

RICHMOND & VA FLOODS

May 27, 1771

THE WORST FLOOD RICHMOND HAS EVER HAD!

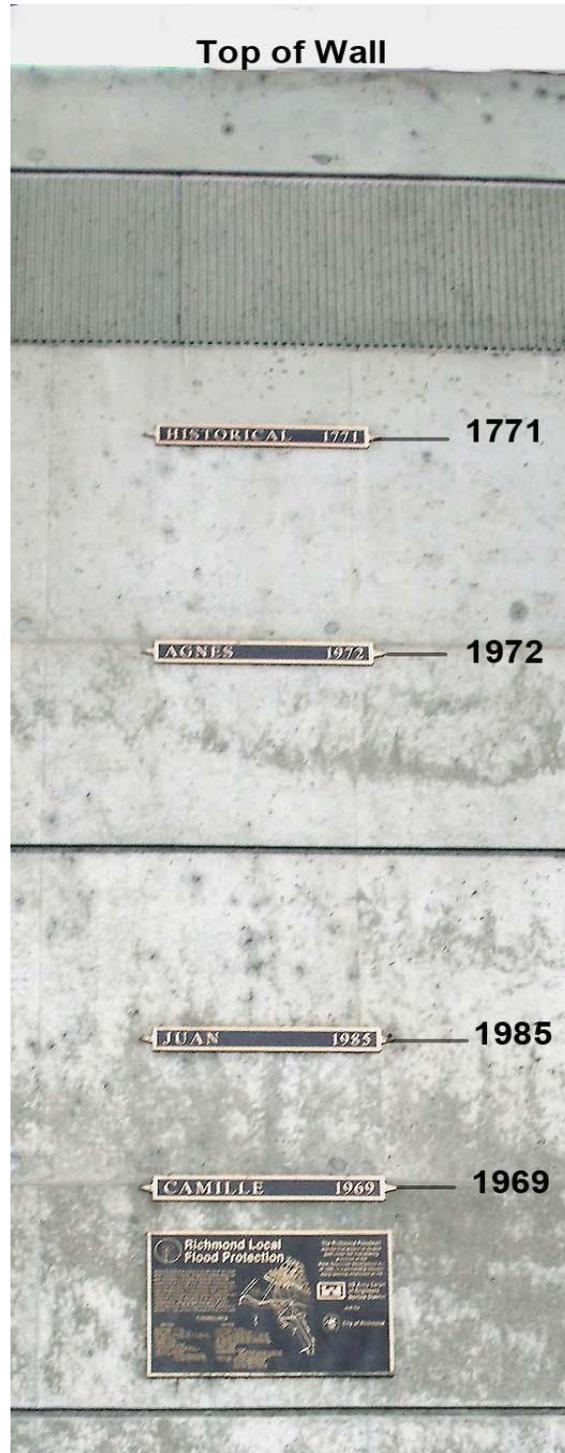


Image of Richmond's Flood Wall showing the Major Floods

Only a James River Flood as Richmond had VERY little rainfall but the Blue Ridge Mountains received Tremendous Rainfall over a 10 to 12 day period.

The Great Flood of May 27, 1771

A wall of water came roaring down the James River Valley following ten to twelve days of intensive rain in the mountains. As water swept through Richmond, buildings, boats, animals, and vegetation were lost. About one hundred fifty people were killed as the river reached a flood stage of forty-five feet above normal.

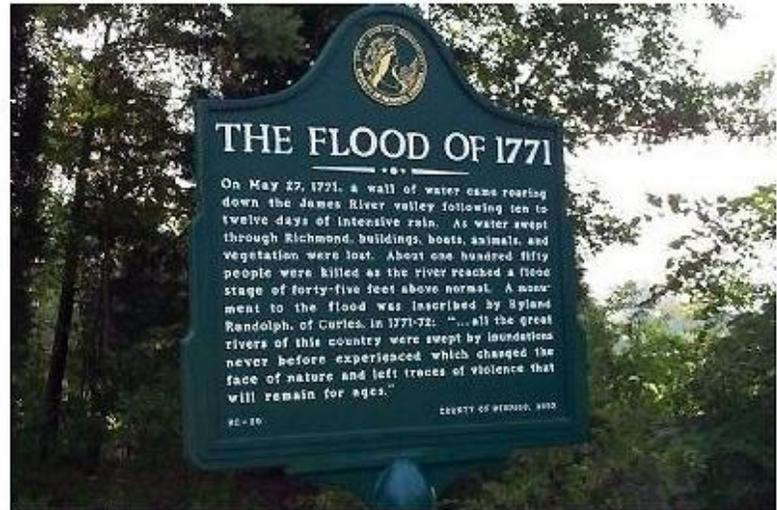


A monument to the flood was inscribed by Ryland Randolph, of Curles, in 1771-72: " ... all the great rivers of this country were swept by inundations never before experienced which changed the face of nature and left traces of violence that will remain for ages. "There is a recent publication that discusses the 1771 flood.

The book is entitled Historical Climate Variability and Impacts in North America and edited by Lesley-Ann Dupigny-Giroux and Gary J. Mock. **This book has a 26 page chapter about the 1771 Flood.** The chapter is entitled "The Great Flood of 1771: An Explanation of Natural Causes and Social Effects".

The Flood of 1771

Inscription. On May 27, 1771, a wall of water came roaring down the James River valley following ten to twelve days of intensive rain. As water swept through Richmond, buildings, boats, animals, and vegetation were lost. About one hundred fifty people were killed as the river reached a flood stage of forty-five feet above normal. A monument to the flood was inscribed by Ryland Randolph, of Curles, in 1771-72: "... all the great rivers of this country were swept by inundations never before experienced which changed the face of nature and left traces of violence that will remain for ages."



By Kathy Walker, August 3, 2007

1. The Flood of 1771 Marker

Erected 2003 by Henrico County. (Marker Number HC 20.)

Location. 37° 24.369' N, 77° 16.167' W. Marker is near Richmond, Virginia, in Henrico County. Marker is at the intersection of New Market Road (Virginia Route 5) and Curles Neck Road, on the right when traveling east on New Market Road. [Click for map.](#) Marker is in this post office area: Henrico VA 23231, United States of America.

(Reference Henrico Road Marker Number HC 20 also has information about the flood)

Contemporary accounts confirm that it was a great flood. A letter to the *Virginia Gazette* of May 30, 1771

There is now the greatest Fresh in James River even known, it being at least twenty Feet higher than that in May 1766. The Warehouses at Westham are entirely gone, with three Hundred Hogsheads of Tobacco. At Byrd's Warehouses, the Water is now Half Way up the Lower Tier of Hog heads; the other Warehouses of Shocko are almost under Water, and the Tobacco drifting away by thirty and forty Hog heads at a Time. It is imagined there might have been about three Thousand Hogsheads in the different Warehouses at Shocko. Almost every Lumber House is gone, and destroyed, on each Side of the River, many of them full of Good.

The *Virginia Gazette* Account Continues

Some People who left Richmond the same day, in the afternoon, say that the River was then rising at the rate of two Inches an hour, but we since learn, that it began to abate about sunset. All the low ground has been overflowed, by which inconceivable damage has been done. Every Thing was carried off to Farrar's Island, belonging to Colonel Thomas Mann Randolph, and at Elk Island, John Wayles, Esquire, is said to have suffered to the amount of four thousand pounds. Nothing being saved but the people and five horses...

The ships in the river were in most imminent danger, from the vast number of huge trees driving down the rapidity of the current, and many of them have sustained great damage. The ships at Shirley Hundred were driven from their Mooring over to City Point, and those at City Point down as low as Jordan's.

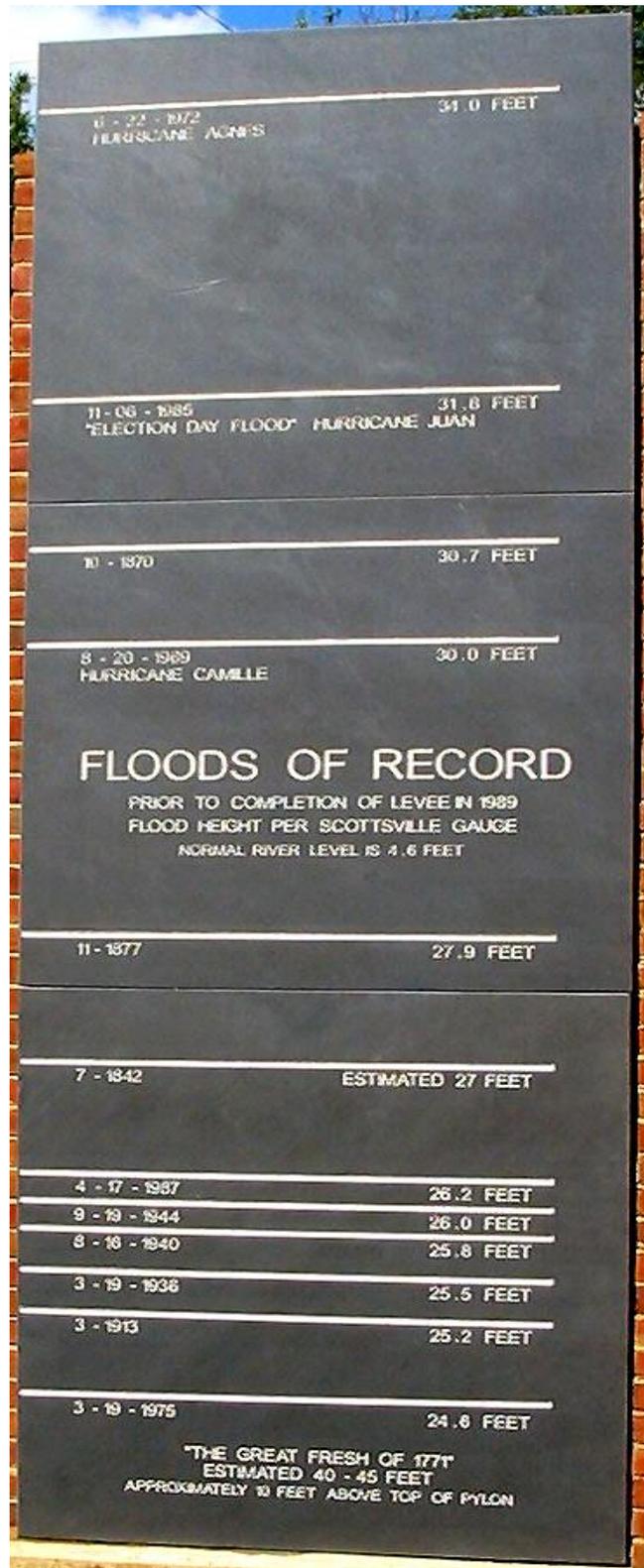
The estimate was a bit off, and the river was really rising on May 26 at a rate of 19 inches per hour. On June 6, 1771, John Howard of Botetourt wrote to Dr. William Cabell in Amherst: I received last night by my fellow Cato accounts of the dismal destruction made in James River by the late Fresh, in which I share very deeply, and I understand all my crop of tobacco that was growing is ruined as well as all that was in the tobacco houses about 6 hogsheads, together with all my tobacco houses except one, are swept away, and 13 hogsheads that were sent to the warehouse, or Westham, I suppose are gone, as I hear the water was over both places, my corn house with the corn swept away, & some of my stock, and it is owing to the great goodness of God that my people are all alive.

