



SC HURRICANES EXECUTIVE SUMMARY

LAST UPDATED: APRIL 2019



SOUTH CAROLINA STATE CLIMATOLOGY OFFICE

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SOUTH CAROLINA BY THE NUMBERS

*based on 1851 - 2018 period of record

THE BREAKDOWN:

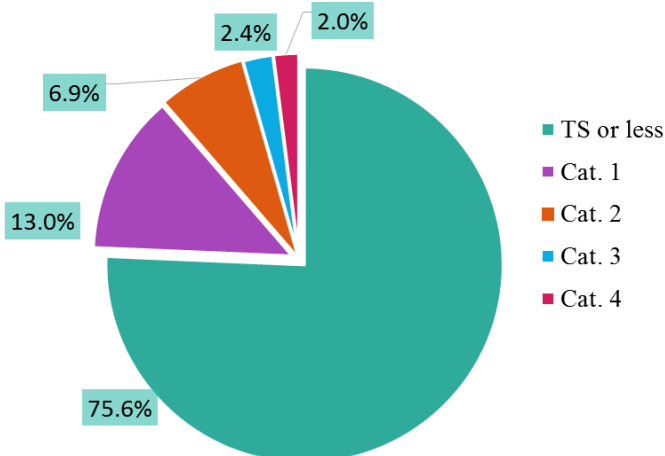
- 246** CYCLONES HAVE IMPACTED SC
- 120** HAVE TRACKED INTO THE STATE
- 41** MADE DIRECT LANDFALL ON COAST
- 4** MAJOR (CAT 3+) LANDFALLS

