NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT

HURRICANE BERYL

(AL022024)

28 June – 9 July 2024

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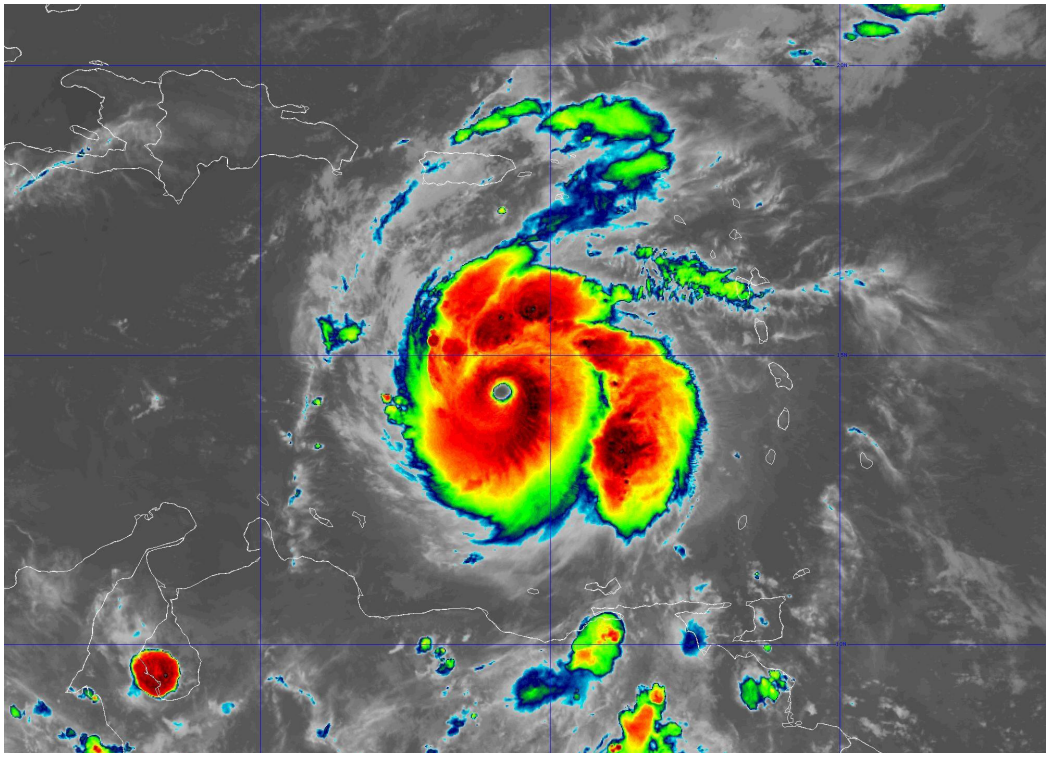

GOES-16 INFRARED SATELLITE IMAGE OF BERYL NEAR PEAK INTENSITY AT 0550 UTC 2 JULY 2024. IMAGE COURTESY OF NOAA NESDIS STAR.

Beryl was an aclimatologically early Cabo Verde hurricane, becoming the earliest category 5 (on the Saffir-Simpson Hurricane Wind Scale) hurricane of record in the Atlantic basin. It passed through the Windward Islands as a major hurricane causing severe damage, and it later made landfall as a hurricane on the Yucatan Peninsula of Mexico and then the coast of Texas. The hurricane was directly responsible for 34 deaths.

Hurricane Beryl

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SYNOPTIC HISTORY

Beryl formed from a tropical wave that moved westward from the coast of Africa on 23 June accompanied by a disorganized area of showers and thunderstorms. The wave moved generally westward across the eastern tropical Atlantic for the next few days with little development. The associated convection first showed signs of organization early on 27 June, and by early on 28 June a better-defined vorticity center had formed with increasingly organized convection. Continued development led to the formation of a tropical depression near 1200 UTC 28 June about 1200 n mi east of Barbados. The "best track" chart of the cyclone's path is given in Fig. 1, with the wind and pressure histories shown in Figs. 2 and 3, respectively. The best track positions and intensities are listed in Table 1[1].

The depression moved westward or just north of westward after genesis in an area of unusually favorable deep-layer easterly flow. This favorable environment allowed the depression to become Tropical Storm Beryl 12 h after genesis, with Beryl then rapidly intensifying and reaching hurricane strength by 0000 UTC 30 June. Rapid strengthening continued until the hurricane reached a first peak intensity of 115 kt at 1800 UTC 30 June, at which time it was located about 260 n mi east-southeast of Barbados. At that point, Beryl began an eyewall replacement cycle (ERC), with the maximum wind decreasing to 100 kt by 0600 UTC 1 July. Near that time, the hurricane, which was centered about 100 n mi south-southeast of Barbados, turned west-northwestward with a forward motion of 18–20 kt.

Beryl emerged from the ERC with an eye of about 20 n mi in diameter, and rapid strengthening resumed immediately as this new eye contracted. Maximum sustained winds increased to near 120 kt - category 4 on the Saffir Simpson Hurricane Wind Scale (SSHWS) - by the time the hurricane made landfall with the eye moving over the Grenadian island of Carriacou at 1520 UTC 1 July. Strengthening continued over the southeastern Caribbean Sea, and Beryl reached a peak intensity of 145 kt by 0600 UTC 2 July. This made it the earliest category 5 hurricane on record in the Atlantic Basin.

Later that day, Beryl entered an area of westerly vertical wind shear that covered the central and western Caribbean Sea, and this resulted in two days of gradual weakening. While this weakening occurred, the center moved through the central Caribbean Sea south of Hispaniola and then passed 15–20 n mi south of the south coast of Jamaica on 3 July with an intensity of 90-95 kt. Continuing west-northwestward, the center passed south of the Cayman Islands early on 4 July with the maximum sustained winds decreasing to near 90 kt. A few hours later, Beryl re-intensified despite the ongoing shear, with the maximum winds increasing to 100 kt by 0000 UTC 5 July. This re-strengthening was short-lived, and Beryl rapidly weakened to a category 1 hurricane by the time the center made landfall on the Yucatan Peninsula of Mexico just northeast of Tulum at 1100 UTC 5 July.

Beryl further weakened over the Yucatan Peninsula, as the combination of shear and land interaction destroyed the small inner core the storm had maintained over the Caribbean Sea. The

[1] A digital record of the complete best track, including wind radii, can be found on line at ftp://ftp.nhc.noaa.gov/atcf. Data for the current year's storms are located in the *btk* directory, while previous years' data are located in the *archive* directory.

cyclone weakened to a tropical storm with poorly organized convection as it emerged over the southwestern Gulf of Mexico late on 5 July. Continued shear and dry air entrainment caused by an upper-level trough located near the coast of northeastern Mexico allowed only gradual re-development as Beryl moved northwestward across the southwestern and western Gulf of Mexico on 6 July.

Beryl turned north-northwestward on 7 July as it moved into a break in the subtropical ridge caused by a large mid-latitude trough over the central United States. During this time, a combination of decreasing shear and a more moist airmass allowed re-intensification to begin in earnest. The cyclone regained hurricane strength around 0400 UTC 8 July as it approached the Texas coast, and it rapidly strengthened to an intensity of 80 kt before the center made landfall near Matagorda, Texas, at 0840 UTC that day. The center then moved northward and north-northeastward, passing over the western side of the Houston metropolitan area between 1200 and 1600 UTC before moving farther inland into eastern and northeastern Texas. Beryl weakened to a tropical storm while passing near Houston, and it weakened to a tropical depression over northeastern Texas near 0000 UTC 9 July. The cyclone then merged with a frontal system and became an extratropical low over central Arkansas by 1200 UTC 9 July.

As an extratropical low, Beryl moved northeastward through the mid-Mississippi and Ohio Valleys, reaching the central Great Lakes by late on 10 July. While no widespread strong winds accompanied the low, the system produced locally heavy rains in a swath from Arkansas to New Brunswick, accompanied by many tornadoes. The extratropical low weakened on 11 July, and it was absorbed into a front over upstate New York between 1200 and 1800 UTC that day.

METEOROLOGICAL STATISTICS

Observations in Beryl (Figs. 2 and 3) include subjective satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB) and the Satellite Analysis Branch (SAB), objective Advanced Dvorak Technique (ADT) estimates and Satellite Consensus (SATCON) estimates from the Cooperative Institute for Meteorological Satellite Studies/University of Wisconsin-Madison. Observations also include flight-level, stepped frequency microwave radiometer (SFMR), and dropwindsonde observations from 15 flights of the 53rd Weather Reconnaissance Squadron of the U.S. Air Force Reserve Command and 16 flights of the NOAA Aircraft Operations Center (14 flights by the P-3 aircraft and 2 synoptic surveillance missions by the G-IV aircraft, Fig. 4). Data and imagery from NOAA polar-orbiting satellites including the Advanced Microwave Sounding Unit (AMSU), the National Aeronautics and Space Administration (NASA) Global Precipitation Mission (GPM), the European Space Agency's Advanced Scatterometer (ASCAT), Defense Meteorological Satellite Program (DMSP) satellites, and the NASA Time-Resolved Observations of Precipitation structure and storm Intensity with a Constellation of Smallsats (TROPICS) satellites, among others, were also useful in constructing the best track of Beryl.

Ship reports of winds of tropical storm force associated with Beryl are given in Table 2, and selected surface observations from land stations and data buoys are given in Table 3. Selected additional storm total rainfall reports are given in Table 4.

Winds and Pressure

The maximum intensity of Beryl is somewhat uncertain due to temporal gaps in the aircraft data near the time of peak intensity and issues with SFMR surface wind estimates that prevented their use in this evaluation. The maximum aircraft-observed flight-level winds during the hurricane were 164 kt at 0941 UTC 2 July at an altitude of 8000 ft/750 mb. Additionally, 700-mb flight-level winds of 157 and 154 kt were measured at 0153 UTC and 0455 UTC 2 July respectively. Using the standard reductions for the eyewall region, these observations support surface intensity estimates of around 140 kt. NOAA Tail Doppler Radar (TDR) data near 0941 UTC 2 July showed maximum winds of 169 kt near 600 m altitude. While it is unclear if this is the best way to estimate surface winds from TDR data, this velocity supports surface winds near 135 kt using the dropsonde-based reductions developed for flight-level winds. Finally, a dropsonde at 0941 UTC 2 July reported very strong winds in the north eyewall, including 198 kt at 910 mb. In real time, this dropsonde did not return a surface wind or useful layer averages due to missing data. However, the NOAA Hurricane Research Division (HRD) reconstructed the sonde data and found surface winds of 143 kt and layer-mean reduced averages in the 138-147 kt range. The evaluation of Beryl's peak intensity leans most toward the data from this latter sonde, and based on this the peak intensity is set at 145 kt – category 5 on the SSHWS.

Beryl's minimum central pressure is estimated at 932 mb on 2 July based on a dropsonde in the eye at 0943 UTC that reported 933 mb with a surface wind of 15 kt.

Beryl's maximum sustained winds at landfall on Carriacou Island, Grenada, are estimated at 120 kt (category 4 on the SSHWS) based on aircraft wind data. No reliable surface wind observations are available from this area. However, a minimum pressure of 950.0 mb was measured at Lauriston, which agrees well with the aircraft-measured central pressure shortly before landfall. Hurricane conditions occurred over portions of Grenada and the Grenadine Islands, with the Bishop International Airport on Grenada reporting sustained winds of 80 kt and a gust of 105 kt at 1600 UTC 1 July.

Tropical storm conditions occurred elsewhere on the islands of the southeastern Caribbean, including Barbados, Tobago, St. Vincent, St. Lucia, and Martinique. The strongest winds observed in these areas were from the Hewanorra International Airport on St. Lucia, which reported sustained winds of 57 kt at 1139 UTC 1 July and a peak gust of 72 kt. Wind gusts of tropical-storm force were reported elsewhere in the Lesser Antilles as far north as Guadeloupe, St. Barthelemy, and St. Martin.

Data from the Hurricane Hunter aircraft and satellite-based Synthetic Aperture Radar data (Fig. 5) show that Beryl's strongest winds stayed just south of the coast of Jamaica on 3 July, with hurricane conditions brushing portions of the southern coast. Tropical storm conditions occurred over the rest of the island. The strongest reported sustained winds were 57 kt at the Newcombe Valley Primary School in St. Elizabeth Parish at 2300 UTC 3 July, with a peak gust of 107 kt. This station is at an elevation of 103 m.

The core of Beryl stayed south of the Cayman Islands, with tropical storm conditions occurring there. Grand Cayman reported sustained winds of 40 kt and a peak gust of 56 kt at 1030 UTC 4 July.

There is substantial uncertainty about Beryl's intensity at landfall on the Yucatan Peninsula of Mexico. The last Hurricane Hunter mission before this landfall showed that the storm was quickly weakening, with the central pressure rising from near 962 mb to near 971 mb between 0000-0600 UTC 5 July, along with decreasing flight-level and surface winds. However, the last fix was 5 h before landfall. Surface observations in the landfall area indicated that the central pressure rose to near 978 mb, and that Beryl retained some of the tight wind core seen in the earlier reconnaissance mission. However, the data also suggest that the strongest winds came ashore on the north side of the eye between observing stations, with the highest reported wind of 58 kt measured after landfall east of the eye at Chemuyil, Mexico. Based on these data, the landfall intensity is set at 80 kt (category 1 on the SSHWS), which is 15-kt less than the operational estimate. Hurricane conditions likely occurred over portions of the coast between Tulum and Playa del Carmen, as well as on portions of Cozumel Island.

Beryl's Texas landfall intensity is set at 80 kt (category 1 on the SSHWS and 10 kt above the operational estimate) based on an aircraft-measured wind of 90 kt at 700 mb at 0733 UTC 8 July and a 1-minute average wind of 73 kt (2.25 m anemometer height) measured by a Texas Tech University (TTU) StickNet station at 1021 UTC that day. This station also reported a peak gust of 85 kt. A private weather station at Matagorda Camp, Texas, reported sustained winds of 71 kt at 0659 UTC 8 July, along with a peak gust of 85 kt. In addition, a gust of 84 kt was reported at a Harris County Flood Control District (HCFCD) station on the Brazos River at 1221 UTC 8 July. Hurricane conditions occurred in the Texas coastal plain from the landfall area northeastward to portions of Galveston Island, with tropical storm conditions occurring elsewhere from the middle Texas coast to the southwest coast of Louisiana. Tropical storm conditions with hurricane-force wind gusts also extended inland over southeastern Texas across and to the north of the Houston metropolitan area.

The Texas landfall pressure is 978 mb based on surface observations at the landfall time in the eye near Matagorda, including a pressure of 978.8 mb at the WeatherFlow station at Matagorda Bay at 0921 UTC. It should be noted that three TTU StickNet stations located inland reported pressures near 977 mb 2–3 h after landfall, and the Matagorda Bay station reported its lowest pressure 40 minutes after landfall. This suggests that Beryl possibly deepened for a few hours after landfall, with weakening beginning once the eyewall was fully inland.

Before Beryl became extratropical, it produced wind gusts to tropical-storm-force along the track as far north as central Arkansas. A few gusts to tropical-storm force also occurred over south Texas well to the west of the center, due mainly to squalls.

While not included in Table 3, as an extratropical low Beryl produced wind gusts of generally 35–40 kt, with some occasional higher gusts, from the lower Mississippi River Valley across the Ohio Valley to the eastern Great Lakes. Many of these gusts occurred on 10 July in a swath from northern Indiana across Ohio and western Pennsylvania into New York. Some of these gusts may have been due to severe convective storms embedded in the circulation.

Ships generally avoided Beryl, as there were only a few observations of tropical-storm force winds mainly from the outer periphery of the cyclone (Table 2). The highest ship-reported wind was 50 kt at 0000 UTC 8 July from the tanker **STI Connaught** (call sign V7DJ7).

Beryl's aclimatologically early occurrence led to its setting or coming close to a variety of meteorological records for Atlantic tropical cyclones (TCs). These include:

- 145-kt peak maximum sustained winds – the strongest maximum sustained winds for an Atlantic hurricane prior to August on record. The old record was set by Hurricane Emily in July 2005 – 140 kt.
- 932 mb lowest minimum central pressure – 3rd lowest central pressure for an Atlantic hurricane prior to August on record. This value trails those of Hurricane Emily of 2005 (929 mb) and Hurricane Dennis of 2005 (930 mb).
- Earliest Atlantic Category 4 hurricane on record (1200 UTC 1 July). The old record was set by Hurricane Dennis of 2005 (0000 UTC 8 July).
- Earliest Atlantic Category 5 hurricane on record (0000 UTC 2 July). The old record was set by Hurricane Emily of 2005 (0000 UTC 17 July).
- Beryl became a hurricane near 49.3°W longitude – the farthest east an Atlantic hurricane had formed in the tropics (south of 23.5°N) in June on record. The old record was set by the Trinidad Hurricane of 1933 (59°W).
- Beryl intensified 55 kt in 24 h from 1800 UTC 29 June to 1800 UTC 30 June – tied for the fastest 24-h intensification rate on record for an Atlantic named storm this early in the calendar year. The previous record was set by Hurricane Bertha of 2008 on 6–7 July.

In addition, Beryl was the strongest hurricane of record to make landfall on Grenada or its dependencies.

Storm Surge[2]

United States – Texas and Louisiana

The combination of storm surge and tide produced maximum storm surge inundation levels of 5–7 ft above ground level (AGL) east of Beryl's landfall location along the immediate coast from Matagorda to Freeport, Texas. A United States Geological Survey (USGS) streamgage located within Brazos Harbor near Freeport measured a peak water level of 6.35 ft above Mean Higher High Water (MHHW), the highest measured by a water level sensor during the event (Fig. 6). Unfortunately, nearby National Ocean Service (NOS) tide gauges at Sargent and Freeport Harbor had outages during the storm and did not record the peak water levels. Instead, a detailed assessment of the peak water level was augmented by a collection of high-water mark data surveyed by a crew from the HCFCD and the National Weather Service (NWS). These measurements were recorded relative to the North American Vertical Datum of 1988

[2] Several terms are used to describe water levels due to a storm. **Storm surge** is defined as the abnormal rise of water generated by a storm, over and above the predicted astronomical tide, and is expressed in terms of height above normal tide levels. Because storm surge represents the deviation from normal water levels, it is not referenced to a vertical datum. **Storm tide** is defined as the water level due to the combination of storm surge and the astronomical tide, and is expressed in terms of height above a vertical datum, i.e. the North American Vertical Datum of 1988 (NAVD88) or Mean Lower Low Water (MLLW). **Inundation** is the total water level that occurs on normally dry ground as a result of the storm tide, and is expressed in terms of height above ground level. At the coast, normally dry land is roughly defined as areas higher than the normal high tide line, or Mean Higher High Water (MHHW).

(NAVD88) and converted to MHHW (i.e., an approximation for inundation at the immediate coastline) using the vertical transformation tool (https://vdatum.noaa.gov/) provided by the National Geodetic Survey (NGS) Office of Coast Survey (OCS) and Operational Oceanographic Products and Services (CO-OPS) of NOAA/NOS. These data were further analyzed relative to the storm surge hindcast produced by the NHC Storm Surge Unit (SSU). Figure 7 shows the completed storm surge analysis by the NHC SSU, highlighting the maximum storm surge inundation above ground level for Hurricane Beryl along the Texas and Louisiana coasts.

The high-water mark survey team found verifiable evidence of 5–7 ft of storm surge inundation above ground level between Matagorda and Freeport, with stilled high-water marks primarily found on fences, and inside sheds and storage compartments. Near Freeport, for example, the NWS survey team recorded a high-water mark of 6.4 ft NAVD88 which converts to approximately 5.0 ft MHHW. A high-water mark of 7.1 ft above NAVD88 (or 6.1 ft MHHW) was also recorded near Matagorda. Elsewhere near Sargent, along the barrier islands east of where Beryl made landfall but more exposed to the open coast, evidence of relatively higher water levels was suggested. In fact, the HCFCD/NWS crew surveyed a high-water mark as high as 10.2 ft NAVD88 which converts to 8.9 MHHW. However, much of this area experienced significant wave impacts. Therefore, the debris lines and marks recorded include the effects of waves and are not representative of still-water inundation.

Elsewhere, maximum storm surge inundation of 4–6 ft AGL occurred along the upper Texas coast east of Freeport to the Galveston Bay Entrance, including Galveston Bay. Figure 6 shows numerous NOS-calibrated tide stations recorded peak water levels of 3–5 ft MHHW. The NOS tide gauge at Morgans Point in Galveston Bay recorded a water level of 5.54 ft above MHHW. Upstream of Morgans Point and along the Buffalo Bayou, the NOS tide station at Manchester reported a peak water level of 8.87 ft above MHHW. However, this tide station was subject to rain runoff and was not considered in the evaluation of peak storm surge. Looking downstream, a NOS tide gauge in Rollover Pass, located within East Bay, recorded a maximum water level of 4.98 ft above MHHW after Beryl's winds shifted from southeast to southwest following the storm's passage over the area. Similar peak water levels were highlighted by the HCFCD/NWS survey team within Galveston Bay and along Galveston Island. For example, a still high-water mark of 7.7 ft NAVD88 (or 6.3 ft MHHW) was recorded near the westward extent of Seawall Blvd. close to the Galveston Beach access point. Maximum storm surge inundation was primarily 3–5 ft AGL along the Bolivar Peninsula, while east of High Island to Sabine Pass peak water levels reached approximately 2–4 ft AGL. The NOS tide stations at the Galveston Bay Entrance and Sabine Pass measured 4.43 ft and 3.12 ft above MHHW respectively. Lastly, along the Louisiana coast, peak water levels of 1–3 ft AGL were observed.

West of the landfall location along portions of the Middle Texas coast, the combination of storm surge and tide produced maximum inundation levels of 3–5 ft AGL from Matagorda to Port O'Connor. The NOS tide station in Port O'Connor, for example, recorded a peak water level of 3.71 ft above MHHW. For the Mid to Lower Texas coast, maximum storm surge inundation levels largely remained less than 3 ft AGL south of the Matagorda Bay Entrance Channel.

Caribbean

Beryl's track through the Caribbean Sea caused severe storm surge impacts to Grenada and its dependencies and St. Vincent and the Grenadines. Unfortunately, no storm surge observations are available from these areas. Other portions of the Windward Islands, the Dominican Republic and Haiti, Jamaica, the Cayman Islands, and the Yucatan Peninsula of Mexico also experienced storm surge and wave impacts.

