

**Codicil to  
APPENDIX A**

**WAKE FOREST HAZARD MITIGATION PLAN**

**Table AA-1: High Hazard Dams in Wake Forest Area**

Note: An explanation of the column "Dam Type" can be found in Appendix E: Glossary.

State ID	Name	Quadrangle	River Basin	Hazard Class Description	Dam Status	Dam Type	Year Dam Construction Completed	Structural Height in Feet
Wake-003	Gresham Lake Dam	Wake Forest	Neuse	H	Impounding	RE	1939	35
Wake-083	Raintree Lake	Wake Forest	Neuse	H	Reclaimed	RE		
Wake-118	EM Johnson Alum Sludge Lagoon Dam	Wake Forest	Neuse	H	Impounding	RE	1994	41
Wake-120	Alyson Pond	Wake Forest	Neuse	H	Impounding	RE		
Wake-125	Heathrow Dam	Wake Forest	Neuse	H	Impounding	RE		
Wake-173	Falls of Neuse Dam	Wake Forest	Neuse	H	Exempt	RE	1981	92
Wake-215	North Ridge Lake Dam Upper	Wake Forest	Neuse	H	Impounding	RE	1966	26
Wake-216	North Ridge Lake Dam Lower	Wake Forest	Neuse	H	Impounding	RE	1971	24
Wake-337	Manchester Dam	Wake Forest	Neuse	H	Impounding	RE		22.5
Wake-358	E.M. Johnson Water Plant B	Wake Forest	Neuse	H	Impounding	RE		
Wake-362	E.M. Johnson PLANT A	Wake Forest	Neuse	H	Impounding	RE		

Source: City of Raleigh Stormwater Services, May 2003

**Table AA-2: Descriptions of Hurricanes and Tropical Storms\***

Storm	Description
Hurricane Hazel October 16, 1954	Hit during highest lunar tide of the year, with an 18-foot storm surge (in some areas). Most destructive hurricane to hit North Carolina to date. Record rainfall. Hurricane Hazel's path of destruction spread over 2,000 miles.
Hurricane David September 4, 1979	Hurricane David was the cause of 19 related deaths in Florida, before moving up the Eastern coast, affecting NC.
Hurricane Gloria July 24, 1985	Hurricane Gloria ranks as the 13th costliest and the 16th most intense hurricane at time of U.S. landfall this century. Gloria first passed over Cape Hatteras, North Carolina on September 27 as a category 3 storm. Moving at more than 30 mph, it made landfall again over southern Long Island, New York as a category 2 storm. Total economic losses were for the U.S. estimated at \$900 million.
Hurricane Bertha July 12, 1996	Hurricane Bertha moved along the edge of the NWSFO Raleigh/Wake County warning area. Three counties sustained substantial crop damage. Wayne \$12 million, Wilson \$7 million, and Johnston \$2 million. Structural damage was light and was primarily caused by trees on homes and cars. The hardest hit county was Wayne where property damage was estimated at \$500 thousand. Power outages were widespread in the eastern counties as trees took down power lines. Two F0 tornadoes occurred; one in Wake and one in Wilson counties. No injuries or deaths were reported. The highest wind recorded was 60 mph at Seymour Johnson AFB near Goldsboro. Greatest rainfall was four inches, also at the AFB.
Hurricane Fran September 5, 1996	Hurricane Fran was one of the worst natural economic disasters to occur in North Carolina history. In the RAH county warning area alone, the damage exceeded \$2 billion. Damage to crops, livestock, and farm equipment/buildings was over 400 million. The agricultural damage was the greatest in Sampson, Johnston, and Wayne counties. Several hundred thousand trees were uprooted or broken. Ten's of thousands of homes were damaged by falling trees. In the path of the storm's center, almost every neighborhood was affected. The copious rainfall produced many severe flash and river floods. The flooding on the Haw River at the Town of Haw River, the Neuse River at Smithfield and Goldsboro, and the Tar River at Louisburg and Rocky Mount, all neared or exceeded the highest flood on record. Many homes located in the flood plain had to be evacuated. The most massive evacuation occurred in Goldsboro where residents of 550 homes had to be moved to public shelters. Hundreds of cars in Goldsboro were damaged by water, many of which were underwater with only the radio antenna showing. Many homes and businesses incurred heavy losses. Along Crabtree Creek in Raleigh, which crested at its highest since 1973, hundreds of new cars from local dealerships floated in 6 feet of water. Scores of businesses reported heavy damage at the areas largest shopping center. The basic necessities of life were missing for several days; milk, bread, drinking water, power and telephone service. It took more than 10 days for power to be restored in many areas. Schools were closed for a week in the hardest hit counties. Automobile travel was hazardous for days after the storm due to fallen and falling trees. Secondary roads were still closed 12 days after the event.

