

# Gallagher Re Hurricane Advisory

## Tropical Storm Debby

August 8, 2024

### Executive Summary

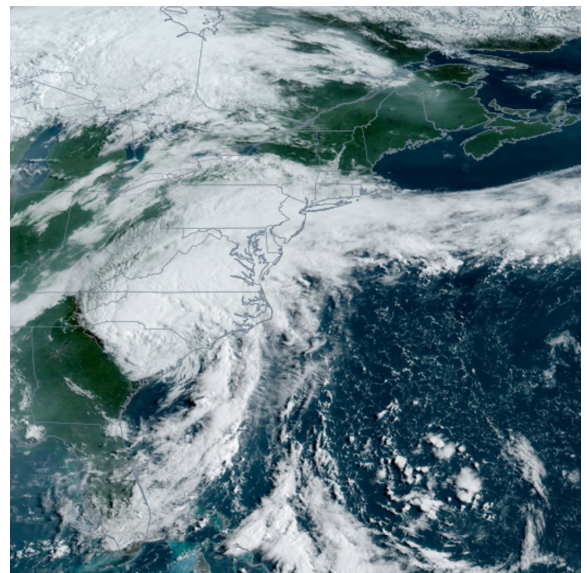
- Debby: Final landfall (August 8) in South Carolina as a tropical storm after first striking Florida as a Category 1 hurricane (August 5)
- Preliminary: Water-related impacts expected to drive bulk of insured losses in the range of USD1 billion to USD2 billion
- Preliminary: Early assessments suggest wind-related physical damage not as extensive as initially feared
- Preliminary: Debby should be a very manageable storm for the re/insurance market
- Preliminary: Overall economic loss expected in the low single digit billions (USD); low inland NFIP take-up to drive protection gap
- After Debby exits, water related impacts and rising streams / rivers will remain a concern for several days
- At least seven fatalities confirmed; state of emergencies in Florida, Georgia, South Carolina, North Carolina, and Virginia

Hurricane Debby made its final landfall near Bulls Bay, South Carolina on August 8 as a tropical storm with wind speeds of 50 mph (85 kph). Debby previously made a Category 1 landfall in Florida's Big Bend region on August 5 with maximum wind speeds of 80 mph (130 kph). Preliminary surveys have determined that wind impacts were less than initially feared, while storm surge and exceptional inland flooding remained the primary loss drivers. Widespread inundation was the result of Debby's slow trek across the US Southeast which allowed for locally noteworthy rainfall totals. The storm and its remnants will accelerate northward and enhance heavy rains in the Mid-Atlantic and Northeast through August 10.

Historical loss data notes that a landfalling Category 1 hurricane in Florida's northern Gulf Coast region has led to wind-related insured losses near or below USD1 billion. The unknown remains the ongoing flooding in the Southeast and Debby's future track across the Mid-Atlantic and Northeast. Dry air which was wrapped into the storm helped to keep rain totals below the worst-case scenario forecasts. Coastal localities still received upwards of 12 to 18 in (300 to 457 mm) of rainfall across the US Southeast.

Several inches of additional rainfall are still likely from North Carolina into the Northeast, and elevated stream levels will persist for several days. Debby's combined wind and water-related insured losses are likely to fall in the range of USD1 billion to USD2 billion for the private insurance market and public entities such as the National Flood Insurance Program (NFIP) or the USDA's RMA crop insurance program. This will be a manageable event for the re/insurance industry. Any financial loss projections are considered preliminary and subject to change. The long duration rain and flood event across the Southeast remains ongoing, and complexity exists around the final extent and severity of hydrological impacts.

The overall economic losses were likely to be far higher. While coastal counties in Florida, Georgia, and the Carolinas have NFIP take-up ranging from 10 to 50%, the percentage of active policies drops dramatically once inland. With further flood potential extending into the Mid-Atlantic and Northeast, where NFIP take-up is also quite low, this means a sizeable portion of flood damage is likely to be uninsured. There may also be a notable impact to the agricultural sector.



Tropical Storm Debby on August 8  
Source: NOAA / RAMMB

## Preliminary Financial Loss Commentary

Weakened steering currents allowed Debby to meander near or just offshore of the Southeast coast for several days prior to the storm's final landfall in South Carolina on August 8. Debby generated copious inland rainfall and coastal storm surge inundation across multiple tidal cycles which resulted in costly impacts. As much as 12 to 18+ in (300 to 457+ mm) of rain had been measured across a wide swath of Florida, Georgia, the Carolinas. This scope of damage, plus additional water-related impacts possible in the Mid-Atlantic and Northeast, is expected to drive a multi-billion-dollar economic loss total. Note that the magnitude of flooding incurred from Debby in the Carolinas was notably reduced from what was experienced in the region's most recent hallmark event with 2018's Hurricane Florence (economic loss: USD30 billion).