Rainfall and Flooding

Beryl produced a long swath of heavy rain along its track. In the islands of the southeastern Caribbean from Grenada to Dominica, rainfall totals were generally in the 3–5-inch range with some higher amounts. However, much higher rainfall totals occurred on the dependencies of Grenada and the Grenadines that were hit by Beryl's eyewall, with Lauriston on Carriacou Island reporting a storm total of 10.31 inches. Rainfall totals of 1–3 inches occurred on Trinidad and Tobago, as well as on Guadeloupe. Rainfall totals in Jamaica were generally in the 8–12-inch range, with a storm total of 13.62 inches reported at Knockpatrick in Manchester Parish. In Mexico (Fig. 8), storm total rainfalls were generally in the 2–4-inch range in the states of Quintana Roo and Yucatan. There were some higher totals, though, including 6.71 inches at Cozumel.

While rainfall totals are not available, outer rainbands on the south side of the hurricane caused flooding rains in portions of northeastern Venezuela.

In the United States, Beryl's rain swath covered an area from eastern Texas northeastward across Arkansas, portions of the Tennessee and Ohio Valleys, the central and eastern Great Lakes states, and upstate New York (Fig. 9). As a tropical cyclone, the heaviest rains fell in the Houston area of southeastern Texas where numerous totals of 8–12 inches were reported, along with maximum totals of 14.99 inches in Thompsons and 14.88 inches at a HCFCD station in western Houston. Totals farther northeast along the track included 7.62 inches in northeast Texas near Texarkana and 7.48 inches at Toad Suck Ferry, Arkansas. As an extratropical cyclone, Beryl produced rainfall totals of generally 3–5 inches, with maximum totals of 6.79 inches near Winamac, Indiana, and Burton, Michigan.

Locally heavy rains from Beryl and its remnants also occurred in portions of Canada from southern Ontario east-northeastward to New Brunswick, with a secondary area of rain over Nova Scotia due to moisture that Beryl helped transport into the area. The rainfall totals in these areas were generally 2–4 inches, with a maximum total of 5.25 inches at Margaretsville, Nova Scotia, and a total of 4.75 inches at Monkton, Ontario.

Tornadoes

Beryl produced 65 known tornadoes during its track across the United States, including 16 in Texas, 22 in Louisiana, 8 in Arkansas, 7 in Indiana, 7 in New York, 2 in Kentucky, and 3 that crossed state lines (one from Louisiana to Texas and two from Louisiana to Arkansas). By intensity, the tornadoes included 1 EF-3, 9 EF-2s, 42 EF-1s, 11 EF-0s, and two of unknown

intensity. The most notable tornado was the EF-2 that passed near Barksdale Air Force Base in Louisiana. Current data indicate that this tornado had a maximum path width of 1000 yards (ties a record for tropical cyclone tornadoes from 1995-present), had a path length of 53.38 statute miles (at the time a record for tropical cyclone tornadoes in the period of record), and was on the ground for about 95 minutes. This tornado produced one fatality in Louisiana. Also notable was the EF-3 tornado in Indiana, which at the time was only the sixth EF-3 tornado associated with a tropical cyclone in the period of record.

In addition to the tornadoes in the United States, Beryl caused two EF-0 tornadoes in Canada near London, Ontario. These caused only minor damage.

Beryl's known number of tornadoes puts it in fifth place on the list of tornado-producing tropical cyclones, behind Ivan of 2004 (118), Beulah of 1967 (115), Frances of 2004 (103), and Rita of 2005 (97).

CASUALTY AND DAMAGE STATISTICS

As of this writing, Beryl is known to be responsible for at least 68 deaths[3] with 34 of these directly attributed to the cyclone's winds, rains, and tornadoes. There were 34 deaths indirectly caused by the storm in the United States. Beryl also caused over $7B of property damage along its track in the United States. A breakdown of the deaths and damage by country or locale includes:

Country	Direct Deaths
Grenada	3
St. Vincent and the Grenadines	8
Venezuela	6
Jamaica	3
United States	14

Grenada

Beryl caused three deaths in Grenada and its dependencies, with two of the deaths on Carriacou and one on Grenada. One death was due to winds blowing a tree onto a house, while the causes of the other deaths are unknown.

[3] Deaths occurring as a direct result of the forces of the tropical cyclone are referred to as "direct" deaths. These would include those persons who drowned in storm surge, rough seas, rip currents, and freshwater floods. Direct deaths also include casualties resulting from lightning and wind-related events (e.g., collapsing structures). Deaths occurring from such factors as heart attacks, house fires, electrocutions from downed power lines, vehicle accidents on wet roads, etc., are considered indirect" deaths.

Beryl caused catastrophic damage on the islands of Carriacou, Petite Martinique, and Saint Patrick, with relief agencies estimating that 98% of the infrastructure was destroyed or heavily damaged on the first two of those islands (Fig. 10). This destruction included the only hospital on Carriacou. The current damage estimate for Grenada and its dependencies is $430 million USD.

St. Vincent and the Grenadines

Reports from the Meteorological Service of St. Vincent and Grenadines and relief services indicate that eight people died in this region. Six of the deaths were due to collapsed structures, while the causes of the other two deaths are unknown. In addition, a ferry with five crewmembers onboard went missing during the hurricane.

Catastrophic damage occurred on the islands of Canouan, Mayreau, and Union, where media reports indicate that 90% of homes were damaged or destroyed. These reports also indicate that severe damage occurred on the other Grenadine Islands, and on portions of St. Vincent. The current damage estimate for St. Vincent and the Grenadines is $300 million USD.

Venezuela

Media reports indicate that six people were killed in the state of Sucre due to freshwater flooding along the Manzanares River, along with more than 6,000 houses damaged. Monetary damage figures are not available at this time.

Elsewhere in the Southeastern Caribbean

There are no reports of casualties from the other islands of the southeastern Caribbean. Media reports indicate that flooding, power outages, and damage by winds and surf occurred on Barbados, Trinidad, Tobago, St. Lucia, and Martinique. On St. Lucia, damage to buildings and agriculture is estimated at $2 million USD. On Barbados, the Bridgetown Cruise Terminal was damaged, and many boats in the country's fishing fleet were damaged or destroyed (Fig. 11).

Dominican Republic and Haiti

There are no reports of casualties from the Dominican Republic and Haiti. Beryl's northern fringe produced gusty winds and locally heavy rains in these areas, with high surf causing some coastal flooding along the southern coasts of both countries. Media reports indicate that some homes and buildings were destroyed in the Dominican Republic due to landslides and high surf, with the monetary estimate of the damage unavailable. There are no reports of significant damage in Haiti.

Jamaica

Media reports indicate that three people died in Jamaica due to Beryl. Two of these deaths were due to wind, while the third was from freshwater flooding. The storm caused damage to homes, crops, and infrastructure, including minor damage at the Norman Manley International Airport in Kingston. However, detailed information about the damage is unavailable. The current damage estimate for Jamaica is $41.6 million USD.

Cayman Islands

There are no reports of casualties from the Cayman Islands. Media reports indicate that flooding, landslides, and power outages occurred, but there are no reports of significant damage.

Mexico

There are no reports of casualties from Mexico. Media reports indicate that flooding and power outages occurred along portions of the Caribbean coast of the state of Quintana Roo, especially in the area from Tulum to Cancun. While no details on damage to buildings and infrastructure are available, the current damage estimate for Mexico is $90 million USD.

United States

Beryl directly caused 14 deaths in the United States, with 11 of these occurring in Texas, one in Louisiana, and two in Vermont. In Texas, five of the deaths were due to falling trees blown down by high winds, four were due to drownings in freshwater flooding, one was due to a house fire triggered by storm-related lightning, and one was due to a marine boating incident. The death in Louisiana was due to a falling tree caused by a tornado, and the two deaths in Vermont were due to vehicles swept away by freshwater flooding.

All 34 of the reported deaths indirectly related to the storm occurred in Texas. Fourteen of them were due to heat-induced hyperthermia caused by widespread electrical outages. One death was due to a fall in a home after an electrical outage, and one was due to an electrical outage causing a breathing machine to fail. Six deaths were related to post-storm tree-trimming or clearing, while two others were due to carbon monoxide poisoning. The causes of the other indirect deaths were not available as of this writing.

The NOAA National Centers for Environmental Information estimates the damage to property in the U.S. to be $7.2 billion. While details about how this damage was distributed are not available, the Texas Department of Emergency Management reported that Beryl destroyed 239 buildings in Texas and damaged 2,555 other buildings. Much of this damage likely occurred due to winds and storm surge in the landfall area of Brazoria, Chambers, Fort Bend, Galveston, Harris, and Matagorda Counties (Fig. 12). Damage was also reported from winds and storm surge elsewhere from the middle Texas coast to the southwestern Louisiana coast and inland over eastern Texas near the storm track. In addition to the damage, media reports indicate that

almost 3 million people lost power due to the cyclone, with 2.7 million of those in southeastern Texas.

Canada

One death was reported due to flash flooding in Wolfville, Nova Scotia on 11 July. The rain that caused this death occurred after Beryl dissipated and was not directly related to the core swath of Beryl's rains in the northeastern United States and Canada. Thus, this death will not be included in the official death toll for the cyclone.

Freshwater flooding due to the heavy rains caused minor damage in portions of southeastern Canada. The two tornadoes near London, Ontario, also caused minor damage. Monetary damage estimates for Canada are not available at this time.

FORECAST AND WARNING CRITIQUE

Genesis

The genesis of Beryl was poorly forecast (Table 5), with less than average lead time. The tropical wave from which Beryl developed was introduced in the Tropical Weather Outlook (TWO) only 60 h prior to genesis with a low chance (<40%) in the 7-day genesis category. The 7-day probability was raised to a medium chance (40-60%) 42 h before genesis and to a high chance (>60%) 36 h before genesis. The wave was introduced into the 2-day genesis category as a low chance 42 h before genesis, with the chance increased to medium 36 h before genesis and high 12 h before genesis. The location of Beryl's genesis was generally well forecast (Fig. 13). The best track genesis location was inside the forecast areas of the graphical TWO, although it was close to the southeastern edges of the graphical areas. The short lead time of the genesis forecasts appears to be due to the cyclone forming earlier than forecast by the global models, including model runs available only two days before genesis.

Track Forecast

A verification of NHC official track forecasts for Beryl is given in Table 6a. Official track forecast errors were lower than the mean official errors for the previous 5-yr period at all forecast periods. The Climatology-Persistence (OCD5) errors were also smaller than those of the previous 5-yr period, suggesting that the storm was easier than normal to forecast. A homogeneous comparison of the official track errors with selected guidance models is given in Table 6b, with that comparison's forecast skill over OCD5 shown in Figure 14. The official forecasts were generally better than the guidance for the 12–36 h period, although some of the consensus models had slightly lower errors at 12–24 h. From 48–120 h, the GFS and the GFS ensemble mean (GFSI and AEMI) had lower average errors than the official forecast. One interesting note is that the TABM model, which is a simple model using mid-level steering flow and a small

correction for the beta drift effect, had the lowest average track errors of all the guidance for 72, 96, and 120 h. This model is not normally one of the better track forecast models.

Examination of the individual official forecasts (Fig. 15a) shows two main sources of error. The largest track forecast errors occurred during the time that Beryl was moving through the western Caribbean when the forecasts for landfall on the western Gulf coast had a strong left or southward bias. Indeed, the Texas landfall position in the best track is at the right/northward edge of the official forecasts, and the forecast landfall points shifted significantly to the north as the storm approached the coast. One reason for the TABM model's superior performance was that it forecast Beryl's Texas landfall location (Fig. 15b) better and more consistently than the official forecasts, the GFS forecasts (Fig. 15c), or the ECMWF forecasts (Fig. 15d). Why this was the case is unclear at this time. The second source of error occurred during the time Beryl was over the western tropical Atlantic, when the official forecasts and several of the guidance models showed a northward bias.

Intensity Forecast

A verification of NHC official intensity forecasts for Beryl is given in Table 7a. Official intensity forecast errors were greater than the mean official errors for the previous 5-yr period at all forecast times except 120 h. However, the OCD5 errors were also much higher than the mean errors for the previous 5-yr period, indicating that Beryl's aclimatological intensity was harder than normal to forecast, which is not surprising given the rapid intensification and weakening episodes. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 7b, with that comparison's forecast skill over OCD5 shown in Figure 16. The official forecasts had lower mean errors than almost all of the guidance at 12, 24, 36, 48, and 120 h. However, several of the models had lower mean errors at 60, 72, and 96 h. The best overall intensity forecast aid was the intensity consensus (ICON), which had lower mean errors than the official forecasts from 48–120 h.

Examination of the individual intensity forecasts (Fig. 17) shows that while the official forecasts caught the general intensity trends well, there were several sources of error. The first was during the rapid intensification episodes between 28 June–1 July, where the peak intensity of Beryl was underforecast. Second, many of the forecasts made between peak intensity and landfall in Mexico had a low bias – partly from the higher than expected peak intensity, and partly because the cyclone weakened less than forecast over the western Caribbean. A third source of errors occurred when Beryl crossed the southwestern Gulf of Mexico, with the forecasts having a high bias due to Beryl's slower than expected re-intensification. Finally, forecasts for the time after the Texas landfall had a high bias since Beryl weakened faster than forecast.

An interesting aspect of the intensity forecasts of the Texas landfall was that the global and regional dynamical models forecast a significant amount of strengthening would occur in the last 6–12 h before landfall when the center was close to the coast. These forecasts verified well as Beryl intensified 20 kt in the last 9 h before landfall. Based on this guidance, the NHC intensity forecasts consistently called for a landfall intensity near 75 kt, even when Beryl intensified slower than originally forecast during the first part of its movement across the Gulf of Mexico.

Tropical Cyclone Wind Watches and Warnings

Tropical cyclone wind watches and warnings associated with Beryl are given in Table 8a. The lead time provided by the various Hurricane Watches and Warnings for the landfall areas was generally good. For the landfall in Grenada, a Hurricane Watch was issued for the Grenada and St. Vincent areas by the meteorological services of those countries 48 h before landfall, with a Hurricane Warning issued 39 h before landfall. For Jamaica, a Hurricane Watch was issued by the meteorological service of Jamaica 48 h before the center approached the eastern end of the island on 3 July, while a Hurricane Warning was issued 39 h before that time. For the Yucatan Peninsula, a Hurricane Watch was issued for the landfall area by the meteorological service of Mexico 59 h before landfall, and a Hurricane Warning was issued 44 h before landfall. For the Texas landfall, a Hurricane Watch was issued for the landfall area about 54 h before tropical-storm conditions reached the coast, with a Hurricane Warning issued about 30 h before hurricane conditions reached the coast.

However, there were two wind watch/warning issues during Beryl. First, the Hurricane Warning for the Texas coast from San Luis Pass to Port Bolivar was short-fused, as it was issued only a few hours before the arrival of tropical-storm conditions in the area. Second, tropical storm conditions occurred along portions of the southwestern coast of Louisiana outside of any Tropical Storm Watch or Warning. This occurred because a) Beryl got larger than anticipated on its eastern side, and b) after landfall the center turned east of north earlier and more than forecast, bringing it closer to the Louisiana coast.

Storm Surge Watches and Warnings

Storm surge watches and warnings associated with Beryl are given in Table 8b. As seen in the table, the first Storm Surge Watch was issued for the Texas coast at 2100 UTC 5 July from the mouth of the Rio Grande northward to Sargent, with the watches subsequently extended northward and eastward along the Texas coast. The first Storm Surge Warning was issued at 2100 UTC 6 July from the North Entrance of the Padre Island National Seashore northward to San Luis Pass, including Corpus Christi Bay and Matagorda Bay. These warnings were subsequently extended northward and eastward along the Texas coast to Sabine Pass (the TX/LA border) by 1500 UTC 7 July.

Figure 18 shows the geographic extent of the Storm Surge Warning in effect at 0300 UTC 8 July (Advisory 38), approximately six hours prior to landfall. Observed water levels in excess of 3 ft MHHW are used as a first-cut threshold to verify the Storm Surge Warning, and show good agreement with the Storm Surge Warning at this time. Watches and warnings issued south of Port O'Connor did not verify, but were warranted given the track uncertainty at the time of issuance. The lead time of the Storm Surge Watch and Warning at Freeport was 48 h and 30 h, respectively, and in Galveston Bay, 51 h and 30 h, respectively.

A peak storm surge forecast of 3–5 ft AGL was issued at 0300 UTC 6 July for Baffin Bay to San Luis Pass, including Sargent and Freeport, areas hardest hit along the coast during Beryl. Numbers were increased to 4–6 ft AGL at 2100 UTC 6 July from Mesquite Bay to Sargent. The forecast area of 4–6 ft AGL was extended northward to Freeport at 0300 UTC 7 July and then to San Luis Pass at 0900 UTC 7 July. The numbers were increased again at 2100 UTC on 7 July to

4–7 ft AGL from Port O'Connor to San Luis Pass, including Sargent and Freeport. The final forecast range verifies well with the NHC storm surge analysis.

The initial peak storm surge forecast for Galveston Bay was 2–4 ft AGL. It was increased to 3–5 ft AGL at 0000 UTC 7 July, at the time of the Storm Surge Warning issuance for this area. It was ultimately increased to 4–6 ft AGL at 2100 UTC on 7 July. The final forecast range also verifies well with the NHC storm surge analysis.

IMPACT-BASED DECISION SUPPORT SERVICES (IDSS) AND PUBLIC COMMUNICATION

The NHC began communication with emergency managers on 1 July as Beryl was approaching the eastern Caribbean. Eight decision support briefings were provided to emergency managers through the FEMA Hurricane Liaison Team embedded at the NHC. The briefings were federal video-teleconferences with FEMA Headquarters, FEMA Region 2, FEMA Region 6, and the state of Texas. These briefings continued through 8 July as Hurricane Beryl made landfall in Texas. In addition, NHC provided eight live briefings to U. S. Coast Guard Districts 7 and 8 between 1–8 July.

Beryl received international and national media attention as it became the strongest hurricane to develop in the Atlantic basin in June and broke other records for development so early in the season. For all these reasons, the media engagement for Beryl significantly increased as the days went on. NHC Public Affairs (PA) started to coordinate virtual interviews in English and Spanish on 28 June and these continued for 8 days. The NHC Media Pool was activated for 3 days from 6-8 July. A total of 38 virtual interviews were provided in English, 20 in Spanish, and 43 interviews through the Network Media Pool for a total of 101 interviews.

NHC provided 18 live streams during Beryl from 28 June–8 July. The live streams were announced on Facebook, Instagram and X twice each day. There were three noticeable peaks on all three platforms: first on 30 June when Beryl became a major hurricane, second on 3 July when the hurricane was approaching Jamaica and then Mexico, and lastly on 6 July as Beryl made its way towards the Texas coast. NHC PA also tested providing shorter content in the form of "reels/shorts" of the live streams on the three platforms for the first time during Beryl, and the impressions reached over 130,000.

ACKNOWLEDGEMENTS

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offices in Brownsville, Corpus Christi, Houston, and San Antonio, Texas, along with Lake Charles, Louisiana, provided meteorological and impact data for their areas of responsibility, while the National Data Buoy Center and the National Ocean Service provided much of the coastal, oceanic, and tide gauge data used in the report. The Meteorological Services of Barbados, Grenada, Trinidad and Tobago, St. Vincent, St. Lucia, Dominica, Jamaica, the Cayman Islands, Mexico, France, and Canada provided much of the data from those countries. The ReliefWeb web site (reliefweb.int) provided some of the information on damage in the southeastern Caribbean. Texas Tech University provided data from its portable StickNet stations, while WeatherFlow and the Weather Underground provided data from their stations. The Harris County Flood Control District contributed the data from its stations and was a part of the high-water mark analysis. Roger Edwards of the Storm Prediction Center provided the tornado statistics, while Dave Roth of the Weather Prediction Center provided the rainfall graphic and much of the rainfall data. Sim Aberson and Kathryn Sellwood of the NOAA HRD reconstructed the eyewall dropsonde used to help determine the peak intensity. Josh Morgerman/iCyclone contributed his data and damage image, and other damage images were courtesy of Reuters and the Associated Press.

Table 1. Best track for Hurricane Beryl, 28 June – 9 July 2024.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
28 / 1200	8.9	39.6	1007	30	tropical depression
28 / 1800	9.0	41.3	1007	30	"
29 / 0000	9.2	43.1	1006	35	tropical storm
29 / 0600	9.5	45.2	1003	45	"
29 / 1200	9.7	47.0	1000	55	"
29 / 1800	9.9	48.7	995	60	"
30 / 0000	10.1	50.5	989	70	hurricane
30 / 0600	10.4	52.3	980	85	"
30 / 1200	10.5	54.0	968	100	"
30 / 1800	10.9	55.7	958	115	"
01 / 0000	11.2	57.3	958	110	"
01 / 0600	11.5	59.0	965	100	"
01 / 1200	12.0	60.6	957	115	"
01 / 1520	12.5	61.5	950	120	"
01 / 1800	12.8	62.3	944	130	"
02 / 0000	13.5	64.1	938	140	"
02 / 0600	14.3	65.9	935	145	"
02 / 0945	14.8	67.2	932	145	"
02 / 1200	15.0	67.9	934	140	"
02 / 1800	15.6	69.9	944	135	"
03 / 0000	16.0	71.8	945	130	"
03 / 0600	16.3	73.5	946	125	"
03 / 1200	16.8	75.3	952	125	"
03 / 1800	17.3	76.8	959	120	"
04 / 0000	17.8	78.3	960	115	"
04 / 0600	18.3	80.0	965	105	"
04 / 1200	18.8	81.8	969	95	"
04 / 1800	19.3	83.4	974	90	"
05 / 0000	19.4	84.8	962	100	"
05 / 0600	19.8	86.2	971	95	"
05 / 1100	20.3	87.4	977	80	"

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
05 / 1200	20.4	87.6	980	75	"
05 / 1800	20.9	88.8	987	60	tropical storm
06 / 0000	21.4	89.8	996	50	"
06 / 0600	21.9	90.9	1001	45	"
06 / 1200	22.6	91.8	999	50	"
06 / 1800	23.6	92.7	997	50	"
07 / 0000	24.4	93.6	993	50	"
07 / 0600	24.9	94.3	995	50	"
07 / 1200	25.5	94.9	992	55	"
07 / 1800	26.3	95.4	990	55	"
08 / 0000	27.1	95.7	986	60	"
08 / 0600	28.2	95.9	982	70	hurricane
08 / 0840	28.6	96.0	978	80	"
08 / 1200	29.3	96.0	978	70	"
08 / 1800	30.7	95.6	988	50	tropical storm
09 / 0000	32.1	94.9	997	30	tropical depression
09 / 0600	33.4	94.1	1004	25	"
09 / 1200	35.0	92.4	1004	25	extratropical
09 / 1800	36.9	90.3	1005	25	"
10 / 0000	38.9	87.3	1004	25	"
10 / 0600	40.4	86.1	1002	25	"
10 / 1200	41.5	84.8	1001	25	"
10 / 1800	42.2	82.9	1001	30	"
11 / 0000	42.7	81.3	1003	30	"
11 / 0600	42.9	80.0	1005	25	"
11 / 1200	43.1	78.6	1009	25	"
11 / 1800					dissipated
02 / 0945	14.8	67.2	932	145	maximum winds minimum pressure
01 / 1520	12.5	61.5	950	120	Landfall on Carriacou Island, Grenada

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
05 / 1100	20.3	87.4	977	80	Landfall on the Yucatan Peninsula just northeast of Tulum, Mexico
08 / 0840	28.6	96.0	978	80	Landfall at Matagorda Bay, Texas

Table 2. Selected ship reports with winds of at least 34 kt for Hurricane Beryl, 28 June – 9 July 2024.

