

History: Virginia Hurricanes

Prior to official weather records that began in Norfolk in 1871, early colonists recorded severe weather. In September 1667, the Chesapeake Bay was said to have risen 12 feet. An October 1749 hurricane raised the bay 15 feet, washing up an 800-acre sand spit, which became Willoughby Spit, after an 1806 hurricane deposited even more sand.

Here we have compiled weather records for a number of hurricanes that have impacted Virginia over the past few decades.

Hurricane Sandy, Oct. 26, 2012

- Localities declared (Public Assistance only): the counties of Accomack, Arlington, Clarke, Craig, Culpeper, Essex, Fauquier, Frederick, Greene, Highland, King and Queen, Lancaster, Loudoun, Madison, Mathews, Middlesex, Nelson, Northampton, Northumberland, Prince William, Rappahannock, Shenandoah, Surry, Warren and Westmoreland and the cities of Fairfax, Falls Church and Manassas.
- Fatalities: 2
- Total damages (not including economic losses): \$16.2 million.
- Homes destroyed/damaged: 245.

Remnants of Tropical Storm Lee, Sept. 8-9, 2011

- Localities declared (Public Assistance only): the counties of Caroline, Essex, Fairfax, King and Queen, King George, Prince William and Westmoreland and the city of Alexandria.
- Fatalities: 2.
- Total damages (not including economic losses): \$11.2 million.

Hurricane Irene, Aug. 26-28, 2011

- Localities declared (Public Assistance only): the counties of Essex, Isle of Wight, James City, Lancaster, Middlesex, New Kent, Richmond, Southampton, Sussex, Westmoreland, and York and the cities of Chesapeake, Emporia, Hampton, Hopewell, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg.
- Total damages (not including economic losses): \$35.8 million.

Virginia Severe Storms and Flooding Associated with Tropical Depression Ida and a Nor'easter, Nov. 11, 2009 ("Nor'Ida" or the "Veteran's Day Storm")

- Localities declared (Public Assistance only): Halifax, Isle of Wight, King and Queen, Northampton, and Scurry counties and the cities of Chesapeake, Hampton, Newport News, Norfolk, Poquoson, Portsmouth and Virginia Beach.
- Total damages (not including economic losses): \$11.2 million.

Tropical Depression Ernesto, Aug. 29, 2006

- Localities declared (Public Assistance only): The cities of Newport News, Poquoson, Richmond, and the counties of Accomack, Caroline, Charles City, Dinwiddie, Essex, Gloucester, Greensville, Isle of Wight, James City, King and Queen, King George, King

William, Lancaster, Lunenburg, Mathews, Middlesex, Northampton, Northumberland, Richmond, Surry, Sussex, Westmoreland, York.

- Fatalities: 7.
- Total damages (not including economic losses): \$118 million.
- Homes destroyed/damaged: 609.

Public Assistance (state agencies, local government, utilities)

- Total for debris removal and protective measures: \$7 million.
- Total for road systems, water control, public buildings/equipment, public utility systems, and parks and recreation: \$28.1 million.
- For state agencies: \$9.6 million.
- Total for all public assistance: \$44.7 million.

Hurricane Jeanne, Sept. 28, 2004 (figures through April 2005)

- Localities declared major disaster areas: Cities of Salem and Roanoke, and the counties of Alleghany, Craig, Giles, Montgomery, Floyd, Patrick and Roanoke.
- Fatalities: 1.
- Total damages (not including economic losses): \$3.6 million.
- Homes destroyed/damaged: 280.
- Businesses destroyed/damaged: 12.

Federal Recovery Assistance

- Housing assistance (home repair, rental assistance): \$1.4 million.
- Other Needs assistance (personal property, medical, transportation, miscellaneous): \$795,000.
- Small Business Administration loans to individuals: \$675,000.
- Small Business Administration loans to businesses: \$195,000.
- Hazard Mitigation (federal, state, local funds combined with Hazard Mitigation Grant Program): \$153,000.

Hurricane Gaston, Aug. 30, 2004 (figures through April 2005)

- Localities declared major disaster areas: Cities of Richmond, Hopewell, Colonial Heights and Petersburg, and the counties of Chesterfield, Dinwiddie, Hanover, Henrico and Prince George.
- Fatalities: 9.
- Total damages (not including economic losses or vehicles): \$46 million.
- Homes destroyed/damaged: 5,798.
- Businesses destroyed/damaged: 97.
- Vehicles destroyed/damaged: 2,077.
- Total damage to vehicles: \$41.4 million.

Federal Recovery Assistance

- Housing assistance (home repair, rental assistance): \$6.4 million.
- Other Needs assistance (personal property, medical, transportation, miscellaneous): \$2.7 million.
- Small Business Administration loans to individuals: \$3.4 million.
- Small Business Administration loans to businesses: \$4.8 million.

- Hazard Mitigation (federal, state, local funds combined with Hazard Mitigation Grant Program): \$2.3 million.

