Hurricane Ian

April 3, 2024

State Climatology Office

Open File Report

This report serves as preliminary dissemination of information on the impacts of Hurricane Ian on South Carolina.

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Cover Picture Credits:
Hurricane Ian Landfall Near Georgetown, 2:05 p.m. EDT, September 30, 2022

Top Left: Composite WSR-88d radar imagery from the Iowa State IEM website
Top Right: GOES-East Color-enhanced infrared satellite image from CIRA/RAMMB SLIDER
Bottom: GOES-East Geocolor composite satellite image from CIRA/RAMMB SLIDER

Meteorological Synopsis
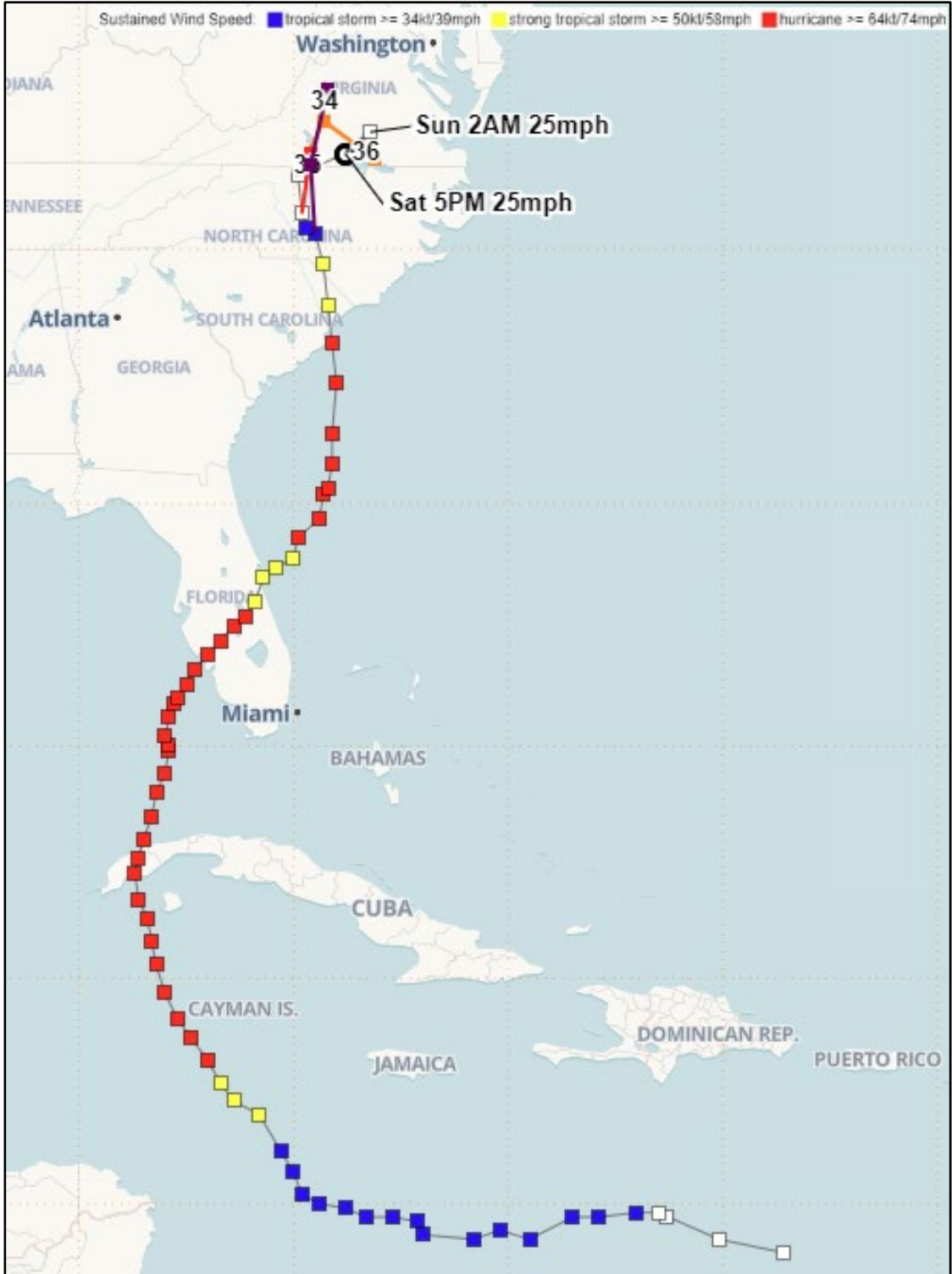
The historical track for Hurricane Ian from the formation of Tropical Depression Nine in the Caribbean Sea through the last advisory position over Virginia's Southside region.
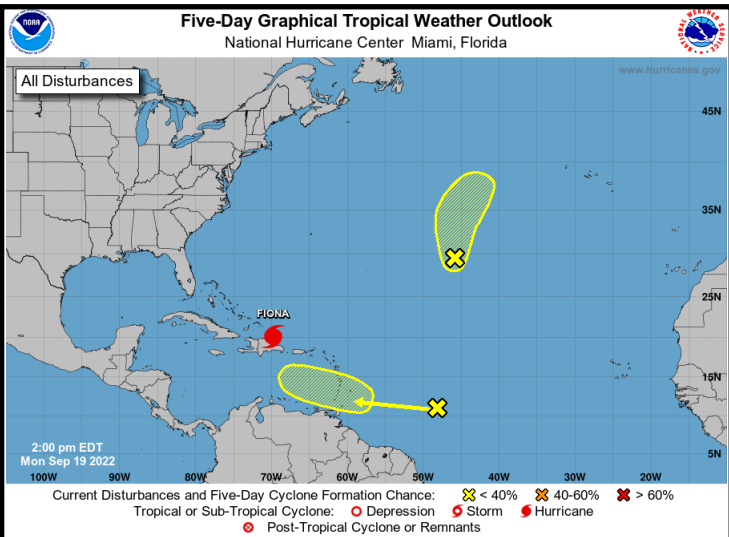*Source: HURREVAC*

Hurricane Ian, like many of South Carolina's landfalling hurricanes, began its life as an African Easterly Wave, commonly called a tropical wave by American meteorologists. The wave that eventually spawned Ian emerged from West Africa over the Atlantic Ocean on September 15, 2022, but it was being tracked by meteorologists well before this time while crossing Africa.

A color-enhanced infrared satellite image from the Meteosat-11 satellite from 0200 UTC on September 15, 2022 (10 p.m. September 14 EDT) shows the tropical wave that eventually spawned Ian crossing the West African coastline. Tropical Depression Seven, which became Hurricane Fiona, can be seen at the top-left. Image source: Colorado State University RAMMB SLIDER
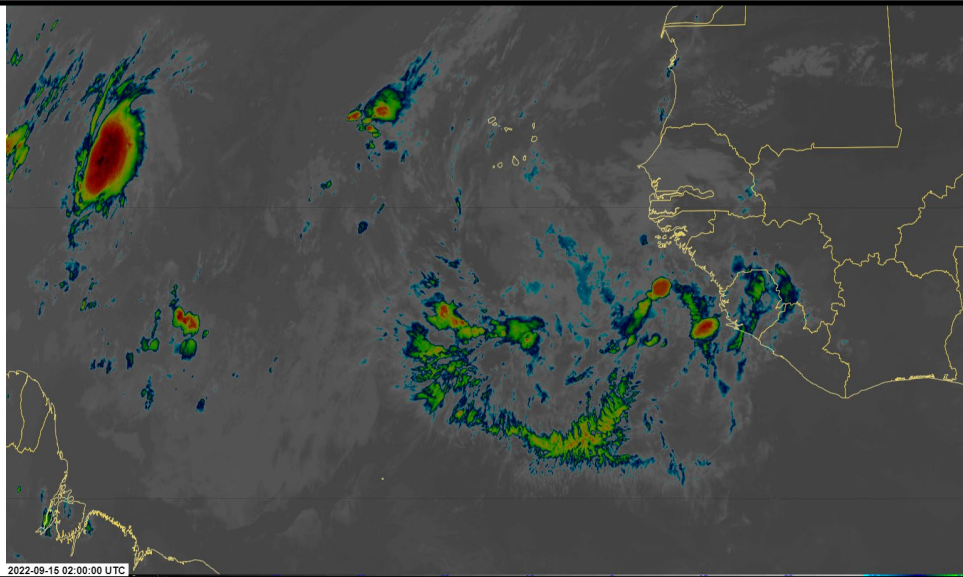
The wave tracked westward for a few days with no sign of becoming better organized and only produced widely separated showers and thunderstorms during this time. However, this changed on September 19-20.

The 5-day NHC outlook from 2:00 p.m. EDT on Monday, September 19, 2022. The disturbance that became Ian was east of the Lesser Antilles.

Thunderstorm activity became more widespread, and a weak area of low pressure formed. However, thunderstorms were not persistent enough to classify the system as a tropical cyclone for the following few days. Finally, at 0900 UTC (5:00 a.m. EDT) on September 23, while passing south of the Dominican Republic, it had sustained thunderstorms long enough to be classified as a tropical cyclone, and the National Hurricane Center (NHC) declared it to be Tropical Depression Nine.

Visible satellite imagery (Band 2) from GOES-East of the western Atlantic basin showing Hurricane Fiona east of Virginia and Tropical Depression Nine over the Caribbean Sea. Cirrus clouds to the south and west of the depression indicate that upper-level northeasterly wind, outflow from Fiona, was shearing the depression's thunderstorms.
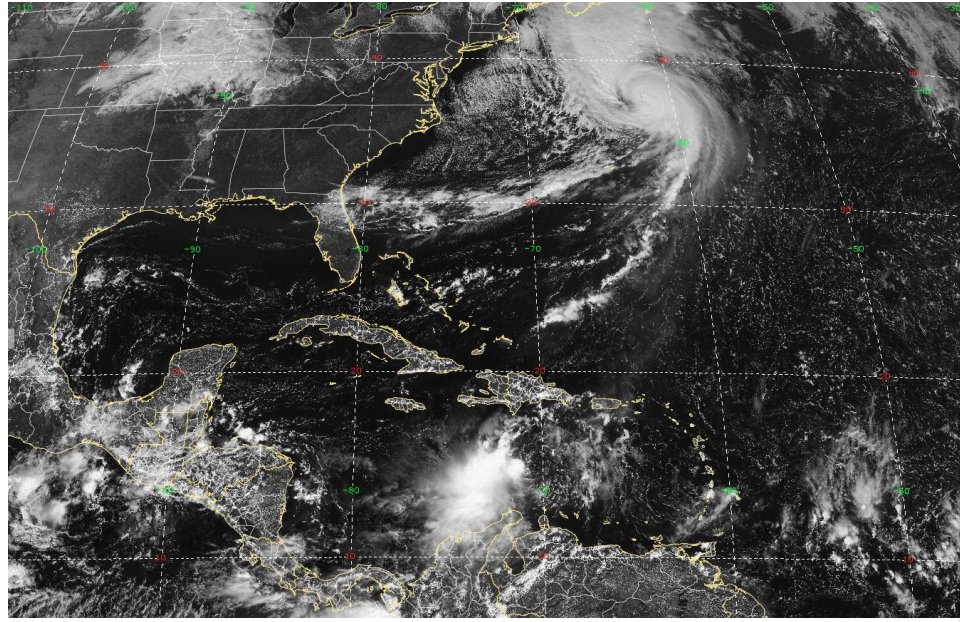
Image source: Colorado State University RAMMB SLIDER