Date/Time (UTC)	Ship call sign	Latitude (°N)	Longitude (°W)	Wind dir/ speed (kt)	Pressure (mb)
30 / 0800	QJLVJF	15.7	52.6	110 / 35	1013.5
05 / 1000	WDN446	21.2	86.7	080 / 47	1007.6
05 / 1100	WDN446	21.2	86.7	090 / 43	1007.4
07 / 0800	WGEH	27.5	91.8	050 / 45	1006.6
07 / 1000	WGEH	27.3	91.5	060 / 45	1006.6
07 / 1200	C6GY5	27.2	90.6	140 / 38	1011.5
07 / 2200	V7A644	26.9	94.0	160 / 38	1004.0
08 / 0000	V7DJ7	27.6	95.0	180 / 50	1007.4
08 / 0000	LAVN4	28.5	93.4	180 / 37	1021.0
08 / 1200	7JUN	28.7	93.3	120 / 38	1005.0

Table 3. Selected surface observations for Hurricane Beryl, 28 June – 9 July 2024.

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Buoys									
42002 NOAA (26.06N 93.65W) (3.8 m)	07/0920	1002.3	07/0202	38 (1-min)	46				
42019 NOAA (27.91N 95.34W) (3.2 m)	08/0330	992.3	08/0259	53 (1-min)	65				
42020 NOAA (26.97N 96.68W) (3.8 m)	08/0010	1000.5	07/2054	33 (1-min)	38				
42035 NOAA (29.24N 94.41W) (3.8 m)	08/1130	1002.3	08/1221	46 (1-min)	54				
42043 TABS B (28.98N 94.90W) (3.8 m)	08/0930	994.0							
42056 NOAA (19.83N 84.96W) (4.0 m)	05/0100	996.3	05/0104	56 (1-min)	67				
42059 NOAA (15.30N 67.48W) (4.0 m)	02/1100	992.2[i]	02/1108	63[i] (1-min)	81[i]				
Barbados									
International Civil Aviation Organization (ICAO) Sites									
Grantley Adams Intl. Aprt. (TBPB) (13.07N 59.49W)	01/0900	1007.4	01/1003	44	59				0.68
St. Vincent and the Grenadines									
International Civil Aviation Organization (ICAO) Sites									
Argyle Intl. Aprt. (TVSA) (13.16N 61.15W)	01/1510	1004.8	01/1620	45	53				1.79
Canouan (TVSC) (12.70N 61.34W)	01/1510	990.3							4.43
Other St. Vincent Stations									
Bequia Island (12.99N 61.26W)			01/1510	52	89				0.45
Grenada									
International Civil Aviation Organization (ICAO) Sites									
Bishop Intl. Aprt. (TGPY) (12.00N 61.79W)	01/1500	1003.3	01/1600	80	105				2.17
Other Grenada Stations									
Carriacou/Harvey Vale (12.45N 61.47W)	01/1500	951.3							2.59
Carriacou/Lauriston (12.47N 61.47W)	01/1500	950.0							10.31
Carriacou/Limlair (12.49N 61.44W)	01/1450	950.7							

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Grenada/Marli (12.22N 61.64W)	01/1520	983.4	01/1530	22	29				4.43
Trinidad and Tobago									
International Civil Aviation Organization (ICAO) Sites									
Crown Point Aprt. (TTCP) (11.15N 60.83W)	01/1000	1004.4	01/1230	25	35				1.54
Other Trinidad/Tobago Stations									
Buccoo (11.18N 60.81W)	01/1000	980.0	01/0740	23	35				1.53
Flagstaff (11.33N 60.54W)	01/0900	960.0							1.93
Goodwood (11.20N 60.64W)	01/1100	989.5	01/1110		35				2.39
Mason Hall (11.22N 60.71W)	01/1000	988.0							2.84
Plymouth (11.15N 60.81W)	01/1000	1004.1	01/1230	30	40				1.77
WeatherFlow									
Lambeau (11.17N 60.76W) (10.0m)			01/1540	21	37				1.53
St. Lucia									
International Civil Aviation Organization (ICAO) Sites									
Castries Charles Aprt. (TLPC) (14.02N 60.99W)	01/1000	1010.2	01/1540	33	56				4.05
Hewanorra Intl. Aprt. (TLPL) (13.73N 60.95W)	01/0900	1009.3	01/1139	57	72				1.48
Martinique/MeteoFrance									
International Civil Aviation Organization (ICAO) Sites									
Le Lamentin Intl. Arpt. (TFFF) (14.60N 61.00W)	01/0900	1010.8	01/0155	27	49				2.38
Other Martinique Stations									
Ajoup B.-Ailer (14.80N 61.50W)									3.00
Ducos (14.59N 60.93W)									4.09
Fond Denis Cadet (14.73N 61.14W) (493m)			01/1246	30	69				4.64
Fond Denis Glis (14.73N 61.12W)									5.43
Fort de France Desaix (14.61N 61.06W) (143m)	01/0900	1010.2	01/0159	21	43				2.69
Fort de France Pte. Negres (14.59N 61.09W) (12m)			01/1606		39				3.51

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Fort France Colon (14.65N 61.07W)									4.28
Francois Chopot (14.63N 60.91W) (53m)			01/0138		41				1.03
Lorrain Vallon (14.83N 61.05W) (83m)			01/1712		35				1.28
Rivere-Pilote Stade (14.48N 60.90W)									3.04
Robert Pte. Fort (14.67N 60.92W) (16m)			01/1527	31	64				1.67
St. Joseph Rabuch (14.67N 61.05W)									3.64
St. Joseph Lezard (14.65N 60.99W) (65m)			01/0942		41				1.38
St. Pierre Depaz (14.75N 61.16W)									4.12
Trinite Caravel (14.77N 60.87W) (26m)	01/0100	1011.2	01/1221	36	54				0.46
Vauclin (14.55N 60.83W) (12m)			01/1154	33	53				0.93
Dominica									
International Civil Aviation Organization (ICAO) Sites									
Canefield Arpt. (TDCF) (15.34N 61.39W)	01/1900	1010.2	01/2150		35				2.39
Douglas Charles Aprt. (TDPD) (15.55N 61.30W)	01/0620	1010.3	01/1613		44				2.22
Other Dominican Stations									
Fresh Water Lake (AWS1) (15.34N 61.31W)			01/0600		45				5.15
Portsmouth Ag. Cntr. (AWS5) (15.57N 61.44W)			01/1700		30				3.26
Guadeloupe/MeteoFrance									
St. Francois Aerodrome (97125011) (16.26N 61.27W)					36				1.22
Jamaica									
International Civil Aviation Organization (ICAO) Sites									
Kingston Manley Intl. Aprt. (MKJP) (17.94N 76.79W)	03/1925	1002.3	03/1900	42	70				
Montego Bay Sangster Intl. Aprt. (MKJS) (18.50N 77.91W)	03/2000	1006.0[i]	03/1538	31[i]	48[i]				

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Other Jamaican Stations									
Clarendon Parish									
May Pen (17.98N 77.25W) (121m ASL)	03/2000	1002.0	03/2100	25	50				4.88
Mitchell Town (17.81N 77.20W) (25m ASL)	03/2000	994.2	03/2100	43	72				5.71
Monymusk (17.81N 77.25W) (10m ASL)	03/2000	993.7	03/2100	42	77				
New Yarmouth (17.88N 77.28W) (42m ASL)	03/2000	999.3	03/2100	43	71				5.75
Osborne Store (17.96N 77.34W)									7.56
Rocky Point (18.30N 77.86W) (341m ASL)	03/2000	991.9	03/2100	48	80				6.09
Salt River (17.83N 77.18W) (2m ASL)	03/2000	997.5	03/2100	28	60				
Hanover Parish									
Cave Valley (17.96N 77.34W)									8.07
Esher Primary School (18.45N 78.21W) (18m ASL)	03/2300	1004.8	04/0000	34	56				2.77
Kendal (18.35N 78.23W)									4.78
Rhodes Hall High (18.37N 78.30W) (2m ASL)	04/0000	1002.3			38				4.71
Shettlewood (18.34N 77.96W) (186m ASL)	03/2300	1001.7	03/2300	34	66				2.88
Kingston/St. Andrew Parish									
JACRA (17.98N 76.81W) (10m ASL)	03/1900	1005.5	03/2000		34				6.09
Lawrence Tavern (18.12N 76.85W)									9.44
Mico University College (17.99N 76.79W) (62m ASL)			03/2100	22	42				5.48
Mona Reservoir (18.01N 76.76W) (183m ASL)	03/1900	1005.5	03/2100	30	57				7.36
Woodford (18.07N 76.75W) (789m ASL)	03/1900	1002.4	03/2100	35	73				6.87
Manchester Parish									
Craig Head (18.23N 77.55W)									11.66
Cross Keys High School (17.89N 77.50W) (588m ASL)	03/2100	992.9	03/2200	37	72				
Ingleside (18.06N 77.50W)									9.70
Knockpatrick (Garth) (17.98N 77.50W)									13.62
New Forrest (17.91N 77.56W) (144m ASL)	03/2100	993.4	03/2200		39				6.19

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
SIRI (18.06N 77.47W) (444m ASL)	03/2110	1000.3	03/2150	39	64				
Portland Parish									
Bybrook (18.18N 76.64W)									13.31
Passley Gardens (18.20N 76.49W) (18m ASL)	03/1900	1005.0	03/2000	29	55				6.61
St. Ann Parish									
Aabuthnott Gallimore High School (18.30N 77.35W) (634m ASL)	03/2100	1006.7	03/1900		48				11.68
Claremont (18.33N 77.18W)									9.51
Dunn's River Fall (17.89N 76.58W) (27m ASL)	03/2200	1007.2	03/2100		58				0.85
Llandovery (18.46N 77.27W) (23m ASL)	03/2200	1006.6	03/2200	34	57				3.17
Moneague (18.27N 77.12W) (335m ASL)	03/2000	1007.4	03/1900	21	52				5.21
Nine Miles (18.30N 77.28W)									12.23
Runaway Bridge (18.45N 77.34W)									5.94
Tivey Penny (18.27N 77.20W) (468m ASL)	03/2000	1003.0	03/2000		55				
St. Catherine Parish									
Amity Hall (17.95N 77.05W) (12m ASL)	03/2000	1002.0	03/2100	21	42				5.30
Bois Content (18.01N 77.16W)									11.56
Dam Head (18.04N 76.98W)									5.98
Innswood High School (17.98N 77.00W) (26m ASL)	03/1900	1003.3	03/2100	22	45				5.03
Twickenham Park (18.00N 76.94W) (53m ASL)	03/1900	1004.6	03/2000		41				4.30
Tulloch Estates (18.11N 76.98W) (95m ASL)	03/1900	1004.9	03/1800		37				6.61
Worthy Park (18.14N 77.15W) (375m ASL)	03/2000	1005.6	03/1600		51				1.72
St. Elizabeth Parish									
Bethlehem Teacher's College (17.97N 77.70W) (667m ASL)	03/2200	991.1[i]	02/2200	38[i]	96[i]				
Black River High (18.03N 77.86W) (667m ASL)	03/2200	994.0	03/2300	32	61				4.79
Burnt Savannah (18.02N 77.76W)									6.05

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Crawford (17.89N 77.50W) (590m ASL)	03/2200	995.7	03/2300	28	64				4.36
Flagaman (17.89N 77.73W) (12m ASL)	03/2200	986.4[i]	03/2200	41[i]	96[i]				
Mountainside Primary School (17.97N 77.75W) (9m ASL)	03/2200	994.7	03/2300	36	91				7.59
Munro College (17.92N 77.69W) (698m ASL)	03/2200	985.2[i]	03/2200	49[i]	103[i]				
Newcombe Valley Primary School (17.92N 77.76W) (103m ASL)	03/2200	988.1	03/2300	57	107				3.13
Y.S. Estates (18.12N 77.83W)									5.50
St. James Parish									
Dumfries (18.43N 77.76W)									6.41
Greenwood (18.50N 77.74W)									6.53
Mount Horeb (18.35N 77.88W)									3.48
St. Mary Parish									
Halifax RADA (18.29N 77.02W) (434m ASL)	03/2100	1006.4	03/2000		50				9.23
St. Thomas Parish									
Hordley Estate (17.95N 76.27W)									3.75
Norris (17.92N 76.58W)									11.65
Serge Island (17.95N 76.48W) (97m ASL)	03/1700	1006.1	03/1800		42				5.20
Whitehorses (17.87N 76.48W)									4.83
Trelawny Parish									
Hampden Estate (18.44N 77.75W) (107m ASL)	03/2100	1006.2	03/2200		41				4.54
Orange Valley (18.47N 77.73W) (74m ASL)			03/2300		41				4.50
Warsop (18.26N 77.59W)									6.61
Westmoreland Parish									
Frome Estate (18.29N 78.16W) (27m ASL)	03/2300	1000.9	04/0000	29	60				2.84
Negril Point L/H (18.25N 78.36W)									5.53
Non-Pariel (18.28N 78.32W)									8.65

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Savanna-La-Mar (18.22N 78.13W)									4.02
St. Leonard's (Seafood Town) (18.26N 77.90W)									3.93
Public/Other									
Peter's Rock (Weather Underground) (18.06N 76.75W) (759m ASL)			03/1629	47	65				
Cayman Islands									
International Civil Aviation Organization (ICAO) Sites									
Owen Roberts Intl. Aprt. (MWCR) (19.29N 81.36W)	04/1020	1004.6	04/1030	40	56				3.09
Mexico									
International Civil Aviation Organization (ICAO) Sites									
Cancun Intl. Aprt. (MMUN) (21.04N 86.88W)	05/1040	1005.0	05/1318	29	42				6.71
Mexican Navy Stations									
Isla Mujeres (IMUX4) (21.25N 86.74W)	05/1130	1007.1	05/1115	38	48				
Isla Perez (IPZY1) (22.38N 89.68W)	05/2345	1003.0	05/2130	38	50				
Matamoros (MTAT4) (25.82N 97.15W)	08/0015	1004.7	07/1800	22	34				
Cozumel (20.51N 86.56W)	05/1000	993.5	05/1030	40	56				
Puerto Juarez (21.19N 86.81W)									4.63
Yucalpeten (21.28N 89.70W)			05/2215	32	42				
Other Mexican Stations									
El Cuyo (21.52N 87.68W)									4.76
Tizimin (TIZY1) (21.16N 87.99W)			05/1240		34				
Kantunilkin (21.10N 87.49W)			05/1050		35				
Valladolid (20.69N 88.22W)			05/1350		49[i]				
WeatherFlow									
Cancun (XCCN) (21.06N 86.78W) (11m)	05/1036	1002.8	05/0921	41	51				

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Cozumel (XCOZ) (20.53N 86.94W) (10.0m)	05/0947	994.6	05/1027	32	59				
Xcaret Park (XPDC) (20.58N 87.12W) (11m)	05/1015	991.3	05/1040	51	70				
Puerto Morelos (XPRM) (20.83N 86.89W) (10m)	05/1000	1000.8	05/1115	40	49				
Xel-Ha Park (XTUL) (20.31N 87.36W) (10.0m)	05/1055	979.3	05/1210	38	55				
Public/Other									
Chemuyil (Weather Underground) (20.35N 87.34W)	05/1048	977.7	05/1215	58	74				
Puerto Aventuras (iCyclone) (20.51N 87.23W)	05/1034	988.9							
Tulum (iCyclone) (20.20N 87.46W)	05/1108	988.5							
Offshore Oil Platforms									
Keathley Canyon 875 (K18H) (26.13N 92.03W) (30m)	07/0855	1007.5	07/0635	40	47				
Garden Banks 426 (KAGI) (27.55N 92.45W) (41m)	07/0935	1008.5	07/0856	35	39				
East Cameron 321A (KEZP) (28.22N 92.80W) (30m)	07/2335	1009.2	07/1550	32	47				
Magnolia (KGBK) (27.20N 92.20W) (68m)	07/0855	1008.2	07/0535	39	45				
Alaminos Canyon 857 (KGYF) (26.13N 94.90W) (65m)	07/1455	995.0	07/1955	48	56				
East Breaks 643 (KVAF) (27.35N 94.63W) (14m)	08/0015	1001.7	07/2215	46	61				
United States									
Texas									
International Civil Aviation Organization (ICAO) Sites									
Fayette Rgnl. (K3T5) (29.91N 96.95W)	08/1435	1003.3	08/1555	22	34				0.34
Panola Cnty. Arpt. (K4F2) (32.18N 94.30W)	08/2335	1001.0	09/0015	25	35				
Navasota Arpt. (K60R) (30.37N 96.11W)	08/1615	985.1	08/1615	41	54				
Robert Wells Arpt. (K66R) (29.64N 96.52W)			08/1255	29	47				
Wharton Rgnl. (KARM) (29.25N 96.15W)	08/0832	999.2[i]	08/0915	32[i]	49[i]				
Houston SW Arpt. (KAWH) (29.52N 95.48W)									7.13
Beaumont Mun. (KBMT) (30.07N 94.22W)	08/1555	1005.8	08/1535	27	39				

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Beaumont/Port Arthur (KBPT) (29.95N 94.03W)	08/1556	1005.4	08/1638	36	53				4.58
Bay City Mun. Arpt. (KBYY) (28.97N 95.86W)	08/1055	979.9	08/0835	48	56				6.66
College Station (KCLL) (30.58N 96.37W)	08/1553	1000.5	08/1620	39	57				1.13
Corpus Christi Intl. (KCRP) (27.77N 97.50W)	08/0051	1004.5	07/2235	27	35				Trace
Corsicana Mun. Arpt. (KCRS) (32.03N 96.40W)	08/2153	1006.4	08/2025	20	36				0.38
Conroe (KCXO) (30.36N 95.41W)	08/1653	990.5	08/1553		70[i]				5.47
Crockett (KDKR) (31.31N 95.40W)	08/2015	993.5	08/1755	32	40				
Hooks Mem. Arpt. (KDWH) (30.07N 95.56W)	08/1453	986.7[i]	08/1450	38[i]	72[i]				4.97
Houston Ellington. (KEFD) (39.60N 95.17W)			08/1354	44	63				
Center Mun. Arpt. (KF17) (31.83N 94.16W)			08/2340	28[i]	36[i]				
Athens Mun. Arpt. (KF44) (32.16N 95.83W)	08/2135	1003.1	08/2115	25	36				
Longview (KGGG) (33.39N 94.71W)	08/2353	999.5	08/2115	23	39				5.43
Galveston Scholes (KGLS) (29.27N 94.86W)	08/1052	999.7[i]	08/1010	45[i]	62[i]				2.75
Giddings (KGYB) (30.17N 96.98W)	08/1515	1005.8	08/1435		38				0.06
Houston Hobby (KHOU) (29.64N 95.28W)	08/1353	991.8[i]	08/1353	47[i]	73[i]				7.26
Harlingen (KHRL) (26.23N 97.66W)			07/2100	30	42				0.23
Houston Intercontinental (KIAH) (29.98N 95.36W)	08/1453	990.5	08/1515	51	72				5.04
Jasper Cnty. Arpt. (KJAS) (30.88N 94.03W)			08/2055	23	38				
Brazoria Cnty. Arpt. (KLBX) (29.12N 95.46W)	08/1053	989.3	08/1036	46[i]	74[i]				5.22
Lufkin (KLFK) (31.23N 94.75W)			08/1915	32[i]	55[i]				3.93
Pearland Rgnl. Arpt. (KLVJ) (29.52N 95.24W)	08/1053	998.4[i]	08/1101	33[i]	61[i]				5.61
Houston Dunn Helistop (KMCJ) (29.71N 95.40W) (69m)			08/1435	50	77				
Orange Cnty. Arpt. (KORG) (30.07N 93.80W)	08/1435	1008.1	08/1855	23	35				2.47
Mt. Pleasant Arpt. (KOSA) (33.10N 94.96W)			09/0155	27	34				
Port Isabel (KPIL) (26.16N 97.34W)	07/2150	1004.7	07/2010	25	37				0.90
Port Lavaca (KPKV) (28.65N 96.68W)			08/0715	29	39				0.95
Palestine Mun. Arpt. (KPSN) (31.78N 95.71W)			08/2015	32[i]	41[i]				

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Palacios Mun. Arpt. (KPSX) (28.72N 96.25W)	08/0853	986.7	08/0942	50	77				7.84
Sugarland (KSGR) (29.62N 95.66W)	08/0853	1002.8[i]	08/1119	42[i]	66[i]				4.22
La Porte Mun. Arpt. (KT41) (29.67N 95.06W)			08/1135	44	64				
Liberty Mun. Arpt. (KT78) (30.08N 94.70W)			08/1515	28	45				
Houston Executive Arpt. (KTME) (29.81N 95.90W)	08/1415	986.6	08/1335	40	56				
Tyler Arpt. (KTYR) (32.36N 95.40W)	08/2253	1001.0	08/2130	28	46				2.86
Huntsville Arpt. (KUTS) (30.74N 95.59W)	08/1753	990.3	08/1457	35	55				4.92
Victoria Rgnl. Arpt. (KVCT) (28.85N 96.92W)	08/0951	1001.2	08/1110	24	41				0.55
Coastal-Marine Automated Network (C-MAN) Sites									
Port Aransas (PTAT2) (27.83N 97.05W) (15m)			07/2100	28 (10 min)	37				
Sea Rim Park (SRST2) (29.67N 94.05W)	08/1300	1006.8							
National Ocean Service (NOS) Sites									
Aransas Pass TCOON (ANPT2) (27.84N 97.04W) (4.0m)	08/0400	1001.6	07/2224	30	38	2.81		1.54	
Aransas Wildlife Refuge TCOON (AWRT2) (28.23N 96.80W) (9.6m)	08/0736	998.9	08/0318	30	36	1.42		1.16	
Baffin Bay TCOON (BABT2) (27.30N 97.41W) (10m)	08/0100	1003.1	07/2224	30	37				
Brazos Santiago TCOON (BZST2) (26.07N 97.16W) (4.3m)	08/0012	1002.4	07/1212	32	39	2.02		1.48	
Matagorda City TCOON (EMAT2) (28.71N 95.91W) (8.2m)	08/0912	979.8	08/0712	59	75	3.71		3.09	
Eagle Point TCOON (EPTT2) (29.48N 94.92W) (5.7m)	08/1248	998.6	08/1236	49	59	4.76		3.57	
Freeport Harbor (FPST2) (28.94N 95.29W) (15m)	08/0948	989.3	08/0854	65	76	2.94[i]		1.92[i]	
Galveston North Jetty (GNJT2) (29.36N 94.73W) (12m)	08/1100	1000.0	08/1218	63	71	4.51		4.43	
Galveston Railroad Bridge TCOON (GRRT2) (29.30N 94.90W) (3.7m)	08/1212	997.9	08/1100	41	54	4.20		3.82	
Galveston Pier 21 (GTOT2) (29.31N 94.79W)	08/1048	998.1	08/1012	35	52	3.54		3.38	
High Island TCOON (HIST2) (29.60N 94.39W)	08/1300	1002.5	08/1448	28	43	3.34		3.27	

