SC HURRICANES COMPREHENSIVE SUMMARY

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SOUTH CAROLINA STATE CLIMATOLOGY OFFICE

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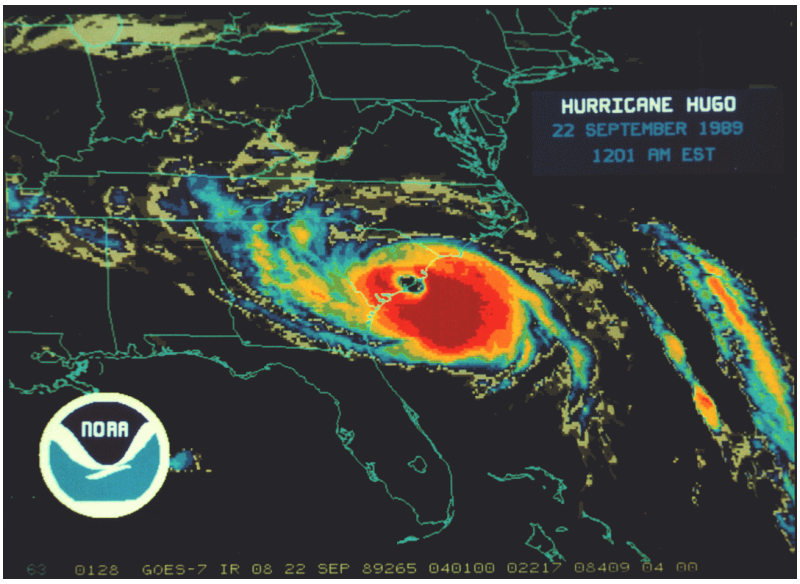
SOUTH CAROLINA TROPICAL CYCLONE CLIMATOLOGY

Understanding hurricanes and tropical storms are an essential piece of South Carolina's climatology, especially when considering the growth of coastal communities. However, impacts from these systems are not limited to those living along the coast. Inland portions of the state have also been affected by heavy rain, flooding, high winds, and tornadoes.

From 1851-2020, 43 tropical cyclones have made landfall along the South Carolina coastline. Of these 43 systems that have directly hit the coast, only four made landfall as major (Category 3+) hurricanes; the 1893 Sea Islands Hurricane, Hurricane Hazel, Hurricane Gracie, and Hurricane Hugo. There are no Category 5 hurricane landfalls on record for the state of South Carolina.



While the official Atlantic Hurricane Season begins each year on June 1st and ends November 30th, the season can start earlier and finish later than these dates.

This summary includes statistical analysis of the historical tropical cyclone data and tracks that have affected the Palmetto State. It also contains an overview of the tropical cyclone hazards documented in the state and brief narratives of notable hurricanes that made landfall along the South Carolina coast, and a timeline of tropical cyclones that cross the coastline since 1851.

SOUTH CAROLINA BY THE NUMBERS

*based on 1851-2020 period of record

79.7%

CHANCE OF BEING IMPACTED BY A TROPICAL SYSTEM EACH YEAR

THE BREAKDOWN:

255 SYSTEMS HAVE IMPACTED SC

131 HAVE TRACKED INTO THE STATE

60 WERE CATEGORY 1 OR HIGHER

43 MADE DIRECT LANDFALL ON THE COAST

4 MAJOR (CAT. 3+) LANDFALLS

The table outlines the earliest and latest tropical storms or hurricanes in the year that have impacted South Carolina.

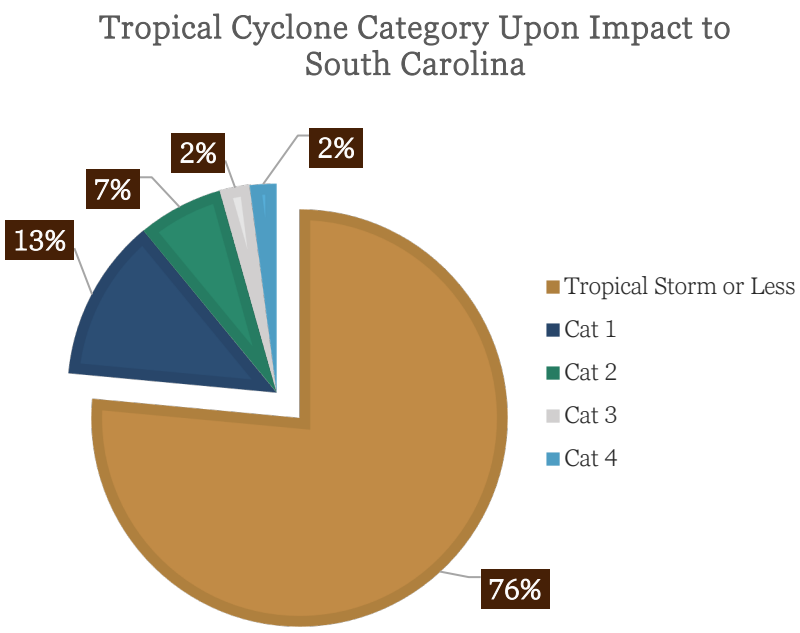
These dates show that South Carolina has never been impacted by a tropical system earlier than February 3rd or later in the year than December 2nd.

A tropical storm or hurricane has never made landfall in South Carolina later than October 31st. No major hurricane (Category 3 or higher) on record has made landfall before mid-August or after mid-October.