Public Assistance (state agencies, local government, utilities)

- Total for debris removal and protective measures: \$2.6 million.
- Total for road systems, water control, public buildings/equipment, public utility systems, and parks and recreation: \$17.2 million.
- For state agencies: \$1.3 million.
- Federal Highway: \$6.6 million.
- Total for all public assistance: \$27.9 million.

Hurricane Isabel, Sept. 18, 2003 (figures from Sept. 18, 2003 through April 30, 2004)

- Localities declared major disaster areas: 100.
- Fatalities: 32.
- Total damages (not including economic losses): \$1.9 billion.
- Homes destroyed: 1,124.
- Businesses destroyed: 77.
- Homes damaged: 9,027.
- Businesses damaged: 1,400.
- Total amount of debris: 20 million cubic yards (equals 200,000 football fields).
- Dump trucks used to haul debris: more than 660,000.
- Water delivered to localities 1.5 million gallons.
- Meals served: 1.4 million.
- Ice delivered to localities: 6 million pounds.
- Generators provided to localities: 150.
- Calls received at the Virginia Public Inquiry Center: 6,000.
- People who registered with FEMA for assistance: 93,000.

Recovery Assistance

- Housing assistance (home repair, rental assistance): \$33 million.
- Other Needs assistance (personal property, medical, transportation, miscellaneous): \$22 million.
- Small Business Administration loans: \$79 million.
- Mitigation: \$15 million.

Public Assistance (state agencies, local government, utilities)

- Debris removal: \$179 million (\$50 million of that for VDOT).
- Total for road systems, water control, public buildings/equipment, public utility systems, and parks and recreation: \$36 million.
- For state agencies: \$25 million.
- Federal Highway: \$30 million.
- Total for all public assistance: \$270 million.

Virginia Hurricane Chronology

17TH AND 18TH CENTURY HURRICANES

Aug. 24, 1635: The first historical reference to a major hurricane that could have affected the Virginia coast is listed for this date.

Sept. 6, 1667: According to the writing of Virginia colonists, the Chesapeake Bay rose 12 feet, probably widening the Lynnhaven River. Jamestown saw 10,000 houses blown down and the storm washed away the foundation of Fort George at Old Point Comfort. Twelve days of rain followed this storm. In "Norfolk in By-Gone Days," the Rev. W. H. T. Squires wrote:

The hurricane blew for 24 hours with unexpected fury, first from the northeast, then due north, thence to the west, and then southeast.... It is said that planters who did not live in sight of the rivers found their farms flooded, and many were forced to seek protection on the roofs of their homes until the storm was over.

Oct. 29, 1693: From the Royal Society of London: "There happened a most violent storm in Virginia which stopped the course of ancient channels and made some where there never were any."

Oct. 19, 1749: This tremendous hurricane raised the Chesapeake Bay an amazing 15 feet and washed up 800 acres of sand that now forms Willoughby Spit. The storm destroyed Fort George at Old Point Comfort after the Virginia General Assembly had tried in 1727 to strengthen it after the damage done by the 1667 hurricane.

Sept. 4, 1775: The death toll in Virginia and North Carolina was 163 lives from this storm. A Williamsburg correspondent of the Virginia Gazette wrote, "The shocking accounts of damage done by the rains last week are numerous; most of the mill-dams are broke, the corn laid almost level with the ground, and fodder destroyed; many ships and other vessels drove ashore and damaged at Norfolk, Hampton, and York."

Sept. 8, 1769: The Virginia Gazette on Sept. 14, 1769 indicated that torrential rains struck around 1 a.m. with violent winds until 10 or 11 that morning. Damage was "inconceivable" and crops were destroyed. The publication reported: "There was not a dry house in town that day... Many old houses were blown down and a number of trees... All the shipping and small vessels at Norfolk are aground, many of them dismantled; some of the wharves are gone, and others damaged. A vessel from Norfolk, laden with coal for the city, was driven up to Jamestown and stove to pieces..."

Sept. 22-24, 1785: From "Historical and Descriptive Sketches of Norfolk and Vicinity" by William S. Forrest was this description: "This year was noted for the highest tide ever before known to the borough (Norfolk) completely deluging a large portion of its site on the waterside."

19TH CENTURY HURRICANES

Sept. 8, 1804: The storm track took the eye just west of Norfolk as it veered to the northeast. The hurricane's storm surge killed 500 people when it made landfall in the Charleston, South Carolina, area.

Aug. 23, 1806: The "Great Coastal Hurricane of 1806" helped form Willoughby Spit.

Sept. 3, 1821: One of the most violent hurricanes on record occurred on this date. The eye passed over Norfolk then moved northeast along the New Jersey coast onto Long Island. Forrest wrote, "Many houses in Norfolk and Portsmouth were damaged – some unroofed and others entirely demolished. Chimneys, trees and fences were blown down and several lives were lost. The tide rose to a great height; the Norfolk drawbridge was swept away, and the damage to the shipping was immense."

A correspondent at Old Point Comfort wrote, "When the wind changed, the water broke in on the island and almost covered it. By its force a number of buildings were destroyed...prostrated fences, and entered every building..."

