1	0	1M	50K	Flash Flood
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*** Narrative for flash floods associated with "Fran" follow the Loudoun Co entry, start time 1100EST *** F53OU

VAZ021-025-027>031-
036>042-050>054

Highland - Augusta - Shenandoah - Frederick - Page - Warren - Clarke - Nelson - Albemarle - Greene - Madison - Rappahannock - Fauquier - Loudoun - Orange - Culpeper - Prince William - Fairfax - Arlington

06	0500EST 1300EST				0	0	265K	7.5M	High Wind
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Gusty winds in excess of 40 mph, combined with soft soil from previous rainfall, caused scattered tree damage across much of the Virginia Piedmont and a small area of the coastal plain. At elevations above 2000 feet, sustained tropical-storm force winds with gusts as high as 79 mph pummelled the landscape, especially the east-facing slopes of Shenandoah National Forest and the George Washington National Forest. Thousands of mainly light wood trees (pines and maples) were snapped or uprooted. Along Skyline Drive alone, over 500 trees had to be cleared from the roadway before it could be reopened. Numerous trails had trees down; some trails remained closed more than one month after the event.

In the central Shenandoah Valley, an area closest to the storm track, widespread scattered tree damage was noted. In Albemarle Co, tens of trees were on roads, requiring a substantial clean-up effort from Virginia Department of Transportation crews. Two homes were deemed temporarily uninhabitable when trees fell on them sometime between 0500 and 0900EST. Immediately east of the Shenandoah Valley, in Culpeper Co, high winds blew a tree through a house; a metal roof at the Dominion Winery was sheared off, and several trees were reported blocking roads and/or knocked into power lines.



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VIRGINIA, North

Farther east, the damage was more scattered, but still requiring some tree removal. In Fairfax Co, a motorist died when his car slammed into a fallen tree. Tree damage was noted in Prince William, Stafford, and Spotsylvania Counties. In Dale City (Prince William Co), a residence had two large oak trees snapped in half and sustained gutter damage. Several trees were blown onto homes in Spotsylvania Co, and others were uprooted in Stafford Co. Other trees were knocked down in Arlington Co.

Virginia Power estimated 38,300 customers without power in northern Virginia mainly due to the high winds; however, there were likely more than 50,000 customers without power after accounting for rural electric cooperatives.

Greene County

Countywide	06	0600EST 1400EST			0	0	50K	30K	Flash Flood
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Orange County

Countywide	06	0600EST 1400EST			0	0	230K	350K	Flash Flood
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Rockingham County

Countywide	06	0600EST 1400EST			0	0	4M	2.5M	Flash Flood
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Culpeper County

Countywide	06	0700EST 1500EST			0	0	240K	200K	Flash Flood
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Madison County

Countywide	06	0700EST 1500EST			0	0	400K	700K	Flash Flood
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Page County

Countywide	06	0700EST 1500EST			0	0	500K	1.4M	Flash Flood
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*** Narrative for flash flooding from "Fran" follows the Loudoun Co entry, start time 1100EST ***

VAZ025>027-029>031-038>042-050>051-053>056

Augusta - Rockingham - Shenandoah - Page - Warren - Clarke - Greene - Madison - Rappahannock - Fauquier - Loudoun - Orange - Culpeper - Fairfax - Arlington - Stafford - Spotsylvania

06 10	0730EST 0130EST			0	0	78.7M	26.8M	River Flooding
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The rapid runoff produced by the heavy rains from Fran caused substantial, damaging, and in some cases record river flooding across much of the northern Virginia watershed from late on the 6th until early on the 10th.

Flash flooding on the 6th rapidly became river flooding late on the 6th along the headwaters of the Potomac, Shenandoah, and Rappahannock River basins, and continued throughout the basins over the weekend and into early the following week. Crests at gaging points in these basins were similar to those in January 1996 across the Lower Main Stem of the Potomac. Levels were 1 to 5 feet higher across the Upper Main Stem Potomac and Rappahannock Rivers. The Shenandoah Basin had levels similar to the October 1942 flood with three points reaching record levels (Lynnwood, Cootes Store, and Strasburg).

There were numerous road closures, rescues, evacuations, washed out and damaged bridges and culverts; the flood also produced major agricultural damage. Debris covered pasture and farmland, and filled small creeks and streams to levels higher than surrounding roads, which redirected the natural stream flow. River sand and mud covered streets and multiple levels of homes and businesses. Debris slides (landslides) were also noted in portions of the Upper Potomac river Basin. There were several electric and phone outages. Three deaths occurred in the northern half of Virginia - due to flash flooding (not river flooding).