23.68" RAINFALL RECORD FROM A TROPICAL CYCLONE IN SC - HURRICANE FLORENCE 2018

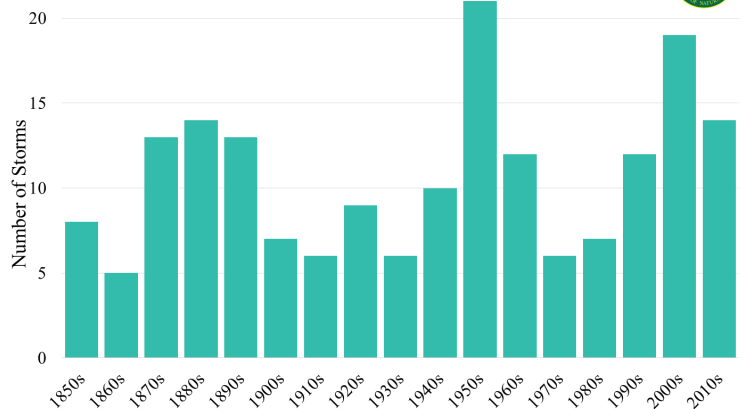
47 TORNADOES CAUSED BY THE PASSING REMNANTS OF HURRICANE FRANCES IN 2004

69% CHANCE OF BEING IMPACTED BY A TROPICAL CYCLONE EACH YEAR

Tropical Cyclone Category Upon Impact to South Carolina



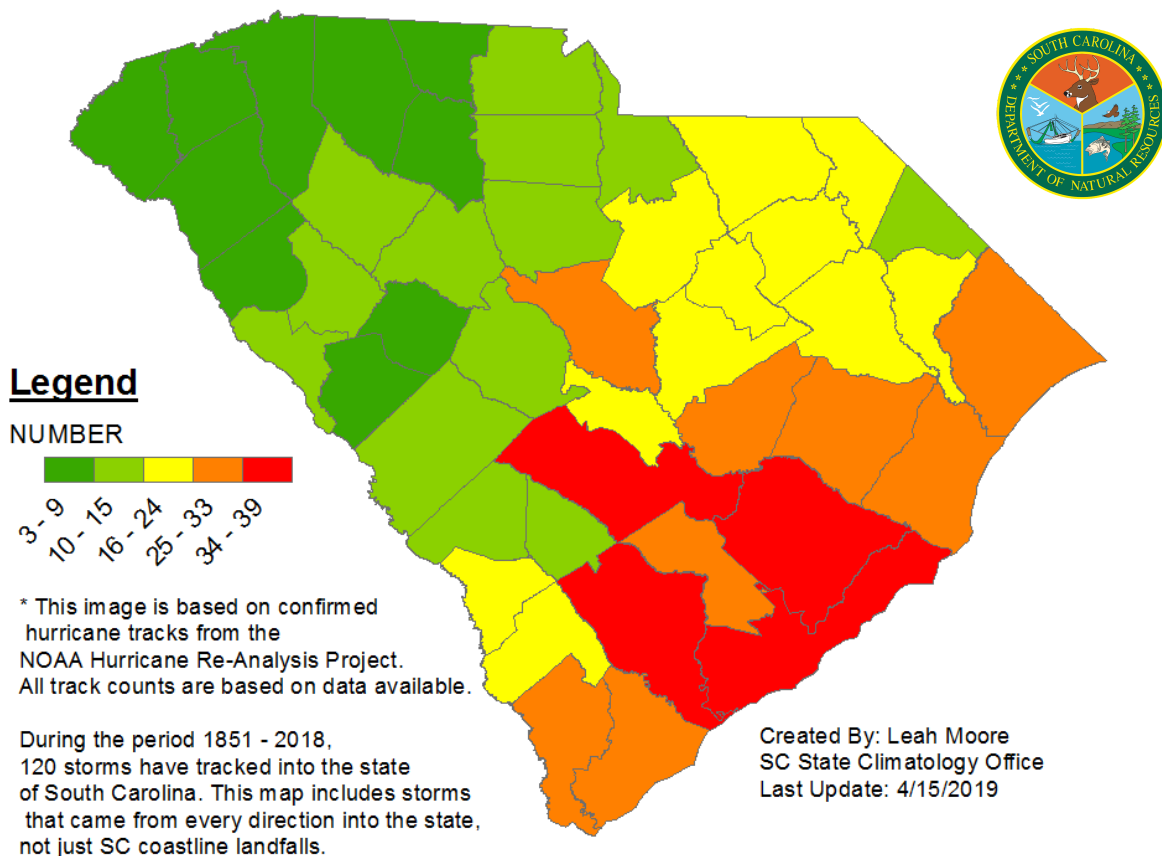
Decadal Tropical Cyclone Activity in South Carolina: 1851 - 2018



This graphic counts the number of storms that influenced SC each year, and then compiles the total for each decade. Source: NOAA Historical Hurricane Tracks
Credit: Leah Moore, SC State Climate Office, SC DNR
Last Update: 4/15/2019