Despite strong vertical wind shear, the depression strengthened into a tropical storm and gained the name Ian at 11 p.m. EDT on September 23. Slow strengthening continued until upper-level winds relaxed on September 25. Ian became a hurricane over the northwestern Caribbean Sea at 5:00 a.m. EDT on September 26 while passing southwest of the Cayman Islands. Intensification became rapid while Ian passed over waters with high ocean heat content later that day. It strengthened to a Category 3 hurricane before making its first landfall in western Cuba around 4:30 a.m. EDT on September 27.
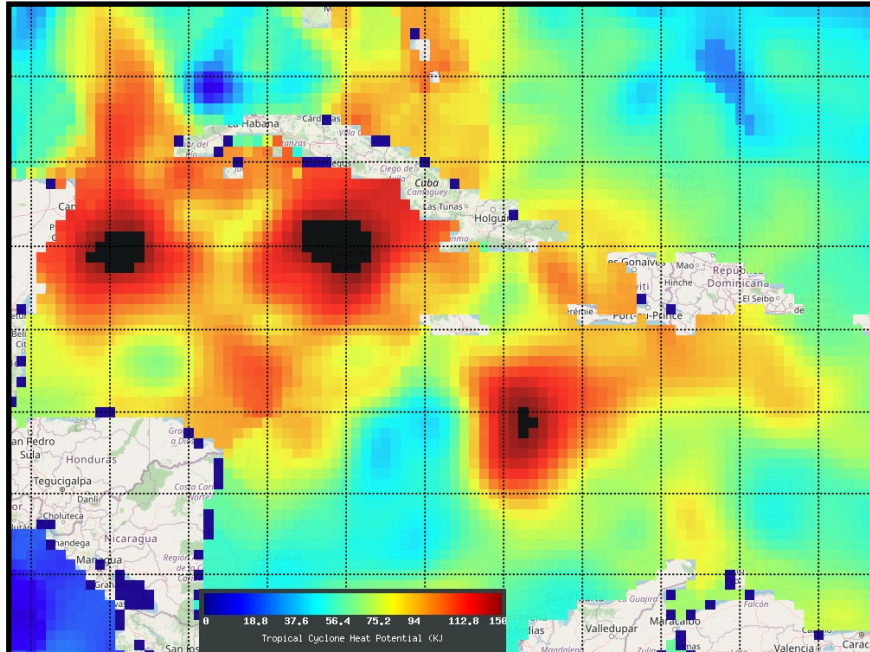

A plot of ocean heat content over the Caribbean Sea from September 25, 2022. Ian's track would take it over the area south of Cuba with ocean heat content values generally 100-150 J/cm² that would fuel rapid intensification.
Source: NOAA-AOML

Ian only slightly weakened while passing over Cuba but was still a Category 3 hurricane upon entering the Gulf of Mexico. Upon emerging over the southeastern Gulf of Mexico, Ian began to strengthen again. Ian began a turn to the right during this time that put it on a course toward southwestern Florida. The strengthening continued steadily, and Ian reached Category 5 intensity with 160 mph winds at 8 a.m. EDT on September 28. It then weakened slightly before its landfall in Florida near Cayo Costa at 3:05 p.m. EDT on September 28. NHC estimated the maximum sustained winds at 150 mph at the time, making Ian a Category 4 hurricane.
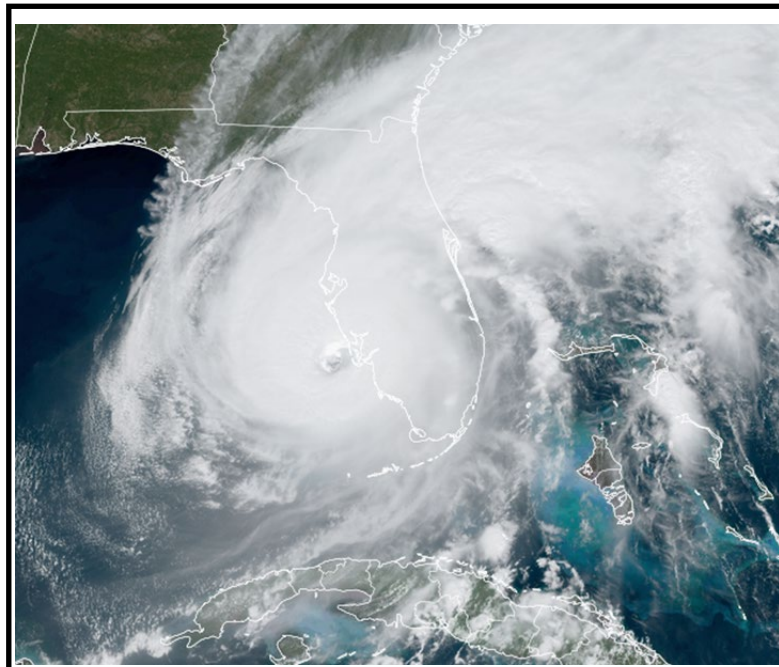

GeoColor composite satellite imagery of Ian as it approached landfall in southwestern Florida as a Category 4 hurricane.

Image source: CIRA/RAMMB SLIDER

Ian took about 18 hours to cross the Florida Peninsula and weakened considerably over land. It emerged near Cape Canaveral as a tropical storm with 65 mph winds just before noon on September 29. It left a path of devastation across Central and South Florida due to the high winds, a coastal storm surge that may have reached 15 feet, and major flooding from extreme rainfall. Ian killed 156 people in Florida.

After leaving Florida, an upper-level low splitting from the main upper-level jet stream began to steer Ian. Ian moved northeastward upon leaving Florida but curved toward the left while traveling over the Atlantic Ocean. The track took Ian over the Gulf Stream waters, resulting in modest strengthening on the evening of September 29 and on September 30 as Ian approached landfall. Ian became a hurricane again as of the 5 p.m. EDT advisory on September 29 with 75 mph winds, then gained additional strength that night. Ian approached the South Carolina coast on the morning of September 30 with maximum sustained winds of 85 mph.

SST Data from 2022-09-29
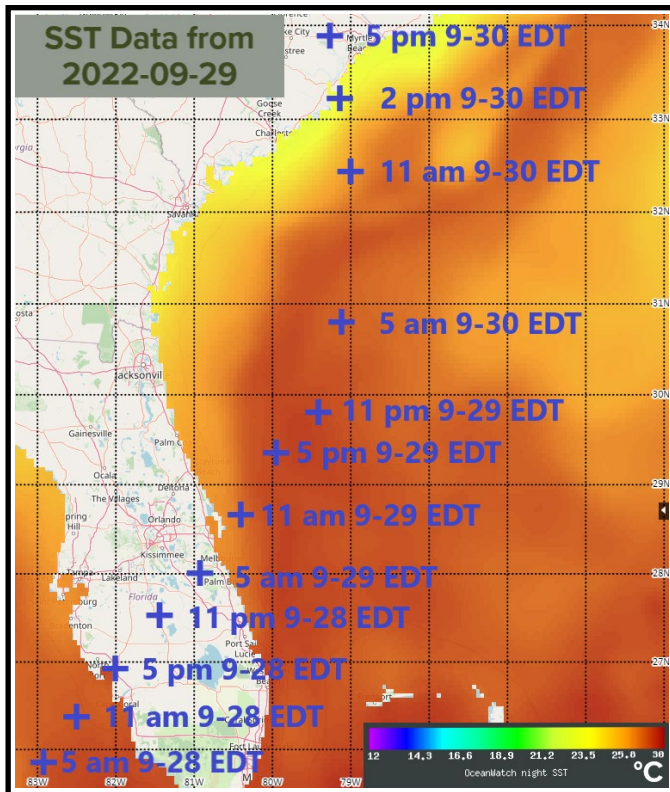
Selected points from Ian's track superimposed on a plot of sea surface temperatures on September 29, 2022. Ian's track after leaving Florida took it over the Gulf Stream ocean current, which caused it to strengthen. It was a strong tropical storm with 70 mph winds just after leaving Florida at 11 a.m. EDT on September 29 but was a Category 1 hurricane with 85 mph winds at landfall just after 2 p.m. EDT on September 30. Sea surface temperatures in the Gulf Stream were generally 28.0-29.5°C (82.4-85.1°F)

SST image source: NOAA PhOD Observations Viewer

Tropical-storm-force winds began along the South Carolina coast well in advance of Ian. This was caused by a large difference in pressure between Ian and surface high pressure well to the north, centered over the Great Lakes region.

This steep pressure gradient led to tropical storm force wind over a larger area around Ian than typical for a hurricane. The large wind field brought tropical storm-force winds to the South Carolina coastline on September 29. Gusts on land this day were up to 53 mph along the coast. Gusts of 30-35 mph were common over the rest of the state. The strong winds continued into the night at the coast.
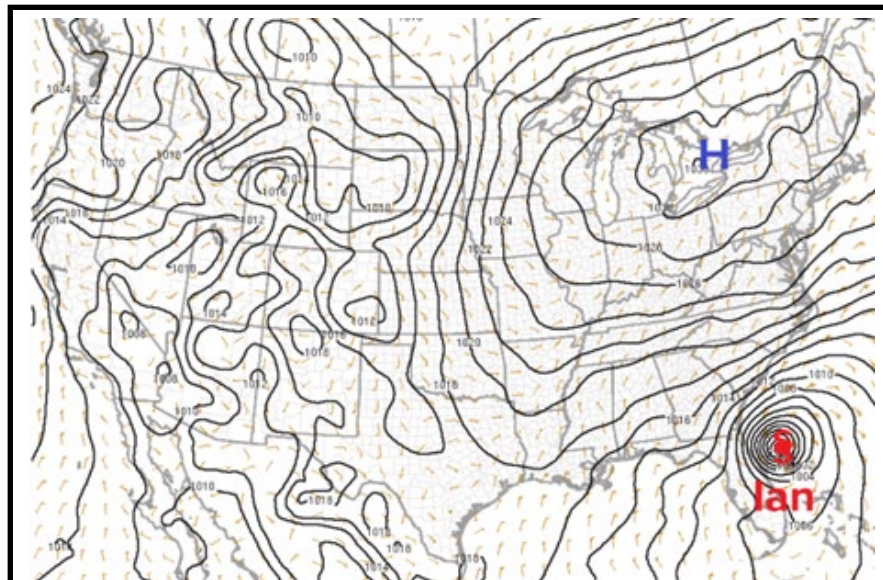
A surface pressure analysis for 0000 UTC September 30, 2022 (8 p.m. September 29 EDT).
Source: Storm Prediction Center Mesoanalysis

Ian's tropical storm-force winds extended up to 275 miles to the northeast of its center on September 30 as Ian approached landfall in South Carolina, but only 120-140 miles in the storm's other three quadrants. The hurricane-force winds reached the South Carolina coastline early on September 30. Ian then made landfall at 2:05 p.m. on September 30 at North Island. NHC estimated maximum sustained winds at the time to be 85 mph.