Refer to the narrative on Flash Flooding for a more detailed breakdown of damage estimates.

Fauquier County

Countywide	06	0800EST 1600EST			0	0	20K	20K	Flash Flood
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Rappahannock County

Countywide	06	0800EST 1600EST			0	0	300K	20K	Flash Flood
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Shenandoah County

Countywide	06	0800EST 1600EST			0	0	1M	1.2M	Flash Flood
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Warren County

Countywide	06	0800EST 1600EST			0	0	6M	500K	Flash Flood
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VIRGINIA, North

*** Narrative follows Loudoun Co Flash Flood entry, 1100EST start time***

Arlington County									
Along Potomac River	06	0900EST 1700EST			0	0	500K		Storm Surge
Fairfax County									
Along Potomac River	06	0900EST 1700EST			0	0	250K		Storm Surge
King George County									
Along Potomac River	06	0900EST 1700EST			0	0	250K		Storm Surge
Prince William County									
Along Potomac River	06	0900EST 1700EST			0	0	500K		Storm Surge
Stafford County									
Along Potomac River	06	0900EST 1700EST			0	0	250K		Storm Surge

The track of Tropical Storm Fran from south-central through western Virginia allowed gusty southeast winds at and just above the surface to channel water up the Chesapeake Bay and its main tributaries. This became a small-scale storm surge, containing 6 foot waves and tides which ran in some places nearly 6 feet above normal. In Alexandria (Fairfax/Arlington Co), water rose to 5 feet deep in the Old Town district, flooding numerous shops, restaurants, and pubs. Fortunately, many shop owners had moved valuable merchandise to higher locations prior to the surge, minimizing property damage.

Farther south, the pounding waves and above normal tides caused damage to piers, marinas, and some residences in Prince William, Stafford, and King George Counties. Along the tidal Potomac River, a storm surge of at least 6 feet piled up water in the Occoquan Bay, eventually flooding numerous homes in Occoquan and Woodbridge. In Stafford Co, the surge caused substantial boat and pier damage near Aquia Creek, and a picnic area was flooded at Quantico. Major damage was also sustained in King George Co north of Colonial Beach.

Clarke County									
Countywide	06	1000EST 1800EST			0	0	400K	400K	Flash Flood
Frederick County									
Countywide	06	1000EST 1800EST			0	0	160K	250K	Flash Flood
Prince William County									
Nw Portion	06	1000EST 1800EST			0	0	170K	50K	Flash Flood
Fairfax County									
W Portion	06	1100EST 1800EST			0	0	100K	25K	Flash Flood
Loudoun County									
Countywide	06	1100EST 1800EST			0	0	240K	170K	Flash Flood

Tropical Storm Fran moved from near Danville around dawn on the 6th to Hot Springs by early afternoon. The storm weakened to a depression around this time, moving north of the state by mid-evening. Torrential rainfall associated with the storm poured onto saturated soil, causing widespread and in many cases catastrophic flooding across the entire western half of Virginia beginning during the pre-dawn hours, which continued until late afternoon.

The hardest hit areas were in the Shenandoah Valley, where maximum transport of tropical moisture was lifted over some of the highest terrain in the state to produce incredible rain totals. In some areas of the Shenandoah Valley, the flood's impact exceeded that of January 1996 and November 1985. Massive public and private property damage was sustained in Warren, Page, Shenandoah, Rockingham, and Augusta Counties. In general, storm total rainfall in these areas ranged from 5 to 8 inches at lower elevations, with 9 to 12 inches along the highest peaks of the Shenandoah National Park. Notable totals at high elevations included 15.61 inches and 14.30 inches at Big Meadows and Toms Branch in Shenandoah National Park.

The storm's heaviest rains fell in a six-hour period at any one location, but rainfall rates ranged from between 1 and 2 inches per hour to as high as 4 inches per hour along the higher terrain.

Three persons perished in northwest Virginia as a result of the flooding. In Highland Co, a woman drowned when she became trapped in an all-terrain vehicle while trying to cross a flooded creek. Two young males were swept away in Augusta Co north of Staunton when trying to cross a washed-out bridge along the Middle River. More than 100 persons were rescued from Fran's



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WEST VIRGINIA, East

WVZ048>055

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

**06 0700EST
1500EST 0 0 250K 500.1K High Wind**

The track of the remnants of Hurricane Fran brought high winds, gusting between 60 and 70 mph at elevations above 1500 feet, into eastern West Virginia during the morning and early afternoon of the 6th. Numerous trees were knocked down, mainly at higher elevations - although the damage was not as pronounced as that several ridges over in Virginia's Shenandoah Valley. In Harper's Ferry (WVZ053), channeling winds and a northeastern exposure caused numerous trees to fall. The gusty winds also tore a portion of roof from one home.