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	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
La Quinta (LQAT2) (27.88N 97.29W) (10m)	08/0318	1002.7	07/2130	27	34	1.47		1.16	
San Luis Pass TCOON (LUIT2) (29.08N 95.12W)	08/1048	994.4	08/0930	51	70	4.01		3.50	
Matagorda Bay Entrance (MBET2) (28.43N 96.33W) (12m)	08/0730	985.7	08/0736	64	77	3.89		2.76	
Morgans Point TCOON (MGPT2) (29.68N 94.99W) (3.2m)	08/1342	997.8	08/1254	57	69	6.39		5.54	
Manchester TCOON (NCHT2) (29.73N 95.27W) (4.1m)	08/1400	991.2	08/1436	34	54				
Port O'Connor TCOON (PCNT2) (28.45N 96.40W) (9.0m)	08/0718	992.2	08/0700	54	66	4.76		3.71	
Port Arthur TCOON (PORT2) (29.87N 93.93W) (11m)	08/1430	1005.6	08/1506	26	40	2.87		2.81	
Rainbow Bridge (RBBT2) (29.98N 93.88W)						3.26		3.12	
Rollover Pass TCOON (RLOT2) (29.52N 94.51W) (11m)	08/1218	1002.0	08/1200	54	63	4.98		4.98	
Rincon del San Jose TCOON (RSJT2) (26.80N 97.47W) (10m)	08/0024	1003.0	07/2306	33	39				
Sea Drift TCOON (SDRT2) (28.41N 96.71W) (10m)	08/0730	997.5	08/0742	24	36	1.08		0.98	
Texas Point (TXPT2) (26.96N 93.84W) (13m)	08/1554	1005.3	08/1554	48	61	3.42		3.12	
Port Lavaca TCOON (VCAT2) (28.64N 96.61W)	08/0900	995.8	08/0848	33	45	2.00		1.21	
Texas Tech University StickNet Sites (1-min sustained winds)									
101 (27.35N 94.63W) (2.25m)	08/1108	992.2	08/1126	55	65				
102 (28.88N 95.24W) (2.25m)	08/1019	988.1	08/0854	65[i]	73[i]				
103 (29.11N 95.08W) (2.25m)	08/1200	997.4	08/1021	73	85				
104 (29.19N 94.97W) (2.25m)	08/0956	997.8[i]	08/0956	51[i]	60[i]				
105 (29.09N 95.28W) (2.25m)	08/1133	992.0	08/1243	47	57				
106 (29.17N 95.26W) (2.25m)	08/1204	995.1	08/1258	44	59				
107 (29.13N 95.40W) (2.25m)	08/1139	990.2	08/0935	45	61				
108 (28.86N 95.82W) (2.25m)	08/1052	980.8	08/0758	44	61				
109 (28.92N 95.69W) (2.25m)	08/1059	981.6	08/0816	40	53				
110 (28.90N 95.77W) (2.25m)	08/1059	978.6	08/0814	45	62				
111 (28.94N 95.86W) (2.25m)	08/1054	977.4	08/0814	40	51				
112 (29.06N 95.92W) (2.25m)	08/1110	979.0	08/0814	33	44				

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	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
213 (28.91N 95.34W) (2.25m)	08/1212	987.9	08/1212	67	77				
214 (28.90N 95.38W) (2.25m)	08/1008	988.3	08/1238	52	68				
216 (28.97N 95.53W) (2.25m)	08/1043	985.4	08/1138	47	66				
217 (28.85N 95.66W) (2.25m)	08/1021	983.8	08/1147	40	56				
218 (28.79N 95.58W) (2.25m)	08/1022	985.1	08/0758	52	64				
219 (28.78N 95.94W) (2.25m)	08/0957	979.5	08/0745	36	49				
220 (28.71N 95.91W) (2.25m)	08/0931	982.5	08/0711	55	63				
221 (29.04N 96.23W) (2.25m)	08/1031	984.4	08/1030	42	55				
222 (28.83N 96.28W) (2.25m)	08/0954	989.3	08/0910	35	49				
223 (28.95N 96.44W) (2.25m)	08/0942	989.6	08/0917	43	52				
224 (28.79N 96.46W) (2.25m)	08/0858	993.2	08/0924	40	52				
325 (28.83N 95.89W) (2.25m)	08/1034	978.2	08/0802	38	53				
326 (28.68N 96.32W) (2.25m)	08/0916	987.1	08/0918	50	65				
327 (28.72N 96.36W) (2.25m)	08/0932	988.1	08/0917	43	59				
328 (28.64N 96.45W) (2.25m)	08/0851	991.7	08/0840	38	49				
329 (29.05N 96.11W) (2.25m)	08/1056	980.7	08/0841	44	62				
330 (28.60N 95.96W) (2.25m)	08/0832	979.6	08/0657	60	71				
331 (28.79N 96.12W) (2.25m)	08/0952	980.5	08/1142	53	63				
332 (28.74N 96.24W) (2.25m)	08/0923	985.7	08/0819	43	58				
333 (28.89N 95.99W) (2.25m)	08/1015	977.1	08/0821	49	60				
334 (28.73N 96.07W) (2.25m)			08/1145	44	56				
335 (28.68N 96.16W) (2.25m)	08/0923	983.0	08/1054	48	64				
336 (28.86N 96.14W) (2.25m)	08/0957	981.5	08/0936	42	54				
439 (28.44N 96.73W) (2.25m)	08/0727	998.6	08/0247	61	76				
440 (28.48N 96.67W) (2.25m)	08/0733	997.0	08/0733	30	40				
441 (29.20N 95.70W) (2.25m)	08/1135	976.6	08/0949	41	59				
442 (28.43N 96.49W) (2.25m)	08/0730	992.4	08/0743	40	49				
443 (28.49N 96.58W) (2.25m)	08/0732	994.8	08/0925	29	39				
444 (28.58N 96.64W) (2.25m)	08/0816	995.5	08/0926	30	41				
445 (29.17N 95.91W) (2.25m)	08/1141	977.3	08/0904	39	52				
446 (29.26N 95.16W) (2.25m)	08/1155	994.1	08/1233	51	60				
447 (29.28N 95.26W) (2.25m)	08/1219	992.7	08/1253	36	57				
448 (29.19N 95.36W) (2.25m)	08/1154	990.5	08/1125	48	63				

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	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
WeatherFlow									
Clear Lake (XCLP) (29.56N 95.07W) (9.8m)			08/1113	48	65				
Crab Lake (XCRB) (29.47N 94.62W) (20m)			08/1225	44	60				
Galveston Bay (XGAL) (29.54N 94.91W) (5.2m)			08/1247	46	64				
Levee (XLEV) (29.42N 94.89W) (8.2m)	08/1205	999.3	08/1210	48	63				
Matagorda Bay (XMGB) (28.59N 95.86W) (6.1m)	08/0921	978.8	08/1116	54	68				
Point Comfort (XPTC) (28.69N 96.56W) (10m)	08/0855	992.0	08/1045	38	56				
SPIW Park (XSPP) (26.16N 97.18W) (5.5m)	07/1954	1002.3	07/1214	26	35				
Surfside Beach (XSRF) (28.93N 95.29W) (7.6m)	08/1002	991.7[i]	08/1342	56	74				
Texas Corinthian Yacht Club (XTCY) (29.53N 95.00W) (6.7m)	08/1254	996.0	08/1044	45	60				
Texas City (XTEX) (29.37N 94.95W) (20m)			08/1019	35	56				
Harris County Flood Control District Sites									
HWY 6 at SH 290 (030HC) (30.11N 96.08W)			08/1512		63				
SH 99 at Cedar Bayou (CBHT2) (29.72N 94.94W) (7.3m)	08/1351	998.6	08/1141	30	55				10.80
Big Island Slough at Fairmont Pkwy. (FLPT2) (29.65N 95.08W)	08/1300	996.0	08/1320		64				
Clear Creek at FM 2351 (FNDT2) (29.54N 95.20W)	08/1310	994.6	08/1340		51				
SH 36 at Brazos River (FRPT2) (28.95N 95.38W) (2.7m)			08/1221		84				
Friendswood Public Safety (FSTT2) (29.50N 95.20W)	08/1300	994.3	08/1258		40				
Greens Bayou at Cutten Rd. (GCGT2) (29.95N 95.52W)	08/1420	984.5	08/1424	29	53				
Galveston Causeway (GVCT2) (29.30N 94.89W)			08/1241		75				
Brookhollow (HCFT2) (29.81N 95.45W)	08/1420	986.5	08/1436		49				
San Jacinto River at I-10 (HLNT2) (29.79N 95.06W)			08/1455		63				
Jamaica Beach (JMBT2) (29.18N 94.97W)			08/1251	63					7.24
John Paul Landing (JOPT2) (29.91N 95.79W) (7.3m)	08/1450	985.6	08/1258	40	66				
Lake Houston (LHFT2) (30.02N 95.12W)	08/1450	995.3	08/1558	32	60				

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Little Cedar Bayou at 8th St. (LPOT2) (29.65N 95.03W)	08/1330	998.0	08/1200		49				
Sens Rd. (LTST2) (29.68N 95.05W)	08/1330	997.0	08/1344		52				
Taylor's Bayou at Shoreacres Blvd. (NTBT2) (29.62N 95.02W)	08/1330	998.0	08/1416		41				
Patricks Bayou at E 8th St. (PTKT2) (29.71N 95.12W)	08/1420	996.0	08/1358		63				
San Jacinto River at Rio Villa (RIOT2) (29.83N 95.08W)	08/1420	995.0	08/1442		46				
NRG Park (RLPT2) (29.68N 95.41W)	08/1410	987.5	08/1424	38	61				11.08
Juan Seguin Park (SCPT2) (29.76N 95.08W)	08/1430	995.6	08/0956	31	57				
Cangelosi at Texas Pkwy. (TCAT2) (29.61N 95.53W)	08/1350	984.5	08/1412		47				
Houston Transtar (TNST2) (29.78N 95.44W)	08/1421	987.2	08/1405		56				14.88
US 99 at Brazos River (USNT2) (29.58N 95.68W)			08/1219		51				
Willow Spring Bayou at Fairmont Pkwy. (WSFT2) (29.65N 95.11W)	08/1311	995.6	08/1149		51				
Remote Automated Weather Stations (RAWS)									
Attwater NWR (ANWT2) (29.67N 96.27W) (6.1m)			08/1235	30	63				3.73
Palestine (APLT2) (31.74N 95.57W) (6.1m)	08/2105	996.0	08/1905		31				3.86
Brazoria NWR (BZRT2) (29.15N 95.30W) (6.1m)			08/1228	41	69				5.61
Caddo Lake (CADT2) (32.69N 94.12W) (6.1m)									3.33
Conroe (CKNT2) (30.24N 95.48W) (6.1m)			08/1503		42				5.33
McFaddin (FADT2) (29.71N 94.12W) (6.1m)			08/1535	35	51				5.89
Henderson (HDRT2) (32.14N 94.85W) (6.1m)	08/2306	995.6	08/2206		29				5.00
Anahuac (HILT2) (29.67N 94.44W) (6.1m)			08/1312	35	55				5.51
Huntsville (HTVT2) (30.74N 95.64W) (6.1m)			08/1506	21	43				4.53
Dayton (KNFT2) (30.11N 94.93W) (6.1m)			08/1722	30	50				4.61
Kirbyville (KRBT2) (29.71N 94.12W) (6.1m)			08/2005		37				3.28
Lumberjack (LMJT2) (31.76N 94.66W) (6.1m)			08/2146		36				3.87
Lufkin (LRWT2) (31.76N 94.66W) (6.1m)	08/2103	994.9	08/2003		36				4.00
Matagorda Island (MIRT2) (28.12N 96.80W) (6.1m)			08/0812	24	39				0.20

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Round Prairie (RPRT2) (31.30N 96.37W) (6.1m)	09/1910	1001.0	08/2110		35				0.97
San Bernard NWR (SRDT2) (28.86N 95.57W) (6.1m)			08/1029	51	79				7.91
Texarkana (TEXT2) (33.37N 94.05W) (6.1m)			09/0004		24				6.76
Southern Rough (WRRT2) (30.54N 94.35W) (6.1m)					36				3.39
Woodville (WVLT2) (30.74N 94.43W) (6.1m)			08/2204	21	45				4.62
Zavsalla (ZVLT2) (31.18N 94.38W) (6.1m)			08/2302		27				3.81
Texas Water Development Board (TDWB) Sites									
Wied Ranch (TWB09) (29.44N 96.44W) (10m)	08/1235	994.5	08/1155	45	65				
Los Machos Farm (TWB27) (27.47N 98.14W) (10m)	08/0020	1003.4	07/2305	35	51				
Carthage (TWB64) (32.13N 94.35W) (10m)			08/2335		34				
Lake Striker (TWB66) (31.93N 94.97W) (10m)	08/2205	998.3	09/0225	25	37				
Texas AgriScience (TWB67) (26.35N 97.89W) (10m)	08/0010	1005.4	07/2120	28	36				
Sanda (TWB81) (30.23N 96.20W) (10m)	08/1605	995.8	08/1515	24	45				
Lake Madisonville (TWB91) (30.96N 95.91W) (10m)	08/1825	996.6	08/1725	21	35				
Public/Other									
College Station Kyle Field (1757W) (30.61N 96.34W) (111m)			08/1610	49	86				
Hunters Creek 1SSE (3776D) (29.76N 95.49W)									9.93
Spring (C5019) (30.21N 95.56W)	08/1608	989.2							6.32
Cypress (C9236) (29.95N 95.74W)	08/1440	983.8	08/1300	36	63				
Tomball (D0708) (30.16N 95.63W)	08/1605	986.5	08/1410		39				7.91
San Felipe (D1824) (29.80N 96.12W) (7.3m)	08/1343	991.3	08/1443	21	49				
Katy (D8266) (29.71N 95.64W)	08/1401	984.5							12.08
Ganado 3.9NW (DW017) (29.08N 96.56W)									6.14
Markham 7.0W (DW031) (28.93N 96.17W)									8.19
Houston (E3791) (29.78N 95.37W)	08/1415	988.5	08/1430	29	56				7.21
Navasota (E4261) (30.29N 96.00W)	08/1600	990.5	08/1446	30	51				

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
La Ward (E6171) (28.77N 94.46W) (7.3m)	08/0921	989.1	08/0926	38	54				
Rosenberg (E6252) (29.52N 95.81W)	08/1231	980.4							6.23
Coldspring (E9198) (30.63N 95.10W)	08/1800	995.6	08/1615	42	55				
Freeport (E9755) (28.94N 95.35W) (2.0m)	08/0734	997.4	08/1218	38	56				
Gilchrist (F0211) (29.50N 94.52W)	08/1215	1001.7	08/1245	51	69				
Deer Park (F2972) (29.69N 95.14W)	08/1322	996.2	08/1156	25	50				
Manvel (F3981) (29.52N 95.38W)	08/1325	988.8	08/1400	43	61				
Thompsons (F4043) (29.48N 95.63W)	08/1300	984.1	08/1149	33	50				14.99
Taylor Landing (F9386) (29.87N 94.14W)	08/1415	1005.8	08/1420		40				3.46
Magnolia (G1931) (29.48N 95.63W)	08/1546	989.9							7.40
The Woodlands (G2240) (30.19N 95.56W)	08/1600	987.5							7.25
Houston WFO (KHGX) (29.47N 95.08W)									5.78
Goodrich 5NW HADS (LVDT2) (29.63N 95.01W)			08/1800	43					2.60
Mission Bend 8N (PRAT2) (29.81N 95.66W)									11.00
UP Sweeny 3E (UR260) (29.04N 95.65W) (8.8m)			08/0903	51	56				
Madisonville (W5ZYX) (30.97N 95.83W) (2.0m)	08/1815	995.7	08/1735	28	44				
Matagorda (iCyclone) (28.69N 95.98W)	08/0857	980.1							
Palacios (iCyclone) (28.72N 96.21W)	08/0925	984.5							
Port Lavaca (iCyclone) (28.64N 96.61W)	08/0829	995.2							
Sargent (iCyclone) (28.79N 95.64W)	08/0939	982.1							
Matagorda Camp (Weather Underground) (28.46N 96.30W)	08/0804	992.2	08/0659	71	85				
US Geological Survey (USGS) Streamgages									
Old Brazos River near Freeport (08079120) (28.95N 95.34W)							7.98 (NGV 29)	6.35	
Brazos River GIWW Floodgates (08117300) (28.90N 95.38W)							7.34	6.02	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
National Weather Service (NWS) High Water Marks									
Freeport (28.93N 95.31W)							6.4	5.0	
Galveston Island (29.24N 94.87W)							7.7	6.3	
Matagorda (28.67N 95.96W)							7.1	6.1	
Louisiana									
International Civil Aviation Organization (ICAO) Sites									
Mansfield (K3F3) (32.07N 93.76W)	08/2335	1004.8	09/0135	28	39				
Grand Chenier (K3L4) (29.80N 92.80W)	08/2115	1009.5	08/1535	29	38				
Alexandria Intl. (KAEX) (31.33N 92.57W)	08/2311	1007.8	08/2118	24	35				0.40
Barksdale AFB (KBAD) (32.50N 93.67W)	09/0025	1003.6	09/0255	28	38				2.51
De Ridder (KDRI) (30.83N 93.33W)	08/2115	1007.1	08/2215	23	34				
Shreveport Downtown (KDTN) (32.54N 93.74W)	09/0053	1003.1	08/2245	25	39				2.39
Lake Charles Chennault (KCWF) (30.22N 93.15W)	08/2150	1009.1	08/1655	24	37				
Lake Charles Rgnl. (KLCH) (30.13N 93.22W)	08/2349	1009.5	08/1644	31	44				0.85
Lafayette (KLFT) (30.20N 92.00W)	08/2345	1009.8	08/2038	21	38				0.23
Ft. Johnson AAF (KPOE) (31.05N 93.20W)	08/2155	1006.3	08/2108	25	42				
Shreveport Rgnl. (KSHV) (32.45N 93.82W)	08/2356	1003.1	08/1950	21	39				2.63
Sulphur (KUXL) (30.13N 93.38W)	08/2035	1009.1	08/1615	27	38				
National Ocean Service (NOS) Sites									
Calcasieu Pass (CAPL1) (29.77N 93.34W) (12.3m)	08/1124	1009.2	08/1646	38	47	2.34		2.29	
Eugene Island (EINL1) (29.37N 91.38W) (4.0m)	08/2312	1011.3	08/2312	31	39	2.18		1.80	
Freshwater Canal Locks (FRWL1) (29.55N 92.31W) (17m)	08/0900	1014.2	08/1836	23	31	3.17		3.02	
WeatherFlow									
Cameron (XCAM) (29.78N 93.20W) (10m)	08/1049	1008.6	08/1529	30	40				

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Remote Automated Weather Stations (RAWS)									
Evangeline Gardner (GARL1) (31.19N 92.63W) (6.1m)			09/0143		34				0.38
Sabine (HAKL1) (29.89N 93.40W) (6.1m)			08/1549	29	50				2.52
Louisiana Agriclimatic Information System (LAIS) Sites									
Red River (LSU09) (32.42N 93.64W)			09/0308	31	35				
Arkansas									
International Civil Aviation Organization (ICAO) Sites									
Baxter Cnty. Aprt. (KBPK) (36.37N 92.47W)	09/1553	1009.3							3.06
Batesville (KBVX) (35.73N 91.65W)	09/1256	1006.5							4.09
El Dorado (KELD) (33.22N 92.81W)	09/0550	1006.1	08/2150	22	34				1.43
Hot Springs (KHOT) (34.48N 93.10W)	09/0824	1004.8	09/0510	24	37				3.26
Harrison (KHRO) (36.27N 93.16W)	09/1453	1010.8	09/1931		21				3.74
Little Rock (KLIT) (34.73N 92.24W)	09/0953	1005.5	09/1642		30				3.45
Pine Bluff (KPBF) (34.18N 91.93W)			09/0830	21[i]	36[i]				1.44
Saline Cnty. Rgnl. (KSUZ) (34.59N 92.48W)	09/0915	1005.5	09/0415	25	37				
Texarkana Rgnl. (KTXK) (33.46N 93.99W)	09/0219	1003.1	09/0219	23	34				4.84
Remote Automated Weather Stations (RAWS)									
Devil's Knob (DKBA4) (35.61N 93.54W) (6.1m)			09/1208		34				3.60
Arkansas Dept. of Transportation Stations									
Doddridge (ARD01) (33.08N 93.99W)	09/0120	1003.8	08/2130	22	41				
Hot Springs (ARD09) (34.50N 92.97W)	09/0830	1005.1	09/0240	27	39				
I-430 River Bridge (ARD14) (34.80N 92.38W)	09/0950	1003.1	09/0320		36				
Public/Other									
Greenbrier (C0364) (35.28N 92.39W)			09/0810		34				
Little Rock WFO (KLZK) (34.83N 92.26W)									5.02

[a] Date/time is for sustained wind when both sustained and gust are listed.
[b] Except as noted, sustained wind averaging periods for C-MAN and land-based reports are 2 min; buoy averaging periods are 8 min.
[c] Storm surge is water height above normal astronomical tide level.
[d] For most locations, storm tide is water height above the North American Vertical Datum of 1988 (NAVD88). Storm tide is water height above Mean Lower Low Water (MLLW) for NOS stations in Puerto Rico, the U.S. Virgin Islands, and Barbados.
[e] Estimated inundation is the maximum height of water above ground. For some USGS storm tide pressure sensors, inundation is estimated by subtracting the elevation of the sensor from the recorded storm tide. For other USGS storm tide sensors and USGS high-water marks, inundation is estimated by subtracting the elevation of the land derived from a Digital Elevation Model (DEM) from the recorded and measured storm tide. For NOS tide gauges, the height of the water above Mean Higher High Water (MHHW) is used as a proxy for inundation.
[i] Incomplete record

Table 4. Selected storm-total rainfalls from various site for Hurricane Beryl, 28 June – 9 July 2024. When possible, stations are sorted by station identifier.