Storm	Description
Hurricane Bonnie August 27, 1998	Hurricane Bonnie made landfall along the southern coast of North Carolina. Only fringe effects were felt in the central sections of the state. Rainbands associated with Bonnie spread inland as far west as Louisburg, Raleigh, Raven Rock, Fort Bragg and Fayetteville. Torrential rains and strong gusty winds accompanied the rainbands through the night on the 27th and into the daylight hours on the 28 <sup>th</sup> . The strongest winds were recorded over Sampson and Wayne counties where gusts over 50 mph occurred. Elsewhere, gusts to 40 mph occurred with the rainbands. Damage was sporadic and confined to the southeast portions of central North Carolina. About 20 roads were blocked for several hours in Harnett County and there were numerous reports of trees being blown down across Sampson, Wayne, Johnston, Wilson, Harnett, and Cumberland counties. About ten thousand people lost power in these areas sometime during the storm. Tobacco losses were extensive. The estimated total value of the tobacco crop lost due to Bonnie ranged from 25 to 50 million dollars. Rainfall amounts averaged 2 to 4 inches over the eastern Piedmont and Sandhills with amounts dropping rapidly west of Raleigh and Fayetteville. For example, downtown Raleigh recorded around 2 inches of rain while the RDU Airport, 10 miles west of downtown, recorded only 1/3 of an inch. Elsewhere, some of the higher amounts included: Wilson 4.94 inches, Clinton 4.45 inches, Goldsboro 3.74 inches, Erwin 2.80 inches, Clayton 2.76 inches, Rocky Mount 2.74 inches and Fayetteville 2.17 inches.
Hurricane Dennis September 4, 1999	After meandering off the coast and ruining the Labor Day weekend for millions, the remnants of Dennis finally moved inland across the central portion of the state. Its main impact was to end the drought in the eastern half of the state. The Triangle received from 6 to 8 inches of rain with Chapel Hill peaking out at 12 inches. The I-40 corridor of counties also got dumped on with totals in the 6 to 10 inch range. This water caused considerable urban and lowland flooding. Several main stem rivers also went into flood. The winds with the remnants of Dennis were generally not a significant problem. There were many old, larger trees uprooted and widespread limb damage was reported. The wind and rain combination caused considerable crop damage.
Hurricane Floyd September 15, 1999	Hurricane Floyd produced more human misery and environmental impact in North Carolina than any disaster in memory. The 15 to 20 inches of rain that fell across the eastern half of the state caused every river and stream to flood. Many rivers set new flood records. Whole communities were underwater for days, even weeks in some areas. Thousands of homes were lost. Crop damage was extensive. The infrastructure of the eastern counties, mainly roads, bridges, water plants, etc., was heavily damaged. By the end of 1999, \$1.5 billion had already been spent, with estimates that the cost would reach \$3-4 billion. The counties within the Raleigh/Wake County warning area probably sustained more than half of the state total. Even worse, was the loss of life, mainly due to flooding. Many Carolinians did not heed the call to evacuate and many more drove into flooded streams and rivers. In the central part of the state, 21 people lost their lives. Also, the loss of livestock was significant, mainly swine and poultry. Floyd will indeed go down in the history books.
Hurricane Isabel September 17, 2003	Three people killed, two by falling trees and a utility worker who was electrocuted. About 83,000 customers were without power.

Source: National Climatic Data Center, <http://www4.ncdc.noaa.gov/cgi-win/wwwcgi.dll?wwwEvent~Storms> and SHELDUS (Spatial Hazard Events and Losses Database for the United States, [http://go2.cla.sc.edu/hazard/db\\_registration](http://go2.cla.sc.edu/hazard/db_registration)).

\* Descriptions of hurricanes are of those only affecting Wake County, NC.