SC TROPICAL CYCLONE CLIMATOLOGY

South Carolina Tropical Cyclone Track Density by County

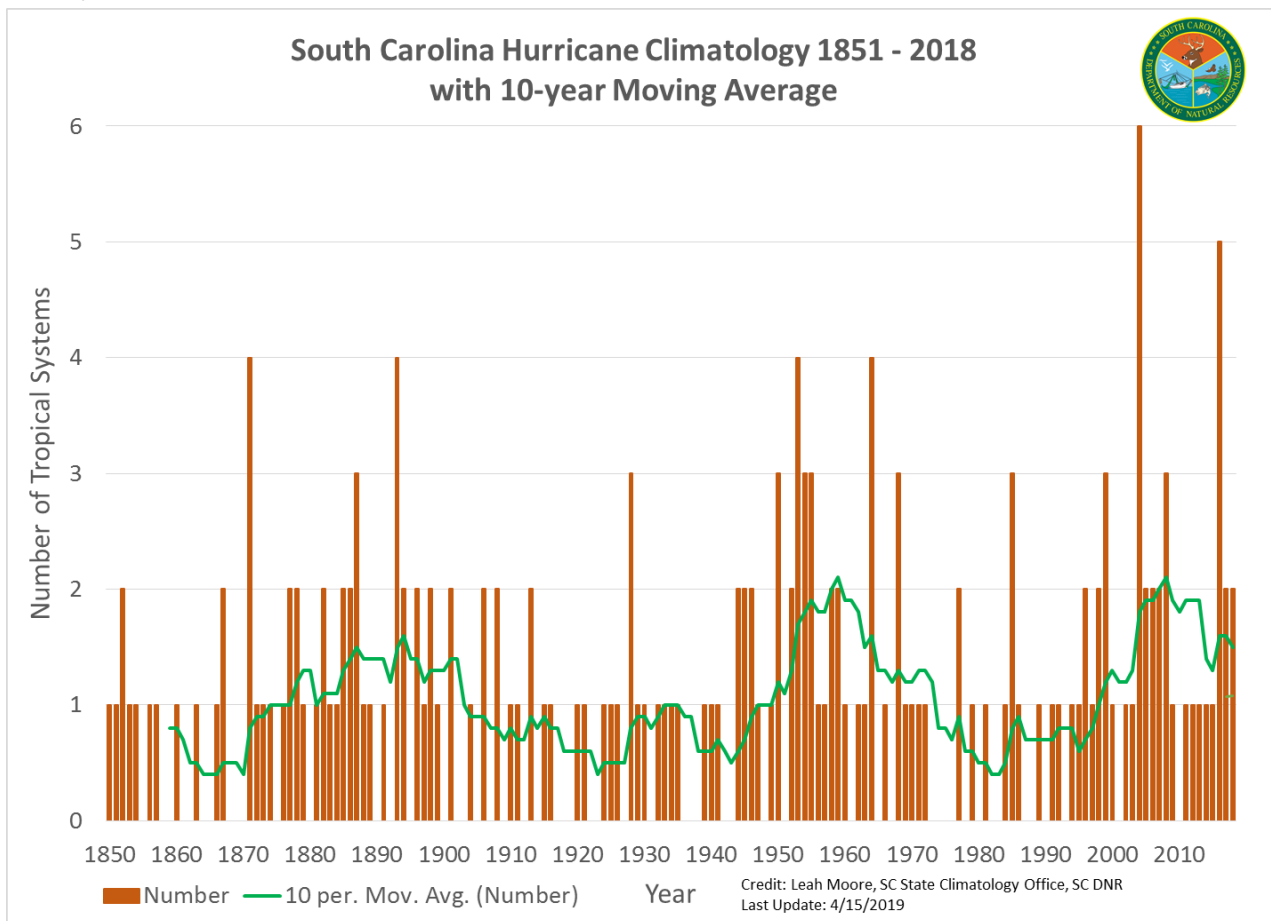


Understanding hurricanes and tropical storms are an essential piece of South Carolina's climatology, especially when considering the growth of coastal communities. From 1851 – 2018, 41 tropical cyclones have made landfall along the South Carolina coastline. Of these 41 systems that have directly hit the coast, only 4 have been confirmed major (Category 3+) hurricanes, according to the Saffir-Simpson hurricane scale. There are no Category 5 hurricane landfalls on record for the state of South Carolina. Three major Category 4 hurricanes have made landfall: Hazel (1954), Gracie (1959), and Hugo (1989). Many climatologists theorize that the "Great Storm of 1893" that struck the southern coast on August 20, 1893 was at least a Category 4 hurricane, but prior to 1900, there was no consistent and accurate measure for hurricane strength classification. For this reason, it is classified as a Category 3.

SC TROPICAL CYCLONE CLIMATOLOGY

The climatological record of South Carolina tropical activity before 1851 is somewhat extensive, but less reliable than data beginning when record keeping became consistent. Tropical cyclone records date back to 1686 for the Charleston area, because of the large colonist population in Charleston at that time as compared to other areas along our coast. In the 1600's and 1700's, tropical activity was usually referred to as a "gale" or a "September gale", which basically meant that a record keeper noted especially strong winds and reported impacts. Many called them "September gales" because of their noted tendency to come at harvest time and ruin various crops and livestock populations for the colonists.