**Hurricane Ian Peak Wind Gust (mph)
September 30th, 2022**

33
35
39
38
35
43
32
43
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34
36
32
41
41
37
37
38
43
39
51
56
34
32
44
37
51
38
34
39
51
32
58
51
65
Buoy,
Murrells Inlet (84)
41
38
Buoy, Winyah Bay (84)
43
48
36
68
74
Buoy, Fort Sumter (82)
49
52
Buoy, Calibogue Sound (52)
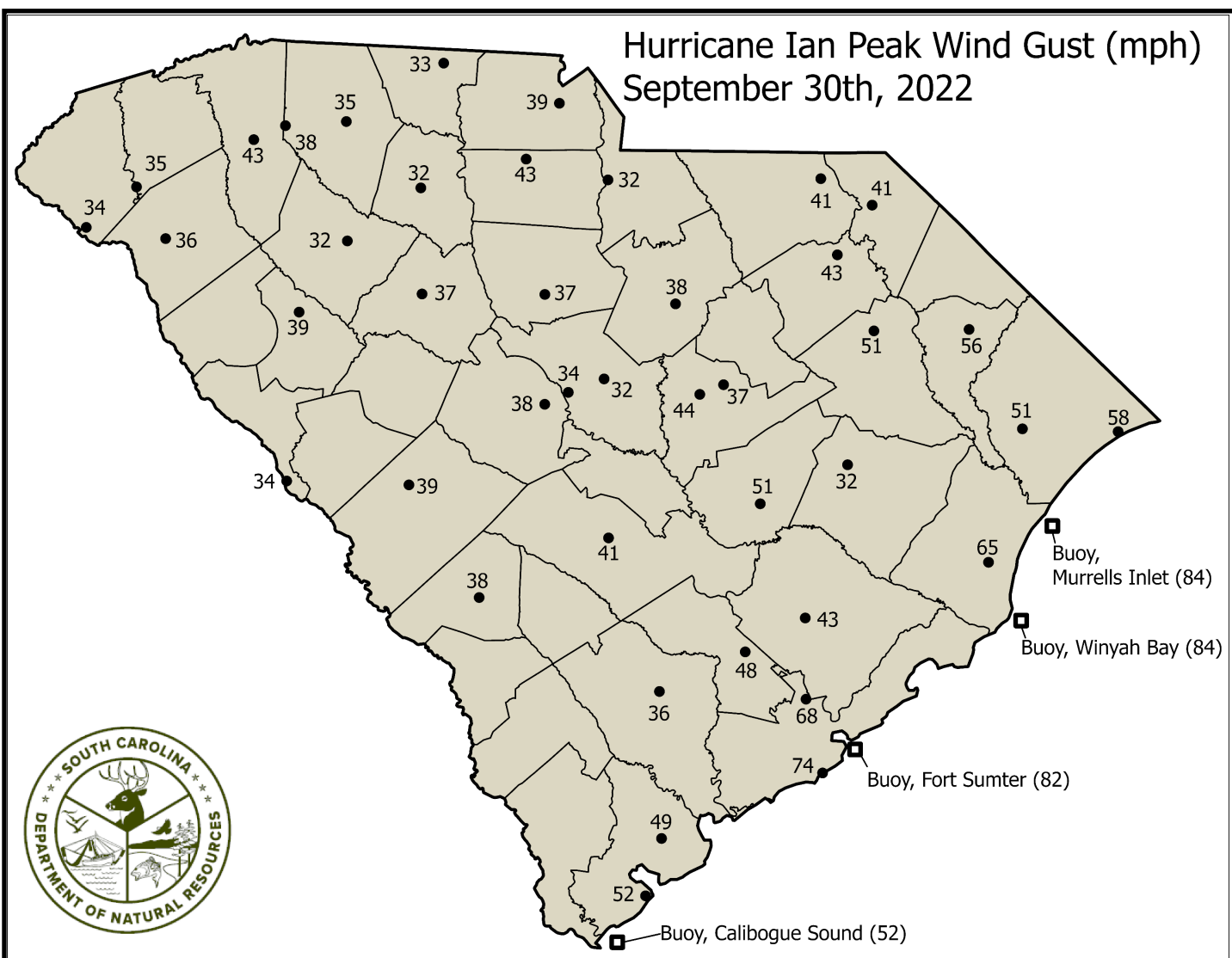
A map showing peak wind gusts from Hurricane Ian.

NHC's Surface Wind Field graphic from Advisory 29, issued at 5:00 p.m. on September 29.

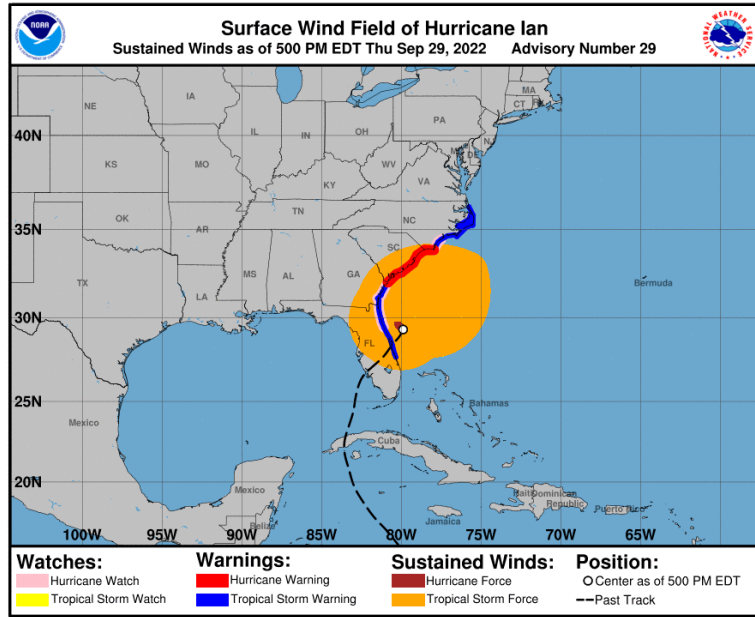The gusty northeasterly winds of September 29 caused the tides to run above the usual astronomical levels along the South Carolina coast, resulting in tidal flooding. The tide gauge at Charleston peaked at 7.65 feet, considered moderate flooding. The tide gauge at Springmaid Pier in Myrtle Beach peaked at 7.5 feet, also considered minor flooding.

Ian brought a storm surge along the South Carolina coast, but a significant storm surge occurred primarily north of the Santee Delta area. The greatest surge occurred near Pawleys Island, just northeast of Ian's landfall location. The highest measured storm surge in the state was a 6.41 feet at Springmaid Pier in Myrtle Beach, but the storm surge from Ian may have exceeded seven feet near Pawleys Island.
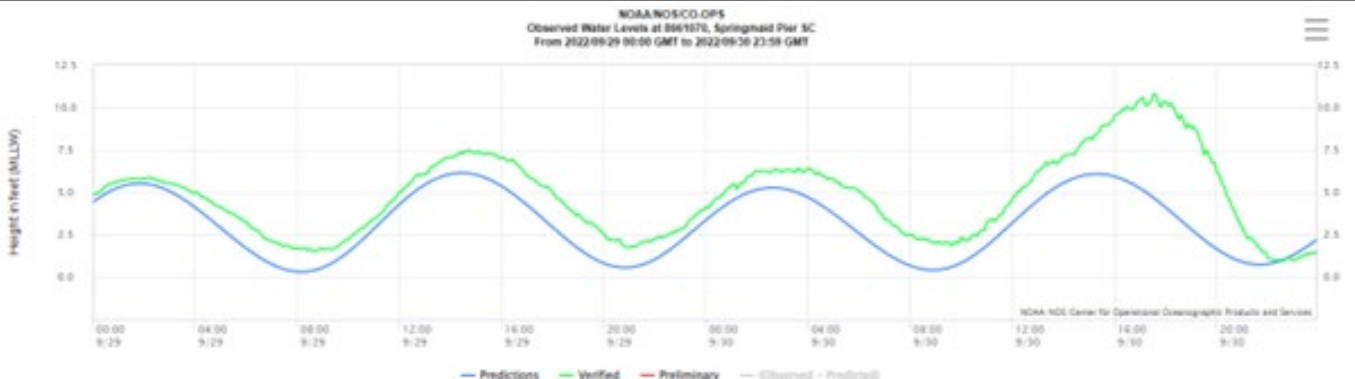

Tidal observations (green) from the gauge at Springmaid Pier from 0000 UTC September 29 to 0000 UTC October 1 (8 p.m. September 28 to 8 p.m. September 30 EDT).
The peak was 10.77 feet. Flood stage for this gauge is 7 feet and major flood stage is 10.5 feet.

The coastal flooding that occurred on September 29 and with Ian's landfall on September 30 occurred during a period of near-average astronomical tides. The high astronomical high tides peaked on September 25, when a new moon occurred but the lowest astronomical high tides occurred on October 2, when the moon reached its first quarter phase.