**Table AA-3: Descriptions of Flood Events\***

<b>Storm</b>	<b>Description</b>
Flooding March 13 1966 - October 22 1990	No descriptions given.
Flash Flood June 24, 1995	Wake County Emergency Operations Center reported that Falls of Neuse Road and Litchford Road were being flooded by over 1.25 inches of rain in less than an hour. Litchford Mobile Home Park was under water and seven people had to be evacuated by boat. Several homes sustained water damage.
Flash Flooding August 27, 1995	Over 140 homes and businesses in Raleigh were either damaged or destroyed due to flash flooding. Governor Jim Hunt estimated the uninsured losses at \$6 million.
Flash Flood October 4, 1995	Wake County Sheriff's Department reported several roads under water in the eastern and northern sections of Raleigh. Crabtree Creek in Raleigh rose above flood stage closing some streets.
Flash Flood October 5, 1995	Wake County Sheriff's Department reported several roads in southern section of the county under water. Old Stage Road, one mile north of the Johnston County line, was closed due to flood waters eroding away the shoulder of the roadway and undercutting the pavement.
Flash Flood September 6, 1996	A total of 8 to 10 inches of rain with Hurricane Fran caused the Crabtree Creek to reach the highest level since improvements to the drainage basin were made and the second highest level on record. Severe flooding of streets, homes, and businesses near the creek occurred overnight and well into the morning.
Flash Flood September 10, 1996	Several major roads through Raleigh were closed due to high water, including Capital Blvd, Highway 64, and Glenwood Avenue. A bridge was washed out on SR2320 north of Wendell. An earthen dam broke north of Zebulon between Highways 64 and 401.
Flash Flood September 10, 1996	Crabtree Creek went above bankfull and flooded surrounding roads and businesses. The creek flows through most major commercial areas of Raleigh.
Flash Flood September 11, 1996	A cluster of slow moving thunderstorms produced brief flooding of many urban highways and local streams.
Flash Flood October 8, 1996	Heavy rains associated with TS Josephine flooded major roads in Raleigh including Atlantic Avenue, New Bern Avenue, Glenwood Avenue and portions of Avent Ferry. Small streams overflowed onto secondary roads throughout the county.
Flash Flood April 28, 1997	Several major thoroughfares out of town were flooded in north Raleigh. Water also briefly spilled over the bridge on Highway 401 on the Neuse River. Avent Ferry Road in the southern part of the County was also briefly closed.
Flash Flood July 24, 1997	The remnants of Hurricane Danny moved slowly northeast from upstate South Carolina into extreme southern North Carolina shortly after midnight on the 24 <sup>th</sup> . Danny entered Anson County and then passed over Richmond, Moore, Hoke and Harnett Counties from 1:00 AM through 7:00 AM. Danny moved northeast over Harnett, Wake, and Johnston Counties between 7:00 AM and 9:00 AM. It then accelerated northeast into Nash, Franklin, Wilson, Edgecombe, Halifax and Warren Counties between 9:00 AM and 1:00 PM. Danny produced torrential rainfall of 2 to 4 inches per hour as it passed over these counties. Numerous roads were flooded and several bridges were covered with water. Video of stranded cars and accidents were the mainstay of the evening news.
Flash Flood January 16, 1998	Heavy rain brought a rapid rise in Crabtree Creek in Raleigh. The flooding occurred from Wake Forest Road downstream to Atlantic Avenue and to Capital Boulevard. The gage at Wake Forest Road rose to 1 foot above flood stage for a few hours time. This caused minor flooding to the parking lots and businesses

Storm	Description
	adjacent to the creek. Atlantic Avenue and Hodges Street had to be closed due to 2 to 3 feet of water. Several cars were submerged in the high water and had to be evacuated. High water also flooded portions of Capital Boulevard, closing several lanes of traffic. Flooding of creeks and streams throughout Wake County caused the closing of other roads including Poole Road and Rose Lane in Raleigh. Avent Ferry Road near NCSU Centennial Campus was also closed due to several feet of water on the roadway. Flooding occurred all along Swift Creek from Raleigh to Fuquay-Varina.
Urban/Small Stream Flood January 23, 1998	Urban flooding occurred in the City of Raleigh as a general soaking rain became heavy during the late morning and lasted into the early afternoon. Rainfall amounts of 1 inch per hour brought storm totals in the 3 to 4 inch range in the area. Several small streams came out of their banks and numerous streets in low lying/flood prone areas became flooded with 6 to 12 inches of water. Jones Sausage and Rock Quarry Roads in east Raleigh were closed for brief periods of time. Several cars became submerged in the water on Capital Boulevard near Crabtree Boulevard and at Capital and New Hope Church Road.
Flash Flood March 9, 1998	Thunderstorms produced very heavy rain across most of eastern and central Wake County and most of Johnston County. Emergency Management personnel reported numerous streams and creeks came out of their banks in both counties. The most flooding in Wake County was around the south side of Raleigh where several roads had to be closed. In Johnston County, flooding was reported from many locations including Selma and Clayton. Several rural roads were closed. Rainfall amounts of 1 to 1.5 inches occurred in less than an hour.
Flash Flood March 19, 1998	A slow moving cold front became stationary over central North Carolina during the early morning hours of the 19 <sup>th</sup> . Heavy rain developed near the frontal boundary and moved slowly across Montgomery, Moore, and Randolph counties, then into areas from Siler City and Raleigh northeast to Durham, Chapel Hill, Oxford, Henderson, and Warrenton. Numerous roads had to be closed in Chatham, Wake, Durham, and Vance Counties. Rainfall amounts up to 4 inches fell on already saturated ground.
Urban/small Stream Flood August 8, 1998	Several slow moving thunderstorms dumped up to 3 inches of rain on southern and western portions of Raleigh during the early morning hours. Several streets and roads were closed due to high water including Avent Ferry Road near NC State University. Three cars were caught in a low lying parking lot and completely submerged in the water. They sustained heavy damage. No injuries were reported.
Urban/small Stream Flood August 16, 1998	The same storm that caused wind damage also caused flooding over western and into central Wake County from near the RDU Airport east into the City of Raleigh. Several roads had to be closed including Avent Ferry near NC State University. Rainfall amounts of 2 to 3 inches fell in 1 to 1.5 hours sending small creeks and branches out of their banks. At least 5 cars were heavily damaged from the rising water. They were parked near a small creek in an apartment parking lot.
Flash Flood August 26, 1999	Up to 5 inches of rain fell in the northern portion of the county. The result was widespread flooding of roads, especially in Wake Forest. One person had to be rescued from a flooded vehicle.
Flash Flood September 5, 1999	The remnants of Hurricane Dennis dumped 6 to 8 inches of rain across the heart of Carolina. This water caused many streams and creeks to overflow their banks. In the Capital area, Crabtree Creek and Walnut Creek flooded nearby streets and communities. The same scenario was repeated across the rest of the Triangle and surrounding counties.
Flash Flood September 15, 1999	Rainfall associated with Hurricane Floyd produced unprecedented flash flooding across the eastern half of the state. Every river and stream flooded nearby roads and communities. Several lives were lost due to people driving into flooded roadways or directly into streams where roads were washed out. Several earthen