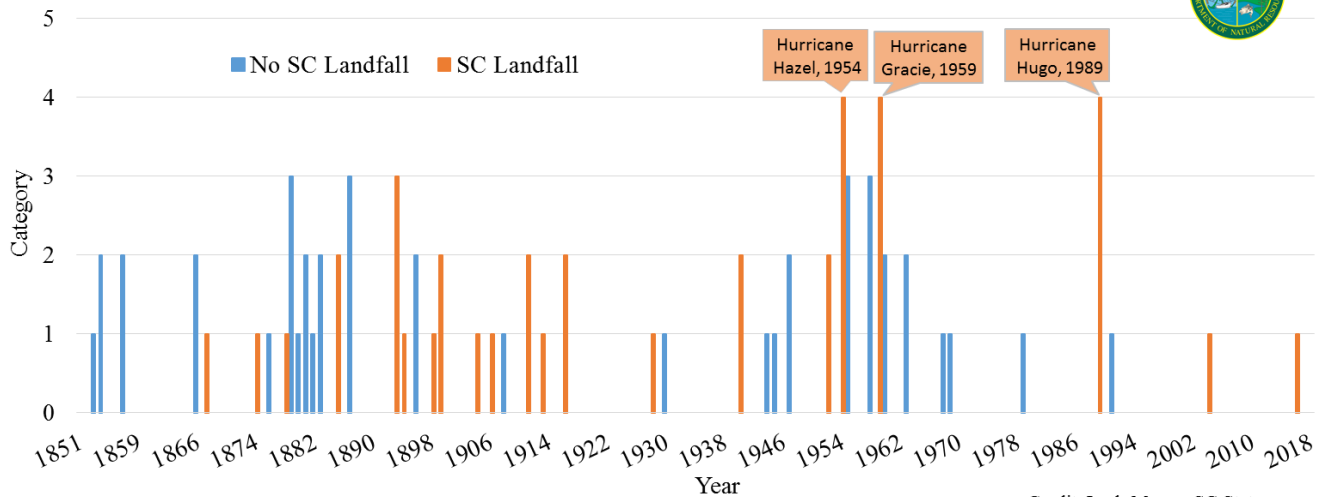
The famous hurricane of 1893 (discussed on the next page) was responsible for at least 2,000 deaths. This is largely due to the lack of warning notices in that era. Today, meteorologists are able to track a storm several days in advance and anticipate the track. The improvements in forecast modeling and observation methods allow residents in coastal areas to better prepare for an approaching storm, and therefore saves lives.



NOTABLE HURRICANES: A TIMELINE



Impact of Hurricanes on SC Based on
Saffir-Simpson Hurricane Wind Scale: A Timeline



This timeline shows hurricanes that impacted South Carolina and were on the Saffir-Simpson scale in the period 1851 - 2018.
Source: NOAA Hurricanes Re-Analysis Project and South Carolina Climatological Data, US Weather Bureau

Credit: Leah Moore, SC State
Climate Office, SC DNR
Last Update: 4/15/2019

SEPTEMBER 4, 1686

This storm is known for preventing a Spanish assault on the lower Carolina settlements by driving two of their galleys on shore and forcing retreat. The storm brought severe damage to the Charleston area.

AUGUST 28, 1893

1893 marked the beginning of telegraph communication capabilities, which meant that areas with a large coastal population had the ability to be warned of incoming harsh weather conditions. However, no warnings were disseminated to areas with lower populations, such as the Sea Islands. On August 28, 1893, a hurricane thought by many to have been a Category 4 or 5 made landfall in South Carolina at high tide, creating an enormous storm surge that swept over and submerged many Sea Islands. Maximum winds in the Beaufort, SC area were estimated to be 125 miles per hour, and winds in Charleston were estimated to be approximately 120 miles per hour. At least 2,000 residents of South Carolina died from this event, and an estimated 20,000 - 30,000 people lost their homes. This storm, appropriately called the "Great Storm of 1893", is currently classified as a Category 3 hurricane.

NOTABLE HURRICANES: A TIMELINE

JULY 14, 1916

When this storm made landfall near Awendaw, SC, it was a Category 2, with winds recorded at over 80 mph. It moved slowly as a stalled system over eastern South Carolina, which resulted in record rainfall and widespread flooding. A reporting station in Effingham, SC recorded 13.25 inches of rain in 24 hours.

AUGUST 11, 1940

This Category 2 storm made landfall near Beaufort, SC. The winds measured at 105 mph, and widespread rainfall greater than 10 inches fell in most of the state. 34 people were killed in this storm.

OCTOBER 15, 1954: HURRICANE HAZEL

Hurricane Hazel is one of the most memorable storms in South Carolina history. Hazel made landfall as a Category 4 storm near Little River, S.C., which is located near the state border with North Carolina. At landfall, Hazel had 106-miles per hour wind gusts and 16.9 foot storm surge. One person was killed, and the damage was estimated at \$27 million.