From the "American Beacon" on Tuesday, Sept. 4, 1821, in the Norfolk area came this report: "So general and widespread is the devastation, that it would be impossible...to give...a detail of its awful consequences...very few house-keepers have escaped injury, either in their enclosures or houses and nearly all of the most highly improved lots in the borough have been despoiled of their attractions, by the prostration of their walls or fences, the uprooting of trees...The ground stories of all warehouses on the wharves and as high up as Wide Water Street, were entirely overflowed..."

Sept. 8, 1846: A slow-moving hurricane piled water into the Pamlico and Albemarle sounds. When the winds shifted, the water washed back over the barrier islands from the sound, forming Hatteras and Oregon inlets.

Sept. 17, 1876: During the hurricane on this date, the average 5 minute wind speed at Cape Henry was 78 mph; 8.32 inches of rain fell.

Sept. 12, 1878: A hurricane spawned several tornadoes in Virginia between 1 p.m. and 4 p.m., killing one and injuring seven. Tornadoes hit Dinwiddie County southeast of Petersburg, Ford's Depot, Nottoway County near Burkeville and Goochland County near Dover Mills, making a 28-mile track.

Oct. 22-23, 1878: The hurricane's eye made landfall at Cape Fear, North Carolina, and moved north across Richmond and Washington, D.C., losing little strength. Wind downed trees and fences and unroofed homes. Very high tides occurred on the coast. Cobb and Smith islands on the Eastern Shore were completely submerged and all livestock were swept away. Average wind at Cape Henry was 84 mph. Eighteen died when the A.S. Davis went ashore near Virginia Beach.

Aug. 18, 1879, "The Great Tempest": A gale blew from the northeast for 24 hours before the winds shifted northwest and increased to 70 mph. The eye passed about 50 miles west of Norfolk, raising the tide to nearly eight feet. Average wind speed at Cape Henry was 76 mph, with estimated gusts of 100 mph. More than 46 people were lost in Virginia and North Carolina, many on ships. From The Norfolk Landmark on Aug. 19, 1879 came this report: "The tide swept up over Bank Street, invaded the City Hall grounds and went surging and breaking up Cove

Street beyond the Station House, so that the oldest inhabitant saw the like in the history of Norfolk."

Oct. 31, 1887: The average 5 minute wind speed at Cape Henry was 78 mph, and the storm caused a record number of marine disasters.

Nov. 25, 1888: This hurricane passed Virginia 100 to 200 miles off the coast, and yet caused damage in the Tidewater area. High tides flooded the lower part of Norfolk and strong winds blew down telegraph lines and blew vessels from their moorings.

Sept. 10-12, 1889: The hurricane moved north from Puerto Rico and stalled off the Virginia Capes for several days. The force of the storm was felt along the coast from North Carolina to New York with high tides and heavy swells.

Aug. 23, 1893: The average 5 minute wind speed at Cape Henry was 88 mph during this storm.

Sept. 29, 1894: The 5 minute wind speed at Cape Henry was 80 mph during this storm; gusts went to 90 mph.

July 8, 1896: This hurricane spawned at least seven tornadoes in Virginia. One struck Dinwiddie and Prince George counties about 10 miles southeast of Petersburg, and another tracked 17 miles near Williamsburg. Eleven people were injured.

Sept. 29, 1896: This storm killed 16 people and did almost \$4 million in damages along the East Coast. The Richmond News Leader wrote on June 14, 1951 after a tornado had struck the city: "Tornado recalls windstorm of 1896 to older residents...torrential rain and very high wind for several hours in the evening. Wind estimated at 80 mph....Caused a steeple to fall."

From Hurricanes by Ivan Ray Tannehill came this report: The storm "increased in intensity as it reached Florida and moved through the Atlantic state, inside the coastline. Center passed over District of Columbia..."

Oct. 25, 1897: The hurricane lasted 60 hours. Norfolk tides 8.1 feet were above Mean Lower Low Water.

Oct. 31, 1899: During this hurricane, the average 5 minute wind at Cape Henry was 72 mph. The tide in Norfolk reached 8.9 feet above Mean Lower Low Water.

20TH CENTURY HURRICANES

Oct. 10, 1903: The average 5 minute wind speed at Cape Henry was 74 mph, and the tide in Norfolk reached 9 feet above Mean Lower Low Water during this hurricane.

Aug. 26, 1924: During this hurricane, the average 1 minute wind speed was 72 mph at Cape Henry.

Sept. 30, 1924: The fastest wind speed at Norfolk was 76 mph. Heavy rains in central Virginia brought moderate flooding to Fredericksburg on Oct. 1. The river crested at 22.8 feet (about 5 feet over flood stage).

Aug. 22, 1926: The fastest 1 minute wind speed in Cape Henry was 74 mph during this storm.