On August 1, 1771, Richard Bland wrote to Thomas Adams:

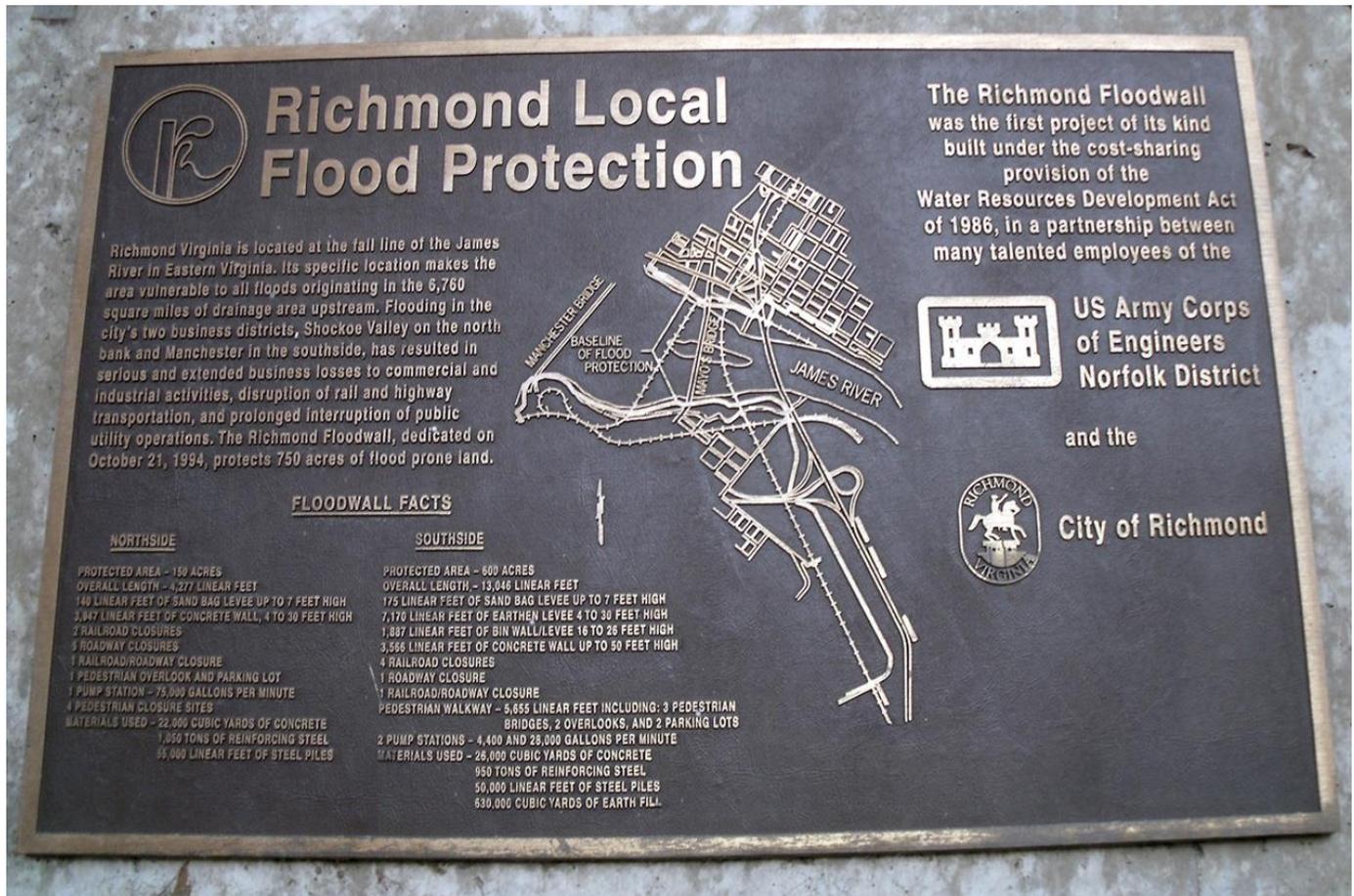
Upon the 27th of May a most dreadful inundation happened in James, Rappahannock and Roanoke Rivers occasioned by very heavy and incessant rains upon the mountains for ten or twelve days...promiscuous heaps of houses, trees, men, horses, cattle, sheep, hogs, merchandise, corn, tobacco & every other thing that was unfortunately within the dreadful sweep were seeing floating upon the waters, without a possibility of their being saved.

Obviously, the flood was devastating, and it prompted the assembly to issue 30,000 pounds in Treasurer Notes for the tobacco lost at public warehouses...

The worst flood of the period occurred in 1771 when the James River rose twenty feet higher than any previous flood crest and swept away three thousand hogsheads of tobacco. One historical study of this flooding records that "many trees driven by the rapidity of the current imperiled even the largest ships, driving them from their moorings and carrying several ashore . . . and drowning a number of mariners." Ship channels in the Chesapeake rivers were clogged with sand. Good soil from many plantations was carried off in the deluge. To historian Arthur Middleton, the reason for such flooding was clear: "a result of the rapid settlement and deforestation of the piedmont upcountry during the seventeenth century."³⁹



Scottsville is on the outside of a horseshoe bend in the James River and subject to the worst effects from flooding. Note the bottom of the plaque says -- **The great flood of 1771 would have been estimated to be 10 feet above the top of this flood pylon.**



Richmond Flood Wall Plaque

Frequently Asked Floodwall Questions -

Q. How many miles long is the floodwall?

A. North side of James is 4,277 feet long and protects 150 acres of Shockoe Valley. The south side is 13,046 feet long and protects 600 acres. The north side floodwall extends from 12th and Byrd St. to 21st and E. Cary St. The south side floodwall extends from Goodes St. west to just west of the Manchester Bridge

Q. What is the highest point of the floodwall? Where is it? What is the lowest point of the floodwall?

A. The north side wall is between 15 and 25 feet high with the lowest point under the I-95 James River Bridge in Shockoe Bottom. The tallest structure on the south side is the Gravity U-wall just west of the Mayo Bridge which is 43 feet from the top to the river's edge. This is the lowest point along the south side floodwall.

Q. What material is the floodwall made of?

A. Richmond's floodwall was completed in 1995. It's made of 22,000 cubic yards of concrete, 1,050 tons of reinforcing steel and 55,000 linear feet of steel piles.

Q. How many staff people work on the floodwall year round?

A. The current staff is 5. General duties of staff: Preventative maintenance and operation of the floodwalls, canals and Boshers Dam Fish Ladder, landscape maintenance in warm weather months and repairs as needed.

Q. How often is Richmond's floodwall tested?

A. Road Closures are tested once a year.

Q. When was the last time there was a flood in the city of Richmond?

A. The last significant floods occurred in 1996. The Blizzard of 1996 struck the Mid-Atlantic region in January, depositing a record amount of snowfall. Within two weeks of the paralyzing blizzard, a major rainstorm blanketed the area. The combination of warm, humid air and heavy rainfall melted the snow at an unprecedented rate. In a little more than a day, 2 to 5 inches of water from snowmelt combined with 2 to 5 inches of rainfall to create massive floods. The James River rose to 22 feet. Seven months later, rains from Hurricane Fran pushed the levels back up to 23.8 feet.

Q. How often are the pump stations checked?

A. The stations are checked daily and the pumps and related equipment are inspected and operated monthly.

Q. What grade did the last floodwall inspection receive?

A. The ratings are; Acceptable, Minimally Acceptable, and Unacceptable. The last inspection reports received gave the Minimally Acceptable rating which is standard.

Q. Is the Army Corps of Engineers the only certifying organization for the floodwall? If not, what are the others?



A. FEMA also requires the floodwall to meet certification for the Flood Insurance Rate Map (FIRM) for providing protection against the base. The City of Richmond received accreditation for the Local Flood Protection Project on March 19, 2010.

Posted by Richmond VA Department of Public Utilities at Friday, June 15, 2012 at 10:57 AM

1870

September

The Valley of Virginia Flood

The first settlers in the Shenandoah Valley of Virginia discovered a green canopy covering the territory. By the middle 1800s, however, woodland yielded to ax and plow. The Civil War brought additional devastation. At war's end, Union soldiers joked that even a crow would need to carry its own rations to survive a trip across the valley.

And the land wept. Soil depleted. Forests shorn. Where, now, were the trees and other vegetation to break the force of driving rain, to prevent runoff and erosion? Entire communities brazenly occupied old floodplains unaware of impending catastrophe.