Ian caused heavy rainfall of two inches or more over more than half of South Carolina. Rainfall of four inches or more was widespread along the Coastal Plain, extending into the eastern Midlands. The peak rainfall was 10.75 inches at CoCoRaHS station SC-CR-60 near Charleston. While this rainfall caused flash flooding in some areas and exacerbated storm surge flooding along the coast, it did not cause any major river flooding inland due to dry conditions in the weeks leading up to Ian's landfall in South Carolina. In fact, many areas welcomed the rainfall due to antecedent drought conditions. Parts of the Upstate and Coastal Plain experienced a three to four-inch rainfall deficit during the 60 days prior to Ian's landfall.
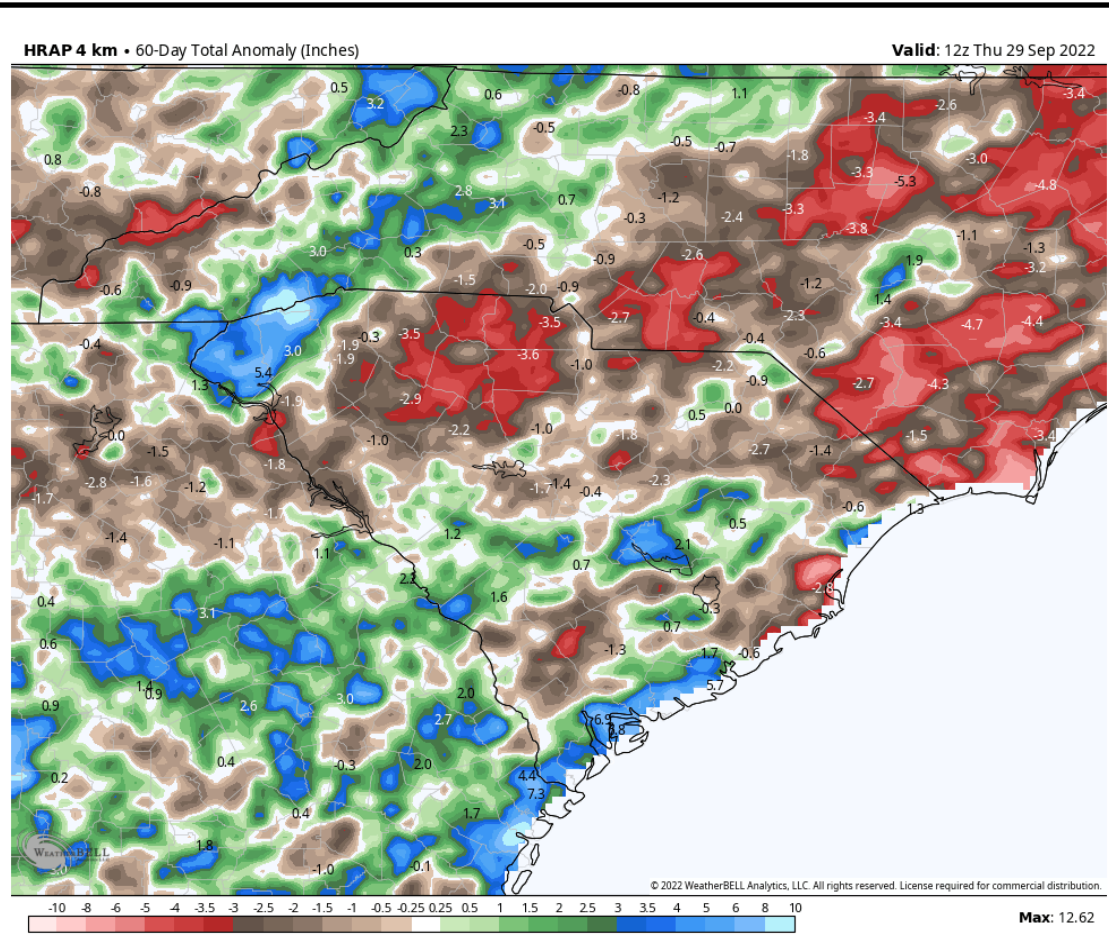
HRAP rainfall for 60 days ending on Thursday, September 29, indicating dry conditions during the period over much of South Carolina during before Ian's landfall in the state.

Source: WeatherBELL

A map of rainfall from September 29 to October 1, 2022. Heavy rainfall sidestepped areas near the Savannah River and the heaviest rainfall occurred in the Charleston area. Rainfall of four inches or more was widespread across the Coastal Plain except in Jasper, Hampton and Colleton Counties.

It is common for landfalling tropical cyclones to spawn tornadoes to the right of the track of their center. While Ian spawned several tornadoes in Florida and one in North Carolina, none occurred in South Carolina. This was because a cool and stable air mass arrived in the state on September 28. Ian's thunderstorms had to ride over this cool and stable air mass as it made landfall, and such situations usually prevent tornadoes from occurring.
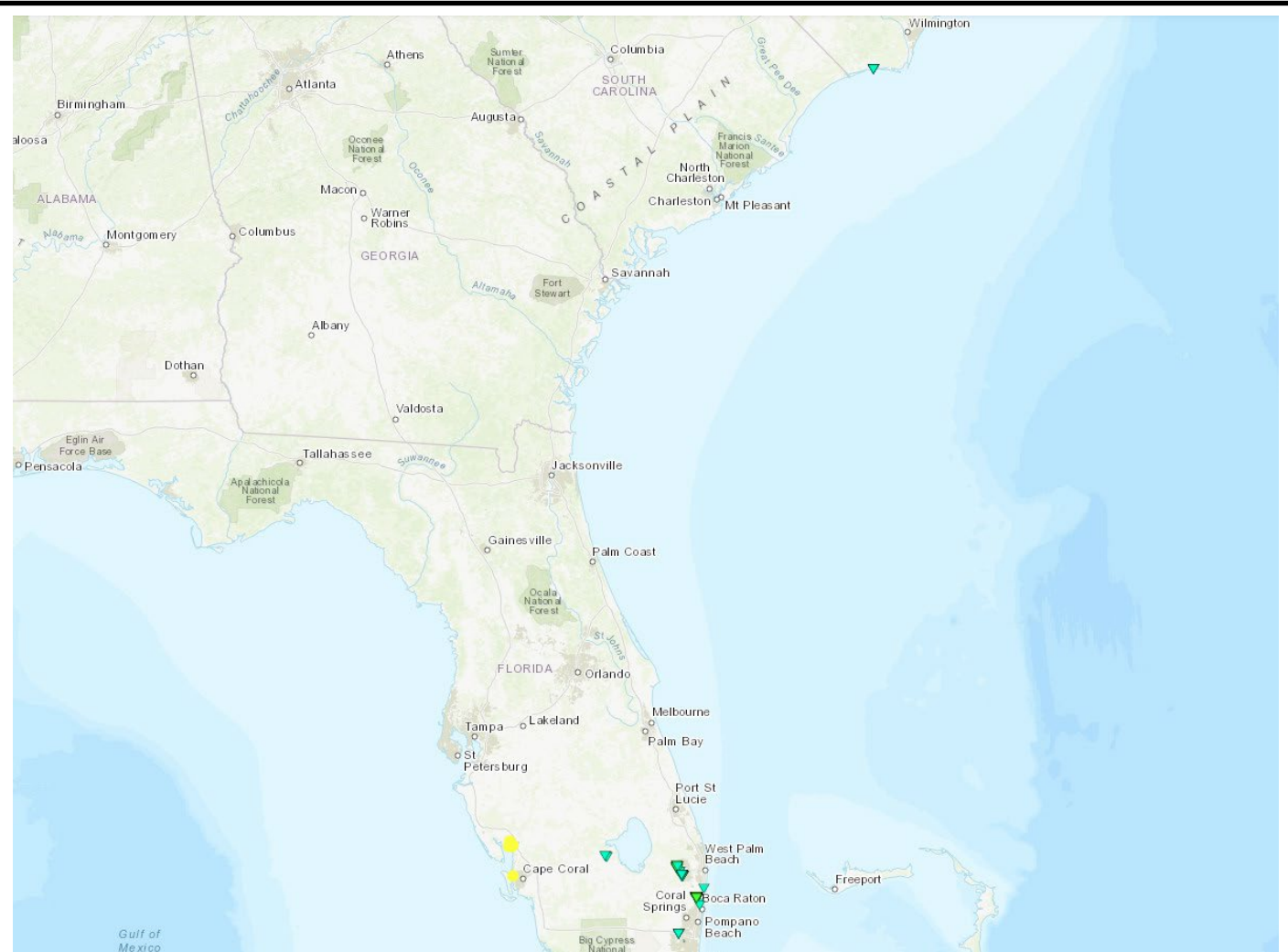
An image captured from NOAA's Damage Assessment Toolkit website showing the locations of tornadoes spawned by Hurricane Ian (Triangle-shaped markers). The two yellow markers indicate damage surveyed which was determined to be caused by Ian's high wind and not by a tornado spawned by the hurricane.

A trackable remnant evident on satellite imagery drifted northeastward across the coastal Mid-Atlantic region on October 5, then into Atlantic Canada on October 6.
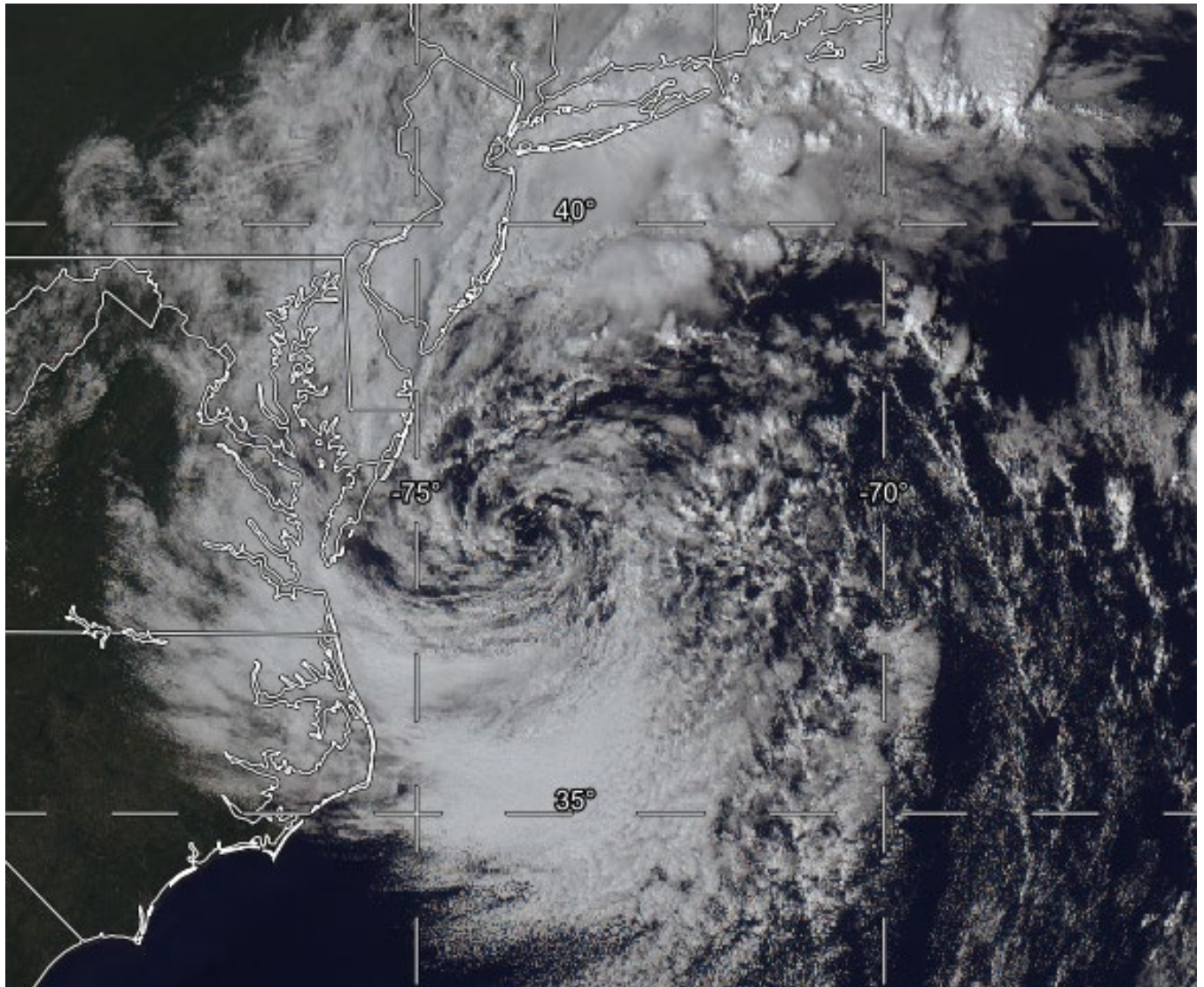
A true-color satellite image from 1900 UTC (3 p.m. EDT) on October 5, 2022, showing Ian's remnant centered southeast of the Delmarva Peninsula.