<b>Storm</b>	<b>Description</b>
	dams also gave way.
Flash Flood September 27, 1999	In the days after Hurricane Floyd, all the rivers in the eastern half of the state remained well above flood stage. Also, the major tributaries remained full, since they could not drain into the main stem river. Many acres around these waterways were flooded and, the ground was saturated. Any additional rainfall produced immediate runoff into local streams/creeks which brought water back onto roads and into surrounding neighborhoods and communities.
Flash Flood September 28, 1999	All the rivers in the eastern half of the state remained well above flood stage. The major tributaries remained. Additional rainfall produced immediate runoff into local streams/creeks. Since the state was still covered by a quasi-tropical air mass, even garden variety thunderstorms dropped copious rainfall amounts. The nightmare flooding simply would not end.
Flash Flood July 29, 2000	Portions of Glenwood Avenue were closed due to flooding and water up to car door handles were reported near RDU Airport.
Flash Flood August 1, 2000	Portions of Glenwood Ave/Hwy 70 closed from Crabtree Mall to the RDU Airport due to flooding. Cary Parkway and High House Road were also closed for an hour.
Flash Flood August 4, 2000	Flooding reported on I-440, Capital Boulevard and Wake Forest Road.
Flash Flood August 4, 2000	6 – 8 inches of water reported on Highway 401.
Flash Flood September 3, 2000	Avent Ferry Road and Hillsborough Street were flooded. Two inches of rain in one hour was reported.
Flash Flood September 4, 2000	Numerous roads were flooded across Raleigh. A creek was flowing across Avent Ferry Road. Highway 401 N. flooded and some trucks were flooded up to their hoods in a car lot.
Flash Flood September 25, 2000	Several roads were flooded, resulting in lane closures on Garner Road, Glenwood Avenue, Creedmoor Road and Litchford Road.
Flash Flood June 16, 2001	Flooding reported on Capital Boulevard at Brentwood Road and Highway 70 in Garner. Pond overflowed onto Wycliff Road at Lake Boone Trail. Avent Ferry Road was closed near NC State campus, causing several apartments to be evacuated.
Flash Flood July 4, 2001	Middle Creek and Swift Creek overflowed their banks, causing extensive flooding in Holly Springs, Fuquay-Varina and Garner. A mobile home park near Ten-Ten Road and Highway 401 was evacuated. Many driveways, roads and a few bridges were washed out, causing some people to abandon their cars.
Flash Flood July 9, 2001	Swift Creek caused flooding on Highway 401 in Fuquay-Varina. Penny Road and several roads near Lochmere Golf Course flooded.
Flash Flood August 11, 2001	Middle Creek flooded several roads around Holly Springs.
Flash Flood September 10, 2001	Flooding was reported on Mitchell Mill Road.
Flash Flood March 31, 2002	6 to 12 inches of water blocked traffic on Glenwood Ave. and Wade Ave.
Flash Flood June 28, 2002	Flooding was reported along Avent Ferry Road. A creek overflowed into a parking lot.
Flash Flood August 26, 2002	A creek overflowed its banks near Saratoga Drive and New Hope Church Road. Some apartments and vehicles were flooded.
Flash Flood October 11, 2002	Several roads in North Raleigh were flooded, and a building on Lumley Road was flooded. Crabtree Creek briefly overflowed its banks.
Flood March 20, 2003	Persistent heavy rain brought widespread flooding across central North Carolina, beginning in the morning of March 20 and continuing into the afternoon. Numerous roads across the area had to be closed due to flooding, and numerous creeks overflowed their banks. Rainfall amounts were mainly between 2 and 4 inches in

Storm	Description
	less than 12 hours. The heaviest rain fell in Forsyth County, where major flooding occurred along Muddy Creek, Mill Creek, and Grassy Creek, and several water rescues were needed.
Flood April 10, 2003	Persistent showers and thunderstorms produced heavy rain and flooding across the Piedmont of North Carolina. Several creeks and streams overflowed their banks, leading to road flooding and numerous road closures. Some basements of homes were flooded in Guilford County, and a water rescue was made in Moore County.
Flash Flood June 7, 2003	A foot or more of water flooded several roads.
July 17, 2003	A house on Banks Road near Highway 401 was flooded
July 29, 2003	Cars were flooded on Avent Ferry Road. One car sitting at a stop light was swept off the road.