Debby's first landfall in Florida occurred just under a year after Hurricane Idalia's landfall in August (2023) as a Category 3 storm. Many residents in the Big Bend were still recovering and rebuilding. Idalia remarkably made landfall only several miles north from where Debby came ashore. Recent historical Category 1 hurricane landfalls in Florida have led to insured losses of roughly USD1 billion, mostly driven by wind impacts. Each storm, however, is unique, and the extent of anticipated hydrological impacts from Debby aided in causing some of the wind-related damage. The stalling nature of Debby and its torrential rainfall resulted in oversaturated soils which allowed a much weaker wind to knock down trees. Parts of northern Florida, Georgia, and the Carolinas have abundant trees and brush which amplified wind damage in regions that saw tropical storm force or higher gusts. However, preliminary damage assessments suggested that the direct scope of wind-related impacts was less than initially feared. The expectation remains that insured losses from wind-related damage will reach into the hundreds of millions (USD).

Insured losses associated with coastal and inland flooding remain more complex. There has already been reports of widespread flood inundation with additional impacts yet to come, despite not reaching the magnitude of Florence (2018). The private insurance market is expected to face losses in the hundreds of millions (USD) primarily from auto policies and privately written residential or commercial flood policies. Payouts from the NFIP are also expected into the hundreds of millions (USD) depending on the final expanse of the rainfall / flood footprint. 2018's Florence resulted in USD920 million (2024 USD) in NFIP payouts. There will also be additional agricultural losses that will lead to further payouts from the crop insurance program run by the USDA's Risk Management Agency.

While coastal counties in Florida, Georgia, and South Carolina have National Flood Insurance Program (NFIP) take-up ranging from 10 to 50%, the percentage of active policies drops dramatically once inland. This means a sizeable portion of flood damage is likely to be uninsured. Further, inland counties have a notably more limited volume of active policies. This raises the risk of an even larger portion of water-related damage going uninsured. For context, NFIP payouts from 2023's Hurricane Idalia resulted in more than USD380 million in losses. The bulk of those losses occurred in the Tampa Bay metro region.

The overall expectation is that Debby will remain a very manageable event for the re/insurance industry. The combined wind and water-related insured losses from the private insurance market and NFIP was likely to fall in the range of USD1 billion to USD2 billion.