Source: University of Wisconsin RealEarth website

Forecast Issues

Ian occurred during a complex weather pattern that resulted in a challenging forecast for the storm's track and intensity. The complexity led to forecast uncertainty and challenges in communicating those uncertainties to the public.

The initial forecast for Tropical Depression Nine called for it to strengthen slowly as it crossed the central Caribbean Sea. Ocean heat content was high in this area, but upper-level winds were unfavorable. Winds aloft were from the northeast as the outflow from distant Hurricane Fiona, passing west of Bermuda at the time, was causing vertical wind shear over the Caribbean Sea. Early forecasts from NHC correctly predicted the slow strengthening of the depression, which became Tropical Storm Ian as of Advisory 4, issued at 11 p.m. EDT on September 23.

The forecast track and intensity graphic from NHC's first advisory for Tropical Depression Nine.
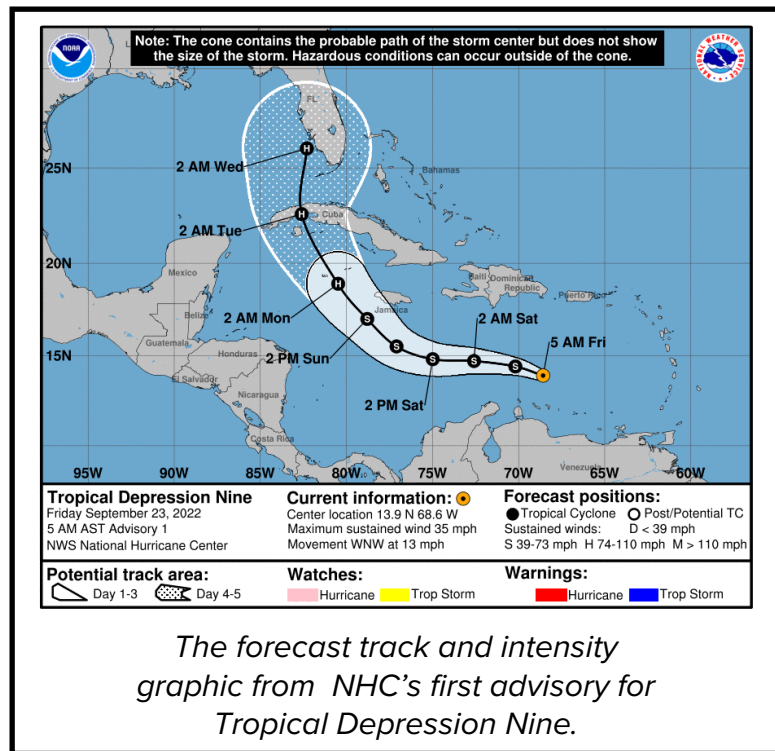
Ian tracked west of early forecast positions by up to 100 miles at a 5-day range, but this is a below-average forecast error for tropical cyclone predictions at this range.

As Hurricane Fiona moved eastward and farther away from Ian, the hostile upper-level winds over the Caribbean Sea diminished. As it became clear that upper-level winds would become more favorable for strengthening as Ian reached the western Caribbean Sea, concern increased for the storm to become very intense. Sea surface temperatures were as warm as 89°F along Ian's forecast track, and ocean heat content was very high over the northwestern part of the Caribbean Sea. By September 24, NHC forecasters were accounting for this in their forecasts, calling for a period of rapid intensification, resulting in Ian reaching Category 3 intensity by the time it reached the western end of Cuba and for additional strengthening once Ian reached the southeastern Gulf of Mexico.
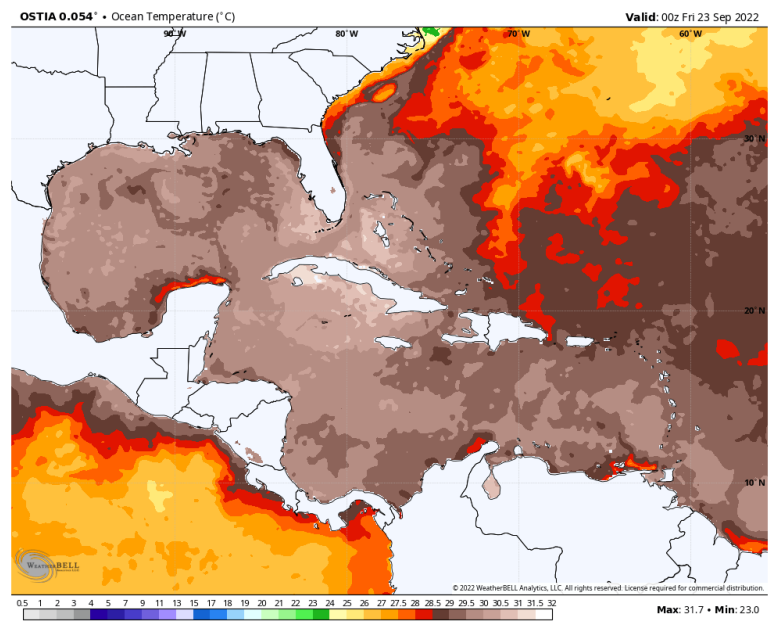
A map showing sea surface temperatures on September 23, 2023. Most of the area along the forecast path of Tropical Depression Nine was at least 29°C (84.2 °F) and was as warm as 31.5 °C (88.7°F).

Source: WeatherBELL

Once Ian reached the western Caribbean Sea, the forecast became more challenging. By September 25, it was clear that Ian would turn northward over the western Caribbean Sea in response to an upper-level trough over the eastern part of North America at the time. However, it was unclear whether Ian would take a path over the eastern Gulf of Mexico or instead over the Florida peninsula and the Atlantic Ocean before affecting areas along the East Coast of the United States.
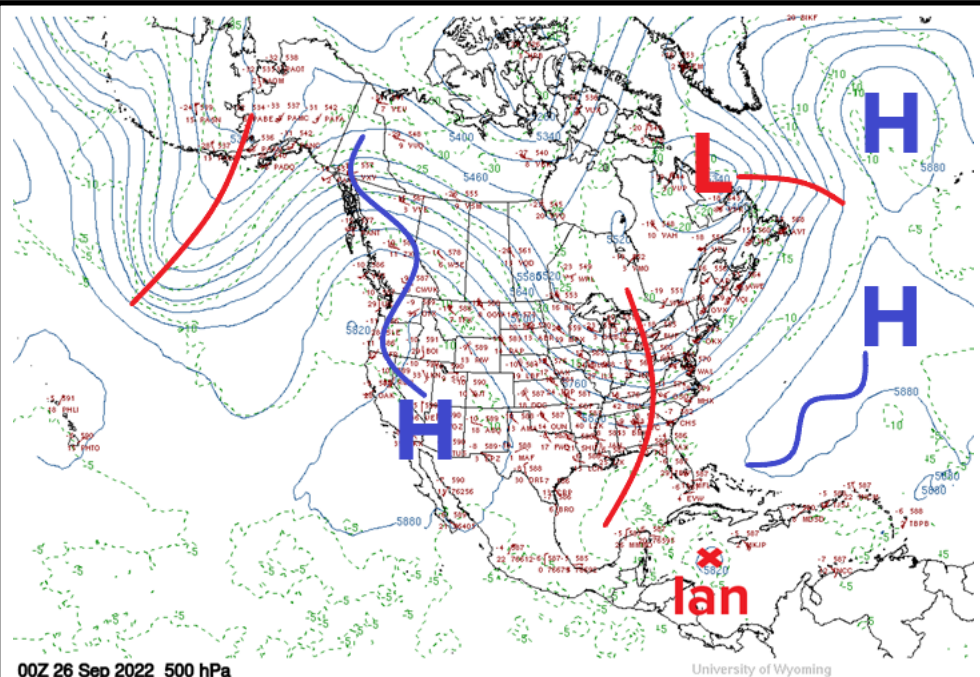
An analysis of the 500-hPa (millibar) level over North America and vicinity from 0000 UTC September 26, 2022 (8 p.m. September 25 EDT). An upper trough (highlighted by a red line) was over eastern North America, while an upper ridge (denoted by a wavy blue line) was over the southwest Atlantic Ocean. Ian was steered between these two features.
Source: University of Wyoming

The uncertainty stemmed from the speed which Ian would move toward the trough, how quickly the trough would lift out, and whether a part of the trough might be left behind to form an upper-level low over the southeastern part of the United States.

By September 25, it had becoming certain that South Carolina would be affected in some way by Ian. Most forecast models indicated a track over or near a part of the state. However, the potential impacts were unclear. A track of Ian through the Gulf of Mexico, then across Florida and Georgia, then into the state would cause heavy rainfall and a tornado risk, but not much wind and storm surge. However, a track farther east would decrease the tornado risk but increase the risk for high wind, storm surge, and extreme rainfall. A track far enough to the east would bring Ian over the Atlantic for a time, resulting in it regaining strength after passing over Florida.

At the time, it appeared that Ian would move into the Gulf of Mexico before the trough began to lift out of the eastern part of North America, and computer model guidance showed that no upper low or only a weak upper low would would be left behind. This caused forecasters at NHC to shift their forecast track for Ian to the left.
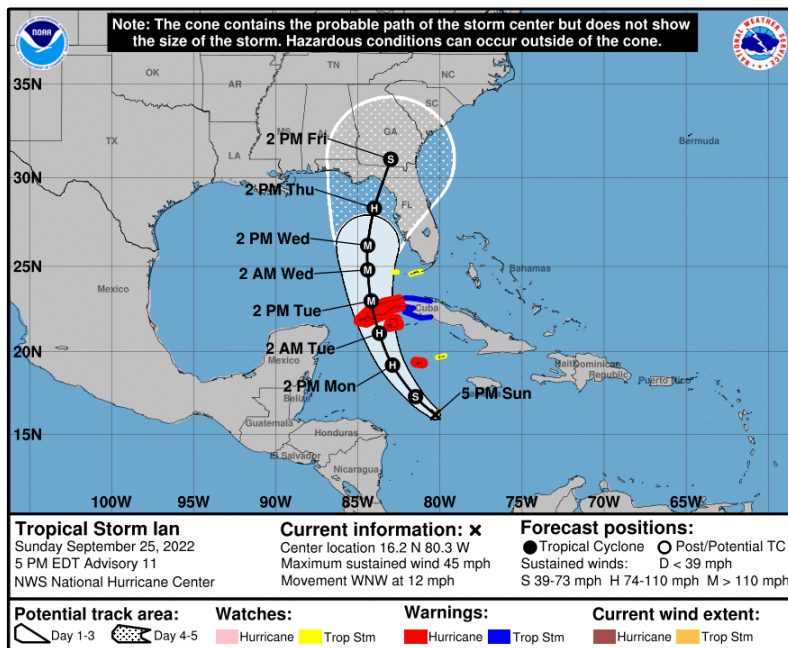
The forecast track and intensity graphic from NHC's Advisory 11 on Ian, issued at 5 p.m. EDT on September 25. Parts of South Carolina were within the 5-day uncertainty cone by this time.