Aug. 12-16, 1928: Two tropical storms moved across the Florida panhandle and then turned northeast and moved up the Appalachian Mountains, weakening into depressions. The depressions passed over Virginia just four days apart, bringing heavy rains, flash flooding and significant rises on the larger rivers. Major flooding occurred on the Roanoke River through Roanoke and Brookneal. The river crested at just over eight feet above flood stage in Roanoke. The fourth highest crest to date occurred on the Roanoke River at Brookneal, at 14 feet over flood stage.

Sept. 19, 1926: The fastest 1 minute wind speed at Cape Henry was 72 mph during this storm. The tide reached 7.16 feet above Mean Lower Low Water in Norfolk.

Oct. 18, 1932: The tropical storm made landfall on the Gulf Coast and moved northeast, weakening to a depression. The center passed over the Virginia-Kentucky border into West Virginia. Heavy rains to the east of the storm impacted the Appalachian Mountains, causing major flooding on the Roanoke River through Alta Vista. The Roanoke crested at 11 feet over flood stage.

Aug. 23, 1933: The hurricane was born off the Cape Verde Islands and reached Category 4 strength but weakened to a Category 2 before making landfall. The storm caused record high tides up the entire west side of the Chesapeake Bay, with damages that were the highest ever recorded from a storm surge, causing 18 deaths and \$79 million in damages in Virginia. Virtually the entire Tidewater area, including Virginia Beach, was paralyzed by the storm through loss of communication, electricity, water service and roads. More than 79,000 telephones were put out of commission and nearly 600 trees, many of them a century old, were uprooted in the city. The highest wind speed was 88 mph at the naval air station in Norfolk. As the storm moved north, damages in the Commonwealth were largely to crops: \$2 million in corn, \$2 million in tobacco, \$750,000 in apples and \$500,000 in other crops.

Sept. 16, 1933: The hurricane developed east of the Bahamas and strengthened to a Category 3 storm, making landfall near Cape Lookout, North Carolina. The tide surpassed eight feet at Sewells Point, causing floods in the Tidewater area less than one month after the Aug. 23 storm. But due to preparations made by citizens, the damage was estimated at less than \$500,000 compared to the millions of dollars of damage the Aug. 23 storm caused. More than 2,000 telephones lost service. The storm tide flooded City Hall Avenue and Granby Street and tied up traffic in the downtown area all day. The fastest wind speed at the naval air station in Norfolk was 88 mph with 75 mph at the NWS Office in Norfolk and 87 mph at Cape Henry. Two people were killed in Virginia. High winds and waves in Pamlico and Albemarle Sounds left hundreds without food and shelter and contributed to the 21 lives lost in North Carolina.

Sept. 5, 1935 “The Great Labor Day Hurricane”: While this storm is known for its destruction of the Florida Keys, it eventually moved north over the central portions of the Carolinas and then back out to sea near the Virginia Capes. While passing, it spawned several tornadoes in Virginia and caused flooding. A killer tornado (probably an F3) in Prince Edward tracked 10 miles, killing two and injuring 12. A third tornado struck Southampton County near Courtland and killed one person. Another tornado tracked from Portsmouth across Craney Island to the western portions of the city of Norfolk and Willoughby Spit, becoming a waterspout. One tornado struck Pittsylvania County and injured three people. Another tornado struck Gloucester and was on the ground for eight miles and injured six people. Heavy rains fell over central Virginia from the storm and a major flood resulted on the James River in Richmond. Water level at the Richmond locks reached 23.7 feet, 15 feet above flood stage.

Sept. 18, 1936: This storm developed near the Windward Islands and intensified to a Category 3 off the Carolina coast, passing within 25 miles of Virginia Beach, with the fastest wind speed

of 84 mph at Cape Henry. In the lower section of Norfolk, high winds demolished windows, roofs and buildings with damages of about \$500,000. Shipping was suspended, train service canceled and traffic was stalled. Yachts were driven ashore and sustained damage. The road from Currituck to Norfolk was washed out. The tide reached more than nine feet at Sewells Point, the second highest tide of record. Due largely to extensive preparations made because of warnings from the Weather Bureau, damage was less than the August 1933. "Hurricanes" by Tannehill reported: "It moved northward gaining in intensity. By the morning of the 15th this hurricane was of wide extent and marked intensity. On the 16th, the area of winds of force 6 and higher (Beaufort scale) was about one thousand miles in diameter. By that criterion, it was one of the largest tropical cyclones of record. ...At Norfolk, it was considered the worst storm that ever visited that section..."

Sept. 14, 1944, the "Great Hurricane": Heavy rain and high winds lashed the Virginia Beach area, with the fastest wind speed of 134 mph gusting to 150 mph at Cape Henry, the highest wind speed of record in this area. Extensive property damage occurred along the coast, with 41,000 buildings damaged from the Carolinas to New England. Some 390 lives were lost; 344 were World War II servicemen who died when a destroyer, two Coast Guard cutters and a minesweeper sunk.

Aug. 31, 1952, Hurricane Able: The first hurricane of 1952 made landfall between Charleston, South Carolina and Savannah, Georgia, and then moved north across Virginia and Washington, D.C. in a very weakened form. Rainfall totaled two to three inches and winds peaked at 60 mph. Its greatest impact on Virginia was a small F2 tornado that struck Franconia in Fairfax County, where it traveled two miles. Total damage from the hurricane and tornado was \$500,000.