Source: National Climatic Data Center, <http://www4.ncdc.noaa.gov/cgi-win/wwwcgi.dll?wwwEvent~Storms> and SHELUDS (Spatial Hazard Events and Losses Database for the United States, [http://go2.cla.sc.edu/hazard/db\\_registration](http://go2.cla.sc.edu/hazard/db_registration)).

\*Descriptions of flood event data were not recorded by the NCDC prior to 1995.

**Table AA-4: Descriptions of Thunderstorms and High Wind Events\***

<b>Date/Location</b>	<b>Description</b>
June 15, 1958 – April 8, 1991	No descriptions available.
August 5, 1994	Sheriff's office reported tree and power lines down.
November 11, 1995 North Raleigh	Trees down in portions of north Raleigh at Six Forks and Strickland Roads. Tree down on a car causing extensive damage.
January 19, 1996 Wake Forest	Trees and power lines down.
March 5, 1997 Wake Forest/Zebulon	Several trees were blown down in northern and eastern Wake County. The areas hit hardest by the squall line were Wake Forest and Zebulon
April 1, 1997	A strong low pressure system exited North Carolina early on the 1 <sup>st</sup> , followed by a strong gradient wind behind the associated surface cold front. Winds gusted to around 45 knots during the day and were sustained at 30 knots at times from the northwest during the afternoon. Several trees were blown down across the county. Many of the fallen trees had damaged root systems related to Hurricane Fran hitting the area in September 1996. While planting azaleas in his front yard, a man was crushed by a pine tree that snapped off about 15 feet above the ground. He died at the hospital due to a broken neck and chest injuries. Another man was injured by a falling tree while working on a roof. About 10,000 customers lost electric service in the Raleigh area due to trees falling on power lines.
July 24, 1997	The remnants of Hurricane Danny intensified explosively as it entered Wake County. It also picked up speed and was moving 40 to 50 mph when it moved off the coast of North Carolina. Trees and power lines were downed throughout the warned area as the storm accelerated northeast.
February 3, 1998	Strong and gusty wind associated with a storm system that moved across North Carolina downed several trees, although only 30 to 35 mph wind gusts were recorded. The saturated soils greatly aided the wind in downing the trees.
February 16, 1998	Strong winds with gusts to 35 mph were common across central North Carolina during the night of the 16 <sup>th</sup> and into the morning hours of the 17 <sup>th</sup> . The strongest gust was recorded at Goldsboro (52 mph). Several trees were downed in almost all of the counties in central North Carolina from Winston-Salem to Raleigh/Durham to Goldsboro and Rocky Mount. A combination of the wind and very soggy soils led many of the trees to fall. Several homes were damaged in Sampson, Wayne, Wake, and Cumberland Counties.
August 14, 1999 Wake Forest	Several roads were blocked by fallen trees, causing widespread power outages. Many roads were flooded.

Source: National Climatic Data Center, <http://www4.ncdc.noaa.gov/cgi-win/wwwcgi.dll?wwwEvent~Storms> and SHEL DUS (Spatial Hazard Events and Losses Database for the United States, [http://go2.cla.sc.edu/hazard/db\\_registration](http://go2.cla.sc.edu/hazard/db_registration)).

\*Descriptions concerning thunderstorms and high wind events were not recorded by the NCDC prior to 1993.

**Table AA-5: Descriptions of Hail Events\***

<b>Date/Location</b>	<b>Description</b>
August 15, 1958 - May 26, 1995	No descriptions available.
May 1, 1997 Wake Forest	0.75 inch hail fell in the Town of Wake Forest.
May 1, 1997 North Raleigh	0.75 inch hail reported by Skywarn at Durant Road and Capital Boulevard in north Raleigh.
June 2, 1997 North Raleigh	Dime size hail fell at the Six Forks and Sawmill Road intersection of north Raleigh.
June 3, 2000 North of Raleigh	Dime to quarter size hail was reported throughout the county.
March 31, 2002 North of Raleigh	Nickel size hail reported at Durant and Litchford Roads.
June 1, 2002 Wake Forest	N/A

Source: National Climatic Data Center, <http://www4.ncdc.noaa.gov/cgi-win/wwwcgi.dll?wwEvent~Storms> and SHEL DUS (Spatial Hazard Events and Losses Database for the United States, [http://go2.cla.sc.edu/hazard/db\\_registration](http://go2.cla.sc.edu/hazard/db_registration)).