	EARLIEST RECORD	LATEST RECORD
TROPICAL STORM	February 3, 1952	December 2, 1925
CATEGORY 1	May 27, 1908	October 20, 1853
CATEGORY 2	July 14, 1916	October 31, 1899
CATEGORY 3	August 18, 1879	October 13, 1893
CATEGORY 4	August 26, 1958	October 15, 1954
LANDFALL	May 7, 2015	October 31, 1899

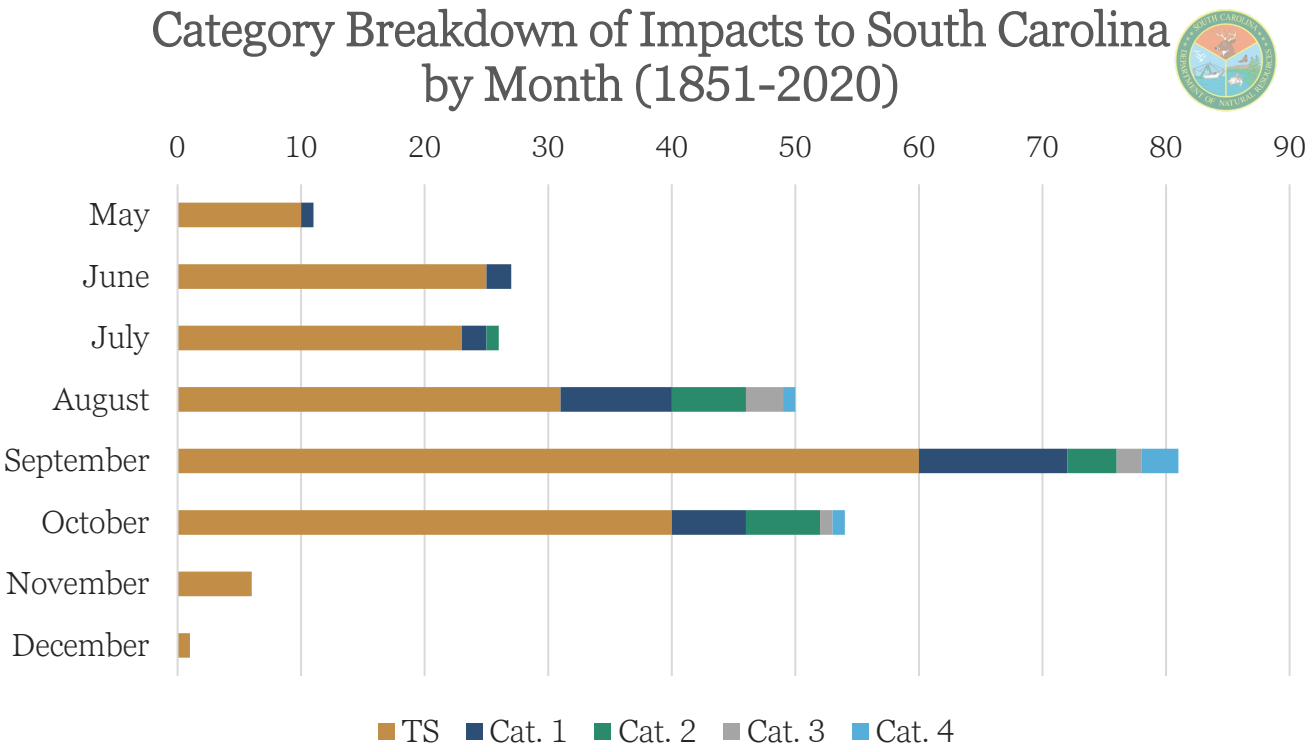
STORM IMPACTS ON SOUTH CAROLINA

The average size of a tropical system is approximately 300 miles in diameter, so while a storm might not track directly through the state, it can still have far-reaching impacts in the form of high winds, heavy rain, tornadoes, and coastal surge.



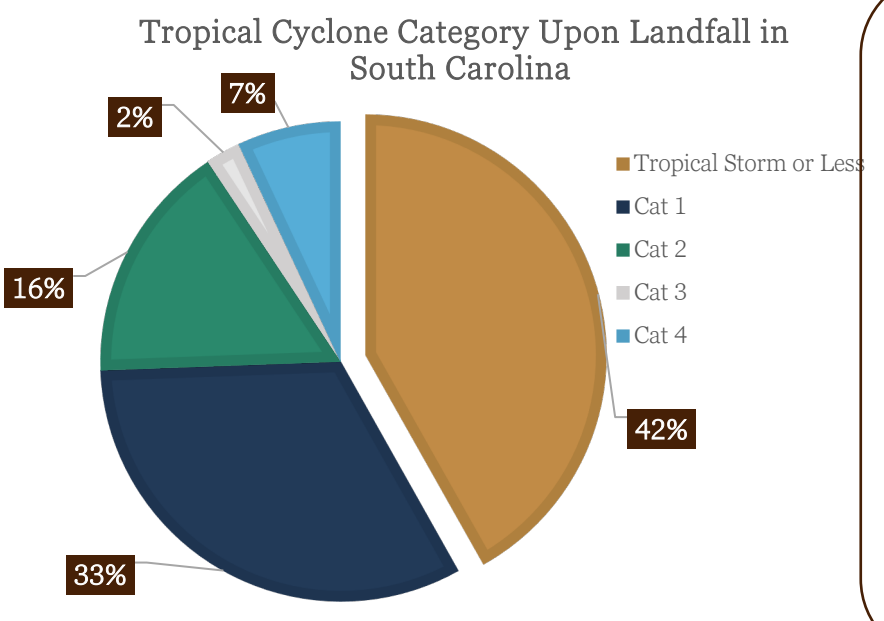
Tropical Storms and Hurricanes That Have Impacted South Carolina:

195	Tropical Storm or Less
32	Category 1
17	Category 2
6	Category 3
5	Category 4
0	Category 5



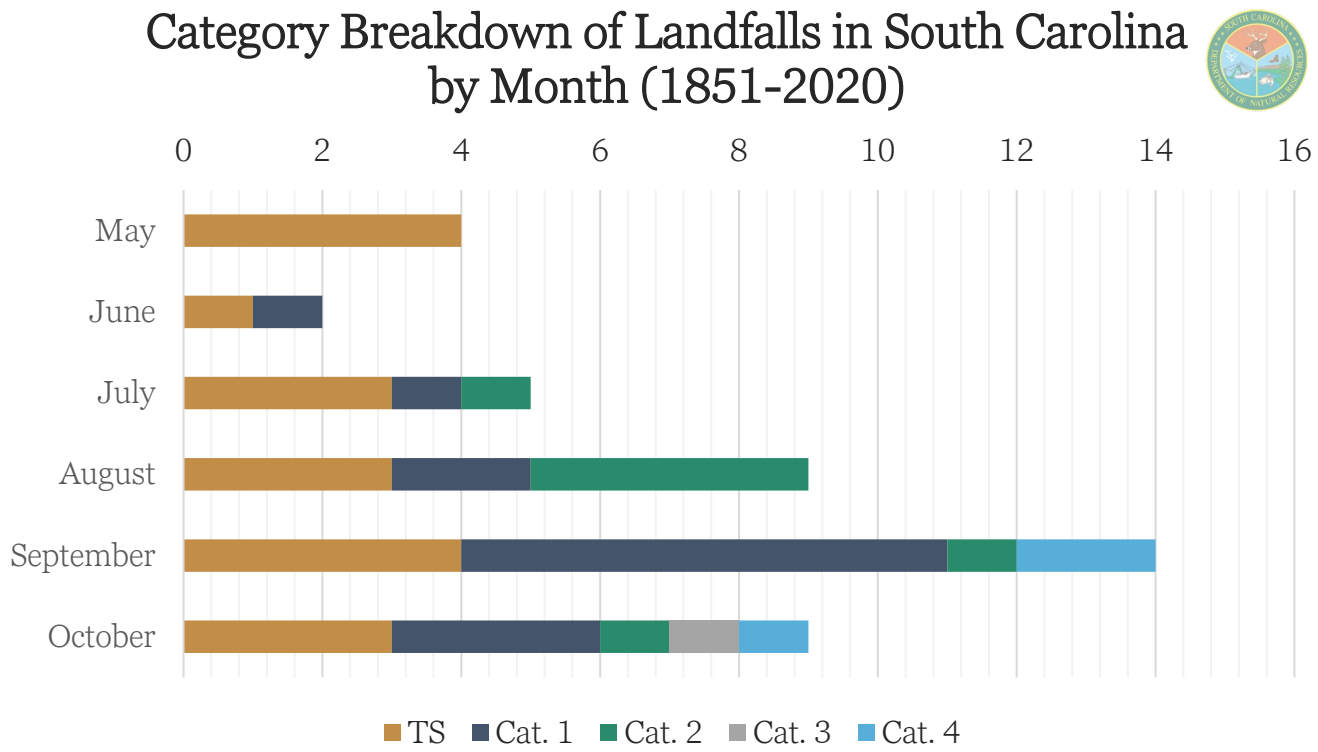
LANDFALLS IN SOUTH CAROLINA

A tropical cyclone makes landfall when the center of the storm intersects or crosses with a coastline. Because the strongest winds in a tropical cyclone are not located precisely at the center, a cyclone's strongest winds can be over land even if landfall does not occur.



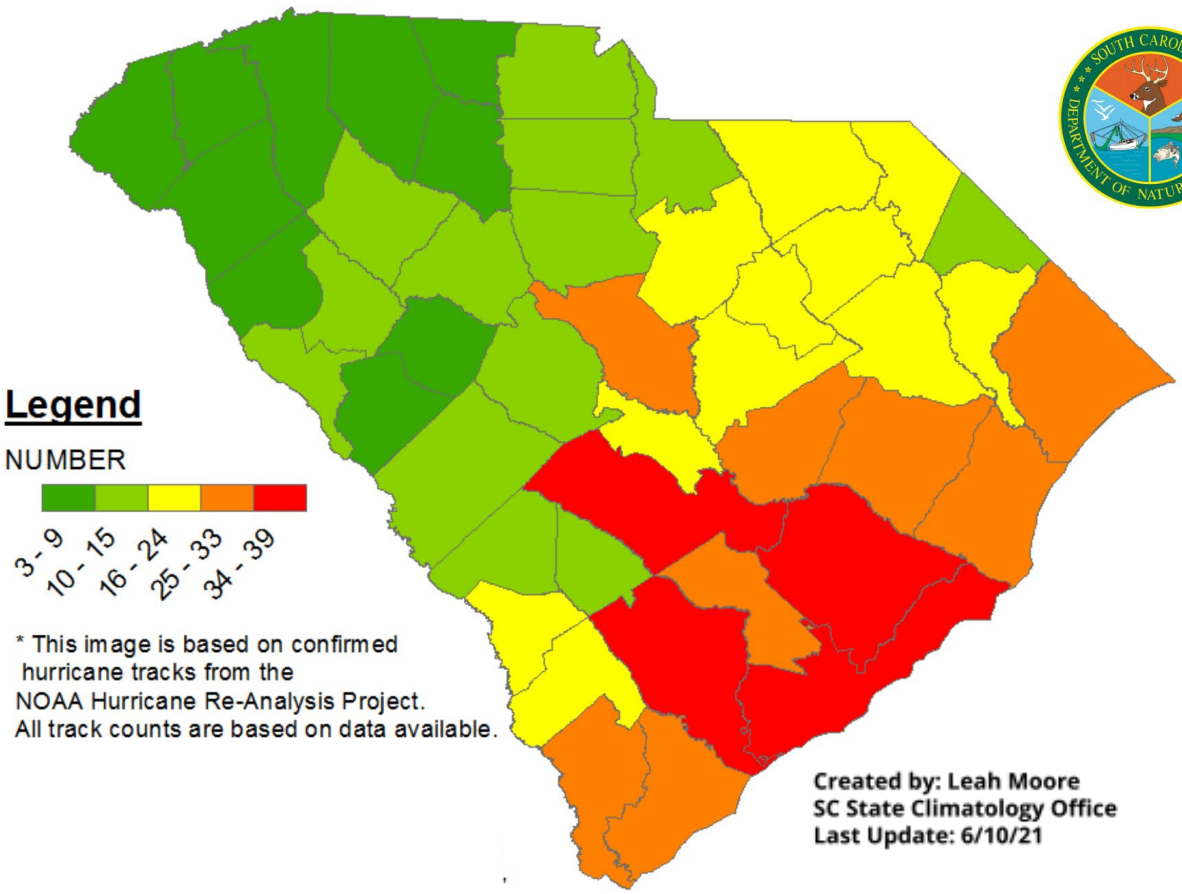
Tropical Storms and Hurricanes That Made Landfall in South Carolina:

18	Tropical Storm or Less
14	Category 1
7	Category 2
1	Category 3
3	Category 4
0	Category 5



SOUTH CAROLINA TROPICAL CYCLONE TRACK DENSITY

During the period 1851-2020, the center of 139 tropical cyclones has tracked into South Carolina. This map includes the counts of systems categorized by the National Hurricane Center as either extratropical storm, tropical storm, or hurricane that have passed into/through each county of the state from any direction, not simply making landfall on the coastline. This map does not consider the track of any remnants from tropical cyclones or far-reaching impacts of tropical cyclones that tracked outside of the state boundary.



Tropical systems can be hazardous for residents all over the state, even if they do not make landfall along the South Carolina coast. As a tropical cyclone moves inland, it loses its strength since it is no longer over its fuel source, the warm ocean water. Even in a weakened state, the remnants of these storms can produce heavy rain, tornadoes, and strong winds to interior portions of the area.

HAZARDS

STORM SURGE

Storm Surge Damage from Hurricane Hugo
Photo courtesy of SCDNR

Coastal communities must understand the impacts of storm surge and local tides, which can combine to create hurricane storm tides. One of the highest storm tides on record along the South Carolina Coast occurred during Hurricane Hugo (1989). From Sewee Bay to McClellanville, the storm tide exceeded 20 feet, sweeping away anything in its push inland.

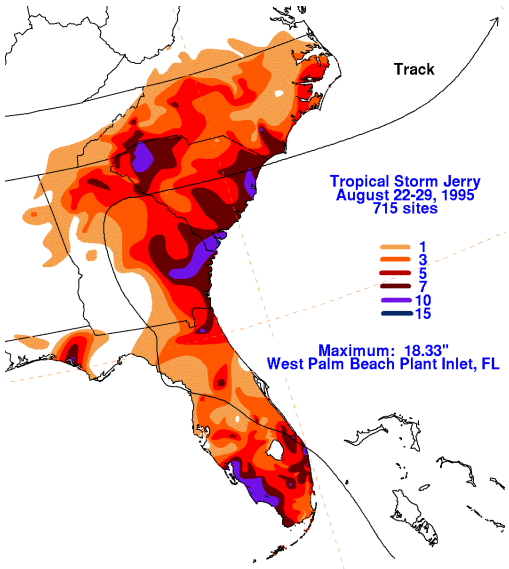
The storm surge went 10 miles inland up the Cooper, Ashley, and Santee Rivers, destroyed piers and oceanfront property, and caused significant beach erosion in Georgetown and Horry counties. Although Hurricane Irma (2017) made landfall in southwest Florida, it produced maximum inundation levels of 3 to 5 feet above ground level along the Georgia and South Carolina coast. Historically, storm surge is the leading cause of death of landfalling tropical cyclones.

23.68"

STATE RAINFALL RECORD FROM A TROPICAL CYCLONE HURRICANE FLORENCE 2018 IN LORIS, SC

INLAND FLOODING

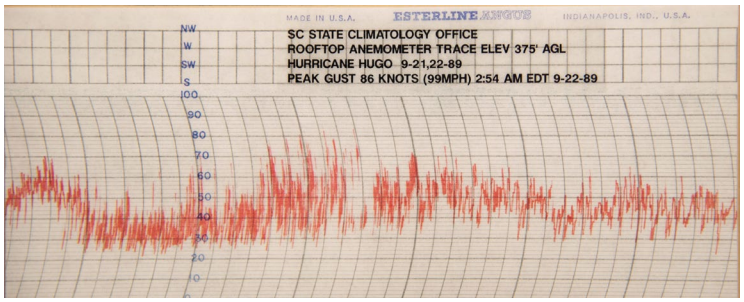
Flooding from tropical cyclones is not correlated with the intensity of the tropical storm or hurricane but rather the speed at which the system moves across an area. Heavy torrential rains can occur hundreds of miles away from the center of the storm. Flooding from heavy rains is the second leading cause of death from landfalling tropical cyclones. A slow-moving Tropical Storm Florence (2018), dropped more than 30 inches of rain across portions of eastern North Carolina and over 20 inches of rain in Chesterfield and Horry counties, causing extensive flooding within the Pee Dee watershed that lasted for weeks. In 1995, Tropical Storm Jerry made landfall along the Florida coast before slowly moving into the Upstate. Torrential rains dumped up to 15 inches of rain, leading to multiple dam breaks and extensive flooding along the Saluda, Board, Congaree, and Edisto rivers.