Aug. 14, 1953, Hurricane Barbara: The hurricane's fastest 1 minute wind speed was 72 mph at Cape Henry and 63 mph with gusts to 76 mph at Norfolk Airport.

Oct. 15, 1954, Hurricane Hazel: Hazel maintained hurricane force winds up the East Coast and produced a number of record wind gusts. Winds gusted to 130 mph in Hampton, 100 mph in Norfolk, 92 mph in Blackstone, 79 mph in Richmond and 98 mph at Washington National Airport in Arlington, Virginia. Damages in Norfolk alone reached \$3.5 million with 1,800 homes and businesses damaged. Hundreds of thousands of trees were destroyed, taking with them half of the phone and electric lines in the state, causing \$2 million in damage. A 150-foot microwave telephone tower was toppled near Warsaw, Va.; 200 plate glass storefronts in Richmond broke; in the Shenandoah Valley, turkey growers lost between 150,000 and 250,000 turkeys when poultry sheds were wrecked.

Small crafts were driven ashore or they sank. Four people died when a tug boat capsized on the James River about 25 miles from Richmond. Piers were demolished and private docks swept away in the Tidewater rivers. Lynchburg, Roanoke and Danville recorded five to six inches of rain, which caused flooding in small streams. Virginia lost 13 people. Severe flooding followed on the Rappahannock River with some flooding also on the James, Potomac and Shenandoah Rivers. Norfolk winds gusted to 53 mph from the east and Cape Henry had 43 mph winds with gusts to 49 mph. Roanoke saw winds gust to 62 mph and Lynchburg 56 mph out of the north. Statewide damages equaled \$1.5 million.

Aug. 12-13, 1955, Hurricane Connie: Connie made landfall near Cape Lookout, North Carolina, on Aug. 12, and 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.

Aug. 17, 1955, Hurricane Diane: Just five days after Connie, Diane made landfall near Wilmington, North Carolina as a Category 1 hurricane on Aug. 17 and moved north across central Virginia. 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 5 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. Statewide damages totaled \$1.5 million.

July 10, 1959, Hurricane Cindy: This hurricane spawned 8 tornadoes in Georgia, North Carolina and Virginia.

Sept. 30, 1959, Hurricane Gracie: The storm moved just west of Charlotte, North Carolina, into southwest Virginia. Two to four inches of rain fell, with local amounts of eight to 10 inches. Norfolk recorded 6.79 inches in 24 hours. An intense squall line developed over southwest Virginia in the afternoon that progressed east. Gracie spawned tornadoes in North and South Carolina, Virginia and Pennsylvania. In Virginia, three strong F3 tornadoes struck Albemarle, Greene and Fluvanna counties, killing 11 people.

Sept. 12, 1960, Hurricane Donna: Donna produced nearly three inches of rainfall over Richmond and Washington, D.C. The fastest wind speed was 89 mph at Norfolk. Donna produced five tornadoes in North and South Carolina and Virginia. The F2 tornado hit Virginia in Buckingham County at 6 p.m., and stayed on the ground for half mile. Rainfall was 4 to 8 inches and some streams and rivers on the Delmarva coast reached record or near record overflow. There were three deaths.

Sept. 1, 1964, Hurricane Cleo: Record rains fell over much of the Hampton Roads area on Aug. 31 and Sept. 1. The Back Bay Wildlife Refuge recorded more than 14 inches of rainfall. Winds in the Norfolk to Virginia Beach area were 31 mph with gusts up to 42 mph. Cleo spawned 17 tornadoes across Florida, South and North Carolina and Virginia.

Aug. 20, 1969, Hurricane Camille: Camille made landfall as a Category 5 hurricane, smashing into the Mississippi coast with 200 mph winds on Aug. 17. She was the strongest hurricane to make landfall in the United States this century. She maintained hurricane force winds for 10 hours as she moved 150 miles inland. Camille entered Virginia on Aug. 19 as a tropical depression, and though not a hurricane or tropical storm, she had picked up enough moisture from the warm Gulf Stream that when she slowed over the Commonwealth, one thunderstorm followed the other for 12 hours. Nearly 31 inches of rain fell with devastating results. The ensuing flash flood and mudslide killed 153 people, mostly in Nelson County where 113 bridges washed out. The major flooding that occurred downstream cut off all communications between Richmond and the Shenandoah Valley. Waynesboro on the South River saw eight feet of water downtown and Buena Vista had more than five feet. Damage was estimated at \$113 million.

Aug. 27, 1971, Tropical Storm Doria: The fastest wind speed was 71 mph at the naval air station in Norfolk. Doria made landfall in North Carolina near Atlantic Beach and moved up the Delmarva coast. Three inches of rain, flooding and a tornado caused \$375,000 in damage. One person drowned in Virginia.