On the night of September 29-30, 1870, rivers rose, reclaiming their own. A day of heavy rain culminated in an hours-long downpour resulting in unprecedented flooding.

A cold front crawling through the central Appalachians combined with a maritime flow. The result: up to 15 inches of rain in two days along the Blue Ridge—most fell within hours.

John Campbell of Lexington, Va., the local Smithsonian weather observer, reported. "At 3 p.m. (on September 28), the most remarkable rain that the oldest inhabitants have ever witnessed. It was light until about 9 p.m. After this, heavy showers fell until about 1 a.m. During the remainder of the night, the whole of the next day (29th), till about 12 at night, the rain fell in torrents. A fraction over 14 inches fell at Washington College (now Washington and Lee). At a point 7 miles from Lexington about 15 inches was measured..."

Campbell continued, "The river near Lexington (North Branch of the James River) was 20-feet and 6 inches above its ordinary height, and 12 feet above what is considered very high water."

Towns along the James River were ravaged. Landslides in the Blue Ridge buried many residents. **More than 100 people died in the Old Dominion.**

The Lynchburg News reported horrific conditions:

"The scene of desolation and destruction that met the eye when daylight Friday morning appeared was positively appalling and no words can give even a faint idea of the terrible sight which everywhere sickened the heart of the beholder. Houses overturned, boats swept away, the places where dwellings stood but a few hours before now vacant, with the waters boiling and surging around them; affrighted women and children gathered in tearful groups, with the few scanty articles of furniture and clothing around them they had been enabled to save from the fast rising waters—presented a scene which appalled the strongest heart, and drew tears from the eyes of many as they sadly gazed upon the mournful spectacle of desolation and destruction visible as far as the eye could reach."

The James River crested in Scottsville at 30.7 feet. (Flood stage 20 feet.), only exceeded by the legendary Great Freshet of 1771.

“The calamity of Scottsville is almost complete,” wrote a correspondent. “Where so recently was heard the merry laugh of merchants, is now heard the complaint, the wailing and cries of her sufferers. Where was seen so recently the busy bustle of her citizens, now reigns dejection, irresolution and a general conformity to the gloom and widespread ruin around.

“Many of her dwellings have been swept away, and her lumber houses, well-stored with flour, wheat and other produce have been inundated and their valuable contents ruined. Her foundry, workshops and mills are closed. Her merchants and laborers are bereft of the means of support and, thrown upon an impoverished public; the town is almost an impassable firm deposit of mud where the waters have receded.

“What is true of our town is true of almost every village on the river. But what are the loss of these compared with the destruction of the crops of corn, hay, tobacco, oats and barns of wheat and valuables all along the James River valley?

“Many millions of dollars cannot repair our damages. Great was the loss before the close of the war, but never before have we suffered such general impoverishment. We could scarcely before pay our taxes. —Now that this visitation is upon us, it is certain we cannot until harvesting of another crop. More than this we need, and must ask, for Government aid in order to redeem from want and suffering a poverty-stricken people. We are scourged exceedingly. Let us humiliate ourselves before Heaven and implore deliverance from the fearful misery which hangs over us.”

Devastation accompanied the Shenandoah River. Nearly every mill in the valley succumbed to the mighty rush of water.

Shenandoah City, the most populous town in Page County, was nearly washed off the map by the Shenandoah River. About 60 buildings were lost including a large ironworks complex. The bell atop its carpentry shop echoed through the night as the building sailed toward oblivion.

“Mein Gott!” declared a German workman. “It sounded like the death-knell of the world!”

Harpers Ferry, located at the confluence of the Shenandoah and Potomac rivers, was the site of a large government armory and Civil War combat but sustained far greater carnage from the flood. A marker in today’s historic district explains:

“Waterpower built this town and the power of the water eventually destroyed it.

“Many people who had left Harpers Ferry during the war did return, only to be driven away again—and this time permanently—by the devastating flood of 1870 and those that soon followed. Harpers Ferry never fully recovered.”

Virginus Island (pop. 100), a settlement in the shadow of Harpers Ferry, was destroyed. It boasted a saw mill, iron foundry, tannery, and machine shop. The roar of the Shenandoah River mingled with screams of those pleading for rescue. About 50 people drowned.

Residents caught in the calamity clung to uncertain refuge. Emily Child's house became sanctuary for the desperate. Her residence—one of the sturdiest in the neighborhood—survived. In a subsequent letter, she wrote:

“I snatch a few minutes to give you a few particulars of the disaster that has happened to us here. The valuable property belonging to the firm of which John (Emily's husband) is a member is a mass of ruins and we have barely escaped with our lives. We had no idea of the danger until it was too late to escape from the Island. Last Friday, towards evening, the water commenced rising rapidly. Before two hours every way of escape and all hope of rescue was cut off from us. So we were compelled to stay within the crumbling walls, which sheltered us from the terrible water that seethed and dashed around us. There were two bridges connecting the Island with the mainland, one wooden one near our house and the railroad bridge. So violent was the water that these were torn to fragments and carried away.

“As soon as we saw there was danger of the water coming into the house we commenced to tear up carpets and moved furniture upstairs but so hurried were we that we were compelled to leave some, and some were overlooked so though we saved the bulk of our furniture, still we lost many indispensable and some valuable articles. But our hearts are overflowing with gratitude that God has spared our lives, that our loss, though heavy, is, we hope, not impossible.”

The region, still recovering from the ravages of the Civil War, suffered a staggering setback. Thousands of families were utterly destitute. Newspapers and private organizations began a charity drive uniting North and South.

From the *Alexandria (Va.) Gazette*: “A committee of the citizens of Harper's Ferry and vicinity has made an appeal for aid in behalf of the sufferers by the flood at that place. Whilst assisting the people of Harper's Ferry, it should be remembered that throughout the Valley of Virginia there is much suffering, and that material aid alone will relieve those in want of the necessaries of life. Let all who can contribute.”

The New York Times: “... The Valley of Virginia is ravaged as cruelly as though fire and sword had once more visited it; along the James and Potomac, there is such distress as has not been since the dark days of the rebellion. A calamity like this should be the means of showing that we know no political differences in the presence of distress. The Quaker's formula of ‘How much do you sympathize with them?’ will suit the present case admirably, and before many days are over, ought to find a response from the wealth and commerce of this State such as will convince Virginia how truly we sympathize with her in this hour of deep misfortune.”

The Richmond Dispatch concluded: “Our old State is not quite washed away nor is it ruined yet. A year will go far to wipe out the losses and to make us all nearly forget them; save, perhaps, those who have lost dear ones by the relentless waters.”

September 28-30, 1870

The flood of September 28-30, 1870 was one of the earliest floods in the history of the Shenandoah Valley where written accounts are widely available. The flood event occurred throughout the central Valley from the north in Rockingham County and to the south in Rockbridge. The rain was first welcomed after a period of drought and a summer where rivers had been running below normal. As the rain continued, rivers rose to swirling torrents. The Shenandoah River with its expanded and rapid course carried houses, trees, and bridges in Rockingham County and northward. The Village of Port Republic was reportedly covered by 15 feet of water at one time during the event. An example of destruction caused by this flood could be seen in Harper's Ferry, West Virginia, and the confluence of the Shenandoah and Potomac rivers where 43 people died.

In Augusta and Rockbridge counties, extensive damage occurred. Some reports measured nine inches of rain with this storm. In Staunton, flooding along Lewis Creek caused damage to its downtown and washed away a railroad bridge. The C & O railroad was damaged including another bridge that washed away in Waynesboro. In Rockbridge

County, Lexington was particularly hard hit in The Point area where several houses were swept away. Also in Rockbridge County, farms, crops, and fences, were destroyed by the flood event. Throughout the Shenandoah Valley, communication lines and transportation routes were blocked.

With images of the Civil War still fresh in the minds of people, rebuilding from the flood of September 1870 became another challenge in the recovery they were already experiencing. "...some idea may be obtained of the immense destruction which has spread over many portions of our beloved old State, greater, by far, than the devastations of four years war. Our people however, have exhibited in the past a wonderful recuperative power.

They will not be downcast now, but will bow with humble resignation to the will of Heaven, and will still hope and strive for the best." – Staunton Vindicator, October 7, 1870 Richmond under water September 1870.

This flood isn't listed on the Richmond flood wall but Richmond was affected by this flood also as shown below in the picture.

1870 has been called the **Year of Disasters**. The worst flood in 100 years occurred. An overcrowding during a court hearing over Richmond's elections collapsed the third floor of the Virginia State Capitol, causing it to fall into the Hall of the House of Delegates, killing 60 and injuring 250. Robert E. Lee's death in Lexington where he headed what is now Washington and Lee University compounded grief, followed by the Spotswood Hotel fire, killing eight people. (Ref. Wikipedia 1865-1880: Reconstruction and City growth)