HAZARDS

WIND

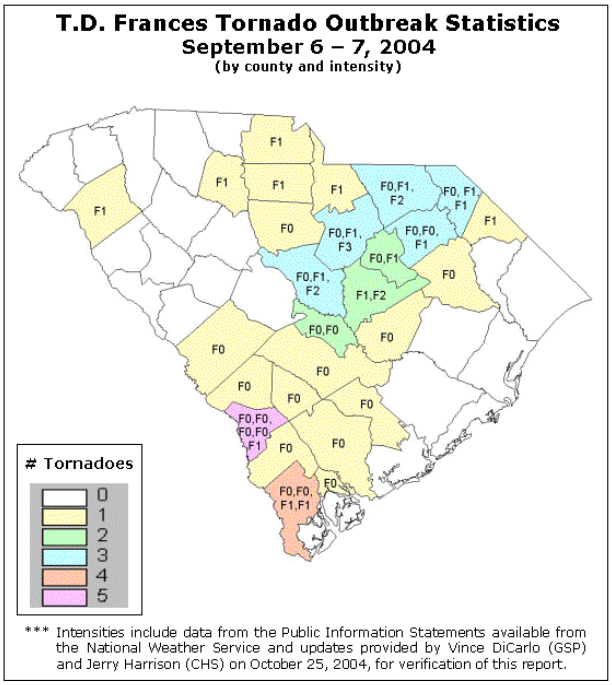
Pine Trees Snapped in Francis Marion National Forest from Hurricane Hugo
Photo courtesy of SCDNR



Tropical cyclones are known for their damaging wind and are categorized on the Saffir-Simpson scale based on the maximum sustained winds, not the maximum wind gusts. The size of a tropical cyclone wind field can expand out hundreds of miles from the storm's center, with the concentration of strongest winds normally located in the eyewall. Winds can stay at hurricane strength well inland of the coast. As Hurricane Hugo (1989) moved through the state with hurricane-force winds (74 mph or higher) and Shaw Air Force Base, located 80 miles from the coast, recorded a wind gust of 109 mph.

TORNADOES

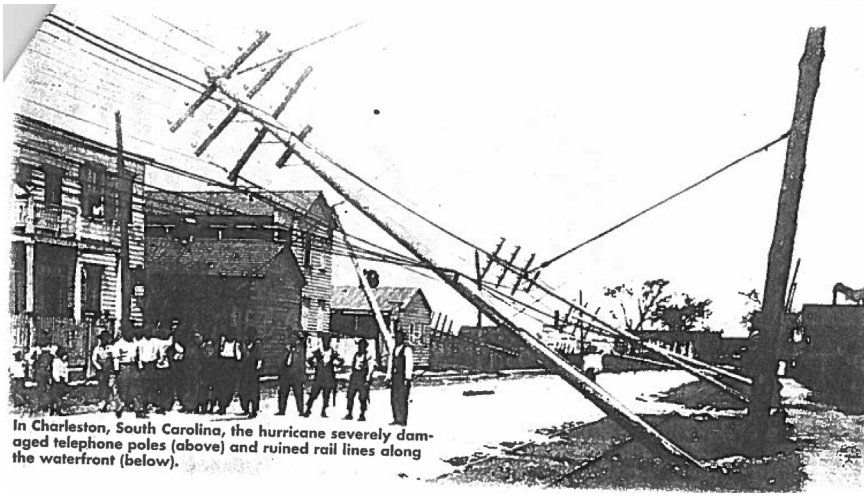
Tornadoes produced by tropical cyclones form in the outer rainbands, which can be hundreds of miles away from the storm's center and are more likely to occur in the right-front quadrant of the storm. More than half of landfalling hurricanes produce at least one tornado. One of the largest tornado outbreaks recorded in South Carolina was Hurricane Frances (2004), which made landfall along the east coast of Florida. Thunderstorms in the far-reaching outer rainbands spawned over 100 tornadoes across the Southeast, including 47 tornadoes in South Carolina. While most of the tornadoes are on the lower end of the Enhanced Fujita Scale, one was an F3 (winds between 158 – 206 mph) in Kershaw County that destroyed buildings and mobile homes near the city of Camden.



NOTABLE HURRICANES

AUGUST 28, 1893

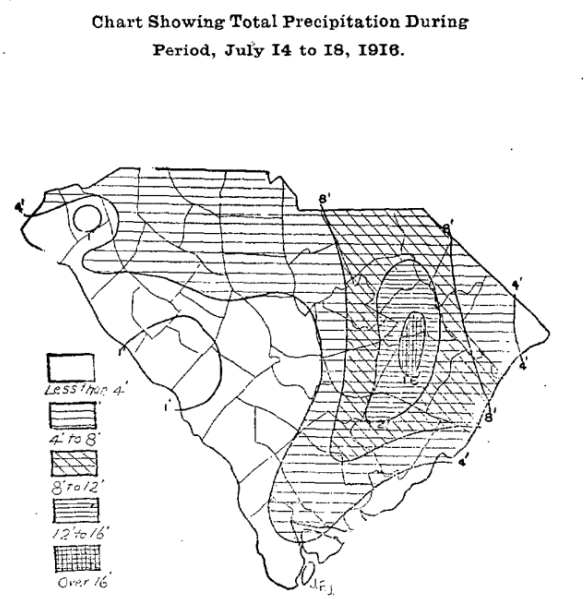
1893 marked the beginning of telegraph communication capabilities, which meant that areas with large coastal populations could be warned of incoming harsh weather conditions. However, no warnings were disseminated to regions with lower populations, such as the Sea Islands.