Over the following days, the computer model guidance gradually shifted eastward with Ian's track, increasingly calling for the upper trough over eastern North America to lift out of the region sooner while leaving an upper-level low behind over the Southeast. With the change in guidance came changes in NHC's forecast track.

By September 27, the NHC forecast indicated a track sending Ian across the Florida peninsula and over the Atlantic for a time before curving back toward the East Coast. By September 28, the NHC forecast began to show a landfall in the South Carolina Lowcountry. Additional eastward shifts in the forecast brought the expected landfall location to northeastern Charleston County by 5 p.m. EDT on September 29.

The forecast track and intensity graphic from NHC's Advisory 19 on Ian, issued at 5 p.m. EDT on September 27.
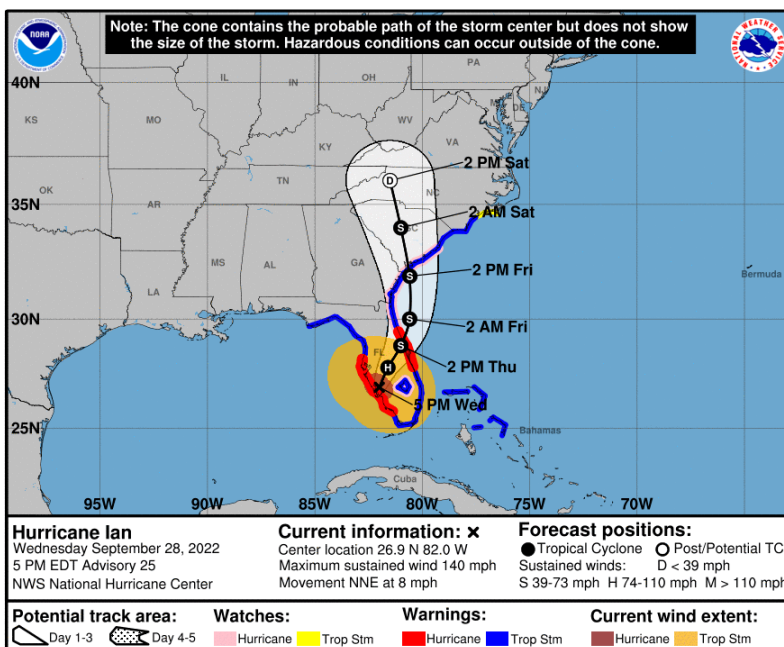
The forecast track and intensity graphic from NHC's Advisory 25 on Ian, issued at 5 p.m. EDT on September 28.

On the evening of September 29, the upper trough over eastern North America was lifting northeast but was leaving behind a small upper low over Georgia. The low was steering Ian to the northeast away from Florida but would cause it to turn northward and eventually to the north-northwest into South Carolina. After landfall, Ian would combine with the upper low to become a slow-moving extratropical storm system.

Analysis of the 500-hPa level over North America from 0000 UTC on September 30, 2022 (8 p.m. September 29 EDT).

Source: University of Wyoming

The process of Ian and the upper low combining was complex and such scenarios are often handled poorly by computer models. This was a factor in the uncertainty with Ian's forecast and had a role in the need for many changes to the track forecast.
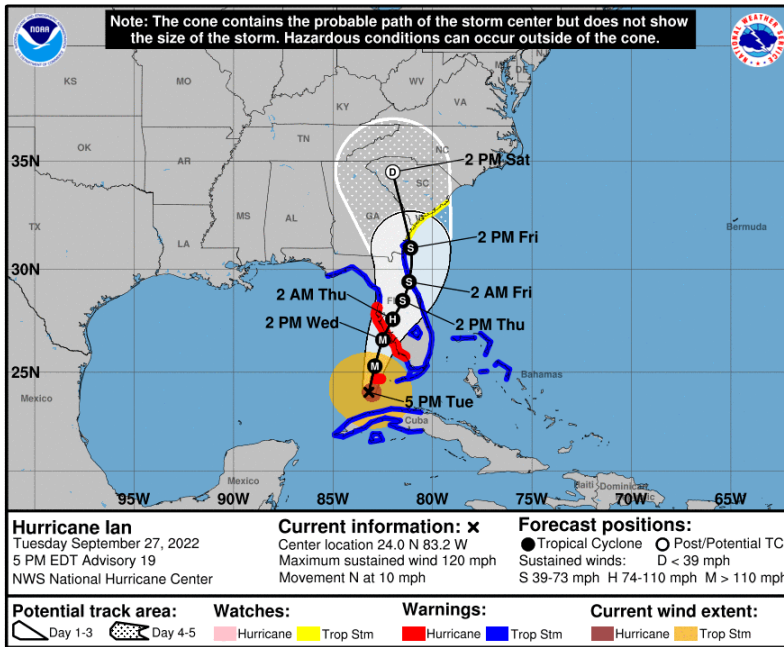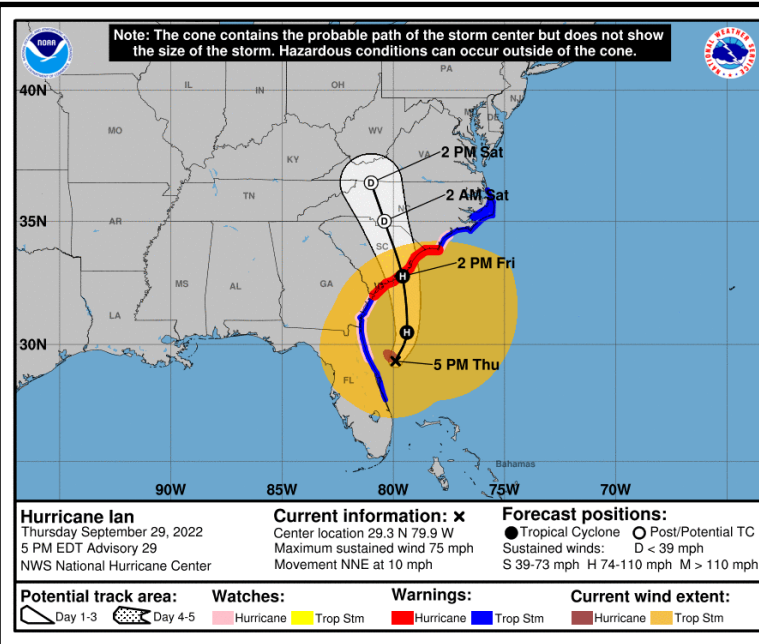

The forecast track and intensity graphic from NHC's Advisory 19 on Ian, issued at 5 p.m. EDT on September 29.

The forecast was further complicated by other weather features over and near the Southeast while time Ian was moving toward the region. A cold front associated with the upper trough over eastern North America moved into the region on September 25 and became stationary over Florida and off the East Coast on September 28. North of the front, a strong area of high pressure was moving over the Great Lakes.