Richmond under water
September 1870
Richmond Times Dispatch

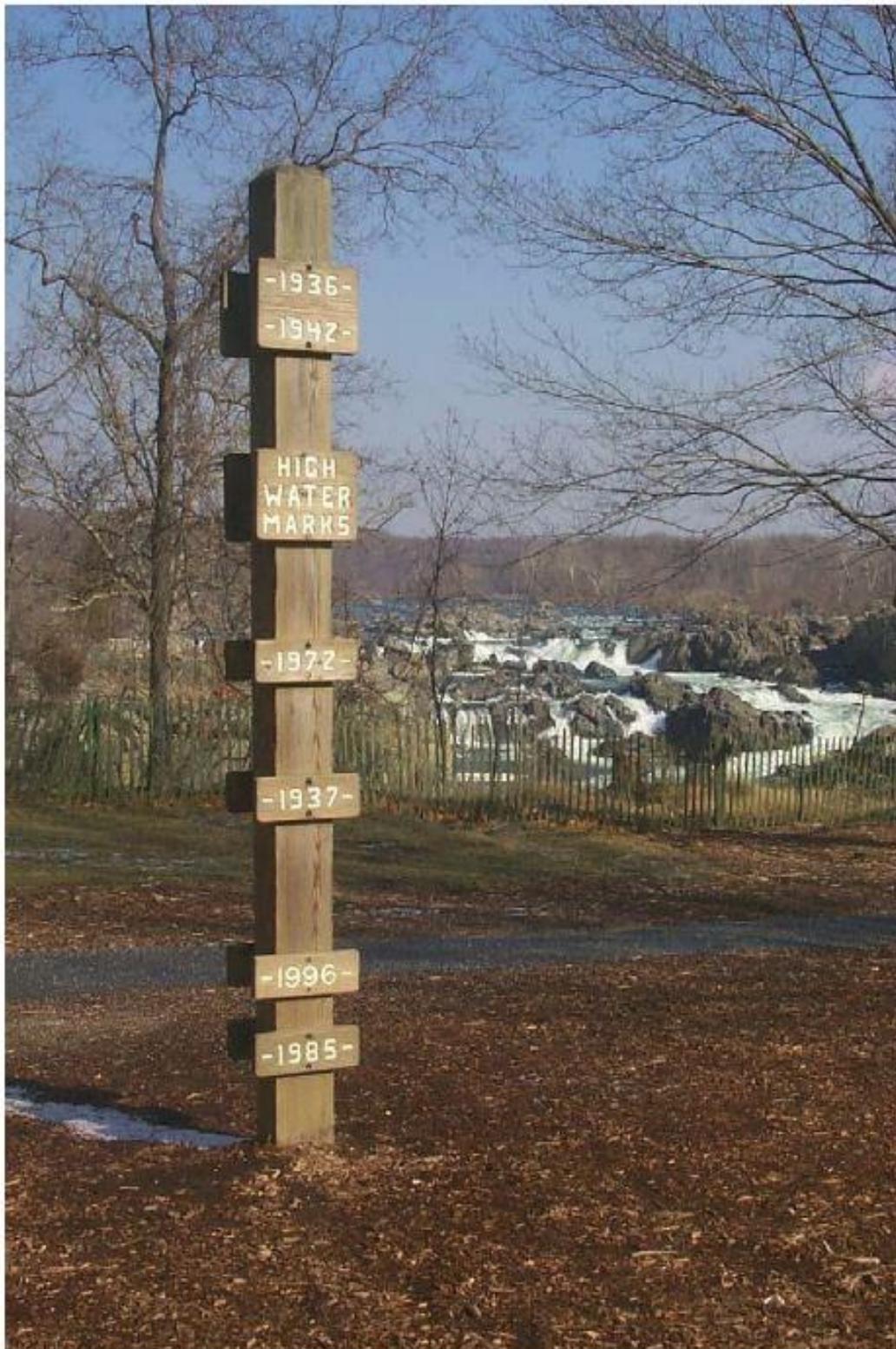
March 17-18, 1936

During the period March 9-22, successive storms crossed the eastern region of the U.S. with floods occurring from Virginia to Maine. A total of 150 to 200 lives were lost and damage was in the millions. In Virginia, the Potomac, Shenandoah, Rappahannock, James, and York Rivers flooded. Most large flood events in Virginia are associated with tropical systems. This flood was the largest non-tropical flood event. The winter of 1935-1936 was marked by long-continued periods of low temperatures and heavy snowfalls.

In December, it was estimated that areas in the northern Blue Ridge Mountains exceeded 40 inches of snow. Some snow melted during a mild January, but more fell in late January to mid-February. March began with warm temperatures and a thaw. The first rainstorm came in the second week with up to three inches falling. The rains melted the snow, adding an equivalent of one to two inches of rainfall. This caused the rivers to rise and set the stage for the next rain event.

The primary flood-producing rains came March 17 and 18 when a storm, drawing moisture from the Gulf of Mexico, tracked right across Virginia. It dumped an additional six inches of rain on top of the already saturated soil.

Richmond didn't get the heavy precipitation that other areas of Virginia received. On March 17, 1936 they reported only 0.60 inches and only a trace on the 18th and for March they only had 3.83 inches.



High Water Marks on the Potomac at Great Falls in Northern VA

The North Fork of the Shenandoah crested eight feet above flood stage in Rockingham County. At Front Royal, the Shenandoah flooded the city rising to 14 feet above flood stage. The Potomac River in Washington, D.C. rose nine feet above flood stage flooding portions of Arlington and Alexandria including the old airport (where the Pentagon is now located).

The fresh water inundation on the Lower Potomac and tributaries killed thousands of bushels of oysters and seedlings. In Culpeper, the Rapidan crested at over five feet above flood stage and in Fredericksburg, the Rappahannock flooded. The James River, at Richmond, reached 26.5 feet (18.5 feet above flood stage) causing serious flooding to the city's industrial and business sections.

Weather Summary October 1942

The remnants of the eight tropical storm of the year moved into the Mid-Atlantic on the 13th after making landfall as a tropical depression in the Carolinas. The slow moving remnants of the tropical system dumped a few inches of rainfall over the area until the system was swept out of the region by a cold front a few days later. The long duration of widespread heavy rain resulted in major flooding across much of Virginia and parts of the Virginias.

Torrential rains fell from October 12-16 in Northern Virginia causing the worst river flood in the history of the state. The hardest hit was the mid portion of the Rappahannock River and the Shenandoah River.

On the Rappahannock, damages came to \$2.5 million (1942 dollars) and most of that was in Fredericksburg, where the river rose to 41 feet (27 feet above flood stage).

On the Shenandoah River, a stage of almost 50 feet was reached at Riverton on the morning of the 16th. Flood stage is 22 feet and it broke the record set by the March 1936 flood by 12 feet! Flood losses on the Potomac River were \$4.5 million.

The Potomac at Washington reached 17.6 feet (flood stage is seven feet).

Areas of Alexandria and Arlington were seriously flooded.

Flooding was not quite as serious on the James River, yet the flood crest in Richmond reached 16 feet above flood stage. **Ten to 12 inches of rain fell from Fredericksburg to Warrenton. Seventeen inches were recorded in Front Royal.**

In Shenandoah National Park, along Skyline Drive, rainfall totals reached 18 to 19 inches!

To the south, Nelson County received 16 inches. The rainfall in Richmond was light in comparison with only 3.13 inches of rainfall between and including October 12th - 16th.

Another high rainfall total was 12 to 16 inches fell from near Paw Paw, West Virginia south along the mountains into Highland and Bath Counties of far western Virginia. Highways and bridges were washed away. Over 1,300 people were left homeless in Albemarle, Spotsylvania, Stafford and Warren Counties. Miraculously, only one person died.

Transportation was interrupted for three days. Severe damage occurred to Virginia crops: peanuts, cotton, sweet potatoes, soybeans, shocked corn and late hay. The heavy rains caused a million bushels of apples to drop before they were picked. From NWS Sterling, VA office.

Aug. 12-13, 1955, Hurricane Connie

Connie made landfall near Cape Lookout, N.C. on Aug. 12, then moved north up the Chesapeake Bay where 16 people died when a small boat capsized. Richmond recorded 8.85 inches of rain; Washington, D.C., 6.59 inches; and Norfolk 4.62 inches. Minor flooding was reported at Virginia Beach and Willoughby Spit areas. Total damages were \$1 million.

Richmond had 8.89 inches of rain on the 12th from Connie. Then a total of 3.39 inches on the 17 and 18th from Hurricane Diane this made a total of 12.18 inches in the two storms.