June 21, 1972, Tropical Storm Agnes: Agnes was only a weak hurricane when it developed over the Gulf of Mexico and struck the Florida panhandle, entering Virginia as a depression. Agnes produced devastating floods in Pennsylvania, Maryland and Virginia. Sixteen inches of rain was recorded in Chantilly in Fairfax County, and both the Potomac and James rivers

experienced major flooding. Richmond was hard hit. The water supply, sewage treatment, electric and gas plants were inundated. Only one of the five bridges crossing the James survived; the downtown section was closed for several days. More than 60 counties and 23 cities in the Commonwealth qualified for federal disaster relief. Sixteen people died in Virginia and damage was estimated at \$222 million.

Sept. 5, 1979, Hurricane David: This hurricane pawned eight tornadoes across Virginia. Two cities and five counties were hit, from Norfolk in the southeast to Leesburg in the north. There was one death and 19 injuries; damages reached \$5 million.

July 25, 1985, Hurricane Bob: This hurricane brought large bands of thunderstorms over central Virginia and produced strong winds and three tornadoes. Near Manakin in Goochland County, an F0 tornado briefly touched down. A second, short-lived F0 tornado was reported in Hanover County near Holly Hills. A funnel cloud appeared in Albemarle County, becoming a strong F3 tornado that struck the West Lee Subdivision in Greene County and uprooted trees, completely destroying two houses by blowing off the roofs and caving in the sides.

Sept. 27, 1985, Hurricane Gloria: The fastest wind was 94 mph with gusts to 104 mph at the South Island Chesapeake Bay Bridge Tunnel. Rainfall totaled 5 to 6 inches across the Eastern Shore. A fishing pier at Virginia Beach was heavily damaged. Numerous branches and trees blew down with some damage to roofs, signs and trim on buildings. Total damage in Virginia was \$5.5 million.

Aug. 17, 1986, Hurricane Charley: The center passed over southeast Virginia Beach. The fastest wind blew from the northeast at 94 mph with gusts to 104 mph on the southern island of the Chesapeake Bay Bridge Tunnel. Many trees were blown down, including 250 in Hampton Roads. Over 110,000 homes were without power in the Tidewater area. Six-foot waves destroyed 70 feet of the fishing pier in Norfolk. Total damages were less than \$1 million.

July 12-13, 1996, Hurricane Bertha: Made landfall near Cape Fear and moved north, passing over Suffolk and Newport News then northeast toward Atlantic City, New Jersey. The fastest wind speed was 35 mph with gusts to 48 mph at the Norfolk International Airport. The storm knocked out power to 115,000 customers in the eastern part of the state. Bertha spawned four tornadoes in east central Virginia. The strongest was an F1 that moved over Northumberland County, injuring nine people and causing several million dollars in damages. Other tornadoes moved over Smithfield, Gloucester and Hampton.

Sept. 5-6, 1996, Hurricane Fran: Fran made landfall at Cape Fear, North Carolina and moved north, entering Virginia near Danville and dropping 8 inches of rain over the mountains and the Shenandoah Valley. In just one hour, some areas saw 3.5 inches of rain. Rainfall for the week totaled 20 inches at Big Meadows in Page County. Six people died and damages totaled \$350 million. Agricultural damage included destroyed crops and was estimated in excess of \$50 million. All rivers in the central part of the state experienced major flooding. Record-level flooding occurred on the Dan River at South Boston and on the Shenandoah River, requiring the rescue of 100 people. A record number of people (560,000) in Virginia lost power.

County and state agencies helped get food and water into these areas. Hundreds of people were stranded and 75 homes reported major damage in Page County. Rockingham County reported 40 homes destroyed and 105 homes with major damage. In Warren County, 250 homes were flooded with 50 sustaining major damage. Waynesboro saw major damage to its downtown area. The Old Town section of the City of Alexandria also saw extensive tidal flooding from the Potomac River. Water was five feet deep in the lower portion of the city and many shops were flooded.

July 24, 1997, Hurricane Danny: Langley Air Force Base in Hampton recorded a wind gust of 61 mph at the Chesapeake Bay Tunnel Bridge. Tropical moisture from Danny interacted with a stationary front across the central Shenandoah Valley and central Piedmont. More than six inches of rain fell in some locations, causing flash flooding of creeks and streams. Orange County received the most rain and 10 roads were closed from high water. Danny spawned three small tornadoes in the Norfolk-Chesapeake area; each was on the ground for about a mile. One moved through southern Norfolk, damaging a business, destroying a car wash, causing major damage to a dozen structures.

Aug. 27, 1998, Hurricane Bonnie: Bonnie made landfall near Wilmington, North Carolina and then moved back out to sea over the northern Outer Banks as a tropical storm and then strengthened again over the open waters. The fastest wind speed was northeast at 46 mph with gusts to 64 mph at Norfolk International Airport. Langley Air Base recorded a sustained wind of 53 mph with gusts to 67 mph. Cape Henry recorded a sustained wind of 81 mph and a gust of 104 mph. Power was knocked out to 320,000 customers in the Norfolk-Virginia Beach area. Numerous trees were down, and some structural damage to buildings occurred. Windows were blown out of high-rise hotels and there was some roof damage. The heavy rain and a 2 to 4 foot storm surge combined to produce street flooding in Norfolk, Virginia Beach and Portsmouth. Total storm damages in Virginia reached \$24 million.