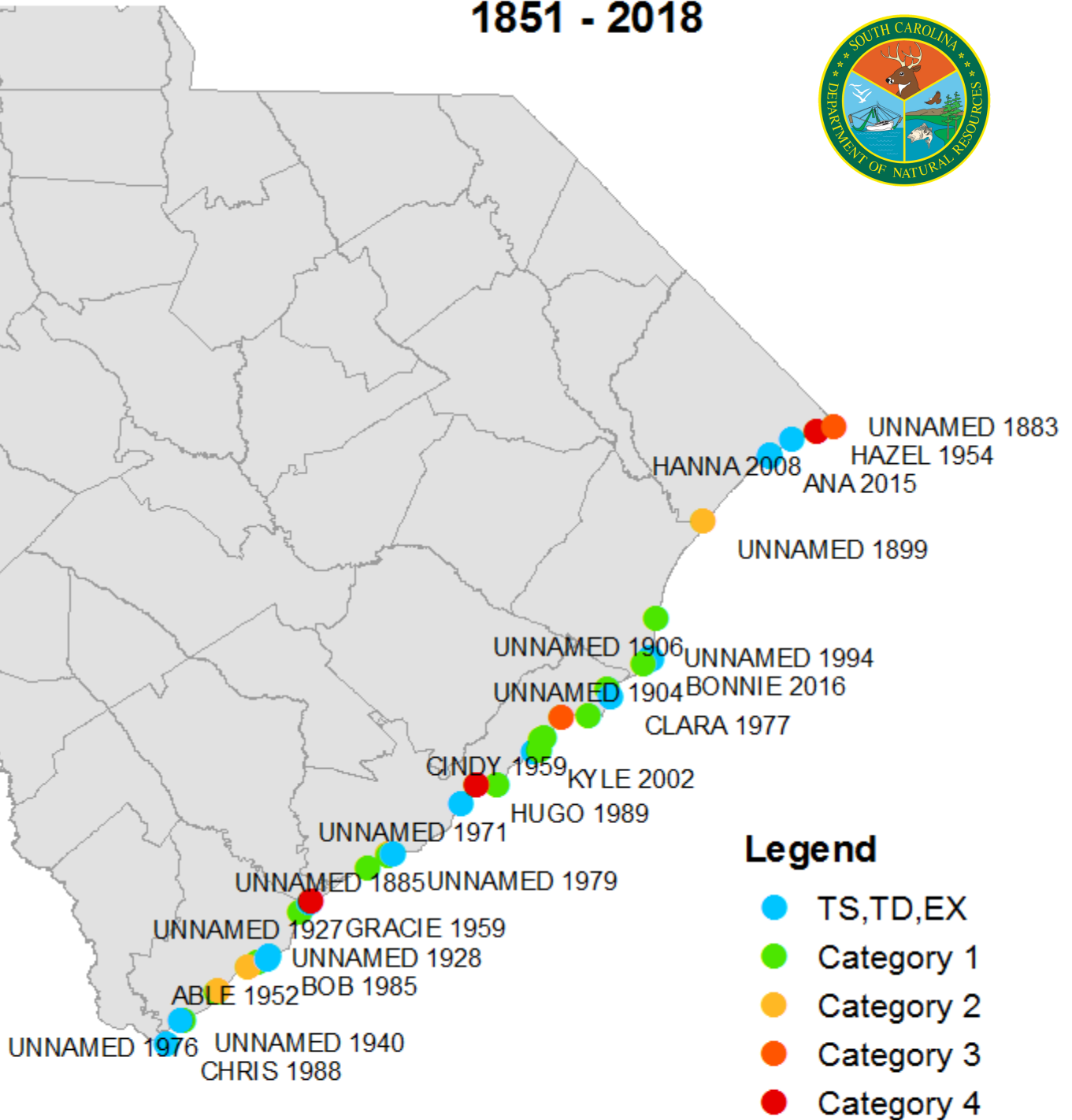
SEPTEMBER 29, 1959: HURRICANE GRACIE

Gracie, a Category 4 hurricane, made landfall on St. Helena Island with 130 mph winds and continued toward the north-northwest. Substantial damage occurred along the coast from Beaufort to Charleston. Flooding occurred through much of the State and crop damage was severe. NOAA's Hurricane Re-analysis Project upgraded Gracie from a Category 3 to a Category 4 hurricane in June of 2016.

SEPTEMBER 21, 1989: HURRICANE HUGO

Hugo (September 1989) made landfall near Isle of Palms with wind gusts more than 160 mph during the night of 21st. It maintained hurricane force winds as far inland as Sumter, where gusts reached 109 mph. Hugo caused 35 related fatalities and damages more than \$7 billion, making it the costliest hurricane in SC history, but not the deadliest. Forested areas in 36 counties along the path of the storm sustained significant damage.