**Pendleton County
Countywide**

**06 0700EST
1600EST 1 0 1M 75K Flash Flood**
M20VE

**Grant County
Countywide**

**06 0900EST
1800EST 1 0 250K 25K Flash Flood**
M?VE

**Hardy County
Countywide**

**06 0900EST
1800EST 0 0 750K 120K Flash Flood**

**Hampshire County
Countywide**

**06 1000EST
2000EST 0 0 250K 150K Flash Flood**

*** Narrative follows Morgan Co Flash Flood entry, 1100EST start time***

WVZ048>050-054>055

Grant - Mineral - Hampshire - Pendleton - Hardy

**06 1015EST
08 0730EST 0 0 16.5M 950K River Flooding**

Incredible rainfall associated with the remnants of Hurricane Fran caused considerable and in some cases record flooding along rivers and tributaries in the Potomac basin. A thin band of 11 to 14 inches of rain falling along higher ridges ran off into the Upper South Fork of the South Branch Potomac River and the Lost River sub-basin. These rain amounts led to record river flooding along the South Fork, Lost River, and Trout Run sub-basins.

River flooding began simultaneously with the flash flooding in the Potomac Highlands. The flooding continued for nearly 48 hours before levels receded below flood stage. Crests were 1 to 5 feet above those of the January 1996 flood across the South Branch; crests were within 1 to 3 feet of January levels across the North Branch.

Damage was excessive, especially along the South Branch Potomac. A state-owned railroad system sustained numerous washouts and peripheral damage; the railroad, which tracks through Hardy, Hampshire, and Grant Cos (WVZ048-050-055) suffered \$2.5 million in damage.

In Hardy Co alone, 90 percent of the county roads were closed from washouts. Over 50 percent of the private culverts were completely washed out. Between 75 and 100 wells were damaged; nearly 1/4 of those remained unusable months later due to bacteria contamination. Agriculture and poultry farms, especially those in flood plains, were struck hard. Eight to ten thousand acres were inundated with an estimated \$200 thousand in damage to unharvested corn crops. Another \$200 thousand was estimated from lost or destroyed chickens. The \$5 million in reported property damage included \$3.5 million to 227 residences and \$1.5 million to public buildings.

Well after the flood, debris covered pasture and farmland, and filled creeks and streams enough to redirect normal flow. River sand and mud also covered streets and in some cases was above the ground floor of residences and businesses. Landslides were also noted in portions of the Upper Potomac basin. Electric and phone outages lasted several days, especially in isolated locations.

Please refer to the narrative on flash floods for a further breakdown of damages.

**Berkeley County
Countywide**

**06 1100EST
1900EST 0 0 150K 50K Flash Flood**

**Jefferson County
Countywide**

**06 1100EST
1900EST 0 0 100K 50K Flash Flood**

**Mineral County
Countywide**

**06 1100EST
1900EST 0 0 500K 50K Flash Flood**



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					Killed	Injured	Property	Crops	

WEST VIRGINIA, East

Morgan County
Countywide

06	1100EST 1900EST				0	0	250K	25K	Flash Flood
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The remnants of Hurricane Fran moved through eastern West Virginia during the late afternoon of the 6th, preceded by torrential rains which caused widespread and in some cases catastrophic flooding. Property and crop damage was most substantial in the Potomac Highlands where flooding was severe. Evacuations were required once again in portions of Hardy, Hampshire, and Pendleton Counties. Two persons died directly from the floods. In Grant Co, a man drove a tractor into flood waters and was swept away to his death. A young man drove an automobile into flood waters in Pendleton Co, and was swept away as well.

Property and crop damage was less severe in the Panhandle - a combination of lesser rain totals and fewer mountainous areas. Storm total rainfall ranged from 3 to 5 inches in the panhandle; 5 to 8 inches in the Potomac Highlands. However, a thin band of 11 to 14 inches fell at the highest elevations.

In the panhandle, approximately 600 acres of corn were lost to the flood. Some livestock were also lost. Though corn crop losses were extensive for the event, the effect of the loss only thinned out a bumper crop for the season.

See the River Flood section for further information.

Pendleton County
W Portion

09	1642EST 1715EST				0	0	5K		Flash Flood
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Several roads flooded in western Pendleton Co, a result of torrential thunderstorm rains on previously saturated soil.

Pendleton County
Upper Tract

12	1720EST				0	0			Hail (0.75)
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"Peanut M&M" sized hail was reported in Upper Tract.