Hurricane Connie Track

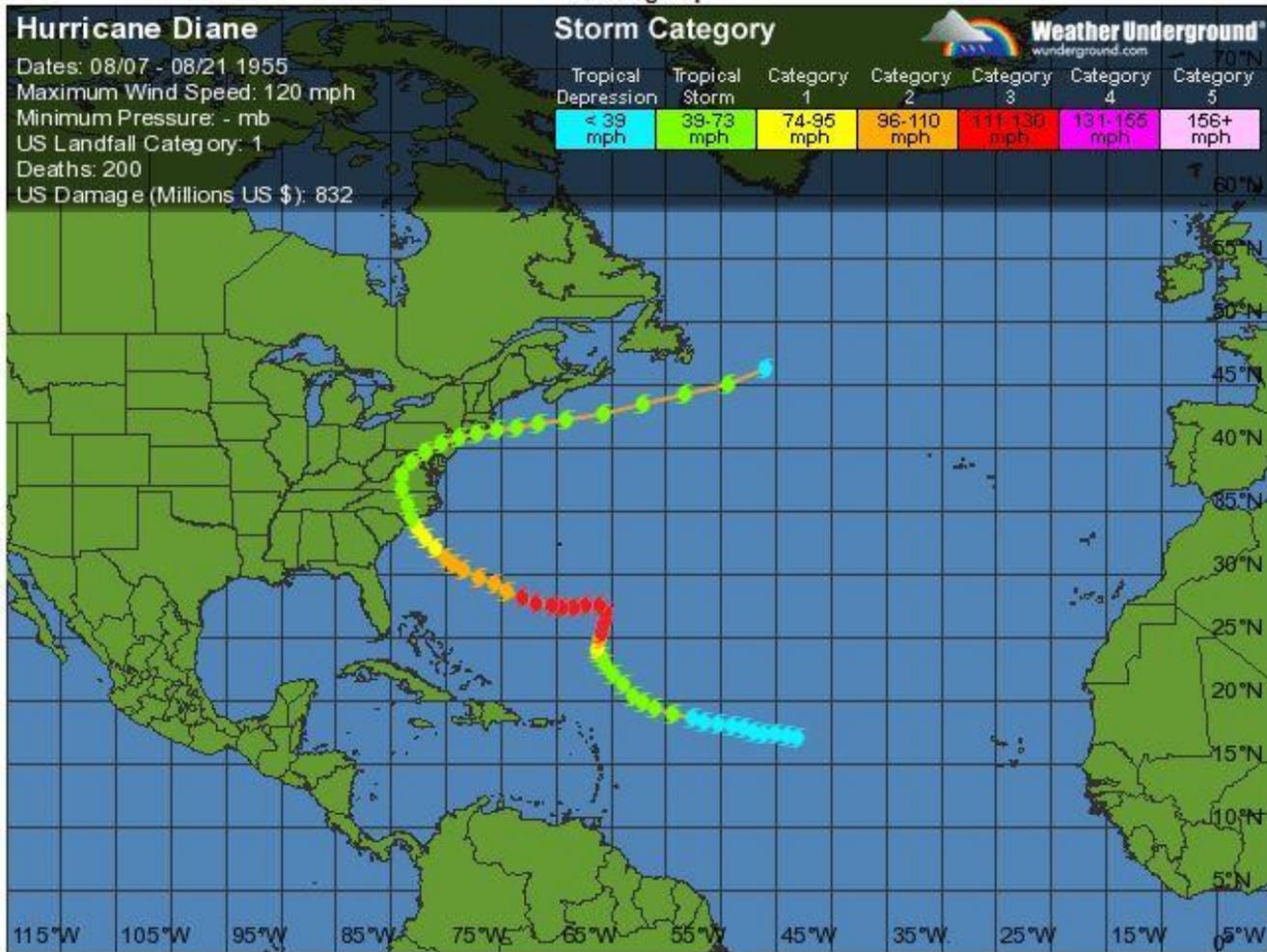


Aug. 17, 1955, Hurricane Diane

Just five days after Connie, Diane made landfall near Wilmington, N.C. as a Category 1 hurricane on Aug. 17 and moved north across central Virginia. As she did so, rain spread north up to 250 miles ahead of the storm's eye. On the evening of the 17th, the Blue Ridge Mountains saw rainfall amounts of five to 10 inches along the southern and eastern slopes. The Skyline Drive area was hardest hit. The combination of rain from Connie and Diane brought a record amount of rainfall for the month of August. Severe flooding followed on the Rappahannock River, with some flooding on the James, Potomac and Shenandoah rivers. Norfolk winds gusted to 53 mph. State wide damages totaled \$1.5 million.

Richmond had 8.89 inches of rain on the 12th from Connie. Then a total of 3.39 inches on the 17 and 18th from Hurricane Diane this made a total of 12.18 inches in the two storms.

Hurricane Diane Track

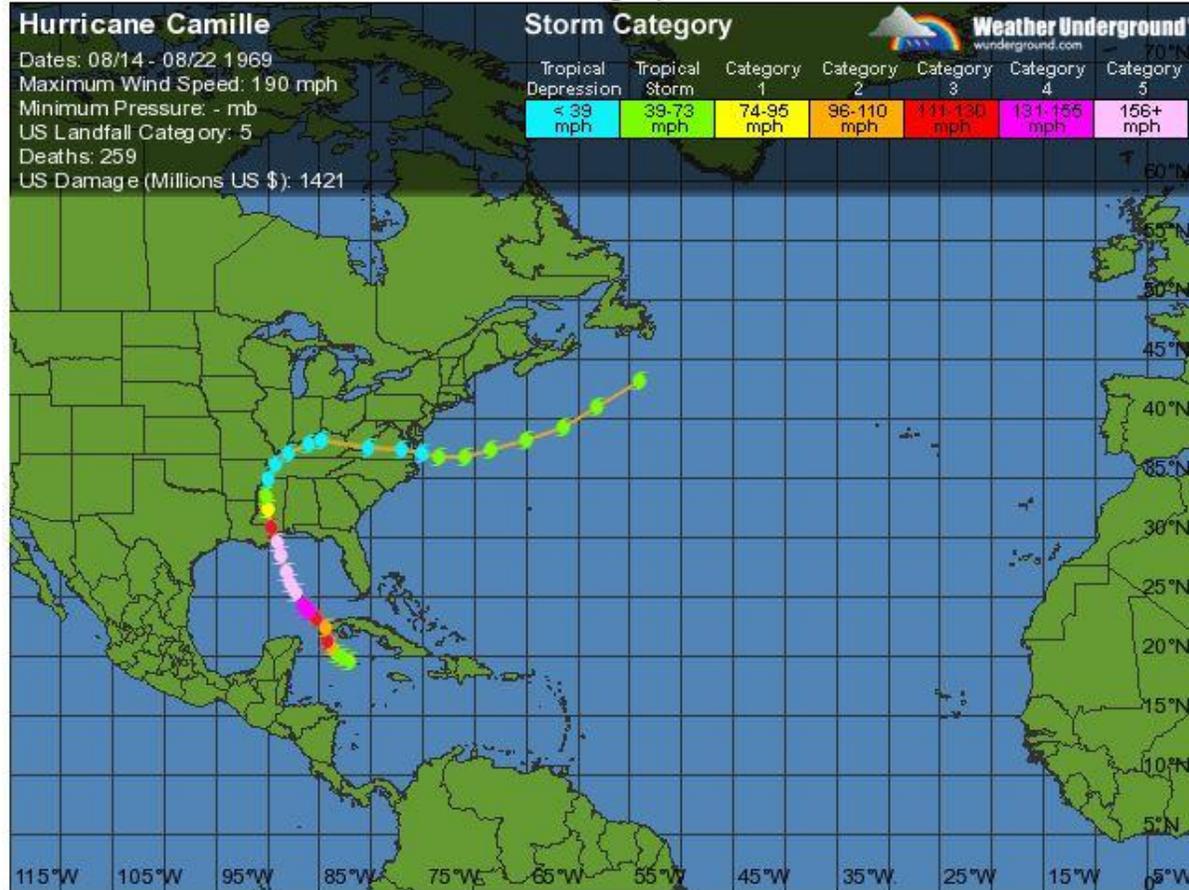


August 19-20, 1969 Hurricane Camille

This was the 4th Worst Flood for Richmond

Hurricane Camille made landfall on the Louisiana Coast and maintained hurricane strength for 150 miles up the Mississippi Valley. The storm turned east and headed for Virginia. It tapped into the warm moisture-rich air over the southern Gulf Stream and drew it northwest toward its center and toward the Virginia Mountains. Thunderstorms began to grow and it started raining. The storms formed a band with each thunderstorm following the one before it as they rose up the mountain slopes between Charlottesville and Lynchburg. An area 100 miles long and 25 miles wide received more than 10 inches of rain. Richmond had only 2.69 inches of rain on August 19th and 20th. In Nelson County, the storm total came to 27 inches and unofficial rain total was estimated at 31 inches! Rain from Camille produced the **worst flash flood** in Virginia's history. It was so devastating that **117 people died**, all communications were cut off to the outside world and damages came to over half a billion dollars.

The following stories were obtained from the *Charlottesville Daily Progress* and published in the *Southern Climate Review* in the Autumn 1989 addition:



Wayne Oliver, of Lovington, awoke around 3 a.m., heard some unusual noises, decided to get out of bed and have a look around. Eight inches of water were on the bedroom floor. "We'd been having some trouble with the water system and I thought maybe a pipe had burst, so I went to check it out. That's when the house started moving." The wife and two young children huddled on the bed while Wayne fought to open the water-swollen attic door and lift them above the rising water. "The bed was floating and it got higher and higher and you could feel the house moving. The boards were cracking and popping and first the floor came apart in the kitchen and then it came apart in the bedroom and then the bed hit the ceiling with me on it and the whole house came apart! It threw me into the water and carried me away and I couldn't hold them. I never saw them again.... I don't know how far I drifted. There were boards hitting me and I was groping for them but nothing would hold me up until I finally came up on a piece of the house. I think it was the living room." Mrs. Oliver was washed a mile from her home. Her husband wound up in a tree a half mile away. The children were never found.

A mother and child stayed in their home as it was torn from its foundation and floated over seven miles downstream. They were unharmed.

Dora Morris lived at the head of Davis Creek where its average depth is a few inches. In virtually continuous lightning, she estimated it had risen to a height of 50 feet. "The awful lest roar. It was a horrible sound. I suppose it was the landslides and the trees tumbling down the hollow, tearing at everything." She said it lasted four hours.

By 1 a.m., August 20, the amount of rain was enough to undermine the forest floor, and mudslides - soil, rock, boulders, trees, and some inhabited houses poured down the ravines. At some points, these slides were blocked and created temporary dams that impounded acres of water. Finally, the dams would give way sending torrents down the creeks into Tye, Piney, and Rockfish Rivers. For five miles down Davis Creek, logs were piled 30 feet high.

Curt Matthews smelled it coming. The scent of crushed pine pitch, amidst the roar of the mudslides, invisible in the storm, was what saved his life. At 1 a.m. "I had gone in to lie down for a while, and when I came back out on the porch, I smelled the unusual odor of bark and sap and green timber. I'm in the logging business and I know that smell, but I never in my life smelled it so heavy, even in a sawmill. The air was like sticking your head in a sack of bark. Finally, I couldn't stand it any longer and I went to wake up my wife and told her we had to get out. She didn't want to go and it took me 20 minutes to get her and the child ready. But in 20 minutes, the water rose from three to eight feet in my yard.... It must have been all these trees coming apart and washing down the hollow that I smelled. I guess I was one of the lucky ones." His home and land disappeared without a trace, but the family got out in time.

Samuel Johnson of Massies Mill was washed through the eaves of his two-story house at 3 a.m. He rode the water a half mile downstream and lodged in a tree. "The house went away like a paper bag bursting." He spent over six hours in the tree with "not a rag on my body...just the same as I came into the world." The other family members in the house did not survive the night.