Location	Total Rainfall (in)	Location	Total Rainfall (in)
Dominica			
Bellevue Chopin (ARG1) (15.27N 61.34W)	3.28	Syndicate (ARG22) (15.52N 61.42W)	3.91
Botanical Garden (ARG2) (15.30N 61.38W)	3.38	Belles Bridge (AWL1) (15.42N 61.34W)	4.58
Carholm (ARG4) (15.46N 61.38W)	3.31	Boerie Lake (AWL2) (15.35N 61.32W)	5.30
Campbell Water Tank (ARG7) (15.37N 61.38W)	3.47	Cochrane Intake (AWL4) (15.35N 61.36W)	5.14
Delices Water Tank (ARG8) (15.29N 61.27W)	3.09	Roseau River at Copthall (AWL5) (15.31N 61.36W)	3.67
Giraudel Water Tank (ARG9) (15.29N 61.34W)	3.94	Yorke Valley Bridge (AWL12) (15.41N 61.39W)	3.80
Laudet (ARG13) (15.33N 61.34W)	4.08	Jimmit DMS (AWS3) (15.37N 61.40W)	3.94
Picard Water Tank (ARG15) (15.55N 61.45W)	3.59		
United States			
Texas			
Harris County Flood Control District Sites			
SH 288 at Loop 610 (007HC) (29.68N 95.38W)	11.76	McGowen (MGOT2) (29.74N 95.37W)	9.96
Halls Bayou at Airline Dr. (AIRT2) (29.89N 95.40W)	10.40	Mustang Bayou at CR48 (MUBT2) (29.53N 95.42W)	9.96
Houston 1.4W (BBST2) (29.76N 95.41W)	10.80	Marys Creek at Veterans Dr. (MVDT2) (29.55N 95.29W)	9.97
Mission 6.3N (BKRT2) (29.79N 95.67W)	10.12	Clear Creek at Mykawa Rd. (MYKT2) (29.60N 95.30W)	10.52
Spring Valley 0.6NE (BSBT2) (29.80N 95.50W)	10.76	New Territory Blvd. (NTRT2) (29.59N 95.40W)	10.40
Bessie Creek at FM359 (BSIT2) (29.87N 96.00W)	6.76	Oyster Creek at Lexington Blvd. (OLBT2) (29.60N 95.59W)	10.52
Brazos River at I-10 (BSRT2) (29.77N 96.04W)	6.28	Armand Bayou at Space Center Blvd. (RMBT2) (29.66N 95.14W)	6.64
Cotton Bayou at Lakes of Champions Blvd. (CBLT2) (29.83N 94.84W)	6.36	Silber (SBRT2) (29.78N 95.46W)	10.44
Groveton 8.6 SW (CHET2) (30.95N 95.19W)	6.76	First Colony (SGDT2) (29.57N 95.61W)	10.80
Katy 0.5W (CIBT2) (29.80N 95.83W)	6.12	Amil Gates at SH6 (SGLT2) (29.61N 95.64W)	10.00
Country Place (CUYT2) (29.58N 95.36W)	11.00	Brookshire Creek at US90 (SIRT2) (29.79N 95.94W)	6.80
Friendswood 2SW (CCWT2) (29.50N 95.22W)	10.20	Southside Place 1.3S (SLKT2) (29.69N 95.44W)	9.92
Briar Branch at Campbell Rd. (CPBT2) (29.79N 95.51W)	10.16	Smith Gully at SH146 (SMGT2) (29.83N 94.90W)	8.20

Location	Total Rainfall (in)	Location	Total Rainfall (in)
Sugar Land 2.2SW (DCHT2) (29.60N 95.64W)	13.32	West University 2.4E (SMWT2) (29.71N 95.39W)	11.68
Ditch E at Austin Pkwy. (DTET2) (29.59N 95.62W)	10.84	Threemile Creek at Joseph Rd. (TMJT2) (30.15N 95.86W)	7.52
Ditch A at Eldridge Rd. (EDRT2) (29.62N 95.62W)	7.92	Brookside 4.2W (UCCT2) (29.59N 95.39W)	11.76
Fryday (FDYT2) (31.09N 95.21W)	7.04	Hilshire Village 5.5N (VCVT2) (29.87N 95.47W)	11.96
Sims Bayou at Hiram Clark Rd. (HCST2) (29.62N 95.45W)	10.72	West Fork Chocolate Bayou at CR383 (WCCT2) (29.48N 95.43W)	6.04
Hackberry Gully at I-10 (HBGT2) (29.62N 95.45W)	8.88	Wolf Creek Park (WCPT2) (30.67N 95.15W)	6.00
Lexington at Hunter's Trail (LGTT2) (29.59N 95.52W)	10.72	Willow Water Hole (WHLT2) (29.65N 95.51W)	10.16
Waller 3.7S (LMBT2) (30.01N 95.91W)	7.04	Willis 0.9W (WLIT2) (30.42N 95.49W)	9.16
Kickapoo Creek at Onalaska (LSKT2) (30.85N 95.03W)	5.56	Trinity 4.5N (WRCT2) (31.01N 95.37W)	6.52
Brookside 5.2NW (MSBT2) (29.63N 95.39W)	10.64		
Lower Colorado River Authority Sites			
Bay City 2.9W (BACT2) (28.97N 96.01W)	6.94	Lane City (CDOT2) (29.19N 96.07W)	7.86
Jefferson County Drainage District Sites			
Port Arthur 11NNW (JYIT2) (29.93N 94.11W)	3.47	Beaumont (JZHT2) (30.04N 94.15W)	4.32
Hull 2NNE (JYJT2) (30.16N 94.64W)	4.37	Landis Dr. (JZLT2) (30.07N 94.20W)	3.23
Batson (JYKT2) (30.26N 94.57W)	3.68	Walden Rd. (JZMT2) (30.04N 94.18W)	3.59
Kountze 16W (JYKT2) (30.36N 94.59W)	3.99	Pevito Bayou (JZQT2) (29.96N 94.17W)	3.22
Sour Lake 8NNE (JYMT2) (30.26N 94.36W)	3.61	Turner Rd. (JZST2) (30.06N 94.31W)	3.22
Nome 4N (JZBT2) (30.10N 94.39W)	3.97	China 7SSW (JZWT2) (29.95N 94.40W)	3.05
Washington Blvd. (JZGT2) (30.05N 94.16W)	4.24	Taylor's Bayou (JZYT2) (29.87N 94.16W)	4.28
Hydrometeorological Automated Data System (HADS) Sites (NWS)			
San Augustine (AYIT2) (31.40N 94.15W)	3.19	San Leon 1S (MOKT2) (29.45N 94.92W)	3.55
Katy 3.1SE (BBKT2) (29.74N 95.81W)	7.23	Neches 4NE (NCST2) (31.89N 95.43W)	4.69
Beaumont 5N (BIPT2) (30.18N 94.19W)	3.74	Freeport Old Brazos (OBRT2) (28.95N 95.34W)	7.94
Houston Cole Creek (DEHT2) (29.85N 95.49W)	9.81	Old Ocean 1SW (OCNT2) (29.11N 95.68W)	8.26

Location	Total Rainfall (in)	Location	Total Rainfall (in)
Hawkins (HAKT2) (32.56N 95.21W)	3.62	Pittsburg 5E (PBGT2) (33.02N 94.88W)	3.67
Hockley (HOCT2) (29.92N 95.84W)	7.10	Spring 3NW (PBST2) (30.13N 95.48W)	4.03
Lake Houston Sheldon (HSJT2) (29.92N 95.15W)	6.28	Woodlands (PGRT2) (30.19N 95.48W)	5.26
Jefferson Black Cypress (JEFT2) (32.78N 94.36W)	7.40	Rockland 2.0NW (ROKT2) (31.03N 94.40W)	3.89
Jasper 3.5SW (JWRT2) (30.87N 94.02W)	3.59	Striker Creek Reservoir (SKCT2) (31.93N 94.98W)	4.51
Kennard 7N (KNRT2) (31.49N 95.14W)	5.38	China 3.7N (SOLT2) (30.11N 94.33W)	3.87
Lake Cherokee (LCRT2) (32.38N 94.65W)	4.87	Colmesneil 7.0ESE (TBAT2) (30.88N 94.31W)	3.36
Livingston 2W (LIVT2) (30.72N 94.96W)	4.89	Town Bluff Dam (TBLT2) (30.80N 94.18W)	3.80
Addicks 5.7N (LLYT2) (29.87N 95.65W)	10.42	Talco 2S (WOCT2) (33.32N 95.09W)	3.79
Mauriceville 3.1SW (MCVT2) (30.19N 93.91W)	3.97	Bunker Hill 1SW (WSBT2) (29.77N 95.55W)	11.34
NWS Cooperative Observer Program (COOP) Sites			
Atlanta (ATAT2) (33.12N 94.17W)	3.51	Jacksonville (JKVT2) (30.92N 94.01W)	3.20
Beaumont Research (BAGT2) (30.07N 94.28W)	3.12	Kountze (KTZT2) (30.33N 94.23W)	3.29
Baytown (BATT2) (29.79N 95.04W)	8.76	Linden (LINT2) (33.02N 94.37W)	4.12
Brenham (BHMT2) (30.16N 96.40W)	4.70	Lufkin #2 (LNFT2) (31.34N 94.73W)	5.70
Center (CENT2) (31.82N 94.25W)	3.42	Longview #2 (LNVT2) (32.52N 94.72W)	6.21
Crockett (CKTT2) (31.31N 95.45W)	4.23	Maud (MAUT2) (33.33N 94.34W)	7.25
Conroe (CNRT2) (30.33N 95.48W)	6.01	Madisonville (MSVT2) (30.94N 95.92W)	3.32
Carthage (CTHT2) (32.16N 94.34W)	3.76	Mt. Vernon (MTVT2) (33.19N 95.22W)	3.54
Diana 2W (DIAT2) (32.71N 94.79W)	4.89	New Boston (NBOT2) (33.45N 94.41W)	3.23
Freeport (DOWT2) (28.98N 95.38W)	11.26	Richmond (RMOT2) (29.58N 95.76W)	7.82
Danevang (DVGT2) (29.07N 96.26W)	8.26	Rusk (RUKT2) (31.81N 95.14W)	5.50
Henderson (HENT2) (32.18N 94.80W)	4.60	San Augustine (SAUT2) (31.52N 94.12W)	3.33
Hallsville 4S (HLST2) (32.45N 94.60W)	4.62	Tyler (TLYT2) (32.30N 95.31W)	3.23
Huntsville (UNT2) (30.71N 95.54W)	5.67	Texarkana (TXAT2) (33.44N 94.08W)	7.62
Bellaire 1.6SW (HWET2) (29.68N 95.47W)	7.61	Washington State Park (WAST2) (30.32N 96.16W)	3.20
Hawkins 1E (HWKT2) (32.58N 95.18W)	3.50	Wharton 0.6SW (WHAT2) (29.31N 96.10W)	5.73

Location	Total Rainfall (in)	Location	Total Rainfall (in)
Jasper (JAST2) (30.92N 94.01W)	4.66	West Columbia 1ESE (WSCT2) (29.14N 95.63W)	8.04
Jefferson (JFRT2) (32.77N 94.36W)	5.57		
Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) Sites			
Zavalla 2.0ESE (TX-AG-2) (31.15N 94.39W)	4.32	Spring 8.7W (TX-HRR-315) (30.04N 95.53W)	7.18
Lufkin 7.6WSW (TX-AG-9) (31.30N 94.85W)	5.12	Hilshire Village 2.7NNE (TX-HRR-317) (29.82N 95.46W)	13.41
San Felipe 1.0WNW (TX-AS-6) (29.80N 96.12W)	4.88	Houston 2.8SSW (TX-HRR-321) (29.73N 95.40W)	14.10
Sealy 1.9NNE (TX-AS-7) (29.80N 96.14W)	5.89	Bellaire 3.1W (TX-HRR-322) (29.70N 95.51W)	7.82
Bellville 4.3NW (TX-AS-22) (29.42N 95.27W)	3.50	The Woodlands 3.8W (TX-HRR-326) (30.16N 95.55W)	6.70
Cat Spring 3.7N (TX-AS-33) (29.90N 96.34W)	3.72	Marshall 9.7SE (TX-HRS-12) (32.44N 94.23W)	3.66
Alvin 1.6SW (TX-BRZ-18) (29.42N 95.27W)	7.51	Karnack 2.6N (TX-HRS-14) (32.71N 94.17W)	3.59
Lake Jackson 2.3NW (TX-BRZ-42) (29.07N 95.47W)	10.79	Harleton 4.6WSW (TX-HRS-19) (32.67N 94.65W)	6.88
Pearland 3.4WSW (TX-BRZ-45) (29.54N 95.33W)	10.76	Crockett 1.8NNE (TX-HST-3) (31.34N 95.45W)	3.83
Surfside Beach 1.2SW (TX-BRZ-46) (28.94N 95.30W)	9.08	Nederland 1.8W (TX-JJ-15) (29.97N 94.03W)	5.97
Brazoria 4.2W (TX-BRZ-48) (29.05N 95.64W)	8.44	Beaumont 0.3ESE (TX-JJ-17) (30.09N 94.14W)	5.35
West Columbia 2.5ENE (TX-BRZ-49) (29.16N 95.61W)	8.19	Ganado 1.5W (TX-JK-5) (29.04N 96.54W)	8.45
Angleton 7.7S (TX-BRZ-51) (29.06N 95.45W)	8.65	Kirbyville 1.5SE (TX-JS-3) (30.64N 93.89W)	3.72
Liverpool 4.6NW (TX-BRZ-57) (29.35N 95.32W)	6.40	Cleveland 3.6S (TX-LR-13) (30.29N 95.08W)	5.29
Wake Village 0.8WNW (TX-BWE-5) (33.43N 94.13W)	7.64	Dayton 1.1SE (TX-LR-15) (30.04N 94.88W)	4.32
Texarkana 6.1WSW (TX-BWE-10) (33.41N 94.17W)	5.85	Splendora 3.9ENE (TX-LR-20) (30.26N 95.10W)	4.40
Maud 2.0WSW (TX-BWE-16) (29.35N 95.32W)	6.00	The Woodlands 5.0NW (TX-MNG-78) (30.22N 95.54W)	7.39
Anahuac 5.7N (TX-CHM-11) (29.85N 94.67W)	3.38	Spring 4.2N (TX-MNG-79) (30.12N 95.39W)	4.03
Beach City 4.8SSW (TX-CHM-14) (29.85N 94.67W)	5.82	Magnolia 4.3SSW (TX-MNG-85) (30.15N 95.77W)	5.48
Bullard 3.7E (TX-CHK-1) (32.14N 95.26W)	5.52	Conroe 12.7SSE (TX-MNG-90) (30.15N 95.41W)	6.37
Jacksonville 11.9ESE (TX-CHK-9) (31.90N 95.08W)	6.87	Willis 2.2SW (TX-MNG-103) (30.40N 95.50W)	7.63
Garwood 0.7NW (TX-CLR-3) (29.46N 96.40W)	3.58	Stagecoach 5.3WSW (TX-MNG-106) (30.12N 95.79W)	5.14
New Ulm 7.2S (TX-CLR-6) (29.79N 96.48W)	3.31	Montgomery 10.9SE (TX-MNG-118) (30.29N 95.55W)	5.96
Columbus 4.7ENE (TX-CLR-19) (29.74N 96.48W)	4.00	Avinger 6.6S (TX-MRN-5) (32.80N 94.55W)	5.05

Location	Total Rainfall (in)	Location	Total Rainfall (in)
Pittsburg 3.8SSW (TX-CMP-4) (32.94N 94.98W)	3.25	Jefferson 4.4NNE (TX-MRN-7) (32.82N 94.33W)	4.47
Atlanta 8.7W (TX-CSS-14) (33.12N 94.31W)	5.64	Palacios 11.5NNE (TX-MTG-4) (28.86N 96.17W)	6.70
Richmond 4.6SE (TX-FB-22) (29.53N 95.72W)	11.88	Nacogdoches Arbor Oaks (TX-NC-7) (31.57N 94.68W)	5.34
Katy 7.2SE (TX-FB-80) (29.72N 95.74W)	5.30	Bridge City 1.3NW (TX-OR-1) (30.04N 93.87W)	3.25
Missouri City 3.9S (TX-FB-87) (29.52N 95.53W)	10.81	Vidor 7.2N (TX-OR-6) (30.23N 93.98W)	6.59
Longview 3.4NE (TX-GG-5) (32.56N 94.73W)	8.24	Orange 6.8WNW (TX-OR-9) (30.14N 93.86W)	3.72
Navasota 9.7SSE (TX-GM-11) (30.25N 96.04W)	4.90	Livingston 5.8SE (TX-PL-40) (30.65N 94.87W)	4.09
Anderson 5.1ESE (TX-GM-12) (30.47N 95.91W)	5.58	Henderson 6.9WNW (TX-RS-4) (32.18N 94.91W)	6.65
Galveston 6.4NE (TX-GV-18) (29.28N 94.81W)	7.04	Kilgore 1.7SSW (TX-RS-11) (32.36N 94.87W)	6.33
La Marque 3.9SE (TX-GV-49) (29.33N 94.94W)	5.18	Center 0.6NW (TX-SL-1) (31.80N 94.19W)	3.36
Bacliff 0.5SSE (TX-GV-50) (29.50N 94.99W)	6.42	Tyler 8.9ESE (TX-SM-24) (32.27N 95.17W)	6.72
La Marque 1.8E (TX-GV-51) (29.36N 94.96W)	5.18	Bullard 2.9N (TX-SM-33) (32.18N 95.32W)	5.14
Friendswood 1.0SE (TX-GV-63) (29.50N 95.19W)	9.71	Lindale 2.7E (TX-SM-39) (32.51N 95.36W)	3.60
League City 0.9WNW (TX-GV-69) (29.49N 95.12W)	9.31	Flint 1.0NNW (TX-SM-42) (32.22N 95.35W)	3.36
Dickinson 1.7ENE (TX-GV-76) (29.46N 95.04W)	6.02	Whitehouse 1.6ESE (TX-SM-48) (32.22N 95.19W)	6.63
Texas City 3.5W (TX-GV-90) (29.41N 95.02W)	7.87	Douglassville 1.5SE (TX-SS-8) (32.18N 95.32W)	6.20
Crystal Beach 2.2ENE (TX-GV-92) (29.47N 94.61W)	3.56	Spurger 6.2S (TX-TR-12) (30.60N 94.17W)	4.78
Lumberton 1.2 WNW (TX-HRN-1) (30.27N 94.22W)	3.85	Chester 1.1SE (TX-TR-18) (30.94N 94.59W)	5.40
Kountze 1.1S (TX-HRN-6) (30.36N 94.32W)	3.08	Fred 0.3S (TX-TR-23) (30.57N 94.18W)	5.53
Bunker Hill Village 3.6NNW (TX-HRR-27) (29.81N 95.55W)	9.30	Woodville 6.1S (TX-TR-25) (30.69N 94.42W)	5.75
Pasadena 4.4WNW (TX-HRR-93) (29.68N 95.22W)	9.27	Colmesneil 2.6SSE (TX-TR-27) (30.87N 94.41W)	6.00
Hockley 2.5ESE (TX-HRR-114) (30.02N 95.80W)	8.73	Trinity 2.9E (TX-TT-6) (30.94N 95.32W)	3.74
Tomball 2.7ENE (TX-HRR-117) (30.11N 95.57W)	6.41	Big Sandy 3.9E (TX-UP-8) (32.59N 95.05W)	5.68
West University 0.4WNW (TX-HRR-119) (29.72N 95.44W)	7.96	Gilmer 4.5ESE (TX-UP-11) (32.71N 94.87W)	5.47
South Houston 3.0S (TX-HRR-147) (29.62N 95.23W)	8.26	Chappell Hill 1.8N (TX-WA-10) (30.16N 96.26W)	4.40
Hedwig Village 1.1NNW (TX-HRR-203) (29.79N 95.53W)	10.40	Brenham 1.3ESE (TX-WA-28) (30.15N 96.38W)	4.18
Webster 2.8NNW (TX-HRR-237) (29.57N 95.13W)	8.80	Hawkins 2.6N (TX-WD-8) (32.63N 95.20W)	3.76

Location	Total Rainfall (in)	Location	Total Rainfall (in)
Jersey Village 8.5NW (TX-HRR-251) (29.98N 95.66W)	7.95	El Campo 2.7NW (TX-WH-11) (29.23N 96.30W)	5.84
Taylor Lake Village (TX-HRR-278) (29.60N 95.11W)	6.26	Dodge 1.6S (TX-WK-15) (30.72N 95.40W)	6.30
Cypress 3.2ENE (TX-HRR-282) (30.00N 95.63W)	6.99	Huntsville 8.7NNE (TX-WK-28) (30.82N 95.48W)	5.69
Kingwood 2.4W (TX-HRR-306) (30.06N 95.23W)	5.96	Huntsville 4.7S (TX-WK-31) (30.64N 95.55W)	5.69
Louisiana			
Hydrometeorological Automated Data System (HADS) Sites (NWS)			
Shreveport Red River (SVPL1) (32.52N 93.73W)	5.59		
NWS Cooperative Observer Program (COOP) Sites			
Mooringsport 1N (LCOL1) (32.71N 93.96W)	3.00	Lake Charles 7NW (LCRL1) (30.30N 93.27W)	3.44
Plain Dealing (PLNL1) (32.89N 93.65W)	3.30		
Advanced Hydrological Prediction Service (AHPS) Sites			
Mermentau (MRML1) (30.18N 92.58W)	3.17		
Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) Sites			
DeRidder 2.5SSW (LA-BG-5) (30.81N 93.30W)	3.82	Baldwin 1.8N (LA-MY-3) (29.86N 91.56W)	3.71
Ringold 6.5NW (LA-BV-9) (32.38N 93.37W)	3.27	Coushatta 0.2NNE (LA-RR-7) (32.06N 93.35W)	5.84
Stonewall 1.7NNW (LA-DS-7) (32.29N 93.83W)	3.50	Pleasant Hill 10.2SE (LA-SN-3) (31.70N 93.41W)	3.66
Converse 7.8NNW (LA-DS-8) (31.88N 93.77W)	3.71		
Arkansas			
Hydrometeorological Automated Data System (HADS) Sites (NWS)			
Aplin (APLA4) (34.95N 92.98W)	3.22	Hollis (HOLA4) (34.91N 93.05W)	4.25
Boughton (BHTA4) (33.88N 93.3.0W)	4.62	Mountain View (MTVA4) (35.84N 92.10W)	5.52
Gamaliel 5SE (BNRA4) (36.43N 92.18W)	3.25	Millwood Dam (MWTA4) (33.68N 93.95W)	4.46
Booneville 2S (BONA4) (35.11N 93.92W)	4.01	Ozark Lock/Dam 12 (OZGA4) (35.47N 93.82W)	4.64
Elgin (EFGA4) (35.77N 91.30W)	4.47	Pangburn 1N (PAGA4) (35.43N 90.84W)	4.98