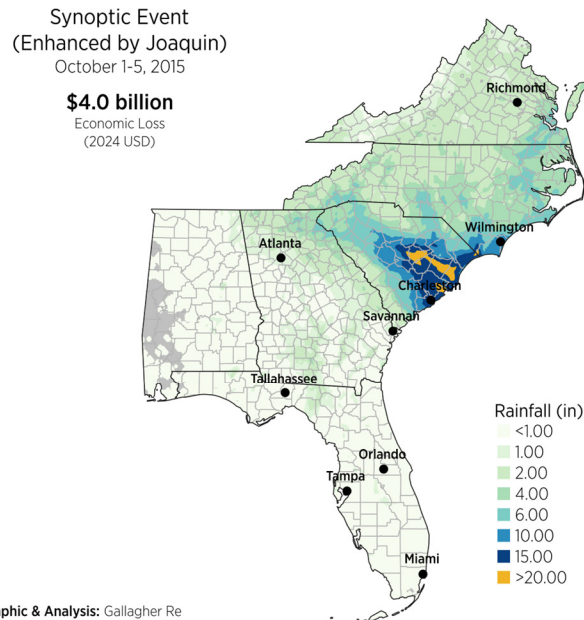
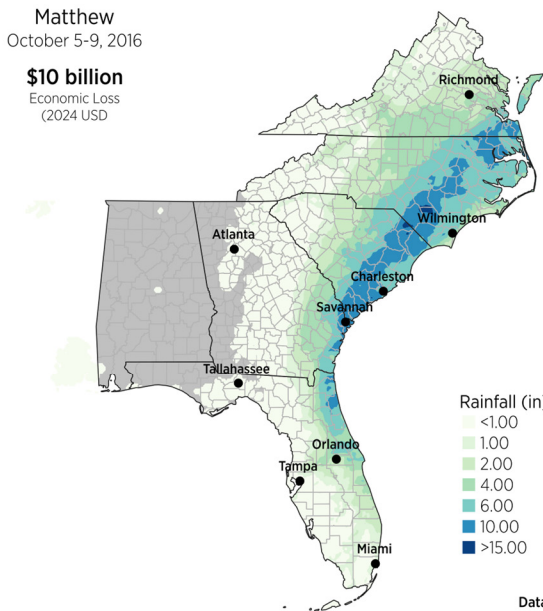
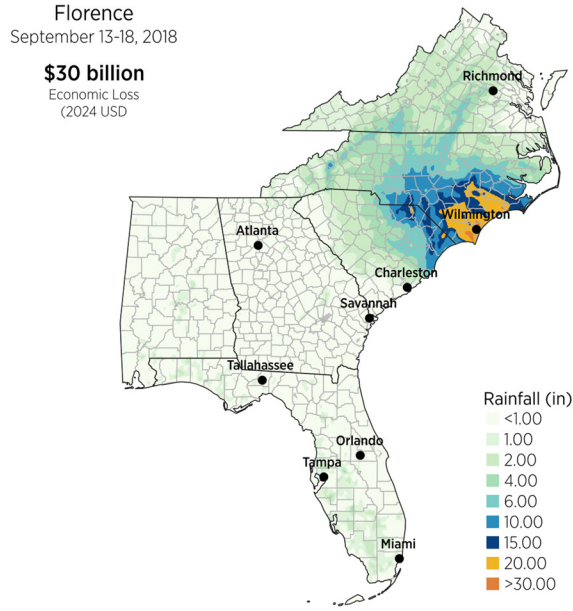
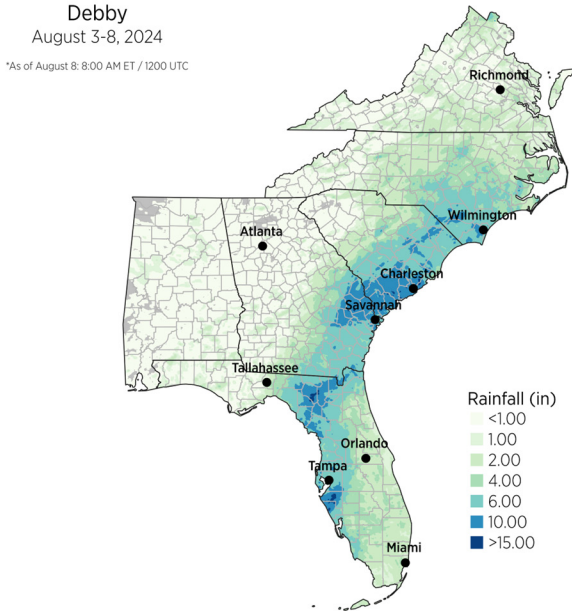
The table below, which includes historical natural disaster loss data from Gallagher Re, looks at a select number of tropical storms and hurricanes that made their first or strongest US mainland landfall in Florida, South Carolina, and North Carolina during the past 10 years for contextual purposes. The economic and insured losses (which have been adjusted to today's dollars using the US Consumer Price Index and a construction / cost of labor factor) represent totals solely incurred on the US mainland.

Year	Storm Name	Category	US Mainland Economic Loss (2024 USD)	US Mainland Insured Loss (2024 USD)
2016	Hermine	Category 1	780 million	390 million
2016	Matthew	Category 1	14 billion	5 billion
2017	Irma	Category 4	51 billion	32 billion
2018	Florence	Category 1	30 billion	7 billion
2018	Michael	Category 5	32 billion	17 billion
2019	Dorian	Category 2	2.0 billion	980 million
2020	Isaias	Category 1	5.7 billion	3.2 billion
2022	Ian	Category 4	120 billion	60 billion
2022	Nicole	Category 1	1.1 billion	750 million
2023	Idalia	Category 3	3.6 billion	1.4 billion

Data: Gallagher Re

## Historical Rainfall Comparison

The graphic below highlights a comparison of heavy rain-dominated events across parts of the Southeast from hurricanes or hurricane remnants in the last decade. Note that Debby's footprint is the most spatially expansive, but the maximum peak totals are much less than recorded during Florence (2018) and the synoptic event in October 2015 that was enhanced by Joaquin. The rainfall totals for Debby are from August 3 (8am ET) to August 8 (8am ET). Rains continue to fall as the system slowly moves northward towards the US Mid-Atlantic and Northeast.