In Charleston, South Carolina, the hurricane severely damaged telephone poles (above) and ruined rail lines along the waterfront (below).

On August 28th, 1893, a hurricane thought by many to be a Category 4 or 5 made landfall in South Carolina at high tide, creating an enormous storm surge that swept over and submerged many of the Sea Islands. Maximum winds in the Beaufort, SC area were estimated to have been 125 miles per hour (mph), and winds in Charleston were estimated to have been approximately 120 mph. At least 2,000 residents of South Carolina died in this event, and an estimated 20,000 to 30,000 people lost their homes. This storm, appropriately referred to as "The Great Storm of 1893," is currently classified as a Category 3 hurricane.

JULY 14, 1916

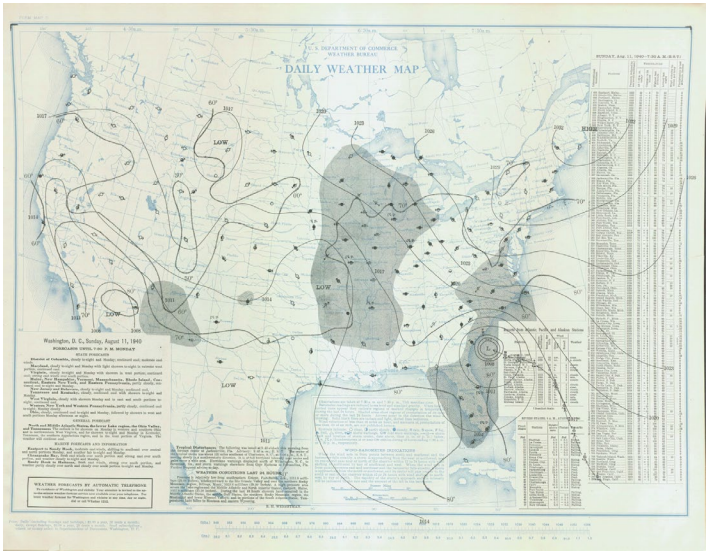


When this hurricane made landfall near Awendaw, SC, it was a Category 2, with winds recorded at over 80 mph. It slowly moved to the northwest as a stalled system over eastern South Carolina, which resulted in record rainfall and widespread flooding. In Effingham, SC (Florence County), a reporting station recorded 13.25 inches of rain in only 24 hours. The storm caused about $10 million ($245 million in 2021) in damages, destroyed over 700,000 acres of crops and produced the most extensive flooding of the Santee River System since records began in 1840. The severe flooding was partly influenced due to an earlier tropical system that affected the state a few days prior.

NOTABLE HURRICANES

AUGUST 11, 1940

This Category 2 hurricane made landfall near Hilton Head with winds of 105 mph and continued to move into central Georgia before curving to the north and heading into eastern Tennessee. Locations in the Lowcountry recorded more than ten inches of rain. High tides caused property damage along the southern coast from Folly Beach to Beaufort, including the U.S. Marine corps base on Parris Island and Port Royal. The extreme high tide at Charleston was determined as 10.71 feet above mean low water. Crop losses, including corn, hay, cotton, and truck were severe in the coastal sections, and trees and roofs were damaged to some extent 50 miles inland.



OCTOBER 15, 1954: HURRICANE HAZEL

Damage from Hurricane Hazel
Photo courtesy of National Weather Service

Hurricane Hazel made landfall as a Category 4 storm near Little River, SC, close to the South Carolina/North Carolina border. Myrtle Beach, SC, reported a peak wind gust of 106 mph at landfall. Hazel made landfall during the highest lunar tide of the year, with a storm surge of at least 10 feet in SC with an 18-foot surge just across the NC border at Calabash. Damage reports from across the Grand Strand state that 80% of the oceanfront buildings in Pawley's Island were destroyed, and only 2 of 275 buildings were left standing in Garden City. Significant damage from both the wind and surge occurred in Georgetown and Horry counties. Rainfall totals ranged from less than an inch on the western half of the state to over eight inches along the Grand Strand. One person was killed, and the total damage costs in South Carolina were estimated to be $27 million (~$300 million in 2021). Hazel was a swift-moving storm, heading north at almost 50 mph. After moving through the Carolinas, Hazel moved all the way North into Toronto, Ontario. While many hurricanes have occurred farther north along the East coast of the United States, Hazel remains the strongest, farthest north hurricane landfall on record.

NOTABLE HURRICANES

SEPTEMBER 29, 1959: HURRICANE GRACIE

Hurricane Gracie made landfall on St. Helena Island near Beaufort as a Category 4 hurricane with winds of 130 mph. The storm continued toward the north-northwest toward the Midlands, still maintaining hurricane strength before weakening to a tropical storm near the Charlotte area. Substantial wind damage occurred along the South Carolina coast from Beaufort to Charleston. Crop damage was reported in the Lowcountry and Midlands, including a significant loss of the unpicked cotton crop. While the storm made landfall at low tide, storm surge up to 10 feet was measured along the coast. The low tide landfall helped mitigate disastrous flooding from the surge. Rainfall totals were greater than six inches along the path of the storm. Ten storm-related fatalities were reported in SC. It was the worst storm to strike the US coast since Hazel in 1954.