South Carolina Tropical Cyclone Landfalls 1851 - 2018



Credit: SC State Climatology Office
Last Update: 4/15/2019

SC LANDFALLS: 1851-2018

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	3	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
1945	9/17	UNNAMED	TS	GA/SC State Line
1952	8/30	ABLE	2	Beaufort
1952	8/27	UNNAMED	TS	Myrtle Beach
1954	10/15	HAZEL	4	NC/SC State Line
1959	7/7	CINDY	1	Awendaw

SC LANDFALLS: 1851-2018

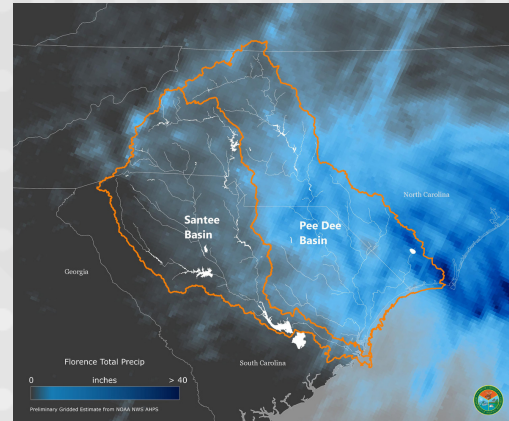
YEAR	DATE	NAME	SC CAT	LOCATION
1959	9/29	GRACIE	4	Beaufort
1971	9/10	UNNAMED	TS	Charleston
1976	8/20	DOTTIE	TS	Charleston
1976	9/14	UNNAMED	SS	Beaufort
1979	6/15	UNNAMED	TD	Kiawah Island
1981	8/19	DENNIS	TD	Georgetown
1985	7/25	BOB	TS	Beaufort
1988	8/28	CHRIS	TS	GA/SC State Line
1989	9/21	HUGO	4	Isle 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 Beach
2015	5/7	ANA	TS	Myrtle Beach
2016	10/7	MATTHEW	1	McClellanville
2016	5/28	BONNIE	TD	Mt.Pleasant

TROPICAL SYSTEMS CAN HAVE A TREMENDOUS IMPACT ON THE STATE WITHOUT MAKING LANDFALL.

Throughout South Carolina's history of tropical cyclones, many of the storms that caused significant impacts did not make a direct landfall along the coast. Some of the worst hurricane-related hazards, such as inland flooding, storm surge and tornado outbreaks were associated with tropical cyclones that made landfall elsewhere. The next page discusses these impacts in more detail.

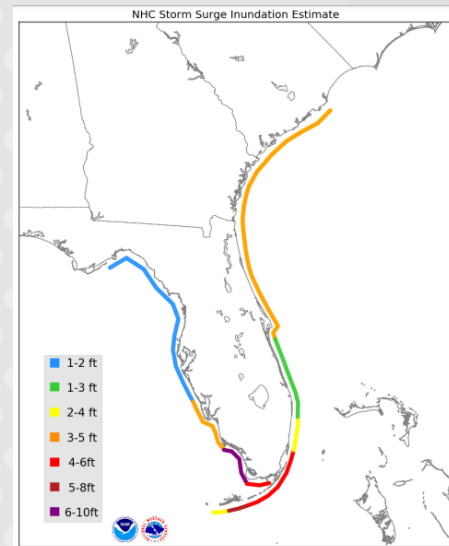
INLAND FLOODING

Flooding from tropical cyclones is not correlated with the intensity of the storm, but rather the speed at which the storm moves across an area. Heavy torrential rains can occur hundreds of miles away from the center of the storm. 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.



STORM SURGE

It is crucial that coastal communities understand the impacts of storm surge and local tides, which can combine to create hurricane storm tides. As Hurricane Irma (2017) made landfall in southwest Florida, the combined effect of storm surge and the high tide produced maximum inundation levels of 3 to 5 ft above ground level along the coast of Georgia and much of South Carolina.



TORNADOES



An F3 tornado plowed through this horse ranch near Camden in Kershaw County. A horse stable was damaged.

Tornadoes produced by tropical cyclones form in the outer rainbands, which can be hundreds of miles away from the center of the storm. Hurricane Frances (2004) made landfall along the east coast of Florida and spawned over 100 tornadoes across the Southeast; including 47 tornadoes in South Carolina. One of which was an F3 (winds between 158 – 206 mph) in Kershaw County that destroyed buildings and mobile homes near the city of Camden.