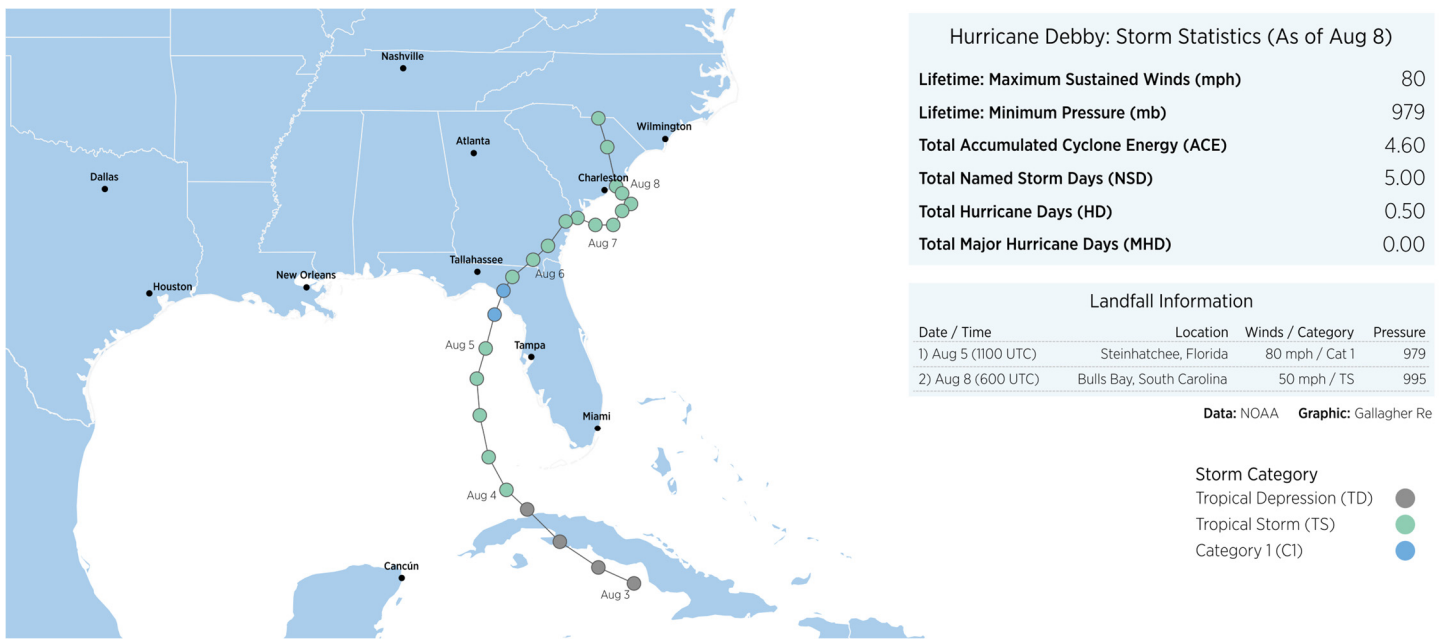
Data: NOAA / PRISM Graphic & Analysis: Gallagher Re

## Discussion & Impacts

After an extended visit to the US Southeast, Debby made its final landfall on August 8 as a tropical storm near Bulls Bay, South Carolina (Charleston County). At landfall maximum estimated wind speeds were 50 mph (85 kph) and were occurring well to the southeast of the storms center. Previously, Debby made landfall as a Category 1 storm in Florida's Big Bend region on August 5 with winds of 80 mph (130 kph) and a minimum central pressure of 979 mb. The hurricane came ashore near Steinhatchee (Taylor County). Overall, wind related impacts in Florida were limited due to the sparsely populated nature of the Big Bend region.

Debby was the 2<sup>nd</sup> hurricane of the 2024 Atlantic season, following Hurricane Beryl's record-breaking journey in June / July. The storm was the 6<sup>th</sup> landfalling August hurricane in the state of Florida since 1990.

As of this writing, at least seven storm related fatalities had been recorded. At the peak, no fewer than 350,000 customers in the state of Florida were without electricity, and thousands of additional outages occurred from Georgia into the Carolinas. Thousands of flights were cancelled or delayed. The Governors of Florida, Georgia, North and South Carolina, and Virginia declared states of emergencies.