\* Descriptions of Hail Storm events were not recorded prior to June 8, 1995 by the National Climatic Data Center (NCDC)

**Table AA-6: Descriptions of Lightning Events\***

<b>Date/Location</b>	<b>Description</b>
August 12, 1966 - March 26, 1988	No description available.
July 17, 1994 North Raleigh	Lightning started a fire that destroyed a home.
January 16, 1998 Wake Forest	Lightning struck a brick house on Seawell Drive in Wake Forest about 20 miles northeast of Raleigh during the early afternoon. The lightning bolt hit the chimney of the new two story house, and the current ran throughout the house's wiring and into the bedrooms. Most of the damage was to the roof and in the bedroom. Flying debris and brick knocked holes in the walls, and bricks from the chimney were found 105 feet away in a neighbor's yard.

Source: National Climatic Data Center, <http://www4.ncdc.noaa.gov/cgi-win/wwwcgi.dll?wwEvent~Storms> and SHELDUS (Spatial Hazard Events and Losses Database for the United States, [http://go2.cla.sc.edu/hazard/db\\_registration](http://go2.cla.sc.edu/hazard/db_registration)).

\* Descriptions of Lightning events were not recorded by the NCDC prior to May 1993.

**Table AA-7: Descriptions of Tornadoes\***

<b>Date/Magnitude</b>	<b>Description</b>
May 12, 1950 - October 23, 1990	No description available.
March 27, 1993 F0 Tornado	A small tornado touched down briefly south of Lake Wheeler and moved northward blowing down trees in its path.
April 15, 1996 F0 Tornado	An F0 tornado initially touched down off Hwy. 64 in Wendell. The tornado width was initially only 50 feet where several trees were taken down. The tornado increased in width to 200 yards as it paralleled Hwy. 64 and moved into the west side of the Town of Zebulon. The storm damaged the Courtesy Car Dealership and tossed a showroom car across the highway. Numerous trees were twisted and felled. The tornado then crossed the highway and narrowed significantly as it reached Hwy. 96 and Greenspace Road about 0.3 miles west of the Wakefield community where it lifted.
April 15, 1996 F1 Tornado	The second of a series of three tornadoes began about 100 yards to the southeast of where the first tornado began (off Hwy. 64 Wendell). The storm was initially less than 25 yards wide as it moved north/northeast and twisted trees and blew shingles off several houses. About one half mile from the initial touchdown, the storm widened to 50 yards as it approached the Town of Zebulon. Trees were downed and the roof was blown off a brick home near the railroad tracks. Another home and a manufactured home were damaged as the storm crossed a street and moved up a hill. The storm then proceeded over and down the hill into a mobile home park. Damage was extensive to all the trailers in the park that were directly in the path. The storm continued moving north/northeast into downtown Zebulon where it downed numerous large trees. Houses in the direct path of the storm were all brick and sustained only roof damage. The Zebulon Middle School sustained major roof damage to the main building. The tornado was last noted at Karial and Old Bunn Roads where minor damage occurred to a frame house and several trees were twisted.
July 12, 1996 F0 Tornado	A small tornado formed along an outer band of Hurricane Bertha. The hurricane was centered approximately 140 miles to the southeast. The tornado was on the ground about 6 minutes and moved east to west at 50 mph. Numerous trees were snapped or uprooted. About 10 homes received minor damage due to falling trees.
March 20, 1998 F0 Tornado	A home video of this storm showed a wall cloud with several small vortices. One of these touched down very briefly and damaged the roof of one home. The adjacent homes, and there were many, were untouched. The insulation from the home was then spread into adjacent trees.
March 20, 1998 F2 Tornado	The tornado remained a funnel as it roared over the Greenbrier Estates just east of US 401. Trees were sporadically uprooted and snapped off. Several trees fell on homes and outbuildings. The tornado touched down on highway 70 at a church. The roof of one section was taken off and the steeple was blown off the chapel. The debris from the church took out windows at a car lot across the street. A block away, the wind removed several siding sheets from a business.
March 20, 1998 F0 Tornado	The storm that hit Garner produced another tornado 6 miles to the northeast on the east side of Raleigh. Damage began just off US 64 at Wake Medical Center and the Tower Shopping Center. Cars were overturned, trees were damaged, and a steel-beamed billboard was twisted. The tornado then crossed the highway where it lifted the roof off the business office of a tree nursery, damaged two sheds, and destroyed 5 greenhouses. Insulation and debris was strewn up in the trees well away from the path.
June 1, 2001 F0 Tornado	Siding was blown off apartment buildings near Highway 54 and Cary Parkway. Trees were also blown down in the area, and a funnel cloud was reported.