Damage from Hurricane Gracie
Photo courtesy of Beaufort County Library

Note: NOAA's Hurricane Re-analysis Project upgraded Gracie from a Category 3 to a Category 4 hurricane in June 2016.

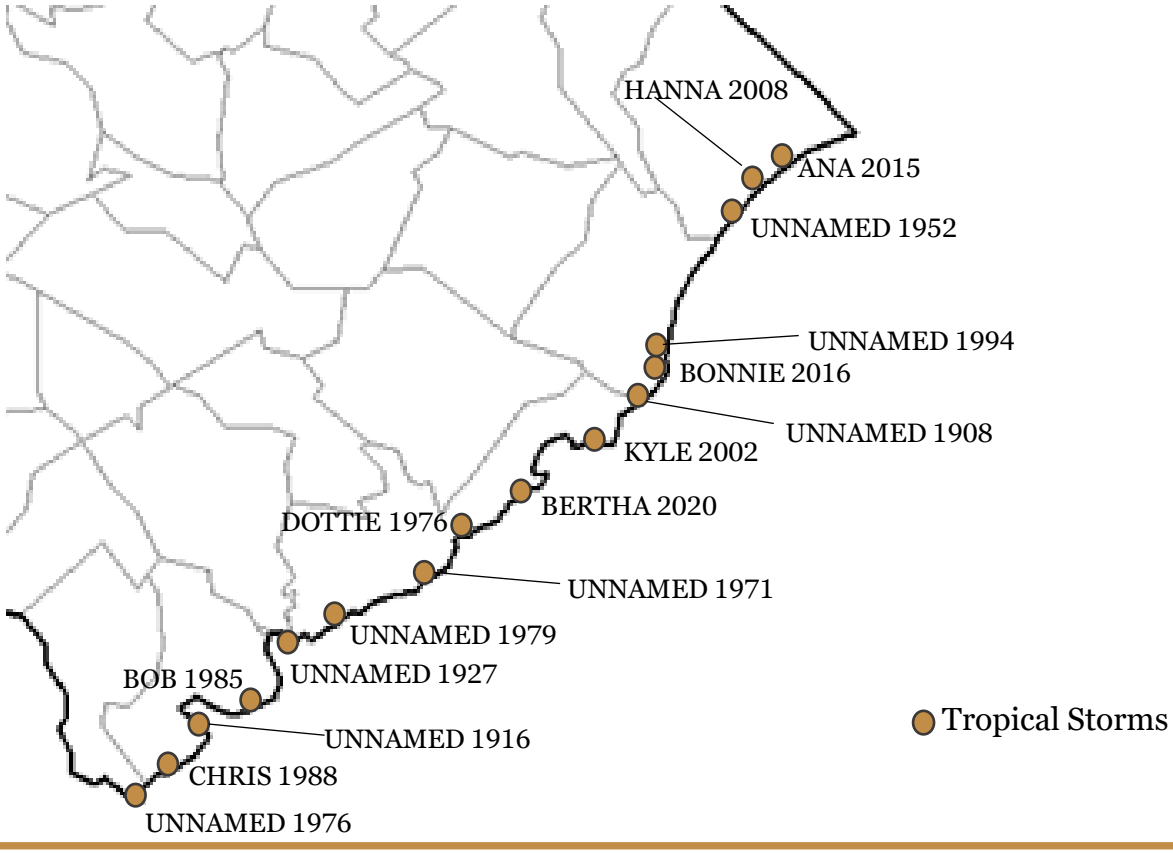
SEPTEMBER 21, 1989: HURRICANE HUGO

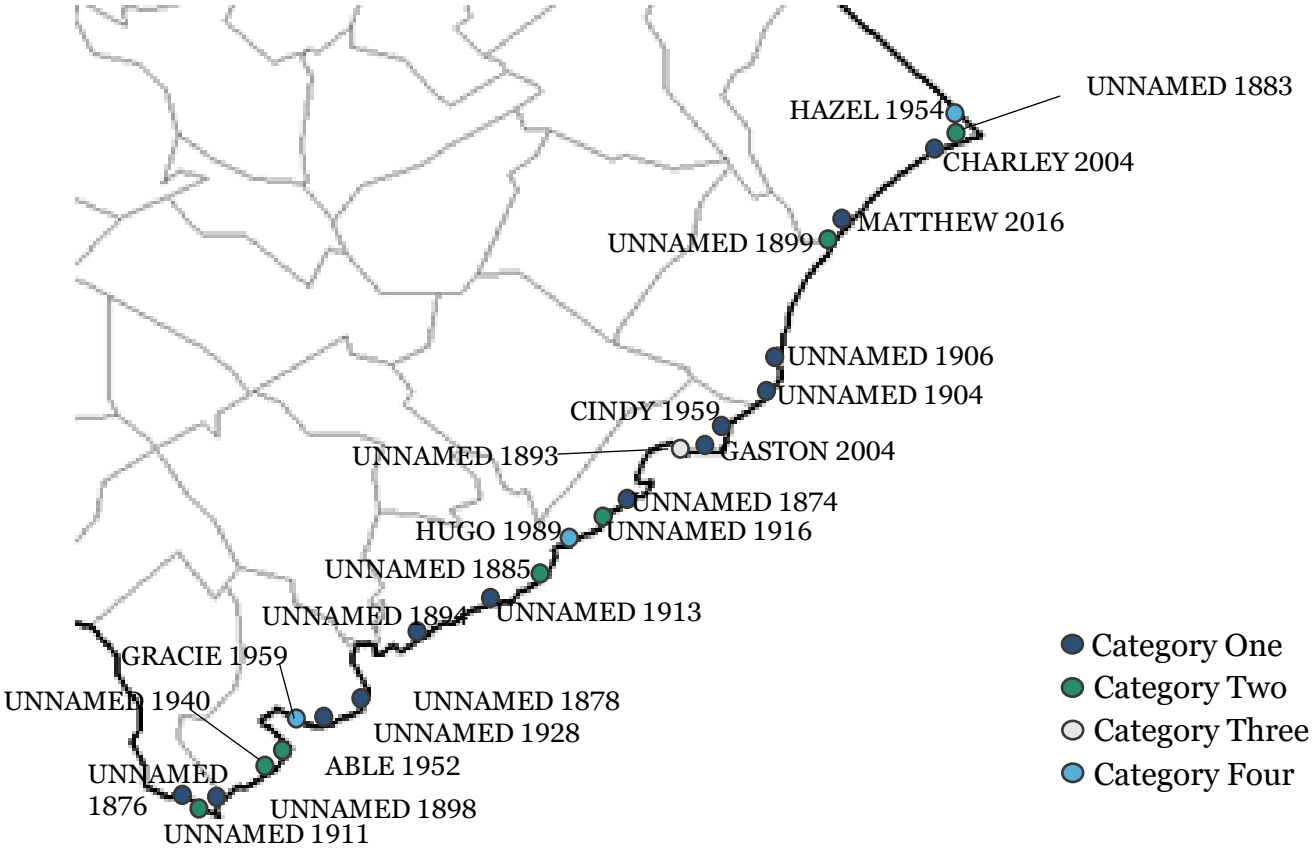
Damage from Hurricane Hugo
Photo courtesy of SCDNR

Damage from Hurricane Hugo
Photo courtesy of SCDNR

Hugo made landfall near Sullivan's Island as a Category 4 hurricane with estimated maximum sustained winds of 135-140 mph during the night of the 21st to the early morning of the 22nd. Hugo was moving northwest at 25 mph when it made landfall. Due to this accelerated speed, Hugo maintained hurricane-force winds (74 mph or higher) as far inland as Sumter, where gusts reached 109 mph and 90 mph in Charlotte, NC. Forested areas in 36 counties along the path of the storm sustained significant damage. Hugo produced the highest storm tide heights ever recorded along the US East Coast, around 20 feet in Bulls Bay, SC, near Cape Romain. Hugo is the costliest storm in South Carolina history and, at the time, was the nation's costliest hurricane (~$7 billion in damage).

SOUTH CAROLINA LANDFALLS





SC LANDFALLS: 1851-2020

YEAR	DATE	NAME	SC CAT	LOCATION
1867	6/21	UNNAMED	1	Charleston
1874	9/28	UNNAMED	1	Mt. Pleasant