The weather map issued by WPC valid at 8 a.m. EDT on September 28, 2022, depicting a cold front over Florida and off the Southeast Coast turning stationary as Ian moved northward over the southeastern Gulf of Mexico.
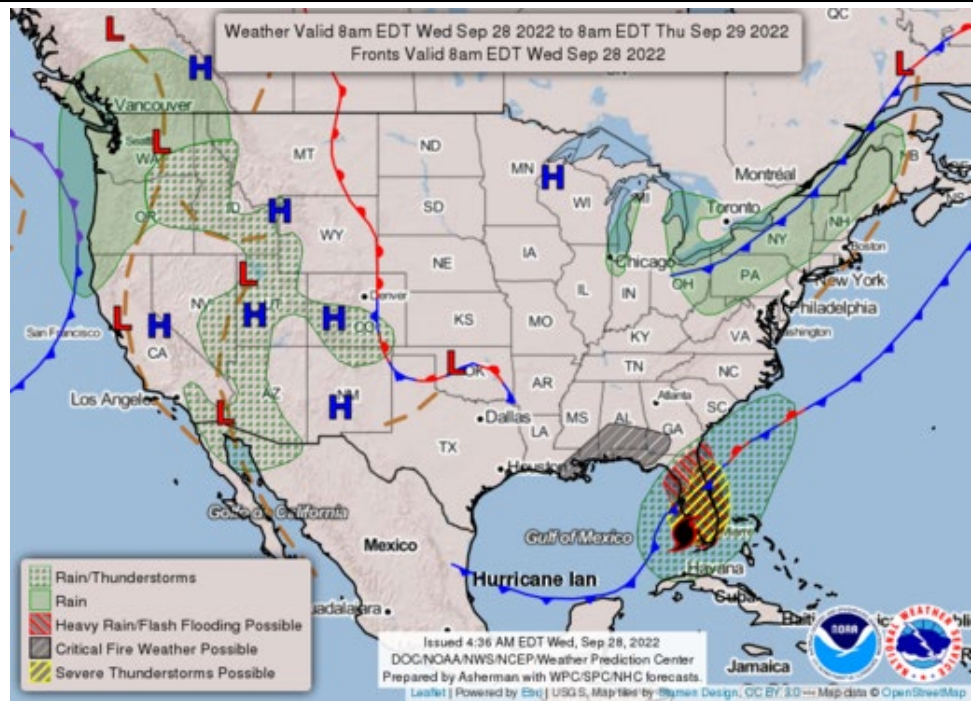
The eastward shifts in the track forecast continued during the night of September 29 and on September 30. At 11 a.m. September 29, the forecast track indicated landfall at Folly Beach, a worst-case scenario for Charleston, which is highly vulnerable to storm surge. Further eastward shifts in the forecast track shifted the largest storm surge northward along the coast, eventually to Georgetown County.
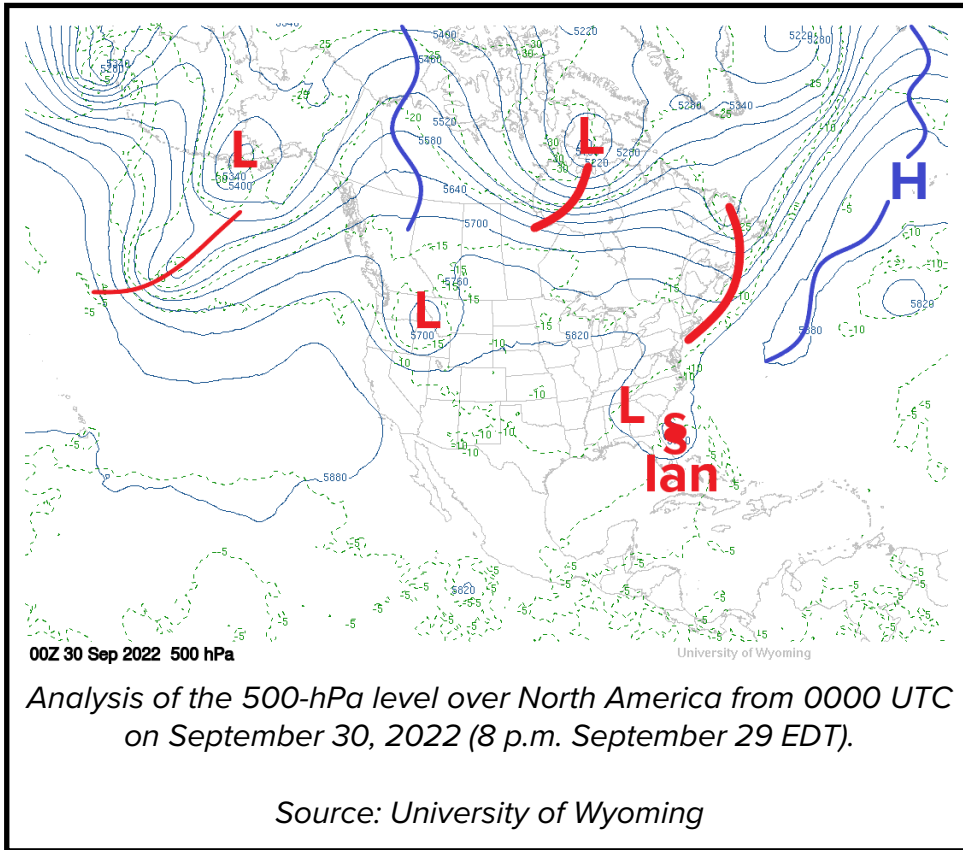
The potential for the early onset of tropical storm force winds was realized by forecasters at NHC, and it led to the issuance of a Tropical Storm Watch with Advisory 18, at 11 a.m. on September 27. The initial watch covered the coastline south of the mouth of the South Santee River. Tropical Storm Warning was issued with Advisory 20 at 11 p.m. EDT on September 27. Ian's strengthening and continued eastward shifts in the forecast track led to the Tropical Storm Warning extending northward to Little River Inlet and a Hurricane Watch issued for the area south of the mouth of the South Santee River with Advisory 24 at 11 a.m. on September 28. The entire South Carolina coast was then put under a Hurricane Warning as Ian with Advisory 28, issued at 11 a.m. on September 29.
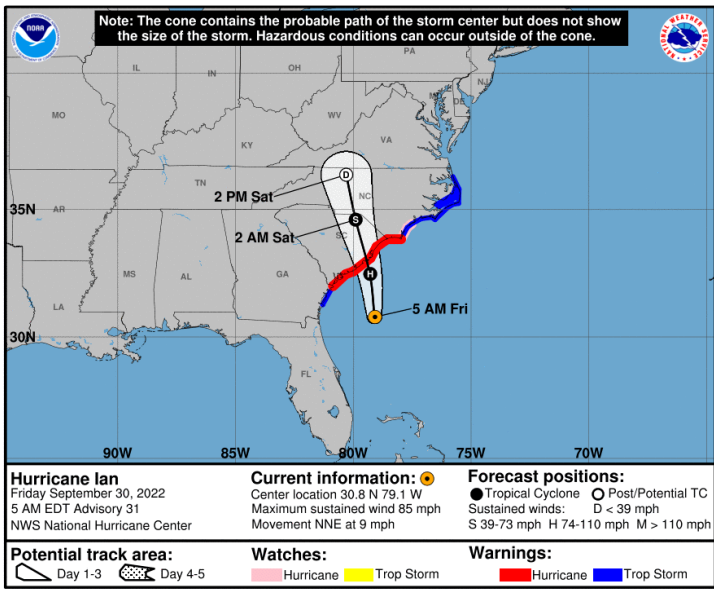
The forecast track and intensity graphic from NHC's Advisory 31 on Ian, issued at 5 a.m. EDT on September 30.

Ian's landfall occurred at 2:05 p.m. on September 30 on North Island, southeastward across Winyah Bay from Georgetown. The upper low that steered it into South Carolina had essentially captured it by 5 p.m. EDT on September 30 when Advisory 33 was issued, so NHC declared Ian to be extratropical then. Tropical Storm Warnings remained in effect for parts of the South Carolina coast until Advisory 34 was issued at 11:00 p.m. when all warnings ended. Advisories from NHC continued until 5 a.m. EDT on October 1, when NHC passed advisory responsibility to the Weather Prediction Center (WPC). WPC issued its final advisory at 11 p.m. EDT on October 1, when they considered Ian to have nearly dissipated.
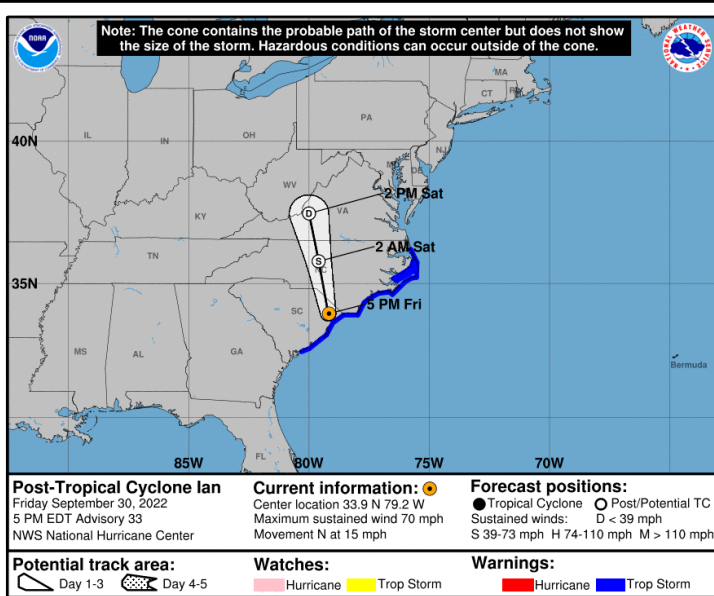
The forecast track and intensity graphic from NHC's Advisory 33 on Ian, issued at 5 p.m. EDT on September 30.

Appendix 1: Wind Gust Tables

Selected Peak Wind Gusts From Hurricane Ian Land Stations				
Location	**Peak Gust (mph)**	**Time (EDT)**	**Provider**	**Anemometer Height (feet)**
Folly Beach South End	74	9:50 a.m.	WeatherFlow	35.0
Charleston Battery Point	72	1:50 p.m.	WeatherFlow	32.8
Charleston I-26 near US 17	70	2:00 p.m.	SCDOT	Unknown
Charleston International Airport	68	1:55 p.m.	NOAA	33.0
Murrells Inlet	68	11:39 a.m.	WeatherFlow	23.5
Georgetown Winyah Bay Fishing Pier	65	12:50 p.m.	WeatherFlow	34.0
Mount Pleasant RiverTowne C.C.	65	12:08 p.m.	CWOP	Unknown
Folly Beach	63	10:00 a.m.	Davis	Unknown
Arthur Ravenel Bridge	62	1:45 p.m.	SCDOT	Unknown
N. Myrtle Beach Fire Station 2	62	2:59 p.m.	Davis	Unknown
Mount Pleasant WCBD-TV	61	1:15 p.m.	CWOP	Unknown
N. Myrtle Beach Fire Station 1	59	3:34 p.m.	Davis	Unknown
Charleston Battery Point	58	8:57 p.m.	WeatherFlow	32.8
N. Myrtle Beach Grand Strand Airport	58	4:30 p.m.	NOAA	33.0
Mount Pleasant Regional Airport	56	11:35 a.m.	NOAA	Unknown
Georgetown County Airport	55	10:55 a.m.	NOAA	Unknown
Hilton Head Airport	52	4:15 a.m.	NOAA	Unknown
Florence Regional Airport	51	2:39 p.m.	NOAA	33.0
Conway Horry County Airport	51	11:35 a.m.	NOAA	Unknown
McEntire Joint National Guard Base	51	4:25 p.m.	NOAA	Unknown
Manning – Santee Cooper Airport	51	10:35 a.m.	NOAA	Unknown
Beaufort Marine Corps Air Station	49	3:35 a.m.	NOAA	33.0
Myrtle Beach International Airport	48	11:29 a.m.	NOAA	Unknown

Selected Peak Wind Gusts From Hurricane Ian
Marine Stations

Location	Peak Gust (mph)	Time	Provider	Anemometer Height (feet)
Winyah Bay Range A Rear Light	84	11:00 a.m.	WeatherFlow	50.0
Fort Sumter Range Front Light	82	1:36 p.m.	WeatherFlow	40.0
Charleston Harbor Shutes Folly	76	1:36 p.m.	WeatherFlow	41.5
Buoy 41004	74	5:10 a.m.	NDBC	13.5
Capers Nearshore Buoy (41029)	67	11:08 p.m.	NDBC	9.7
Buoy 41066	65	1:08 p.m.	NDBC	9.7
Charleston Harbor Tide Gauge	65	1:54 p.m.	NOS	28.9
Folly Island CMAN	61	1:50 p.m.	NDBC	32.2
Springmaid Pier Tide Gauge	61	3:06 p.m.	NOS	22.6
Oyster Landing North Inlet	59	12:15 p.m.	NOS	15.1
Calibogue Sound	53	1:45 a.m.	WeatherFlow	19.0
Isle of Palms Pier	51	10:35 a.m.	WeatherFlow	27.0

Wind observation notes:

Quality-controlled observations compiled by the National Weather Service were used to select these peak wind gusts. Some providers reported higher wind gusts in real-time that were later found to be incorrect.

The anemometer height, where available, is given to provide proper context for wind observations. The standard anemometer height for surface weather observations is ten meters, or about 32 feet, 10 inches. Anemometers above this standard height will typically measure a higher wind speed than one at the standard height, while an anemometer lower than the standard height will typically measure a lower wind speed than one at the standard height. This is because there is more friction between the air and terrain, buildings, and vegetation near to the ground than well above the ground.

Similarly, there is less friction between the surface and air over the water than over land, so marine winds were reported separate from land-based stations in this report.

Appendix 2: Rainfall Reports

Data for these charts were taken from several data sources. The charts include the two highest rainfall reports during Ian's passage for each county, except for Dillon and Allendale Counties, which have only one rainfall reporting station. They are ordered by the highest report within each county.