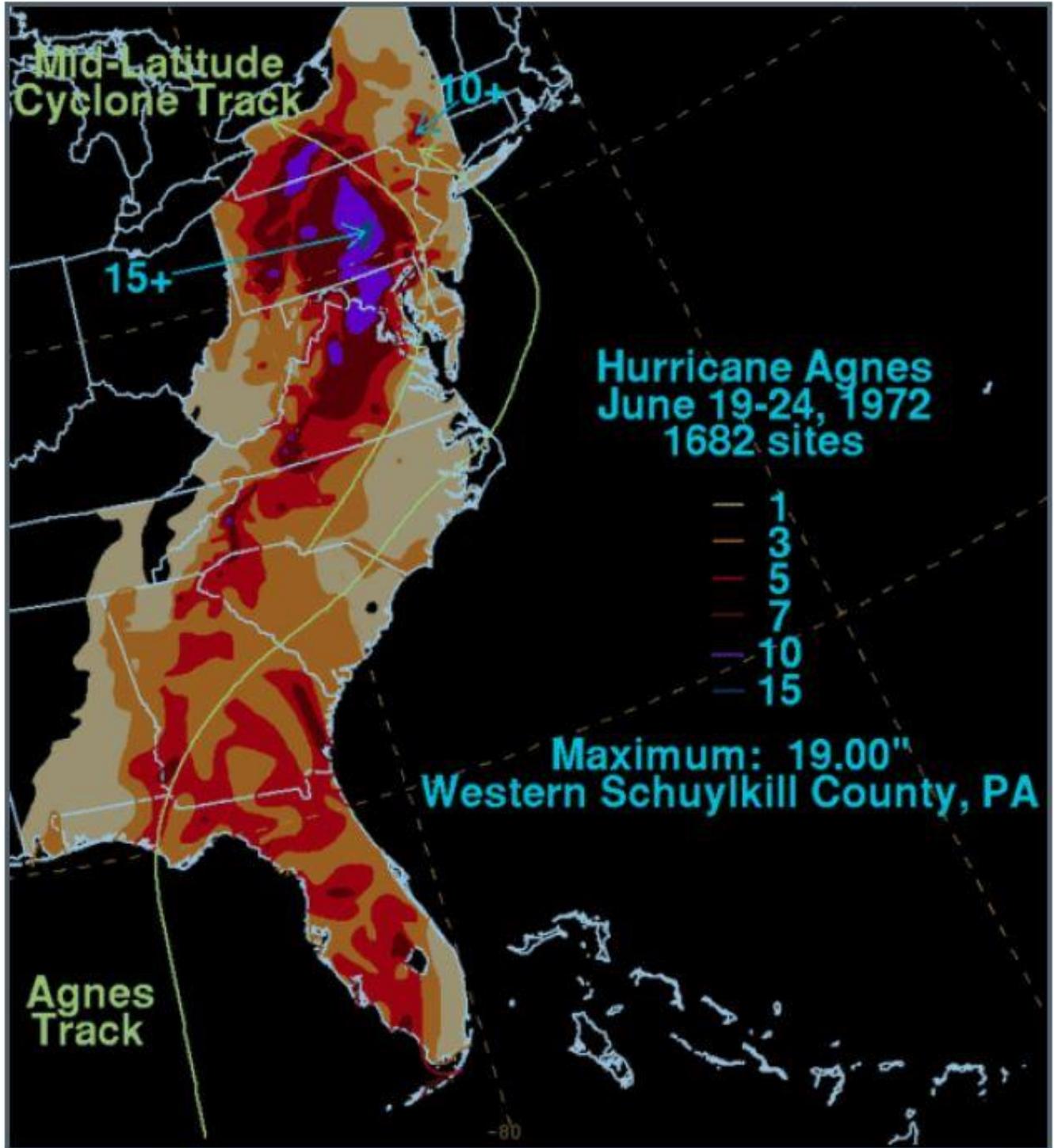
Mr. McQuary of Rockfish: "The first thing I heard was this water on my porch. I kept fussing with my wife, but she didn't want to leave her belongings. There was this rumbling...like thunder...and the ground trembling. As my wife stepped off the porch, the house began to go...rocks and water just squished it off...we managed to get away." Within a half hour, "the thundering came back and big rocks and trees came down.... All I saved is what I had on my back.

Hurricane Agnes 1972 June 19th-24th

Richmond's 2nd Worst Flood

The Richmond International Airport had only 6.92 inches of rain from June 19th to June 21st





Virginia

In Richmond, four people drowned after their car plunged into the swollen James River. A train bound for Washington D.C. stopped due to flooding in Richmond, which temporarily stranded 537 passengers. The Peak Creek in western Virginia overflowed its banks, flooding a low-income housing area of Pulaski, Virginia with water up to rooftops. At the height of the flooding, over 600 miles (970 km) of highways were submerged, resulting in \$14.8 million (1972 USD) in damage to roads in the state. Severe damage also occurred to sewer and water facilities,

totaling to \$34.5 million (1972 USD). 95 houses were destroyed and 4,393 others were damaged, while 125 mobile homes were destroyed and another were significantly affected. Additionally, 205 small businesses were either damaged or destroyed. Overall, flooding was described as "the worst in 50 years". In Virginia alone, 13 fatalities and \$125.9 million (1972 USD) in losses were reported.

Maryland

In Baltimore, three children drowned when their mother's car was swept off a highway. However, the mother survived, and was rescued by firemen using rowboats. In the state of Maryland, damage totaled to \$110 million (1972 USD) and 19 fatalities were reported.

As a result of Agnes' rains, Conowingo Dam, astride the Susquehanna River at the top of the Chesapeake Bay, recorded its all-time highest flow rate and stream heights. Before the river crested, the water came within feet of overtopping the dam. As the dam's normal flood control devices seemed unable to cope, engineers had placed charges to blow out a section of the dam to prevent a catastrophic failure.

Pennsylvania

In Pennsylvania, heavy rainfall was reported, with much of the state experiencing more than 7 inches (180 mm) of precipitation. Furthermore, a large swath of rainfall exceeding 10 inches (250 mm) was reported in the central part of the state. Overall, the rains peaked at 19 inches in the western portions of Schuylkill County. As a result, Agnes is listed as the wettest tropical cyclone on record for the state of Pennsylvania. Overall, more than 100,000 people were forced to leave their homes due to flooding. Some buildings were under 13 feet of water in Harrisburg. At the Governor's Mansion, the first floor was submerged by flood waters. Hundreds were trapped in their homes in Wilkes-Barre due to the overflowing Susquehanna River. At the historic cemetery in Forty Fort, 2,000 caskets were washed away, leaving body parts on porches, roofs, and in basements. In Luzerne County alone, 25,000 homes and businesses were either damaged or destroyed. Losses in that county totaled to \$1 billion (1972 USD). At Chadds Ford Township, the Brandywine Creek crested at 16.5 feet, sending flood waters into the city. Water poured into the first floor of an art museum in Chadds Ford Township, which threatened at least \$2.5 million (1972 USD) in N.C. Wyeth paintings, though they were quickly moved to the upper floors. Along the Allegheny River, it was above flood stage in some low-lying areas. During the height of the storm, the river was rising at about 7 inches per hour. In Reading, the Schuylkill River reached a record flood of 31.5 feet. Hundreds of people were evacuated and over a hundred homes destroyed. Floods reached as far inland as 3rd street in the heart of the city.

More than 100 Harrisburg YMCA campers and staff were evacuated using two CH-47 Chinook helicopters flown by the National Guard at Camp Shikellimy located downstream of DeHart Dam in Middle Paxton Township. Additionally, 36 Girl Scouts

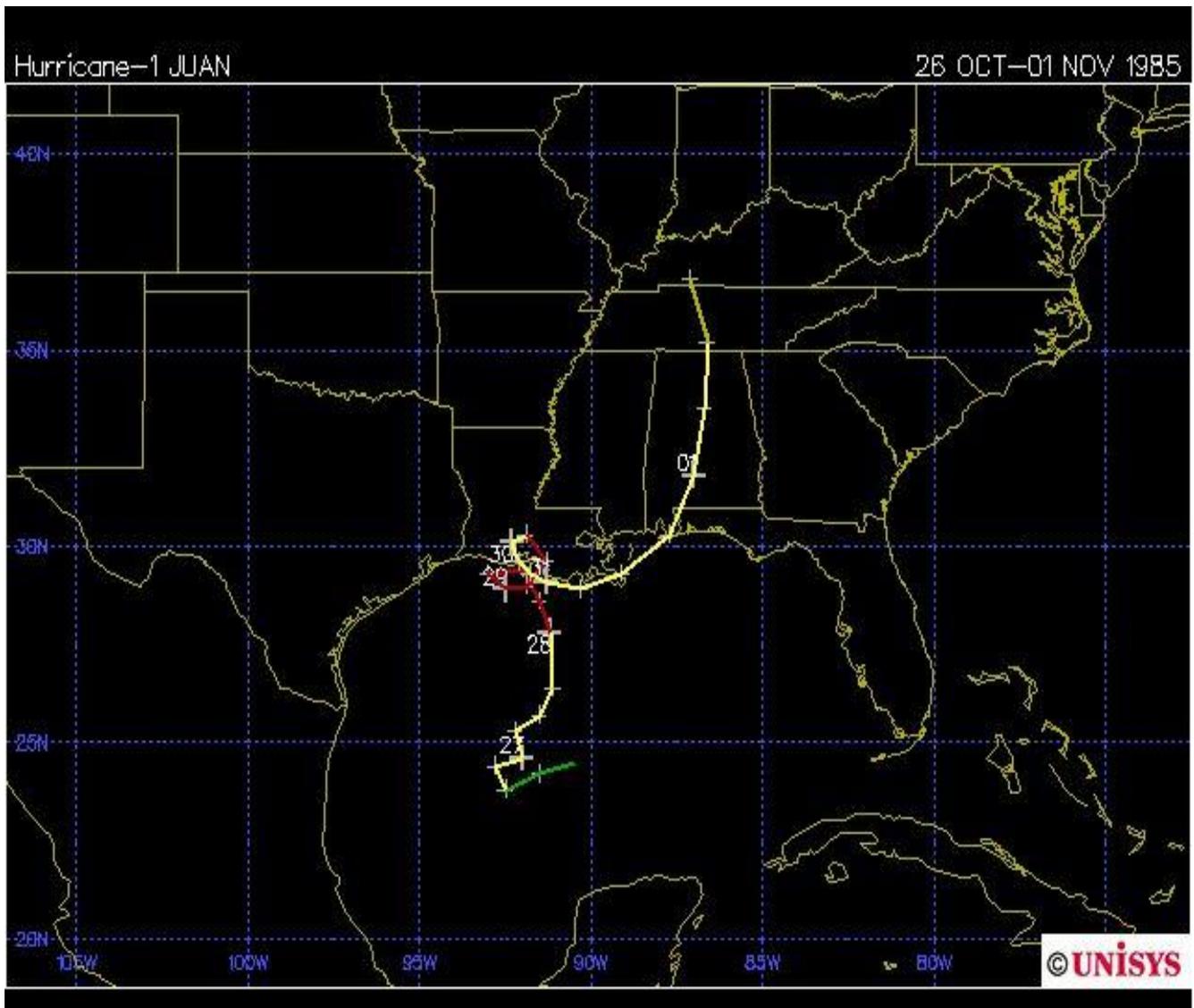
were rescued by state police while at a camp in York. A bridge collapsed in Danville, which caused two diesel locomotives and several freight cars to fall into a swollen creek. In the state of Pennsylvania, more than 68,000 homes and 3,000 businesses were destroyed. Due to the destroyed houses, at least 220,000 people were left homeless. The damage and death toll was the highest in Pennsylvania, with 50 fatalities and \$2.3 billion (1972 USD) in losses in that state alone.