The table below shows selected preliminary wind gusts and current storm total rainfalls from Debby per data from NOAA / NHC. Note than limited station measured wind gusts data were available due to the sparsely populated location of landfall. The event remains ongoing, and some additional rainfall is possible.

Location	Wind Gust (mph / kph)	Location	Total Rainfall (in / mm)
Chiefland, FL	76 mph / 122 kph	Lake City, FL	19.67 in / 500 mm
Dania Beach, FL	73 mph / 117 kph	Parrish, FL	18.86 in / 479 mm
Palmetto, FL	70 mph / 113 kph	Lakewood Ranch, FL	18.34 in / 466 mm
Cedar Key, FL	67 mph / 107 kph	Summerville, SC	18.25 in / 463 mm
Anna Maria Island, FL	64 mph / 103 kph	Sarasota, FL	17.78 in / 452 mm
Whitfield, FL	64 mph / 103 kph	Mount Pleasant, SC	17.70 in / 450 mm
Belleair, FL	63 mph / 101 kph	Green Pond, SC	17.43 in / 443 mm
Sarasota Airport, FL	63 mph / 101 kph	Edisto Beach, SC	15.50 in / 394 mm
Folly Beach, SC	63 mph / 101 kph	Oliver, SC	15.38 in / 391 mm
Albert Whitted Airport, FL	62 mph / 100 kph	Beaufort, SC	15.28 in / 388 mm

In Florida, notable inundation included flooded residential and commercial properties throughout the Tampa Bay region. The storm downed power lines and trees across the Big Bend, which blocked roadways and damaged infrastructure. The Mantee River crested at a record 20.12 ft (6.1 m) on August 6, surpassing the previous record set in July 1962.

Florida’s Gulf Coast and Big Bend region were subject to hurricane-force wind gusts, life-threatening storm surge, and impressive rainfall totals on August 4-5. Maximum storm total rainfall reached or exceeded 12 to 18 in (300 to 457 mm) notably in the Big Bend region and further south near Tampa Bay / Sarasota. A storm tide (storm surge + tide) inundation at Cedar Key topped 6 ft (1.8 m) on August 5. Storm surge in this region of the Gulf of Mexico is often enhanced by the shallow incline to the coast which can quickly compound water with an onshore (from the sea and towards the land) wind flow.

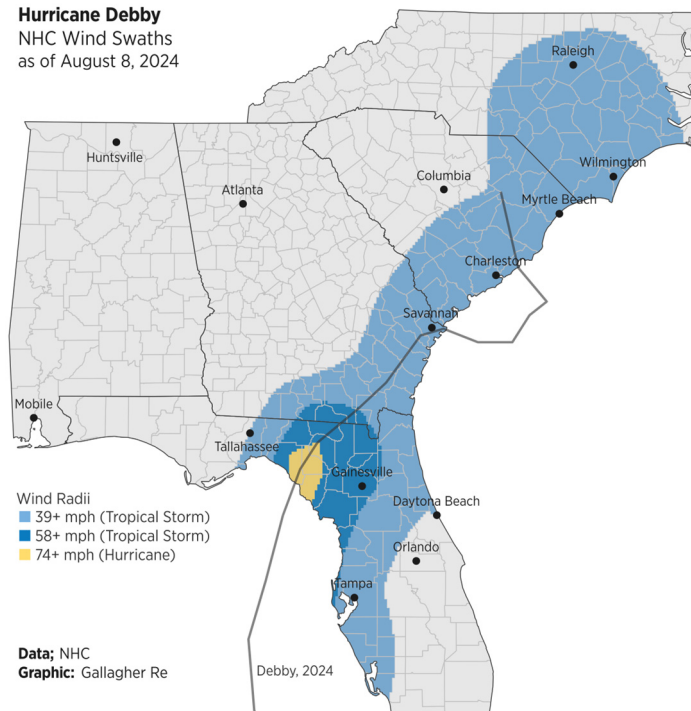
In South Carolina, significant inundation was likewise experienced in Charleston where local roadways became impassable, and water inundation was reported in numerous homes and businesses. Beaches across the state were temporarily shuttered, and high-water rescues were carried out. While large regions of South Carolina were experiencing moderate to severe drought conditions prior to Debby, the excessive rainfall over a relatively short period of time aided in increased runoff which enhanced damage and contributed to the elevated risk of urban and flash flooding. In Georgia, numerous homes were flooded in and near Savannah and several residents had to be rescued.