Those who have an interest in collecting precipitation data are encouraged to join the CoCoRaHS program. Information on the program is found at cocorahs.org. Those who have a high-quality home weather station and are interested in sharing the data are encouraged to contact the Citizen Weather Observer Program at wxqa.com.

Selected Rainfall Reports from Hurricane Ian Lowcountry				
Location	**Identifier**	**County**	**Rainfall (inches)**	**Provider**
5 SSE Charleston	SC-CR-60	Charleston	10.75	CoCoRaHS
2 SE Charleston	SC-CR-89	Charleston	9.44	CoCoRaHS
4 W North Charleston	SC-DC-57	Dorchester	6.89	CoCoRaHS
3 WNW North Charleston	SC-DC-3	Dorchester	6.57	CoCoRaHS
7 N Summerville	SC-BK-63	Berkeley	6.87	CoCoRaHS
6 NE Summerville	SC-BK-94	Berkeley	6.62	CoCoRaHS
6 WSW Cottageville	SC-CL-16	Colleton	4.45	CoCoRaHS
1 S Green Pond	SC-CL-14	Colleton	3.48	CoCoRaHS
Okatie 7.6 NE	SC-BF-36	Beaufort	1.87	CoCoRaHS
Beaufort 5.7 NE	SC-BF-37	Beaufort	1.86	CoCoRaHS
Ridgeland 5.8 ESE	SC-JS-3	Jasper	1.50	CoCoRaHS
Bluffton 7.2 NW	SC-JS-9	Jasper	1.01	CoCoRaHS
Yemassee 1 N	USC00389469	Hampton	1.00	COOP
Hampton 0.8 SW	SC-HM-7	Hampton	1.00	CoCoRaHS

Selected Rainfall Reports from Hurricane Ian Pee Dee				
Location	**Identifier**	**County**	**Rainfall (inches)**	**Provider**
13 NW Georgetown	SC-GT-44	Georgetown	5.96	CoCoRaHS
6 NNE Pawleys Island	SC-GT-9	Georgetown	5.43	CoCoRaHS
Mullins	MULS1	Marion	5.33	COOP
Marion	MRWS1	Marion	4.06	RAWS
2 N Murrells Inlet	SC-HR-63	Horry	4.96	CoCoRaHS
2 NNE Murrells Inlet	SC-HR-122	Horry	4.96	CoCoRaHS
10 NW Kingstree	SC-WL-4	Williamsburg	4.76	CoCoRaHS
8 WNW Kingstree	SC-WL-2	Williamsburg	4.26	CoCoRaHS
6 W Florence	SC-FL-24	Florence	4.42	CoCoRaHS
Florence Regional Airport	KFLO	Florence	4.00	NOAA
Darlington County Jetport	KUDG	Darlington	4.20	NOAA
Darlington	DLGS1	Darlington	3.65	COOP
4 NW Dillon	SC-DL-4	Dillon	4.04	CoCoRaHS
1 SE Bennettsville	SC-MB-2	Marlboro	3.18	CoCoRaHS
2 WNW Clio	SC-MB-11	Marlboro	3.10	CoCoRaHS
3 E Chesterfield	CTFS1	Chesterfield	3.09	COOP
4 NW Society Hill	FW8074	Chesterfield	3.04	CWOP

Selected Rainfall Reports from Hurricane Ian Midlands				
Location	**Identifier**	**County**	**Rainfall (inches)**	**Provider**
Holly Hill 3.6 WNW	SC-OR-51	Orangeburg	7.00	CoCoRaHS
Santee 2.0 ENE	SC-OR-49	Orangeburg	5.22	CoCoRaHS
8 ESE Summerton	SC-CD-19	Clarendon	5.25	CoCoRaHS
Summerton 7.6 SW	SC-CD-17	Clarendon	4.33	CoCoRaHS
2 NNW Columbia	SC-RC-127	Richland	4.26	CoCoRaHS
6 SSE Fort Jackson	SC-RC-30	Richland	4.01	CoCoRaHS
2 W Oakland	SC-SM-39	Sumter	4.36	CoCoRaHS
Sumter	SC-SM-10	Sumter	4.33	CoCoRaHS
Longtown	LNTS1	Fairfield	4.18	COOP
Winnsboro	389327	Fairfield	3.17	COOP
St. Matthews 3.2 ENE	SC-CA-1	Calhoun	3.99	CoCoRaHS
North 8.6 ENE	SC-CA-19	Calhoun	2.50	CoCoRaHS
West Columbia 1.1 NE	SC-LX-176	Lexington	3.63	CoCoRaHS
Cayce 1.5 NNE	SC-LX-173	Lexington	2.52	CoCoRaHS
Prosperity 0.1 NW	SC-NW-27	Newberry	1.84	CoCoRaHS
Prosperity 1.9 SSE	SC-NW-27	Newberry	1.79	CoCoRaHS
Leesville 8.0 N	SC-SL-14	Saluda	1.64	CoCoRaHS
Saluda 3.5 ENE	SC-SL-6	Saluda	0.89	CoCoRaHS

Selected Rainfall Reports from Hurricane Ian
Central Savannah River Area

Location	Identifier	County	Rainfall (inches)	Provider
Denmark 2.8 WNW	SC-BM-1	Bamberg	1.89	CoCoRaHS
Denmark 2.0 N	SC-BM-9	Bamberg	1.17	CoCoRaHS
Salley 4.9 NNE	SC-AK-73	Aiken	1.46	CoCoRaHS
Salley 6.0 NNE	SC-AK-87	Aiken	1.41	CoCoRaHS
Barnwell 4.6 S	SC-BW-6	Barnwell	0.42	CoCoRaHS
Barnwell 1.2 WSW	SC-BW-3	Barnwell	0.40	CoCoRaHS
2 NNW Columbia	SC-RC-127	Bamberg	4.26	CoCoRaHS
6 SSE Fort Jackson	SC-RC-30	Bamberg	4.01	CoCoRaHS
Edgefield 3.3 N	SC-ED-16	Edgefield	0.30	CoCoRaHS
Edgefield 10.5 N	SC-ED-5	Edgefield	0.23	CoCoRaHS
McCormick 0.5 NW	SC-MC-8	McCormick	0.36	CoCoRaHS
McCormick 2.3 W	SC-MC-5	McCormick	0.34	CoCoRaHS
Allendale 1.7 SE	SC-AL-2	Allendale	0.51	CoCoRaHS

Selected Rainfall Reports from Hurricane Ian
Catawba River Area

Location	Identifier	County	Rainfall (inches)	Provider
2 ESE Tega Cay	SC-YR-13	York	3.13	CoCoRaHS
Rock Hill 5.8 WNW	SC-YR-40	York	3.12	CoCoRaHS
Indian Land 4.7 S	SC-LN-10	Lancaster	2.15	CoCoRaHS
Lancaster 7.1 ENE	SC-LN-17	Lancaster	1.37	CoCoRaHS
1 SE Chester	CSTS1	Chester	2.75	COOP
Great Falls – Dearborn Dam	GTFS1	Chester	2.72	COOP

Selected Rainfall Reports from Hurricane Ian Upstate				
Location	**Identifier**	**County**	**Rainfall (inches)**	**Provider**
Union 2.3 NNE	SC-UN-1	Union	2.95	CoCoRaHS
Santuck	CLSS1	Union	2.28	COOP
Gaffney 1.0 SE	SC-CK-13	Cherokee	2.62	CoCoRaHS
Gaffney 3.5 SW	SC-CK-21	Cherokee	2.35	CoCoRaHS
Spartanburg 0.9 E	SC-SP-76	Spartanburg	2.65	CoCoRaHS
Chesnee 3.9 SW	SC-SP-50	Spartanburg	2.60	CoCoRaHS
Enoree 1.9 WSW	SC-LR-26	Laurens	1.35	CoCoRaHS
Fountain Inn 4.1 ESE	SC-LR-37	Laurens	0.94	CoCoRaHS
Simpsonville 4.6 S	SC-GV-44	Greenville	0.79	CoCoRaHS
Simpsonville 2.8 SW	SC-GV-121	Greenville	0.78	CoCoRaHS
Powdersville 2.0 SSW	SC-AN-28	Anderson	0.60	CoCoRaHS
Belton 4.1 SSW	SC-AN-25	Anderson	0.38	CoCoRaHS
Hodges 5.5 NE	SC-GW-8	Greenwood	0.55	CoCoRaHS
Hodges 6.5 ENE	SC-GW-14	Greenwood	0.49	CoCoRaHS
Abbeville 4.1 N	SC-AB-11	Abbeville	0.39	CoCoRaHS
Due West 0.6 NE	SC-AB-20	Abbeville	0.36	CoCoRaHS
Sunset 4.4 ENE	SC-PC-53	Pickens	0.43	CoCoRaHS
Easley 1.3 ESE	SC-PC-15	Pickens	0.40	CoCoRaHS
Salem 4.3 ENE	SC-OC-47	Oconee	0.35	CoCoRaHS
Salem 3.9 ENE	SC-OC-105	Oconee	0.34	CoCoRaHS

Appendix 3: Storm Photos

Photos from Garden City where sand was pushed by Ian's waves and storm surge onto South Waccamaw Drive.

Photo Credit: Lisa Sigler

A photo from Pawleys Island showing inundation caused by Ian around the time of the highest storm surge.

Ian's storm surge washes over the dunes at Myrtle Beach State Park on September 30, 2022.

Image credit: Myrtle Beach State Park Staff via Twitter

Erosion to the dunes at Myrtle Beach State Park in the wake of Ian.

Image credit: Myrtle Beach State Park Staff via Twitter

Storm surge flooding from Ian in Pawleys Island on September 30, 2022.

Image credit: Pawleys Island Police Department via Twitter

*Storm surge and large waves from Ian destroy about half of the pier at
Pawleys Island on September 30, 2022.*

Workers begin efforts to free the shrimp boat Shayna Michelle, which was washed ashore by Ian on September 30. Engine trouble had left it adrift two miles offshore the previous day as its crew sought a safe harbor.

Image credit: South Carolina National Guard Sgt. 1st Class Roberto Di Giovine

For additional information:

National Weather Service products issued during the storm and observations from civilian and military airports during the storm can be found at the Iowa State University's Iowa Environmental Mesonet website.

The National Hurricane Center issued their Tropical Cyclone Report on Hurricane Ian on April 3, 2023.

Version History:

1.0 – Original release on January 18, 2023.
1.1 – This version with corrected Florida deaths, corrected Springmaid Pier storm surge values, and a link to the NHC Tropical Cyclone Report on Ian was released on April 28, 2023.
1.2 – Corrected misspellings of "Pawleys Island" on June 21, 2023.
1.3 – Added text to indicated Ian's peak intensity as Category 5 on Page 6, removed duplicate text on Page 8 and enlarged the wind graphic on Page 8 on April 3, 2024.