Source: National Climatic Data Center, <http://www4.ncdc.noaa.gov/cgi-win/wwwcgi.dll?wwwEvent~Storms> and SHELDUS (Spatial Hazard Events and Losses Database for the United States, [http://go2.cla.sc.edu/hazard/db\\_registration](http://go2.cla.sc.edu/hazard/db_registration)).

\* Descriptions of Tornado activity were not recorded by the NCDC until 1993.

**Table AA-8: Descriptions of Snow and Ice Storm Events\***

Date	Description
March 2, 1960 - February 12, 1993	No description available
January 3, 1994	Snowfall of 4 to 12 inches accumulated over the northern and central mountains.
February 10, 1994	A strong cold front brought a surge of arctic air into North Carolina on the 10 <sup>th</sup> and plunged temperatures 40 to 50 degrees from readings the previous day to below freezing. Low pressure developed along the front causing widespread sleet and freezing rain across northern and western sections. The greatest ice accumulation of 1 to 2 inches associated with damages to trees and power lines occurred in the northern Piedmont and north Foothills regions. Elsewhere in northern interior and western sections, ice accumulations ranged from ¼ to 1 inch. Numerous motor vehicle accidents were also reported.
January 19, 1998	A soaking rain developed across central North Carolina during the overnight hours and gradually changed to snow. Two bands of heavy snow fell. The first band extended from Ansonville of the southern Piedmont northeast through Troy, Southern Pines, Pinehurst, and to Sanford. The second band stretched from Raleigh east through Zebulon, Bailey, Wilson, and Tarboro. Accumulations were in the 2 to 4 inch range with the most accumulations on grassy surfaces and trees. Warm ground temperatures, rain soaked ground, and air temperatures in the mid 30s throughout the storm limited snowfall totals significantly.
December 23, 1998	An ice storm began during the afternoon of 12/23/1998 and continued through the early morning hours on 12/25/1998. Most of the precipitation fell in the form of freezing rain across central North Carolina causing power outages to approximately 500,000 people sometime during the period. Nearly 90,000 people were without power in Wake County alone at 2 pm on Christmas Eve. The most severe ice accumulations were found in a southwest to northeast band across central North Carolina. This band extended from near Albemarle in Stanly County, northeast through the Asheboro area in Randolph County and continued northeast to Raleigh/Durham and Halifax. Accumulations from ½ to 1 inch of ice occurred in these areas. To the northwest, over the Winston-Salem, Greensboro, and High Point areas, the precipitation began as sleet and then turned to freezing rain. Accumulations of sleet ranged nearly an inch in some areas before changing to glaze. With temperatures in the mid 20s, this made travel conditions nearly impossible on the night of the 23 <sup>rd</sup> . From Fayetteville to Goldsboro including most of the eastern Sandhills and Coastal Plain region of the state, rain was mixed with freezing rain. Some locations saw ¼ inch accumulations of glaze on trees and power lines which caused numerous power outages. Travel conditions were not as severe as in the Piedmont region due to the mix with rain and temperatures ranging between 31 and 35 degrees. Early on Christmas morning, the freezing rain changed to a period of light snow over the eastern Piedmont. The snow accumulated 1 to 2 inches in spotty locations centered from Pinehurst in Moore County to Fuquay-Varina in Wake County.
January 18, 2000	Light snow moved over the Triad area in the early morning hours of the 18 <sup>th</sup> and spread slowly east-southeast, reaching the Sandhills and Coastal Plain before daybreak. The snow intensified in the morning in the Triad area where 4 to 6 inches of snow fell. The Sandhills and Coastal Plain received 1 to 3 inches before changing over to sleet and freezing rain in the mid-morning hours. Total accumulations of ice were less than a quarter of an inch. The snow and ice made for slick road conditions across the entire area. Most counties reported numerous accidents, causing many major roads to close.