Overall, dozens of tornado warnings were issued between August 4-8 spanning from Florida into the Carolinas. Brief spin-up tornadoes are common in tropical cyclones due to expanses of enhanced windshear. Tornado damage surveys remained ongoing. At least one tornado in Edisto Beach, South Carolina resulted in structural damage as it came ashore. A subsequent tornado in Wilson County, North Carolina resulted in at least one fatality and destroyed several homes and a local middle school.

Elsewhere, interactions between tropical moisture from Debby and a meandering frontal boundary in the Northeast aided in flooding rainfall and prompted flood and flash-flood warnings in parts of eastern Pennsylvania, northern Maryland, New Jersey, and New York (including New York City) on August 6.

As of this writing (afternoon of August 8), much of central North Carolina remains under flood and flash-flood warnings, and more than 130,000 customers were without electricity.

**Hurricane Debby**  
NHC Wind Swaths  
as of August 8, 2024



While the swath of estimated hurricane force winds was contained to several counties in the Florida Big Bend, the large size and slow motion of Debby allowed the overall tropical storm force wind field to extend from southwestern Florida well into North Carolina.

Now that the storm is again inland, Influence from a deep trough traversing the US Midwest will aid in accelerating Debby and / or its remnants northward into the Mid-Atlantic, Northeast and eastern Canada between August 8-10.

Looking ahead, five-day rainfall forecasts from the Weather Prediction Center (WPC) indicate that additional rainfall amounts reaching 4 to 6 in (100 to 150 mm) are possible from North Carolina into Pennsylvania. This has the potential to create further water related hazards, particularly in the Mid-Atlantic where soils remain saturated from heavy rainfall in the days prior. Even after Debby exits the region, hydrological impacts and stream rises will continue to be an issue across the Southeast and elsewhere for several days.

The Atlantic remains primed for a potentially hyperactive hurricane season. SSTs have stayed near historically warm levels in recent weeks. With the looming arrival of La Niña, this will only bring further favorable environmental conditions as reduced wind shear is a common theme during La Niña phases.

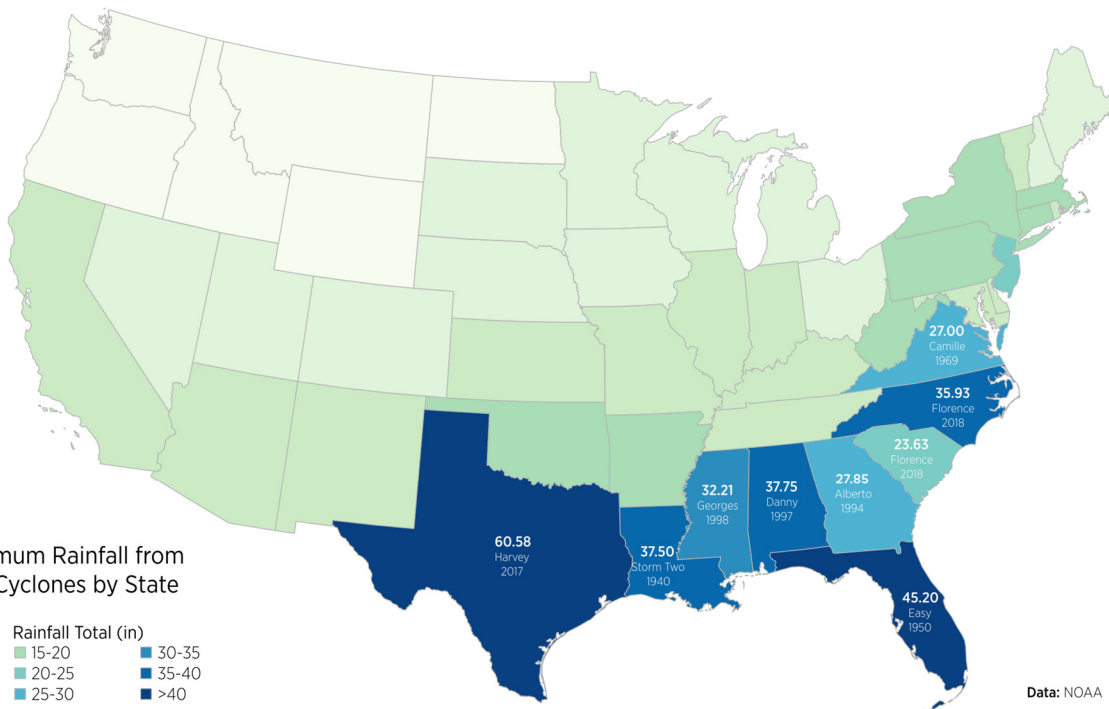
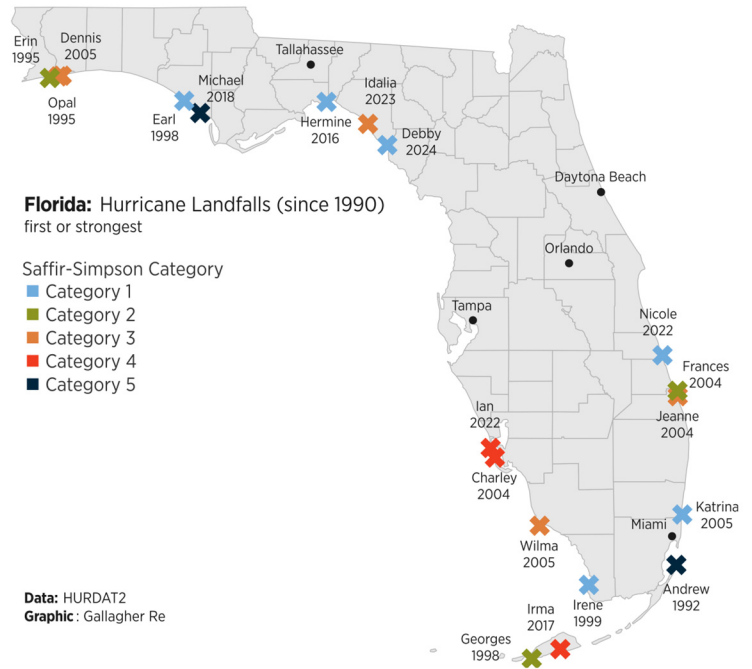
The two-week hurricane outlook released by Colorado State University (CSU) on August 6, gave an 85% chance of above-normal tropical activity in the Atlantic between August 6-19. CSU is a collaborative research partner with the Gallagher Research Centre (GRC).