Hurricane Juan from Oct. 26 to Nov. 3, 1985

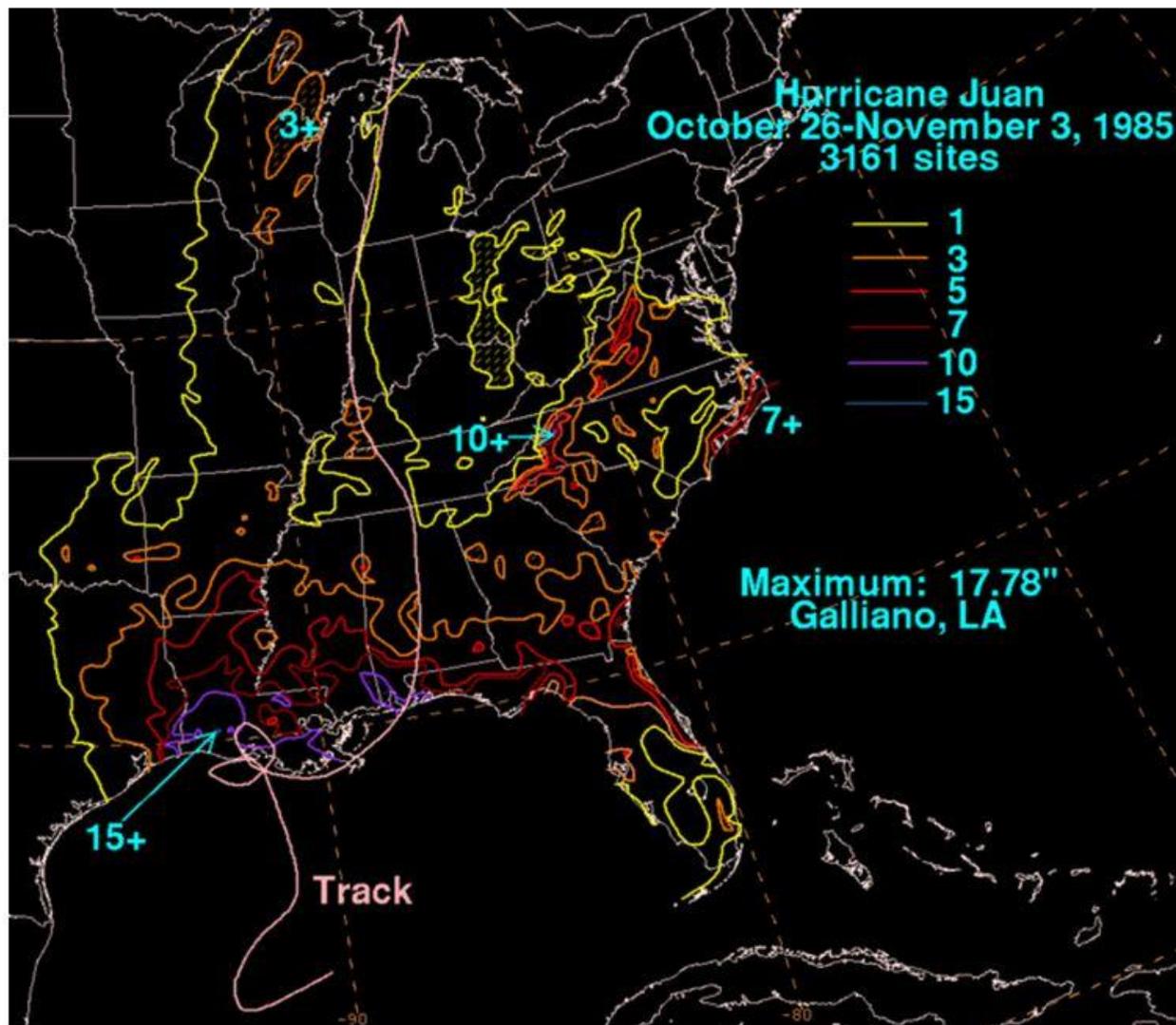
Richmond's 3rd Worst Flood

Richmond had only 1.64 inches

Rain from Oct 31st to Nov. 3rd



The remnants of Hurricane Juan Track into KY and then combinrd with another low pressure to give very heavy rain to WVA.



Appalachian Mountains

Though not directly related to the hurricane, Juan's tropical moisture combined with another low pressure system to drop large amounts of moisture across the Appalachian Mountains and the Mid-Atlantic. Many locations reported record amounts of rainfall from West Virginia, Virginia, Maryland, and Pennsylvania.

Flooding in West Virginia was the worst in the state's history. The worst hit areas were the Cheat River and South Branch Potomac River basins. The remnants of Juan caused 38 fatalities and \$578 million from the flooding.

Flash flooding on November 4 and 5 resulted in overflown rivers across much of Virginia, including the Roanoke River which rose 23 feet above its banks. The flooding resulted in 12 casualties in Virginia, with \$800 million in damage (1985 USD).

The Flood of November 1985 will be remembered in Virginia for its flash flooding. Flooding was caused when a slow-moving low pressure system, possibly containing remnants of Hurricane Juan, moved northeasterly through West Virginia and Virginia dumping torrential rains over a four-day period. Known as the "Election Day Flood" because it occurred during election day, the storm caused 22 deaths. Damages across the state reached nearly eight hundred million (1985 dollars). This flood was the worst flood for the City of Roanoke, where the Roanoke River rose seven feet in one hour and eighteen feet in six hours.

Areas all across the Central Shenandoah Region were affected by the flooding. In Rockingham County, the western part of the County was hardest hit. A railroad bridge built in 1896 was washed out in Elkton. The Town of Bridgewater experienced limited damage because of a levy built after the disastrous flood of 1949. Bridgewater did receive damage to roads, their hydroelectric plant, and the athletic field at Bridgewater College. In Highland County, at least 50 homes and 300 farms received damages from the flooding. In Highland County, road damage was estimated at a little over two million dollars (1985 dollars). In Bath County, bridges were washed out, and property damage was estimated in the thousands of dollars (1985 dollars).

Communities in Augusta County were inundated by floodwater. The swollen Middle River damaged homes, property, and roads in areas like Frank's Mill, Fort Defiance, and Verona. Buffalo Creek washed away bridges and roads in the Buffalo Gap area. Damages to roads in Augusta County were estimated at eight million dollars (1985 dollars) and homes, businesses, and public facilities at seven million dollars (1985 dollars). The rains had minimal affects on the City of Staunton except for the water treatment plant that was damaged and the evacuation of residents of the Beverly Hotel where the flooded basement caused concerns. The City of Waynesboro, on the other hand, experienced significant damages. Waynesboro's South River created record flood levels and caused damages to 140 homes, 32 mobile homes, and 41 businesses. The City's sewage treatment plant was also severely damaged. Damage estimated for the City of Waynesboro directly after the flood exceeded three million dollars (1985 dollars).

In Rockbridge County, Goshen, Glasgow, and Buena Vista were the areas most affected by the flooding. Goshen experienced the heaviest damage due to the swiftness of the floodwaters. Damages in Buena Vista and Glasgow equaled or surpassed what they had experienced during Hurricane Camille in 1969. In Buena Vista, three to six feet of water flooded homes and businesses. In Glasgow, almost half of the homes and two-thirds of the businesses were hit by floodwaters. In Lexington, the waste water treatment plant was covered by the waters of the Maury River. Damages in Rockbridge County were estimated at one hundred million dollars (1985 dollars), well exceeding the cost of Hurricane Camille. In the 1985 Flood, 584 homes and 32 businesses were damaged in Rockbridge County.

The November 1985 Flood reached its watery fingers throughout the Central Shenandoah Region, grasping homes, public facilities, and businesses. The three-

day period of sustained rains caused flash flooding all over the Region. It is no doubt that the Election Day Flood created one of the lowest poll turnouts in history.