1878	9/12	UNNAMED	1	Beaufort
1883	9/11	UNNAMED	2	NC/SC State Line
1885	8/25	UNNAMED	2	Beaufort
1893	10/13	UNNAMED	3	Awendaw
1894	9/27	UNNAMED	1	Beaufort
1898	8/31	UNNAMED	1	GA/SC State Line
1899	10/31	UNNAMED	2	Myrtle Beach
1904	9/14	UNNAMED	1	Georgetown
1906	9/17	UNNAMED	1	Georgetown
1908	10/23	UNNAMED	EX	Georgetown
1911	8/28	UNNAMED	2	GA/SC State Line
1913	10/08	UNNAMED	1	Charleston
1916	5/15	UNNAMED	TS	Fripp Island
1916	7/14	UNNAMED	2	Awendaw
1927	10/02	UNNAMED	TS	Beaufort
1928	9/18	UNNAMED	1	Edisto Beach
1940	8/11	UNNAMED	2	GA/SC State Line
1946	7/05	UNNAMED	TS	NC/SC State Line
1952	8/30	ABLE	2	Beaufort

SC LANDFALLS: 1851-2020

YEAR	DATE	NAME	SC CAT	LOCATION
1952	8/27	UNNAMED	TS	Myrtle Beach
1954	10/15	HAZEL	4	NC/SC State Line
1959	7/7	CINDY	1	Awendaw
1959	9/29	GRACIE	4	Beaufort
1971	9/10	UNNAMED	TS	Charleston
1976	8/20	DOTTIE	TS	Charleston
1976	9/14	UNNAMED	SS	Beaufort
1979	6/15	UNNAMED	TD	Kiawah Island
1985	7/25	BOB	TS	Beaufort
1987	9/7	UNNAMED	TD	NC/SC State Line
1988	8/28	CHRIS	TS	GA/SC State Line
1989	9/21	HUGO	4	Isle of Palms
1994	7/20	UNNAMED	TD	Georgetown
2002	10/11	KYLE	TS	Bulls Bay
2004	8/14	CHARLEY	1	Cape Romain
2004	8/28	GASTON	1	Awendaw
2008	9/4	HANNA	TS	North Myrtle
2015	5/7	ANA	TS	Beach
2016	10/7	MATTHEW	1	Myrtle Beach
2016	5/28	BONNIE	TD	McClellanville
2020	5/27	BERTHA	TS	Isle of Palms