Location	Total Rainfall (in)	Location	Total Rainfall (in)
Greers Ferry Dam (GRRA4) (35.52N 92.00W)	5.18	Poughkeepsie (PKGA4) (36.12N 91.45W)	4.67
Guy 4SW (GUYA4) (35.30N 92.40W)	4.03	Toad Suck Ferry (TODA4) (35.08N 92.53W)	7.48
NWS Cooperative Observer Program (COOP) Sites			
Abbott (ABBA4) (35.02N 94.16W)	3.10	Hardy (HRDA4) (36.27N 91.51W)	3.40
Alum Fork (ALFA4) (34.80N 92.84W)	3.42	Jasper (JASA4) (36.01N 93.19W)	4.00
Antoine 1SW (ANTA4) (34.03N 93.43W)	4.76	Lead Hill (LDHA4) (36.42N 92.92W)	3.96
Benton (BENA4) (35.57N 92.60W)	4.79	Lewisville (LEWA4) (33.36N 93.57W)	3.78
Big Fork 1SSE (BGFA4) (34.46N 93.62W)	3.26	Maumelle (MAUA4) (34.85N 92.47W)	6.00
Batesville Lvstk. (BTSA4) (35.83N 91.79W)	4.80	Mena (MENA4) (34.60N 94.29W)	3.40
Booneville 3SSE (BVLA4) (35.10N 93.91W)	4.10	Mountain Home 1NNW (MHMA4) (36.35N 92.39W)	3.62
Calico Rock 2WSW (CARA4) (36.11N 92.16W)	3.11	Mt. Ida 4S (MOUA4) (34.51N 93.63W)	3.61
Conway (CNYA4) (35.10N 92.49W)	5.22	Murfreesboro 1W (MRFA4) (34.08N 93.70W)	3.51
Cushman (CSMA4) (35.87N 91.84W)	4.21	Morrilton 1W (MRLA4) (35.16N 92.77W)	6.64
Center Ridge 3S (CTRA4) (35.33N 92.57W)	5.90	Millwood Dam (MWOA4) (33.68N 93.99W)	6.03
Crystal Valley (CYVA4) (34.69N 92.45W)	5.30	Newport (NPRA4) (35.60N 91.27W)	4.20
Degray Lake St. Park (DGYA4) (34.25N 93.15W)	4.99	Nashville (NVSA4) (33.93N 93.85W)	4.74
Damascus 2NNE (DMSA4) (35.40N 92.38W)	3.58	Ozone (OZOA4) (35.65N 93.43W)	4.10
Evening Shade 1NNE (EVSA4) (36.08N 91.61W)	3.68	Perry (PERA4) (35.04N 92.80W)	5.03
Heber Springs 2NE (GFFA4) (35.51N 92.00W)	5.38	Salem (SLMA4) (36.36N 91.80W)	3.00
Gilbert (GLBA4) (35.99N 92.72W)	3.00	Subiaco (SUBA4) (35.30N 93.64W)	3.96
Hot Springs 1NNE (HOTA4) (34.51N 93.05W)	3.88	Waldron (WDNA4) (34.92N 94.09W)	3.53
Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) Sites			
Harrison 10.6SW (AR-BN-22) (36.12N 93.24W)	3.01	Lurton 1.3NW (AR-NW-14) (35.78N 93.09W)	3.94
Calico Rock 4.8WSW (AR-BX-3) (36.10N 92.21W)	4.10	Delight 0.3NNW (AR-PK-1) (34.03N 94.42W)	5.51
Midway 2.0W (AR-BX-10) (36.39N 92.50W)	4.29	Murfreesboro 4.5E (AR-PK-9) (34.08N 93.61W)	3.80
Mountain Home 6.3E (AR-BX-11) (36.33N 92.27W)	3.27	Pottsville 3.5ENE (AR-PP-11) (35.28N 93.00W)	3.25

Location	Total Rainfall (in)	Location	Total Rainfall (in)
Henderson 4.0ENE (AR-BX-37) (36.41N 92.16W)	3.00	Dover 6.9E (AR-PP-13) (35.40N 92.99W)	3.71
Greers Ferry 4.3NE (AR-CB-12) (35.61N 92.11W)	4.38	North Little Rock 0.6WSW (AR-PS-20) (34.79N 92.26W)	4.70
Higden 1.6WSW (AR-CB-13) (35.56N 92.23W)	3.77	Sherwood 4.6NNW (AR-PS-26) (34.89N 92.24W)	3.84
Heber Springs 0.3ESE (AR-CB-14) (35.50N 92.03W)	5.60	Maumelle 0.8SE (AR-PS-54) (34.84N 92.40W)	4.29
Arkadelphia 8.5ESE (AR-CK-8) (34.07N 92.94W)	3.68	Little Rock 5.5WNW (AR-PS-88) (34.76N 92.44W)	5.68
Gurdon 0.6NE (AR-CK-10) (33.92N 93.14W)	4.13	Roland 4.2WNW (AR-PS-96) (34.93N 92.57W)	6.02
Morrilton 9.4WSW (AR-CW-7) (35.13N 92.90W)	3.71	Houston 5.0S (AR-PY-2) (34.96N 92.71W)	5.76
Adona 6.1N (AR-CW-10) (35.13N 92.92W)	3.90	Perryville 2.3SSE (AR-PY-8) (34.98N 92.79W)	4.25
Plummerville 0.5ESE (AR-CW-12) (35.16N 92.63W)	4.67	Bigelow 1.9NE (AR-PY-9) (35.02N 92.61W)	6.73
Hattieville 3.6N (AR-CW-16) (35.34N 92.78W)	4.57	Rye Hill 1.1E (AR-SB-11) (35.27N 94.35W)	3.20
Greenbrier 2.4NNW (AR-FK-16) (35.23N 92.43W)	6.89	Greenwood 0.9S (AR-SB-12) (35.20N 94.24W)	3.08
Conway 2.6WNW (AR-FK-44) (35.11N 92.49W)	6.90	Evening Shade 2.7SSE (AR-SH-3) (36.04N 91.60W)	3.71
Hot Springs 2.3S (AR-GL-16) (34.46N 93.04W)	3.90	Hardy 8.0SSW (AR-SH-11) (36.21N 91.51W)	3.67
Sheridan 1.2S (AR-GT-9) (34.29N 92.41W)	3.23	Ash Flat 1.3NE (AR-SH-19) (36.24N 91.59W)	3.04
Hope 11.6S (AR-HM-13) (33.50N 93.56W)	4.34	Little Rock 15.1W (AR-SL-9) (34.72N 92.55W)	5.33
Sulphur Rock 7.1ENE (AR-IN-18) (35.79N 91.38W)	4.82	Bauxite (AR-SL-33) (34.49N 92.40W)	4.80
Batesville 2.7NE (AR-IN-22) (35.80N 91.59W)	3.79	Shannon Hills 2.2ESE (AR-SL-35) (34.61N 92.37W)	5.18
Melbourne 10.0SW (AR-IZ-7) (35.97N 92.03W)	3.72	Alexander 4.5NW (AR-SL-37) (34.67N 92.51W)	4.47
Buckner 0.8NNW (AR-LF-1) (33.37N 93.44W)	3.02	Hot Springs Village 5.0E (AR-SL-43) (34.66N 92.91W)	3.49
Smithville 0.8ESE (AR-LW-11) (36.07N 91.29W)	4.53	St. Joe 2.7WNW (AR-SR-8) (36.05N 92.84W)	3.39
Texarkana 5.3SSW (AR-ML-3) (33.38N 94.04W)	7.40	Leslie 6.0SW (AR-SR-9) (35.77N 92.64W)	3.87
Fouke 2.6N (AR-ML-20) (33.30N 93.89W)	5.11	Mountain View 12.3ESE (AR-ST-27) (35.77N 91.93W)	4.63
Bruno 3.1SSE (AR-MR-15) (36.10N 92.76W)	3.31	Bee Branch 5.4ENE (AR-VB-11) (35.48N 92.30W)	3.20
Mt. Ida 11.5E (AR-MT-12) (34.57N 93.43W)	3.87	Clinton 13WNW (AR-VB-21) (35.63N 92.67W)	3.03
Pindall 11.3SW (AR-NW-12) (35.93N 92.99W)	3.43	Searcy 2.2NNW (AR-WH-28) (35.27N 91.75W)	3.45
Jasper 3.8SE (AR-NW-13) (35.97N 93.14W)	3.76		

Location	Total Rainfall (in)	Location	Total Rainfall (in)
Oklahoma			
Oklahoma Mesonet			
Mt. Herman (MHSO2) (34.30N 94.83W)	4.27	Talihina 4SE (THSO2) (34.71N 95.01W)	3.28
Hydrometeorological Automated Data System (HADS) Sites (NWS)			
Smithville (SMTO2) (34.47N 94.63W)	3.17		
NWS Cooperative Observer Program (COOP) Sites			
Battiest (BSTO2) (34.39N 94.90W)	4.65		
Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) Sites			
Vinita 8.6ESE (OK-CG-2) (36.57N 95.02W)	3.00		

Table 5. For Hurricane Beryl, 28 June – 9 July 2024, the number of hours in advance of formation associated with the first NHC Tropical Weather Outlook forecast in the indicated likelihood category. Note that the timings for the “Low” category do not include forecasts of a 0% chance of genesis.

	Hours Before Genesis	
	48-Hour Outlook	**168-Hour Outlook**
Low (<40%)	42	60
Medium (40%-60%)	36	42
High (>60%)	12	36

Table 6a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Hurricane Beryl, 28 June – 9 July 2024. Mean errors for the previous 5-yr period are shown for comparison. Official errors that are smaller than the 5-yr means are shown in boldface type.

	Forecast Period (h)							
	12	24	36	48	60	72	96	120
OFCL	**18.8**	**27.6**	**36.5**	**50.3**	**69.7**	**84.7**	**125.4**	**147.8**
OCD5	30.7	61.1	94.5	125.5	151.6	180.3	211.5	207.1
Forecasts	41	39	37	35	33	31	27	23
OFCL (2019-23)	23.9	36.5	49.3	63.4	79.2	93.4	132.9	190.4
OCD5 (2019-23)	45.7	97.1	153.0	205.4	254.9	297.8	372.7	439.1

Table 6b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Hurricane Beryl, 28 June – 9 July 2024. Errors smaller than the NHC official forecast are shown in boldface type. The number of official forecasts shown here will generally be smaller than that shown in Table 6a due to the homogeneity requirement.

Model ID	Forecast Period (h)							
	12	24	36	48	60	72	96	120
OFCL	18.1	27.0	35.8	49.9	68.7	85.2	120.9	138.3
OCD5	30.4	60.8	94.9	128.5	158.5	189.2	220.2	210.0
GFSI	18.4	29.9	37.8	**42.2**	**57.1**	**69.3**	**96.4**	**116.3**
HWFI	**17.3**	30.3	40.8	52.8	**63.6**	**77.9**	**97.7**	**111.2**
HMNI	18.4	32.7	45.1	56.5	**66.7**	**77.3**	**118.2**	172.9
HFAI	24.6	**26.4**	**34.0**	**48.8**	69.6	91.8	153.7	187.3
HFBI	18.6	29.2	43.7	67.8	97.2	124.7	205.2	260.9
EMXI	19.7	31.8	43.5	57.0	70.3	92.9	158.1	228.6
NVGI	23.6	38.9	42.8	50.5	72.2	88.1	**102.4**	142.5
CMCI	24.7	41.7	57.0	73.2	91.8	115.7	164.3	201.2
UEMI	21.7	34.6	45.1	59.2	78.0	100.6	147.1	158.9
TVCA	**17.6**	27.1	36.3	**48.1**	**63.7**	**81.4**	126.6	159.9
TVCX	18.1	**26.5**	35.9	**46.9**	**63.1**	**81.0**	125.6	158.8
GFEX	18.7	28.9	38.0	**44.1**	**55.1**	**71.4**	**114.9**	150.8
TVDG	**17.7**	27.5	36.1	**46.0**	**63.0**	**80.5**	125.1	157.2
HCCA	**17.6**	**26.3**	37.5	51.1	69.6	90.9	150.0	169.9
FSSE	**16.7**	28.9	40.3	55.7	76.8	96.0	135.7	158.0
AEMI	18.7	31.0	38.1	**47.8**	**64.9**	**79.4**	**112.7**	**127.7**
TABS	42.1	87.4	122.8	152.8	183.1	217.7	301.6	359.2
TABM	24.8	41.4	51.6	55.4	**59.2**	**64.0**	**91.5**	**98.0**
TABD	22.8	43.9	65.2	89.2	114.6	143.1	183.1	231.5
Forecasts	38	36	34	32	30	28	24	21

Table 7a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Hurricane Beryl, 28 June – 9 July 2024. Mean errors for the previous 5-yr period are shown for comparison. Official errors that are smaller than the 5-yr means are shown in boldface type.

	Forecast Period (h)							
	12	24	36	48	60	72	96	120
OFCL	6.8	9.5	12.3	15.3	18.5	18.7	14.4	**11.3**
OCD5	10.7	14.4	21.0	26.1	31.1	36.5	40.8	23.1
Forecasts	41	39	37	35	33	31	27	23
OFCL (2019-23)	5.0	7.3	8.5	9.7	10.4	10.9	12.9	15.5
OCD5 (2019-23)	6.6	10.2	13.1	15.6	17.2	18.6	21.8	22.6

Table 7b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Hurricane Beryl, 28 June – 9 July 2024. Errors smaller than the NHC official forecast are shown in boldface type. The number of official forecasts shown here will generally be smaller than that shown in Table 7a due to the homogeneity requirement.

Model ID	Forecast Period (h)							
	12	24	36	48	60	72	96	120
OFCL	6.8	9.2	11.7	14.3	18.3	17.8	13.3	10.0
OCD5	10.6	14.1	20.2	24.6	30.2	34.8	39.2	21.5
HWFI	8.1	12.3	14.4	14.3	**12.8**	**13.2**	15.4	20.8
HMNI	8.4	12.8	15.0	16.7	**17.2**	**17.3**	15.6	19.1
HFAI	10.4	14.5	18.3	19.9	20.7	20.4	23.3	21.2
HFBI	8.7	12.3	12.8	15.9	19.1	19.4	17.9	20.2
DSHP	7.7	10.8	13.9	15.0	**17.8**	21.4	16.9	14.0
LGEM	8.4	11.8	14.2	14.3	**15.6**	**16.6**	14.4	10.1
ICON	7.5	10.8	13.4	**14.1**	**14.2**	**14.9**	**12.6**	**9.4**
IVCN	7.5	11.2	13.6	14.5	**15.7**	**16.0**	14.8	10.1
IVDR	7.9	11.6	14.0	15.0	**16.3**	**16.5**	15.7	10.8
GFSI	9.4	14.0	17.7	18.7	23.3	25.4	26.0	24.3
EMXI	10.7	14.2	17.6	21.6	23.5	23.7	21.4	26.4
HCCA	7.0	10.8	14.7	15.4	**16.4**	**16.1**	14.5	12.4
FSSE	7.2	11.7	15.3	17.0	20.4	21.8	20.5	19.6
Forecasts	40	38	36	34	32	30	26	22

Table 8a. Tropical cyclone wind watch and warning summary for Hurricane Beryl, 28 June – 9 July 2024.

Date/Time (UTC)	Action	Location
29 / 0900	Hurricane Watch issued	Barbados
29 / 1500	Hurricane Watch issued	Grenada, St. Vincent and the Grenadines, and St. Lucia
29 / 1500	Tropical Storm Watch issued	Martinique and Tobago
29 / 1800	Tropical Storm Watch issued	Dominica
29 / 2100	Hurricane Warning issued	Barbados
30 / 0000	Hurricane Warning issued	Grenada, St. Vincent and the Grenadines, and St. Lucia
30 / 0000	Tropical Storm Warning issued	Martinique and Tobago
30 / 1200	Hurricane Warning issued	Tobago
30 / 1500	Tropical Storm Watch issued	Trinidad
30 / 2100	Tropical Storm Watch issued	South coast of the Dominican Republic from Punta Palenque to the Haiti/Dominican Republic border, and the south coast of Haiti from the Haiti/Dominican Republic border to Anse d'Hainault
1 / 0000	Tropical Storm Warning issued	Trinidad
1 / 1200	Hurricane Warning changed to Tropical Storm Warning	St. Lucia
1 / 1200	Tropical Storm Watch discontinued	Dominica
1 / 1500	Hurricane Watch issued	Jamaica
1 / 1800	Hurricane Warning discontinued	Barbados and Tobago
1 / 1800	Tropical Storm Warning discontinued	Trinidad
1 / 2100	Tropical Storm Warning issued	South coast of the Dominican Republic from Punta Palenque to the Haiti/Dominican Republic border, and the south coast of Haiti from the Haiti/Dominican Republic border to Anse d'Hainault
1 / 2100	Hurricane Warning changed to Tropical Storm Warning	Grenada and St. Vincent and the Grenadines
2 / 0000	Hurricane Warning issued	Jamaica
2 / 0000	Tropical Storm Warning discontinued	Grenada, St. Vincent and the Grenadines, St. Lucia, and Martinique
2 / 0900	Hurricane Watch issued	Cayman Islands
2 / 1500	Hurricane Watch issued	South coast of Haiti from the Haiti/Dominican Republic border to Anse d'Hainault

Date/Time (UTC)	Action	Location
2 / 1800	Hurricane Watch changed to Hurricane Warning	Cayman Islands
3 / 0000	Hurricane Watch issued	Coast of the Yucatan Peninsula of Mexico from Chetumal to Cabo Catoche
3 / 0000	Tropical Storm Watch issued	Coast of Belize from Belize City to Chetumal
3 / 1500	Hurricane Warning issued	Coast of the Yucatan Peninsula of Mexico from Puerto Costa Maya to Cancun
3 / 1500	Tropical Storm Warning issued	Coast of the Yucatan Peninsula of Mexico from Chetumal to Puerto Costa Maya and from Cancun to Cabo Catoche
3 / 1500	Tropical Storm Watch issued	Coast of the Yucatan Peninsula of Mexico from Cabo Catoche to Campeche
3 / 1500	Hurricane Watch discontinued	South coast of Haiti
3 / 1500	Tropical Storm Warning discontinued	South coast of the Dominican Republic
3 / 2100	Tropical Storm Warning discontinued	South coast of Haiti
4 / 0000	Tropical Storm Warning issued	Coast of the Yucatan Peninsula of Mexico from Cabo Catoche to Progreso
4 / 0300	Tropical Storm Warning issued	Coast of the Yucatan Peninsula of Mexico from Progreso to Campeche
4 / 0300	Hurricane Warning issued	Cozumel Island, Mexico
4 / 0900	Hurricane Warning discontinued	Jamaica
4 / 1800	Hurricane Warning discontinued	Cayman Islands
5 / 1200	Tropical Storm Watch discontinued	Coast of Belize
5 / 1500	All watches and warnings discontinued	Coast of the Yucatan Peninsula of Mexico south of Punta Allen
5 / 1800	All watches and warnings discontinued	Coast of the Yucatan Peninsula of Mexico south of Cabo Catoche
5 / 2100	Hurricane Watch issued	Texas coast from the Mouth of the Rio Grande to Sargent, and the coast of Mexico from the mouth of the Rio Grande to Barra el Mezquital
6 / 0300	Tropical Storm Warning discontinued	Yucatan Peninsula of Mexico
6 / 0300	Hurricane Watch issued	Texas coast from Sargent to San Luis Pass
6 / 1500	Tropical Storm Warning issued	Coast of Mexico from Barra el Mezquital to TX/MEX Border and Texas coast from TX/MEX Border to Baffin Bay
6 / 1500	Hurricane Watch discontinued	Coast of Mexico from Barra el Mezquital to TX/MEX Border
6 / 2100	Hurricane Warning issued	Texas coast from Baffin Bay to Sargent
6 / 2100	Tropical Storm Warning issued	Texas coast north of Sargent to High Island

Date/Time (UTC)	Action	Location
7 / 0900	Hurricane Warning issued	Texas coast north of Sargent to San Luis Pass
7 / 0900	Hurricane Watch issued	Texas coast north of San Luis Pass to Port Bolivar
7 / 0900	Tropical Storm Watch issued	Texas coast east of High Island to Sabine Pass
7 / 1500	Tropical Storm Warning issued	Texas coast east of High Island to Sabine Pass
7 / 1500	Hurricane Watch discontinued	Texas coast south of Baffin Bay
7 / 2100	Tropical Storm Warning discontinued	Coast of Mexico from the mouth of the Rio Grande to Barra el Mezquital
8 / 0000	Hurricane Warning changed to Tropical Storm Warning	Texas coast from Port Mansfield to Port Aransas
8 / 0000	All watches and warnings discontinued	Texas coast south of Port Mansfield
8 / 0300	Hurricane Warning issued	Texas coast from San Luis Pass to Port Bolivar
8 / 0300	Hurricane Warning changed to Tropical Storm Warning	Texas coast south of Mesquite Bay to Baffin Bay
8 / 0300	All watches and warnings discontinued	Texas coast south of Baffin Bay
8 / 0900	All watches and warnings discontinued	Texas coast south of Mesquite Bay
8 / 1500	Hurricane Warning changed to Tropical Storm Warning	Texas coast from Port O'Connor to Port Bolivar
8 / 1500	All watches and warnings discontinued	Texas coast south of Port O'Connor
8 / 1800	All watches and warnings discontinued	Texas coast south of San Luis Pass
8 / 2100	All watches and warnings discontinued	Texas coast south of Port Bolivar
9 / 0000	All coastal watches and warnings discontinued	All

Table 8b. Storm surge watch and warning summary for Hurricane Beryl, 28 June – 9 July 2024.