## Miscellaneous

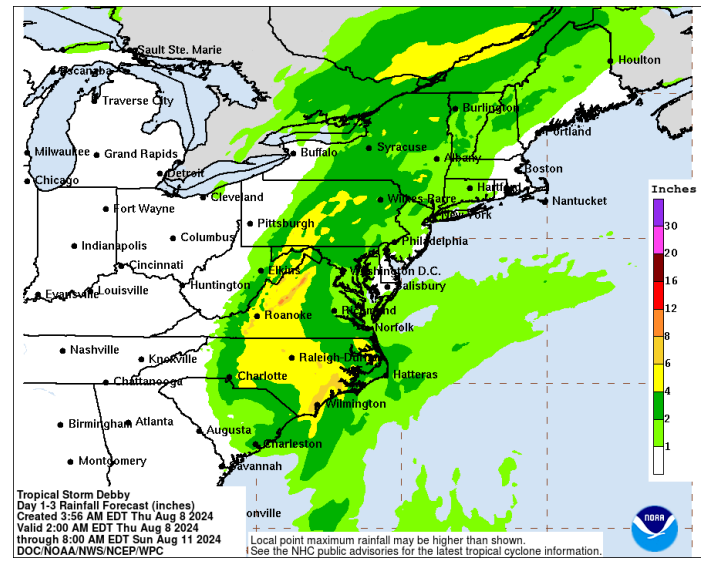
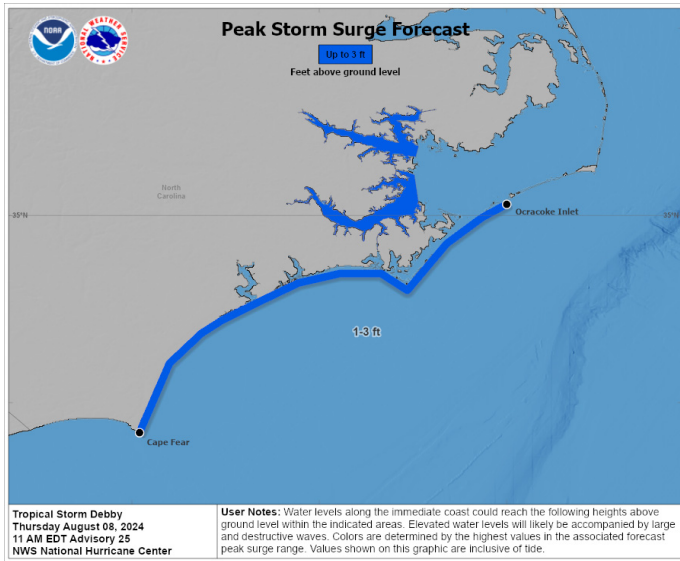
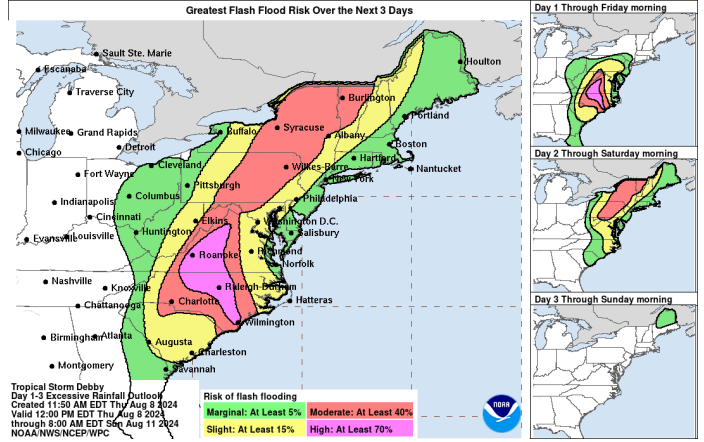
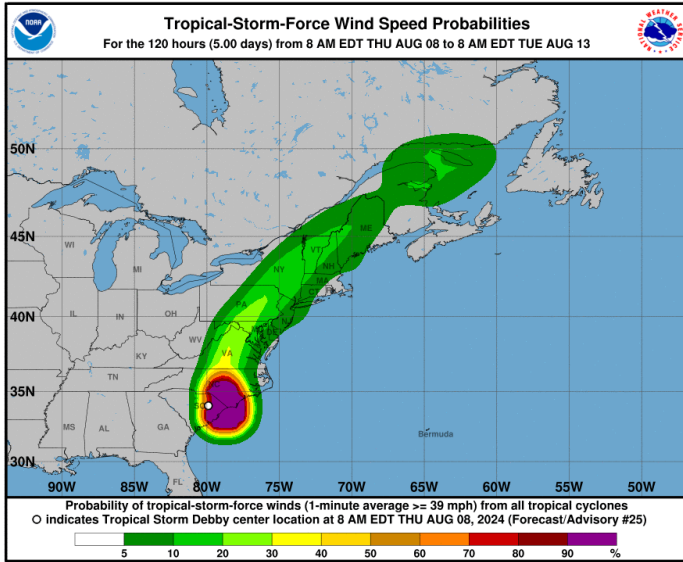
Hurricane Debby made a Category 1 landfall in Florida on August 5. Florida has endured numerous hurricane landfalls in recent years, which has led to notable challenges to the state's insurance market. The included map looks at the state's recent hurricane landfall history, using either the first or strongest landfall location. Florida has remarkably incurred 19 hurricane landfalls since 1990 alone (including Debby). Of these, six have occurred in August: Andrew (1992), Erin (1995), Charley (2004), Katrina (2005), Idalia (2023), and Debby (2024). Overall, seven of the total storms were at Category 1 intensity; the most recent before Debby was Nicole (2022).

Significant rainfall and ongoing flooding associated with Debby's extended visit to the US Southeast has most notably impacted parts of Florida, Georgia, and the Carolinas. Isolated storm total rainfall amounts have approach 20 inches (508 mm). Fortunately, the storm total rainfall from Debby was less than the worst-case forecast scenarios. A lower than modeled rainfall was the result of dry air wrapping into the core of Debby while in lingered near the South Carolina coast.

The map below shows the maximum rainfall by state recorded from a tropical cyclone or its remnants (since 1900), based on data from NOAA's Weather Prediction Center (WPC). It is evident that the historically most significant inland flooding impacts and highest rainfall totals were the result of storms which stalled or lingered near coastal regions for an extended period. This has been seen most recently with memorable storms such as Harvey (2017) in Texas, and Florence (2018) in the Carolinas.



# Meteorological Data & Forecast



- Top Left: Tropical Storm force wind speed probability (sustained winds of 39+ mph)
- Top Right: Tropical Storm Debby 5-day Flash Flood Potential
- Bottom Left: Tropical Storm Debby peak storm surge forecast (feet)
- Bottom Right: Tropical Storm Debby rainfall forecast (inches)

Source: National Hurricane Center (NHC)