Sept. 4-5, 1999, Hurricane Dennis: Hurricane Dennis loomed off Cape Hatteras for several days and weakened to a tropical storm. It then moved west, making landfall on the Outer Banks of North Carolina and spreading rains and wind across Virginia. Tropical cyclone conditions were felt over eastern Virginia from Aug. 30 through Sept. 5. The peak of the storm came on Sept. 4 and 5. A sustained wind of 52 mph was recorded at Langley Air Force Base with a peak gust of 76 mph. An F2 tornado touched down in Hampton, causing significant damage to a three-block area and injuring six people. Six apartment complexes, an assisted living complex and a nursing home were damaged, causing 460 people to be evacuated. Much of Virginia had been experiencing drought conditions prior to Dennis. Total damages from Dennis were \$8 million, mostly from the Hampton tornado.

Sept. 15-16, 1999, Hurricane Floyd: Hurricane Floyd, at one time a large Category 4 storm, had weakened to a minimal hurricane as it reached Virginia. However, rain associated with Floyd began well in advance of the storm and intensified as the storm neared and crossed Virginia Beach on the Sept. 16. Rainfall amounts averaged 10 to 20 inches in a 50 to 75 mile path over southeast Virginia. More than 300 roads were closed in the peak of the storm from flooding and downed trees. Flooding caused \$30 million to \$40 million. The hardest hit counties were Southampton, Sussex, Isle of Wight and Surry. The city of Franklin experienced a record flood with 206 businesses impacted and numerous homes. Two people died in flooding in the state. The highest sustained wind recorded over land was only 46 mph at Langley Air Force Base with a gust to 63 mph. The James River Bridge recorded a wind gust of 100 mph. The saturated ground from Dennis and Floyd combined with the wind and led to trees uprooting and widespread power outages. Two people were killed by falling trees. Total storm damage in Virginia reached \$255 million with 64 jurisdictions affected.

21ST CENTURY HURRICANES

Sept. 18, 2003, Hurricane Isabel: The hurricane made landfall near Ocracoke, North Carolina. The center passed west of Emporia and west of Richmond. The fastest 1 minute wind speed was 54 mph with gusts to 75 mph at Norfolk and 61 mph with gusts to 74 mph at the South Island Chesapeake Bay Bridge-Tunnel. The highest tide at Sewells Point was 7.9 feet above Mean Lower Low Water, which was a 5 foot surge. Significant beach erosion was reported. Numerous trees and power lines were down over a wide area, with over 2 million households without power in Virginia. Virginia damage was over \$625 million, and there were 36 deaths in Virginia directly or indirectly related to the storm.

Aug. 3, 2004, Hurricane Alex: The hurricane's closest approach to land was on Aug. 3, with its center located about 9 miles southeast of Cape Hatteras, North Carolina, as a Category 1. Alex produced locally heavy rainfall across portions of southeast Virginia, but little in the way of damage or flooding.

Aug. 14, 2004, Hurricane Charley: Making a second landfall near Cape Romain, South Carolina, Charley weakened to a Category 1, after devastating portions of central and southwest Florida. Charley brought locally heavy rainfall and strong winds to much of southeast Virginia, especially near the coast. A wind gust to 72 mph was recorded at the Chesapeake Light buoy. In the U.S., 10 deaths and \$14 billion in damage resulted from Charley.

Aug. 29, 2004, Hurricane Gaston: This storm made landfall near Awendaw, South Carolina, on Aug. 29 as a Category 1. Gaston weakened as it lifted northward through North Carolina, then northeastward across southeast Virginia on Aug. 30. Gaston produced a swath of 5 to 14 inch rains extending from Lunenburg and Mecklenburg counties northeast into Caroline and Essex counties. The heaviest rainfall, centered on the Richmond metro area, produced a major flash flood which killed eight people. Five of these deaths resulted from people driving into flooded roadways. A total of 13 tornadoes were observed in central and eastern Virginia, all producing F0 damage. Total damage is estimated at \$130 million.

Sept. 8, 2004, Hurricane Frances: Reaching Florida as a Category 2, this hurricane moved northeast into the northern Gulf of Mexico, eventually turning north and making a second landfall in the panhandle of Florida, and then weakening into a tropical depression. It tracked through western Virginia, then northeast and offshore at the Mid-Atlantic coast. A total of six tornadoes were observed in central and eastern Virginia, the strongest producing F1 damage.

Sept. 17, 2004, Hurricane Ivan: Hitting the Florida/Alabama border as a Category 3 hurricane, it weakened to a tropical depression and moved northeast, tracking along the Appalachian Mountains through western Virginia, then northeast and offshore at the mid-Atlantic coast. Forty tornadoes were produced in Virginia, most in central and northern Virginia. This was a record single-day outbreak for Virginia, and it exceeded the previous annual tornado record of 31. Most of these tornadoes were F0 or F1 in intensity, although 10 F2 tornadoes and one F3 tornado touched down in south central, west central and northern Virginia.