Date/Time (UTC)	Action	Location
5 / 2100	Storm Surge Watch issued	Texas coast from the Mouth of the Rio Grande to Sargent
6 / 0300	Storm Surge Watch issued	Texas coast from Sargent to High Island
6 / 2100	Storm Surge Warning issued	Texas coast from North Entrance of the Padre Island national Seashore to San Luis Pass, including Corpus Christi Bay and Matagorda Bay
6 / 2100	Storm Surge Watch issued	Texas coast east of High Island to Sabine Pass
7 / 0000	Storm Surge Warning issued	Texas coast north of San Luis Pass to High Island, including Galveston Bay
7 / 1500	Storm Surge Warning issued	Texas coast east of High Island to Sabine Pass
7 / 1500	Storm Surge Watch discontinued	Texas coast south of Baffin Bay to the TX/MEX Border
7 / 2100	Storm Surge Watch discontinued	Texas coast south of the North Entrance of the Padre Island National Seashore
8 / 0000	Storm Surge Warning discontinued	Texas coast south of Port Aransas, including Corpus Christi Bay
8 / 0300	Storm Surge Warning discontinued	Texas coast south of Mesquite Bay
8 / 1500	Storm Surge Warning discontinued	Texas coast south of Port O'Connor
8 / 1800	Storm Surge Warning discontinued	Texas coast south of San Luis Pass
9 / 0000	All Storm Surge watches and warnings discontinued	All

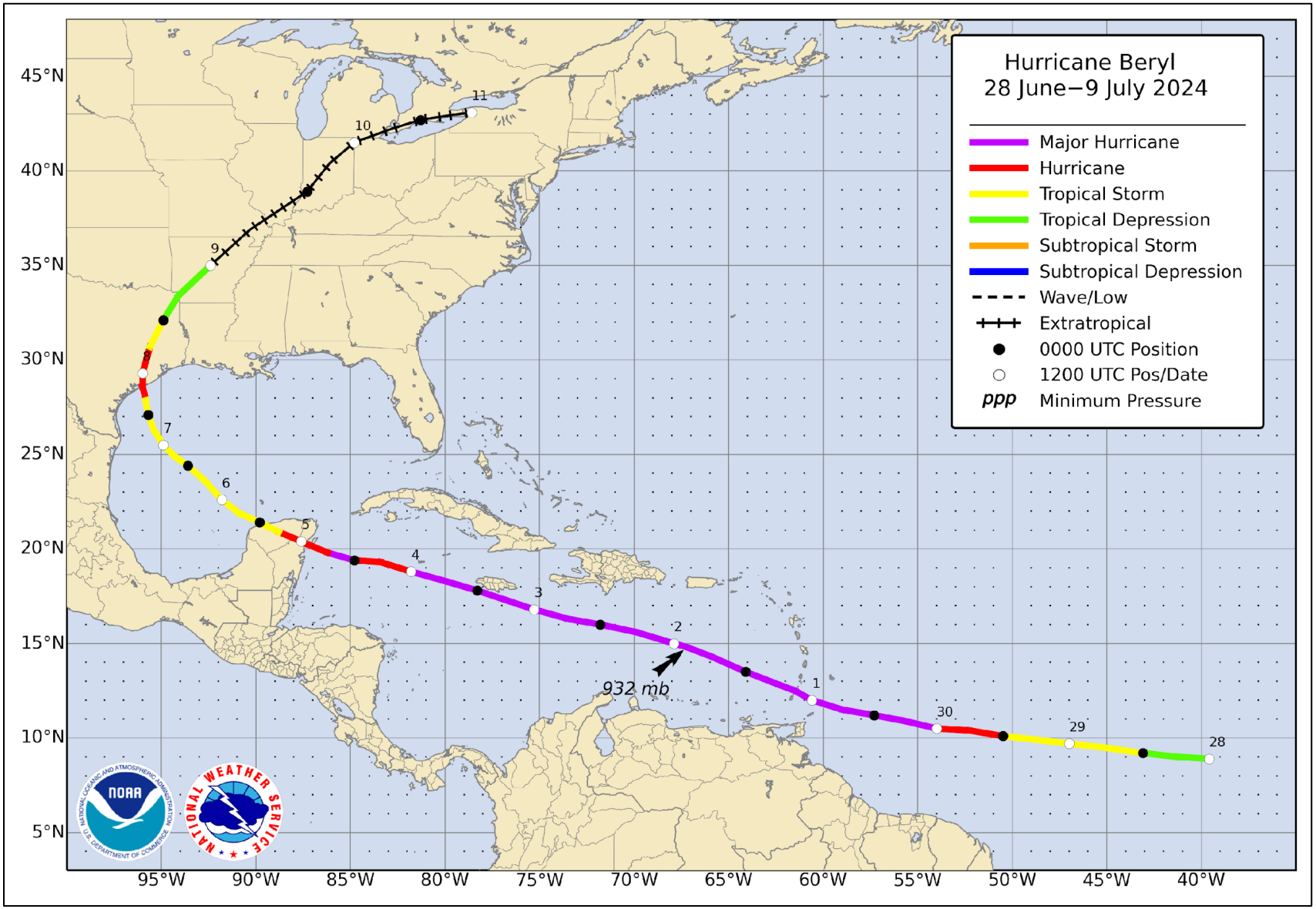

Figure 1. Best track positions for Hurricane Beryl, 28 June – 9 July 2024. Tracks over the United States and during the extratropical stage are partially based on analyses from the NOAA Weather Prediction Center.

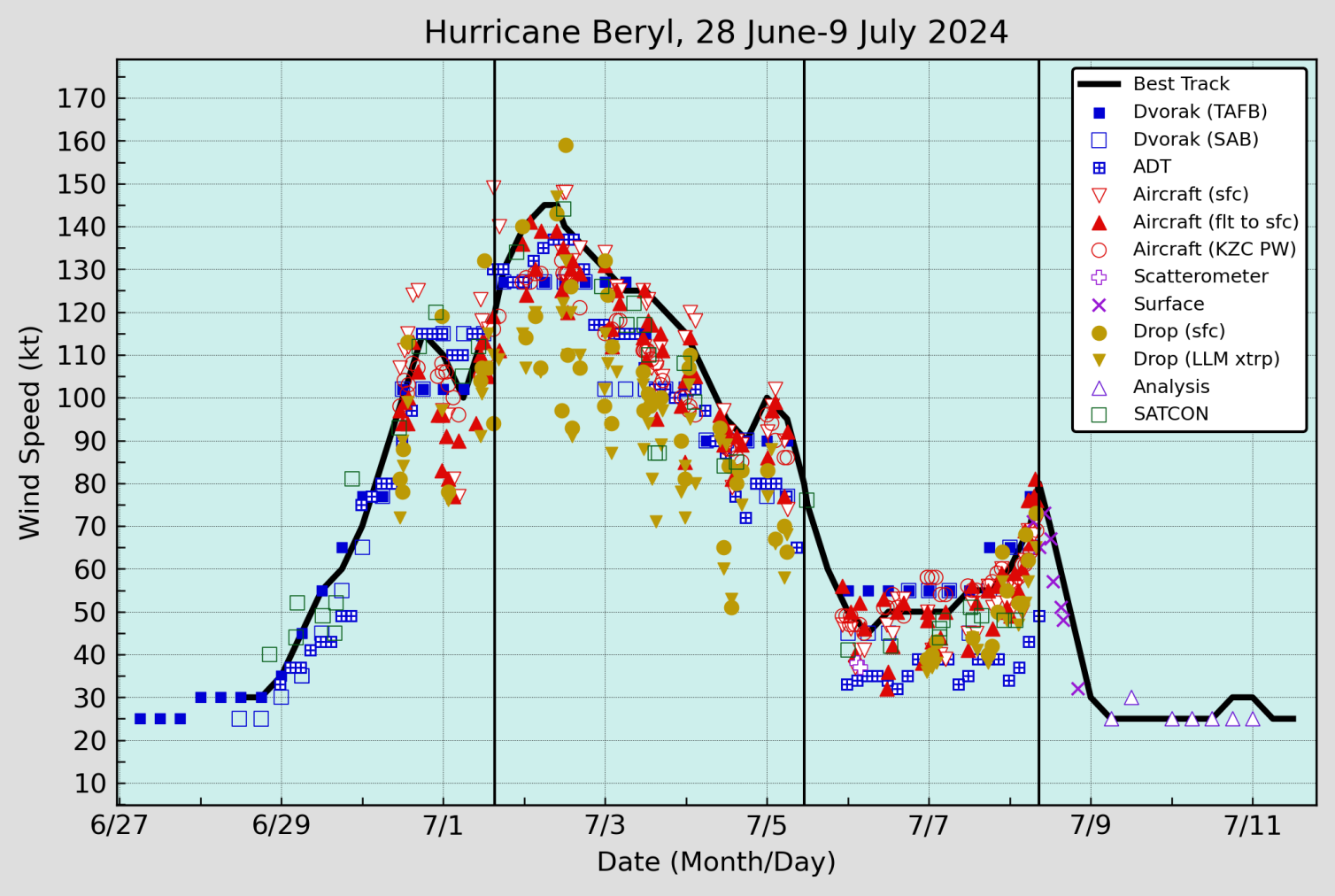

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Beryl, 28 June – 9 July 2024. Aircraft observations have been adjusted for elevation using 90%, 80%, and 75% adjustment factors for observations from 700 mb, 850 mb, and 925 mb, respectively. Dropwindsonde observations include actual 10 m winds (sfc), as well as surface estimates derived from the mean wind over the lowest 150 m of the wind sounding (LLM). Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC, and solid vertical lines correspond to landfalls.

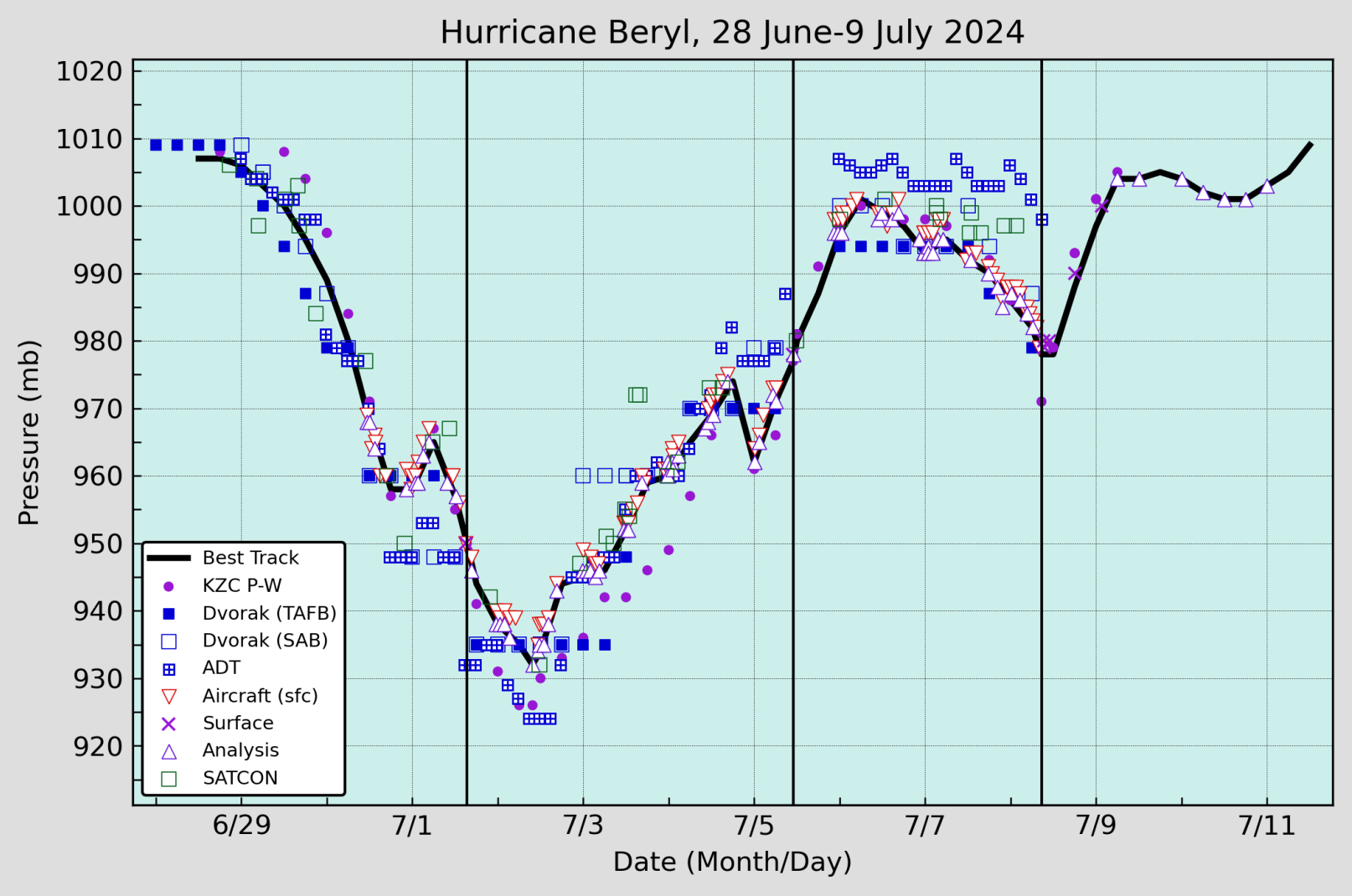

Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Beryl, 28 June – 9 July, 2024. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. KZC P-W refers to pressure estimates derived using the Knaff-Zehr-Courtney pressure-wind relationship. Dashed vertical lines correspond to 0000 UTC, and solid vertical lines correspond to landfalls.

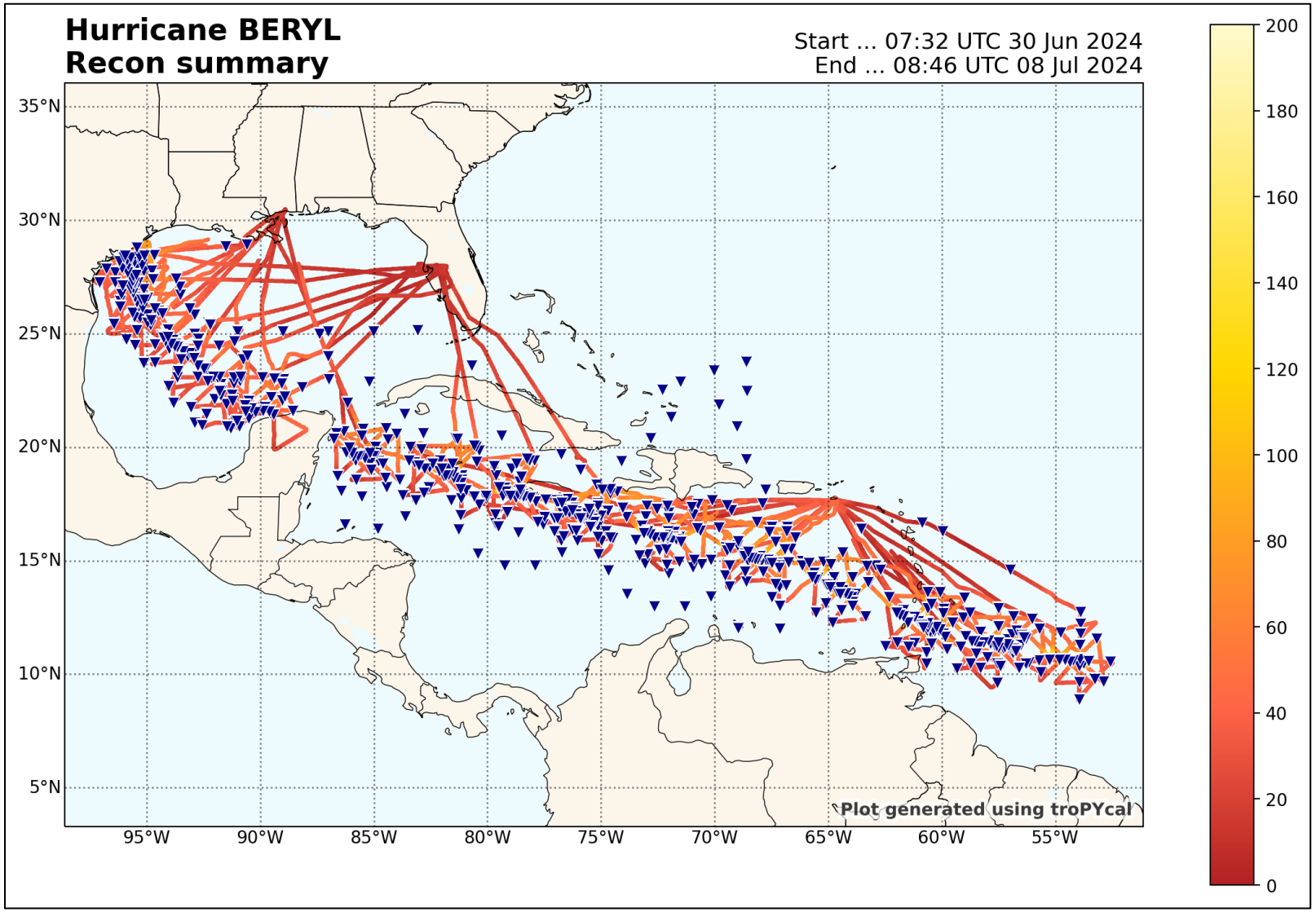

Figure 4. Air Force Reserve and NOAA Hurricane Hunter aircraft flight tracks (red) from reconnaissance missions into Beryl. The black markers denote center fixes, and the blue triangles indicate dropsonde locations. The color coding of the flight tracks is based on the observed flight-level wind speed with the color legend to the right of the map representing the color associated with the various wind speeds in knots. Dropsondes with no flight tracks are from the NOAA G-IV aircraft.

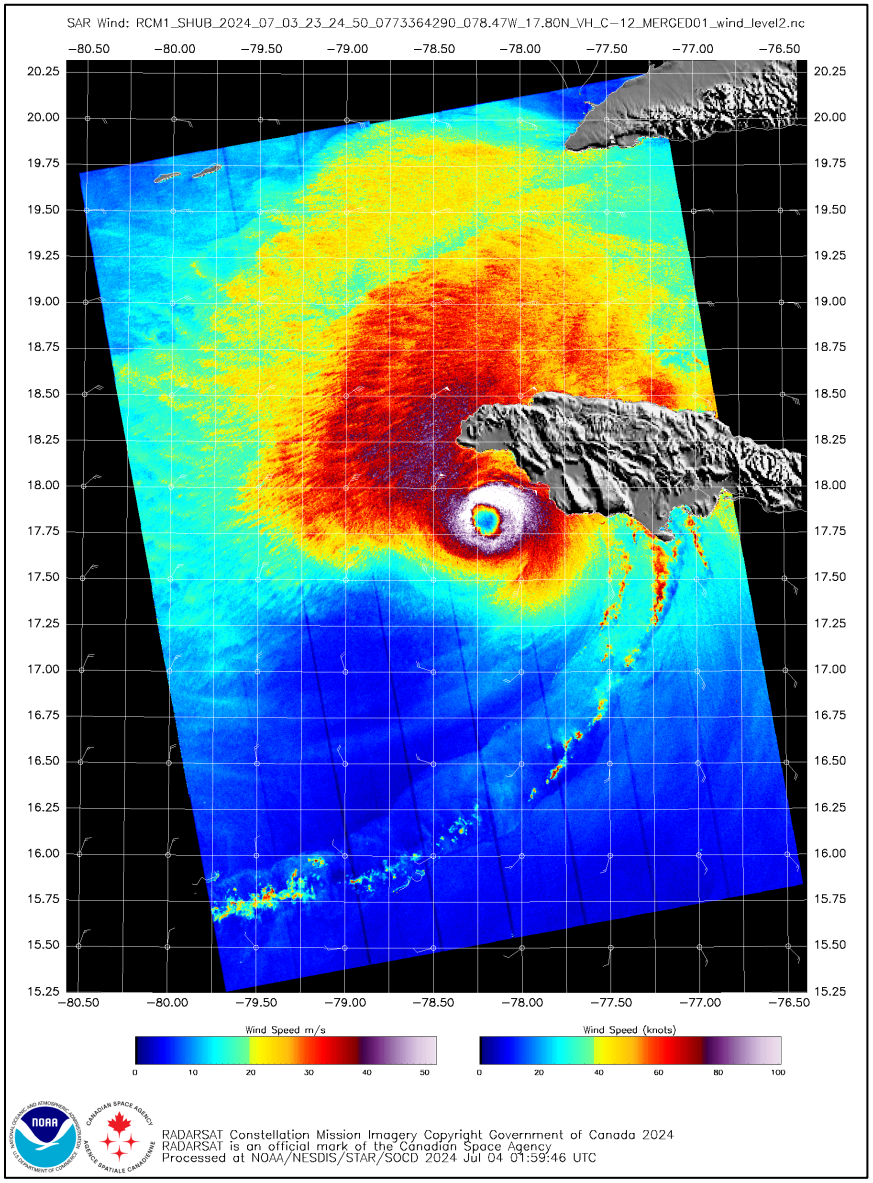

Figure 5. Synthetic aperture radar image showing estimated surface winds in Beryl off the southwestern coast of Jamaica. Data is from the Canadian RADARSAT at 2325 UTC 3 July 2024 with image courtesy of NESDIS STAR and the Canadian Space Agency.