Date	Description
January 20, 2000	An average of 2 to 3 inches of snow fell in the northern half of central North Carolina with a few locations near the Virginia border receiving up to 4 inches. The southern counties in central North Carolina received mostly rain with a trace of snow. The snow began around midnight on the 20 <sup>th</sup> over the northwest Piedmont and moved east. The light snow tapered off to rain and freezing drizzle in the early morning hours. Some secondary roads were reported to be slick while most roads remained clear.
January 22, 2000	A winter storm producing snow and ice moved from west to east across central North Carolina beginning on the evening of the 22 <sup>nd</sup> . The storm produced 2 to 5 inches of snow across the western Piedmont where Stanly and Anson counties reported 4 to 5 inches of snow and the Triad around 2 inches. Amounts less than an inch covered the ground in the Triangle and Rocky Mount areas while the southern tier counties got 1 to 3 inches. After a lull in the late night precipitation, sleet and freezing rain developed early on the 23 <sup>rd</sup> . The accumulation of ice was less than a quarter inch in the southern counties where precipitation was mostly rain. In the central counties including Nash, Wake, Chatham, and Randolph, the ice accumulated to around a quarter inch, causing scattered power outages and downed tree limbs. Precipitation in the northern counties remained mostly snow throughout the event.
January 24, 2000	This record-setting snow storm began with freezing drizzle in the early morning hours of the 24 <sup>th</sup> . Road surfaces quickly froze during this time when the temperature dropped from 32 degrees to 27 degrees. Numerous traffic accidents were reported. By mid-morning, additional precipitation was advancing northward into the southern portions of central North Carolina. During the afternoon of the 24 <sup>th</sup> , rain was falling across southeastern North Carolina while an area of snow was located over the southwest Piedmont to the western Sandhills. Later that evening the precipitation reached the Triangle area beginning as mostly sleet before quickly changing to all snow. The snowfall became heavy early on the 25 <sup>th</sup> with snowfall rates estimated at 4 inches per hour. A north to south oriented band of heavy snow remained in place over Moore, Lee, Wake, Franklin, Granville, Vance, and Warren counties for several hours. Snowfall amounts exceeded 20 inches in some locations in these counties. The western Piedmont counties recorded 8 to 12 inches of snow, while the Coastal Plain received 4 to 8 inches of snow with light icing at the end of the event. The heavy snow brought central North Carolina to a standstill. Many people were impassable and power outages were reported the entire area. Statewide, an estimated 260,000 people were without power, mostly in the Sandhills. Strong gusty winds produced snow drifts several feet high. At the RDU Airport, the record snowfall from one storm was set at 20.3 inches. The total cost of the storm to the state was estimated at \$800 million.
January 28, 2000	Sleet and freezing rain began to fall in the western Piedmont of North Carolina on the evening of the 28 <sup>th</sup> . The ice accumulated to a half inch in some locations near the Triad area and along the Virginia border, with most locations in the area receiving around a quarter of an inch of ice. The rest of central North Carolina received a thin coating of less than a quarter inch, creating patchy spots of ice on roads and causing downed trees and power lines. Approximately 30, 000 people were without power across the state at the peak of the storm. In eastern portions of the Sandhills and in the Coastal Plain, the freezing rain changed to light rain, preventing more widespread icing in that area. A lull in the precipitation from the predawn hours on Sunday until Sunday morning also kept ice accumulation minimal.
January 3, 2002	The first winter storm of the season brought significant snowfall to central North Carolina. An initial round of snow began to fall during the evening of the 2nd. The snow was heavy at times, and accumulated between 3 and 5 inches. The snow changed to sleet and light freezing rain in the Coastal Plain through the early morning hours of the 3rd. After a period of little or no precipitation on the morning of the 3rd, snow began to fall again across the entire area, and was heavy at times, adding an additional 4 to 8 inches. Storm total snowfall amounts were over a foot

Date	Description
	from the Sandhills northeast across the Piedmont to the Virginia border. The Northwest Piedmont, including the Triad area, received 6 to 10 inches. Snowfall amounts were lower in the Southern and Central Coastal Plain, between 4 and 8 inches, due to the snow mixing with sleet and freezing rain.
December 4, 2002	One of the worst ice storms to ever hit Central North Carolina began in the late afternoon on December 4, and ended in the early morning hours of December 5. Precipitation mainly began as a mix of snow and sleet, then turned to freezing rain. A quarter inch of ice or more covered locations mainly to the west of I-95. The highest precipitation amounts stretched across the Piedmont, from Albemarle to Asheboro to Durham to Warrenton, where a half inch to one inch thick layer of ice was reported. 1 to 2 inches of snow also fell in the Triad area and in the counties bordering Virginia with trace amounts elsewhere. Large trees and power lines were downed by the ice all across the area. The storm caused a record number of power outages, as nearly one million people lost power in Central North Carolina, some for nearly a week.
February 16, 2003	Sleet and freezing rain fell across much of central North Carolina. Sleet accumulated between 1 and 3 inches across the Piedmont, mainly west of a line from Southern Pines to Raleigh to Roanoke Rapids. The highest accumulations were near the Virginia border and in the Triad area. Mainly freezing rain fell across the Sandhills and Coastal Plain, with ice accumulations around a quarter inch along a narrow corridor from Wadesboro to Smithfield to Rocky Mount.
February 27, 2003	Freezing rain began in the early morning hours of the 27th, and continued into the afternoon. Ice accumulated to nearly one inch just north of the Triad area. Much of the Piedmont from Raleigh north and west received a quarter to a half inch of ice. Numerous trees were downed and power outages were widespread across the Piedmont.

Source: National Climatic Data Center, <http://www4.ncdc.noaa.gov/cgi-win/wwwcgi.dll?wwEvent~Storms> and SHELDUS (Spatial Hazard Events and Losses Database for the United States, [http://go2.cla.sc.edu/hazard/db\\_registration](http://go2.cla.sc.edu/hazard/db_registration)).

\*Descriptions of Ice and Snow Storms were not recorded and kept by the NCDC prior to 1994.