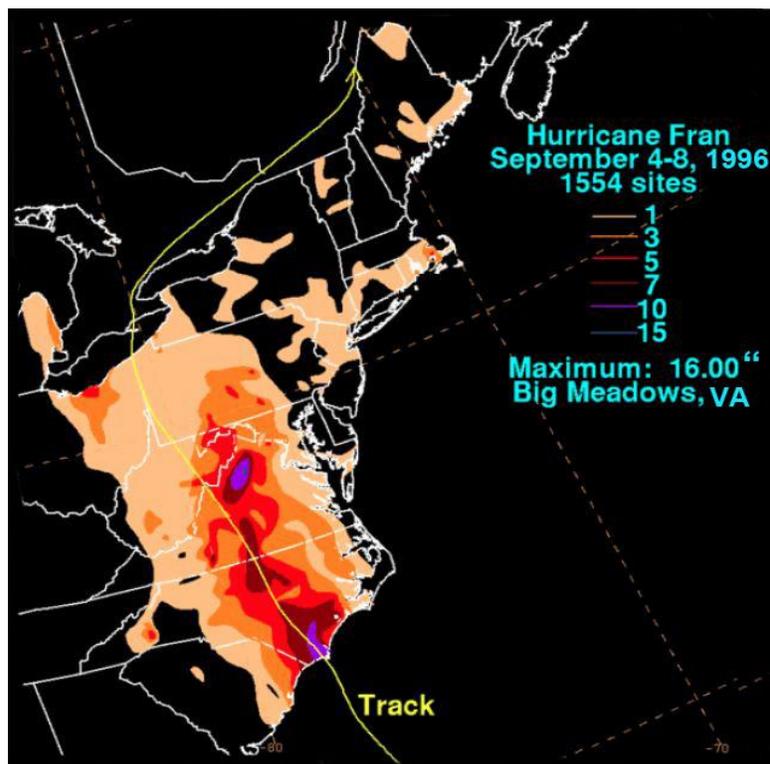
The Madison County Flood - June 27, 1995

The Madison County Flood on June 27, 1995 was the worst flash flood that Virginia had seen since the remnants of Camille dropped up to 30 inches of rain one night in Nelson County in August 1969. The Nelson County flood ranks as one of the nation's worst flash floods of this century. The floods and landslides led to the death of 117 people. The Madison County event was chosen because it is closer to the Baltimore-Washington region. Only one person died versus over 100 in Nelson County is attributed to three significant factors. 1) It was well forecasted. Flash Flood Warnings did not even exist in 1969. The National Weather Service in Sterling contacted the State Emergency Operations Center early that morning informing them that a significant flood was likely. 2) Early response and heroic actions by emergency responders made a big difference. Early warning by NWS to the state allowed them to call in resources before the flooding began to threaten lives. One Coast Guard helicopter came all the way from Elizabeth City, NC. As conditions worsened through the day, the operators of the helicopters risks their lives flying in low visibility into mountain valleys to pluck people from roof-tops and carry them to safe shelter. **Some 80 people were rescued!**

In 1969, there was little preparation for disasters and response to such situations took time to organize and gear up. Time delay cost lives. State and local emergency management has evolved greatly since 1969 and they are far more prepared to deal with such disasters before they even start. 3) The Madison County flood occurred in daylight when people could see rising water and attempt to move to safety and emergency responders could see people on roof tops and pluck them off. In Nelson County, people were asleep and awoke as their houses floated off their foundations. This event was VERY localized and the Richmond International Airport had only 0.39 inches rain on Jun. 26th and Jun.27th of 1995.

The weather that set up the flood included a semi-tropical air mass over the region; an upper level low over the Mississippi Valley which sent impulses/disturbances to the northeast across the area helping to trigger thunderstorms; slow moving cold front sliding south along the front range of the Appalachians and over the coastal plain which helped to focus where the thunderstorms were occurring; and the high pressure to the north which set up a westward flow of moist air from the oceans into the mountains. The mountains helped to lift the air where it condensed into clouds and rain. The focus for thunderstorm development on June 27 was the intersection of the weak cold front which stalled across the area and the upslope (east side) of the Blue Ridge mountains. A large thunderstorm complex developed early that day over Rappahannock County and slowly moved south over Madison County becoming nearly stationary over the southwest corner where it dumped 20 or more inches of rain in a relatively short period of time.

Hurricane Fran September 4-8, 1996



Virginia

In Virginia, winds between 39 and 73 mph lashed Chesapeake Bay and increased water levels in the Potomac River around the nation's capital, where it backed up into Georgetown and Old Town Alexandria, Virginia. There was severe damage to power lines that left 415,000 people without electricity, making it the largest storm related power outage in history until Hurricane Isabel in 2003. Along the Rappahannock River, a storm surge of 5 feet damaged or sank several small boats and damaged wharfs and bulkheads. This was the highest tide in the state since Hurricane Hazel of 1954.

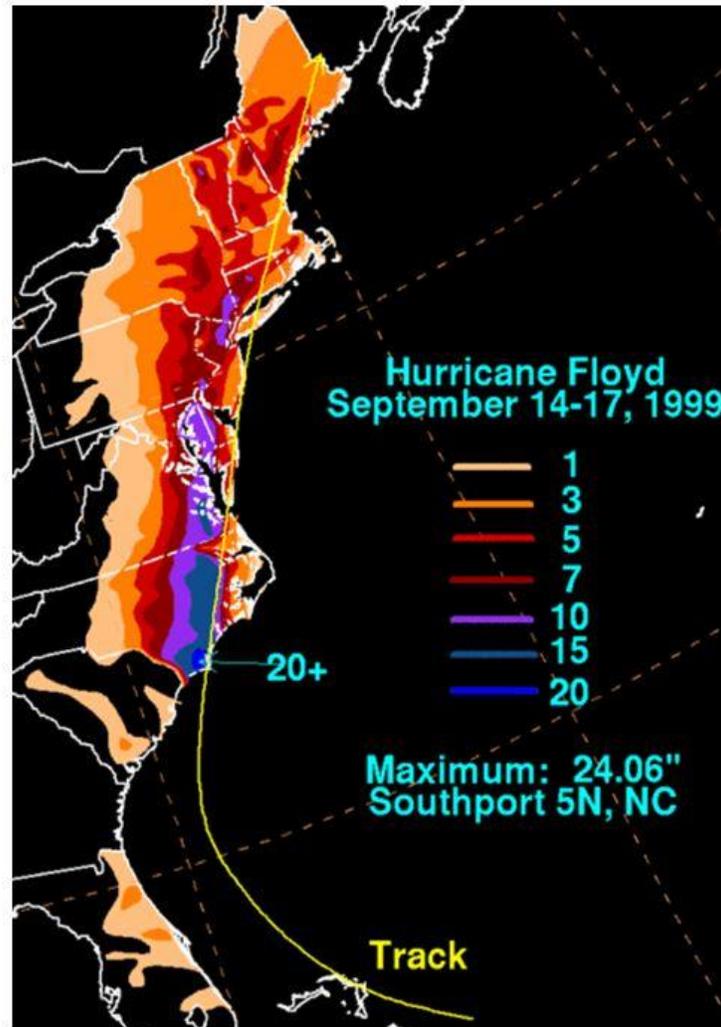
Rain up to 16 inches fell in the western part of Virginia, making Fran the fourth wettest known tropical cyclone to impact Virginia and causing major flash flooding. The floods shut down many of the primary and secondary roads and closed Shenandoah National Park. Fran destroyed about 300 homes, mostly from flooding, and 100 people had to be rescued. But in Richmond only 3.24 inches fell from September 4th to the 8th.

Page County was the hardest hit locality in the state of Virginia with regards to damage. Three days after the storm had passed; hundreds of people were still stranded. Some 78 homes were destroyed and 417 were damaged, however there were no deaths. At one point on Friday every town in the county was isolated due to high water. In the county seat of Luray, the Hawksbill Creek cut the town in half for much of the day, and the strong current forced a house off its foundation and placed in the end zone of Luray High School's football field. Water from the Hawksbill reached 2 feet from the top of the field goal upright—16 feet of water covered the ground. Bulldog field was flooded for over a week after the storm, until finally the standing water was pumped water across U.S. Route 340 back into the Hawksbill Creek. Also in downtown Luray, the large flood-driven waves of the creek demolished three buildings, including the Adelpia Cable building. The creek, typically less than a foot deep, overtook the downtown Main Street Bridge, which rises some 15 feet above the creek bed.^[20]

The Shenandoah River crested some 20 feet above flood stage. The South Fork of the Shenandoah River crested at 37 feet in Front Royal, Virginia, which was 22 feet above the 15 feet flood stage.

In Rockingham County, Virginia, over 10,000 people were evacuated from their homes, however most were allowed to return to their homes after the water subsided.

Hurricane Floyd September 14-17, 1999



By the time Floyd hit the shore, it was significantly weaker than it was at sea, due to the collapsing of its concentric eyes. This had little effect on the inland damage caused by the storm, however, and Floyd produced torrential rains and high winds throughout the Mid-Atlantic as far north as New York City and Long Island. Richmond had 6.54 inches of rain on September 15th and 16th.

Chestertown, Maryland, reported a maximum rainfall total of 14 inches, with other locales reporting similar values. Extreme river flooding caused moderate damage to bridges and roads, resulting in a damage toll of \$7.9 million (1999 USD; \$11 million 2012 USD) throughout the state. In addition, over 250,000 residents were without electricity because of high winds blowing down power lines.

Rainfall amounts peaked at 13.34 inches in Somerville, New Jersey, and 12.36 inches in Vernon, Delaware. The Raritan River basin experienced record flooding as a result of Floyd's heavy rains, 4.5 feet higher than the previous record flood crest. Bound Brook, New Jersey, was especially hard hit by a

record flooding event: a 42-foot flood crest, 14 ft above flood stage, sent 12 feet of water on Main Street and drowned 3 people.

Manville, New Jersey was hit nearly as hard, with record-breaking floods coming from the Raritan River and the nearby Millstone River, which join in Manville. Princeton University in Princeton, NJ, for several days declared municipal tap water unsafe to drink, advised students in dorms not to shower, and provided bottled drinking water.

The Rochelle Park, New Jersey hub of Electronic Data Systems was inundated by the nearby Saddle River, disrupting service to as many as 8,000 ATMs across the United States. Flooding.