Sept. 28, 2004, Hurricane Jeanne: The remnants of Hurricane Jeanne, in the form of a tropical depression, moved through the vicinities of Greenville, South Carolina, Roanoke, Virginia and Washington, D.C. and finally to the New Jersey coast on Sept. 28. Maximum sustained wind speeds ranged from 25 mph to 30 mph near the storm's center. The primary impact on the Commonwealth was flooding, although one F1 tornado touched down in Pittsylvania County. The heaviest rainfall occurred from the New River Valley to the Southern Shenandoah Valley. Rainfall in this region ranged from 3 inches to 7 inches, with the highest amounts falling

in Patrick, eastern Floyd, eastern Montgomery, Giles, Roanoke, Botetourt and Rockbridge counties.

Sept. 1, 2006, Tropical Storm Ernesto: The remnants of Tropical Storm Ernesto interacted with an unusually strong high pressure over New England to generate strong winds, heavy rainfall, and storm surge-related tidal flooding and damage. Five to 8 inch of rainfall amounts were common across central and eastern Virginia. This rainfall caused flooding in many areas, although no substantial river flooding resulted from the heavy rain. Wind gusts of 60 to 70 mph occurred on the Eastern Shore of Virginia, as well as areas adjacent to the Chesapeake Bay from Yorktown northward. Tides were particularly high from communities adjacent to the York River, northward through the Rappahannock River to tidal portions of the Potomac River. Tides of 4 to 5 feet above normal, combined with 6 to 8 foot waves, caused significant damage to homes, piers, bulkheads, boats, and marinas across portions of the Virginia Peninsula and Middle Peninsula near the Chesapeake Bay and adjacent tributaries. Similar damage also occurred in Chincoteague and Wachapreague on the Virginia Eastern Shore. At some locations on the Middle Peninsula, Northern Neck and Eastern Shore, the tidal flooding and damage rivaled that from Hurricane Isabel in 2003. Power outages were widespread across Virginia's Northern Neck and Middle Peninsula.

Nov. 11, 2009, Tropical Depression Ida and a Nor'easter ("Nor'Ida" or the "Veteran's Day Storm") was a powerful autumn storm that caused widespread damage along the East Coast of the United States. This extra-tropical cyclone brought strong winds, coastal flooding and heavy rains to the mid-Atlantic region.

Aug. 26-28, 2011, Hurricane Irene was a large and powerful Atlantic hurricane that left extensive flood and wind damage along its path through the Caribbean, the United States East Coast and as far north as Canada. Irene made landfall near Cape Lookout, North Carolina, at around 7:30 a.m. on Aug. 27 as a strong Category 1 storm. Irene caused 5 deaths in North Carolina. On the evening of Aug. 26, well ahead of landfall, Hurricane Irene also spawned several tornadoes.

Sept. 8-9, 2011, Tropical Storm Lee made landfall in Louisiana on Sept. 4 and moved northeastward toward the Central Appalachians. High pressure halted Lee's northward movement, so the storm stayed in the Mid-Atlantic region, dumping heavy rain on already saturated ground. The most intense rain bands formed on Sept. 7-8, when the worst flash flooding occurred and torrential downpours occurred along a swath from King George County to Montgomery County, including the western suburbs of Washington, D.C. A rain gauge near Franconia recorded 5.47 inches, a three-hour amount that has approximately a 0.2 percent chance of occurring in any given year. Tragically, at least two people lost their lives in floodwaters in Fairfax County. Hundreds in Fairfax and Prince William County were evacuated, and many major roads were flooded and closed, including portions of the Capital Beltway, Interstate 66 and George Washington Parkway. The Virginia Railway Express's Manassas Line and numerous school districts remained closed as floodwaters slowly subsided.

Oct. 26, 2012, Hurricane Sandy was a late-season storm that formed in the central Caribbean on Oct. 22 and eventually made landfall near Atlantic City, New Jersey. It brought significant flooding to the Virginia coast, heavy snow to higher elevation in the southwestern and western counties, and high winds and heavy rain to northern Virginia. At least 100 secondary roads, parts of Interstate 77 and the Midtown Tunnel between Portsmouth and Norfolk were closed because of flooding. There were more than 40,000 power outages.

Because of its tremendous size, however, Sandy drove a catastrophic storm surge into the New Jersey and New York coastlines. U.S. damage estimates were near \$50 billion, making Sandy

the second-costliest cyclone to hit the United States since 1900. There were at least 147 direct deaths recorded across the Atlantic basin due to Sandy, with 72 of these fatalities occurring in the mid-Atlantic and northeastern United States. This is the greatest number of U.S. direct fatalities related to a tropical cyclone outside of the southern states since Hurricane Agnes in 1972. For a complete summary of Sandy, view the [National Hurricane Center Sandy Tropical Cyclone Report](#).

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