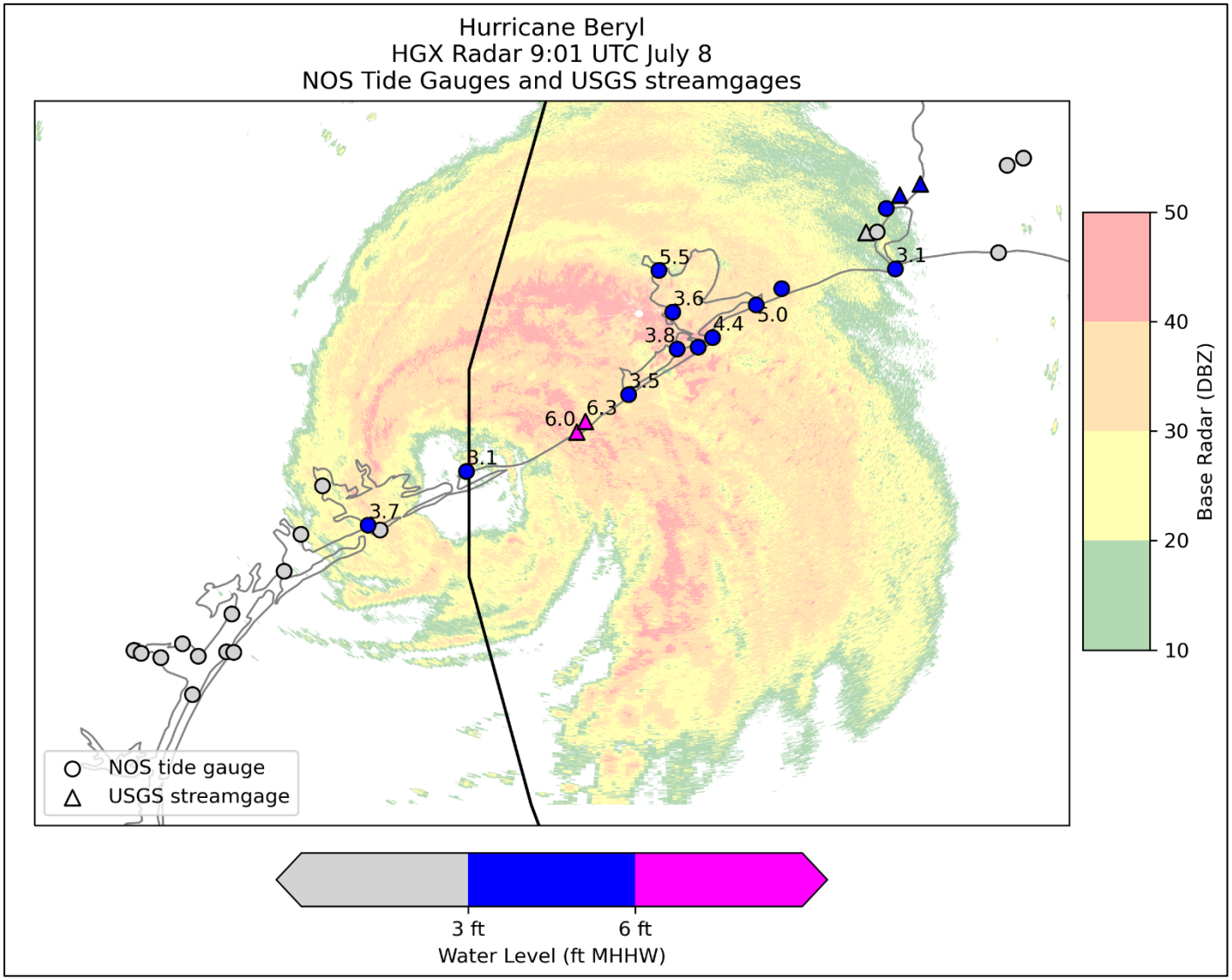

Figure 6. Maximum water levels measured during Hurricane Beryl from select NOS tide gauges (circles) and USGS streamgages (triangles) superimposed on WSR-88D reflectivity data from the KHGX radar at 0901 UTC 8 July. Water levels are referenced as feet above Mean Higher High Water (MHHW), used as a proxy for inundation (above ground level) on normally dry ground along the immediate coastline. Image courtesy of the NHC Storm Surge Unit.

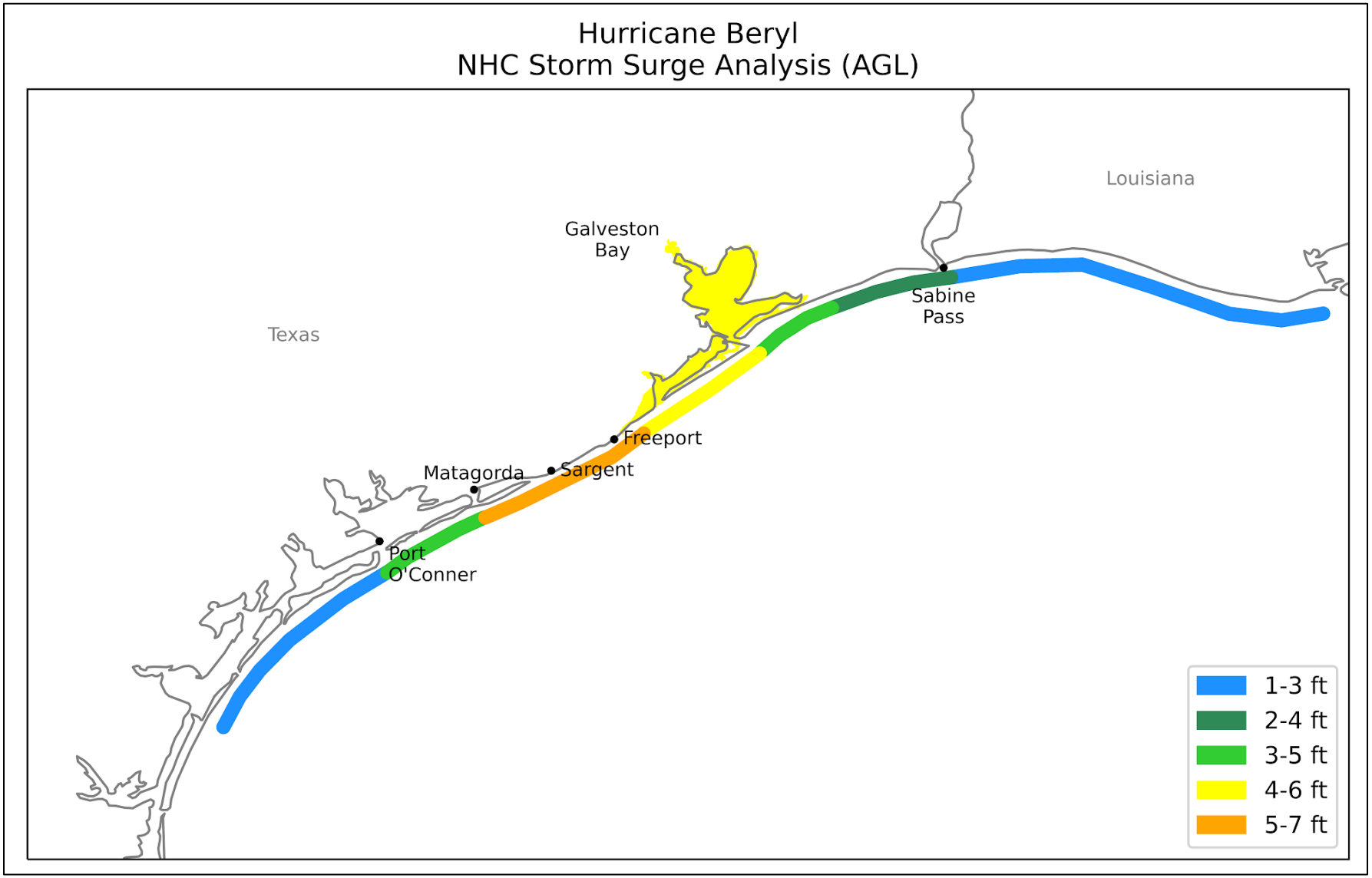

Figure 7. Analyzed storm surge inundation (feet above ground level) along the Texas and Louisiana coast. Image provided by the NHC Storm Surge Unit.

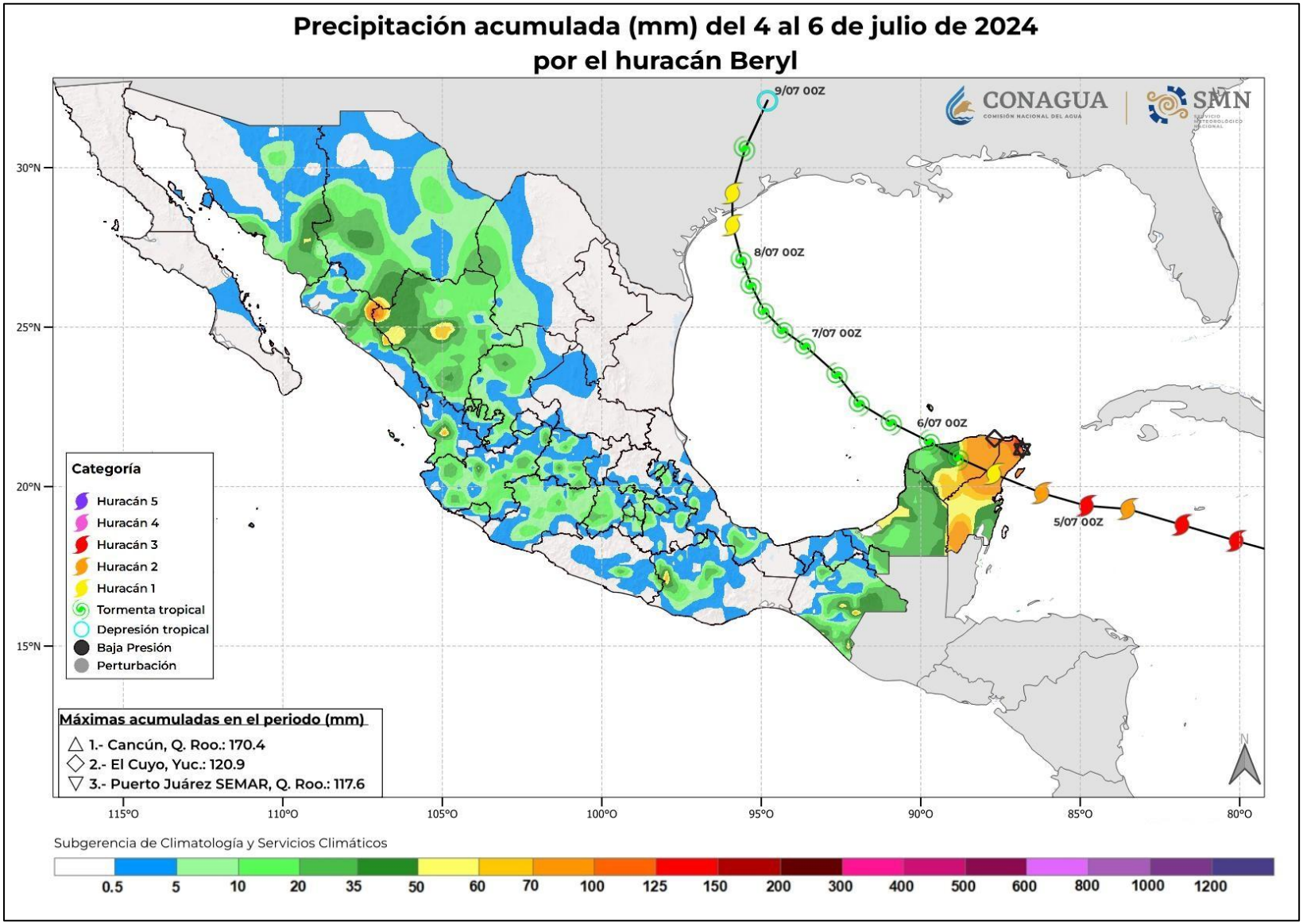

Figure 8. Rainfall totals for Mexico from 4–6 July 2024 including the passage of Hurricane Beryl. Not all of the rain depicted is directly related to Beryl. Image courtesy of the Servicio Meteorológico Nacional of Mexico. The track and intensity are from NHC operational values.

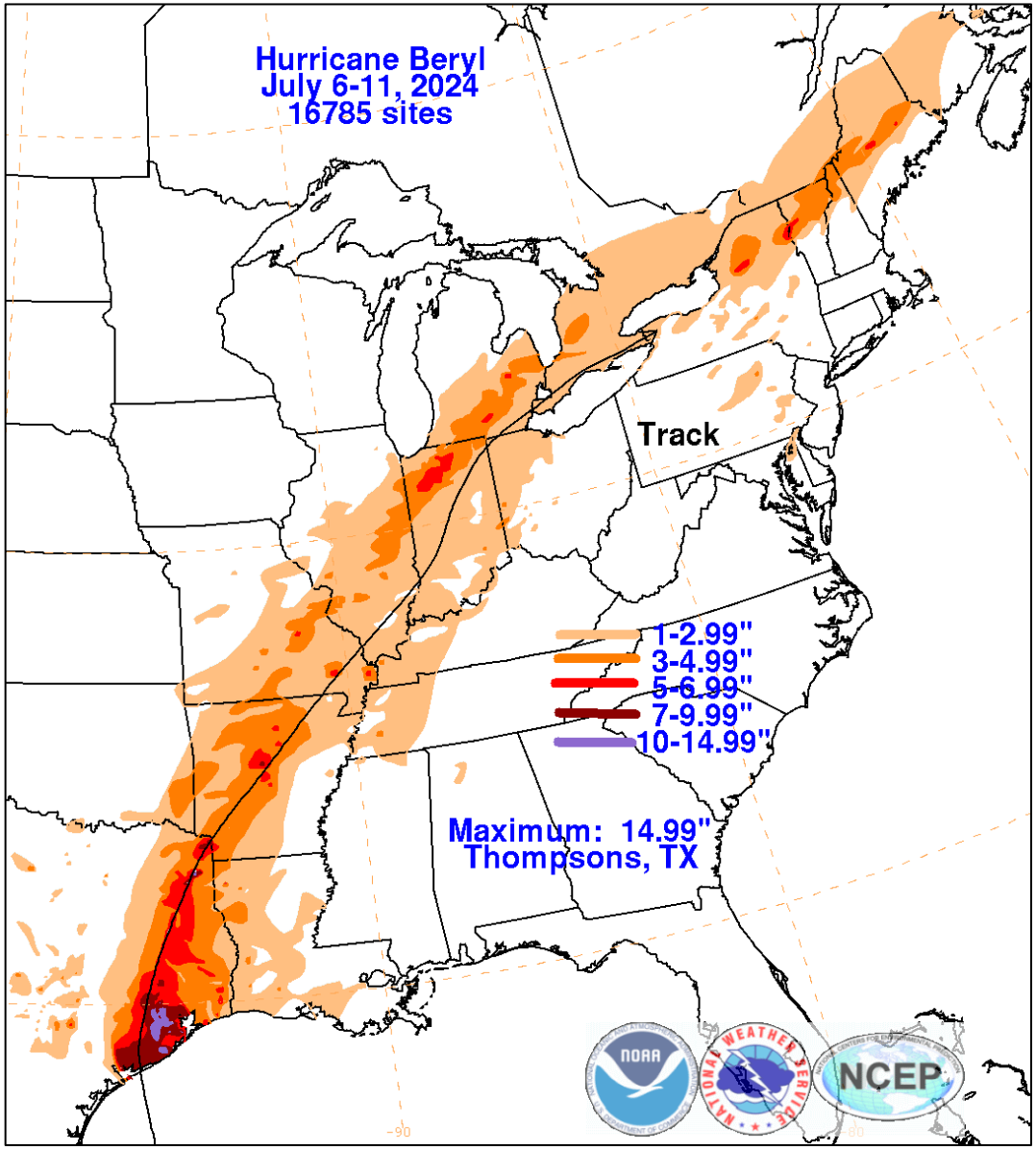

Figure 9. Rainfall totals for the United States and southeastern Canada during the passage of Hurricane Beryl. Image courtesy of Dave Roth at the Weather Prediction Center.

Figure 10. Destruction on the island of Petite Martinique, Grenada, caused by Hurricane Beryl. Image courtesy of Arthur Daniel/Reuters.

Figure 11. Damaged fishing boats at Bridgetown, Barbados, caused by Hurricane Beryl. Image courtesy of Ricardo Mazalan/Associated Press.

Figure 12. Wind and storm surge damage to homes and trees at Sargent, Texas, caused by Hurricane Beryl. Image courtesy of Josh Morgerman/iCyclone.

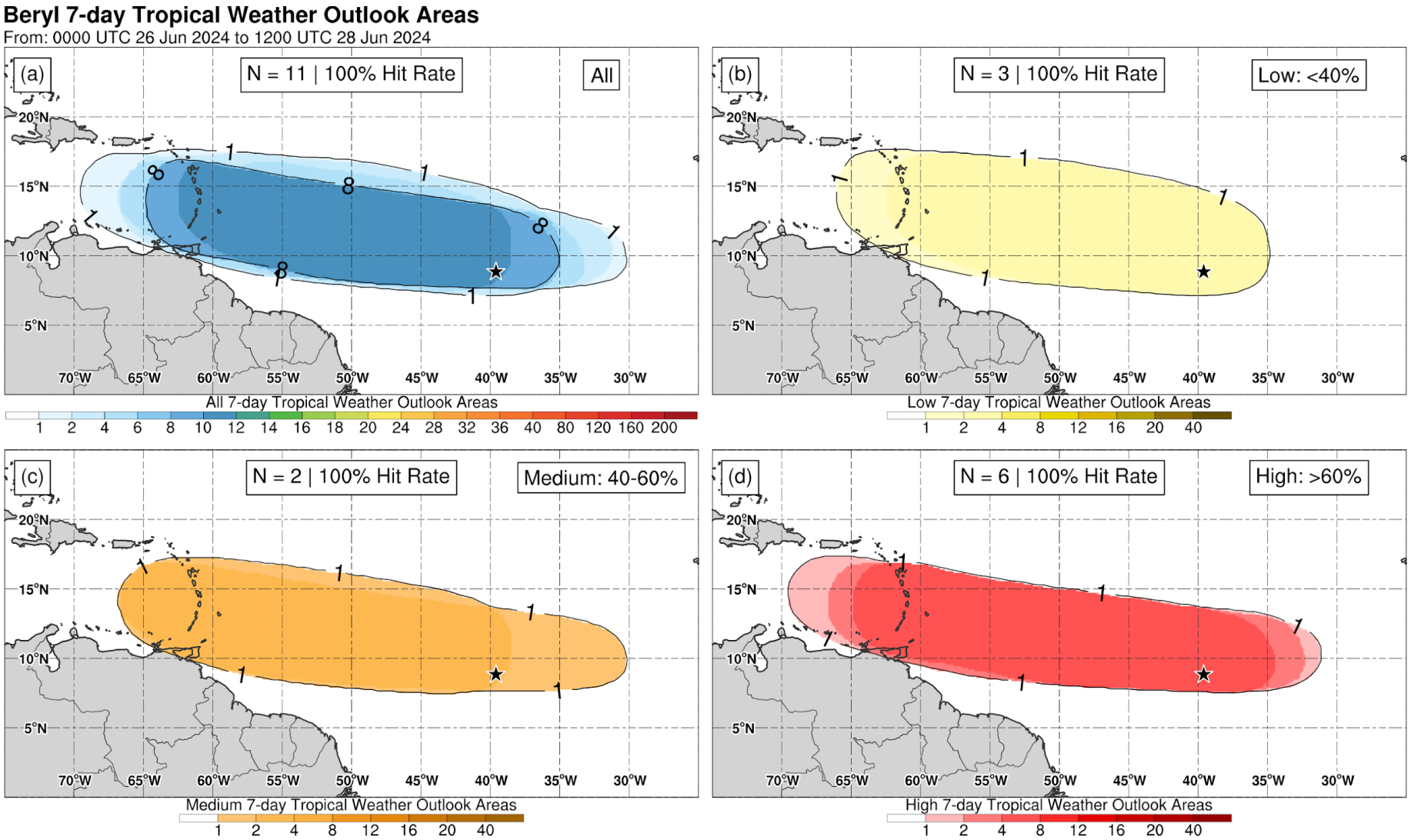

Figure 13. Composites of 7-day tropical cyclone genesis areas depicted in NHC's Tropical Weather Outlooks prior to the formation of Beryl for (a) all probabilistic genesis categories, (b) the low (<40%) category, (c) medium (40–60%) category, and (d) high (>60%) category. The location of genesis is indicated by the black star.

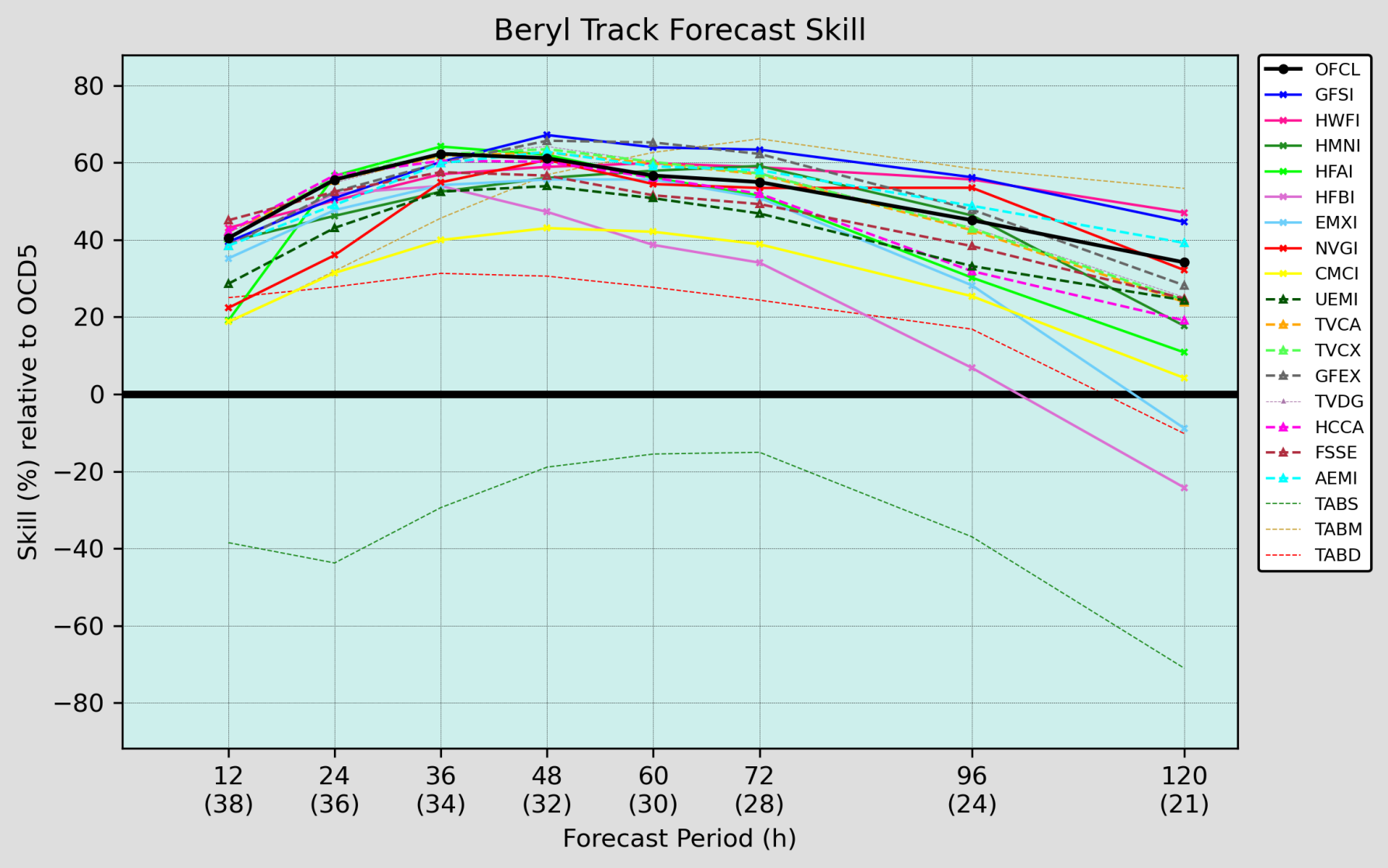

Figure 14. Skill diagram for selected track forecast models (homogenous sample) in percent relative to OCD5 for Hurricane Beryl, 28 June – 9 July 2024. The number of forecasts at each time period is shown in parentheses below the horizontal axis.

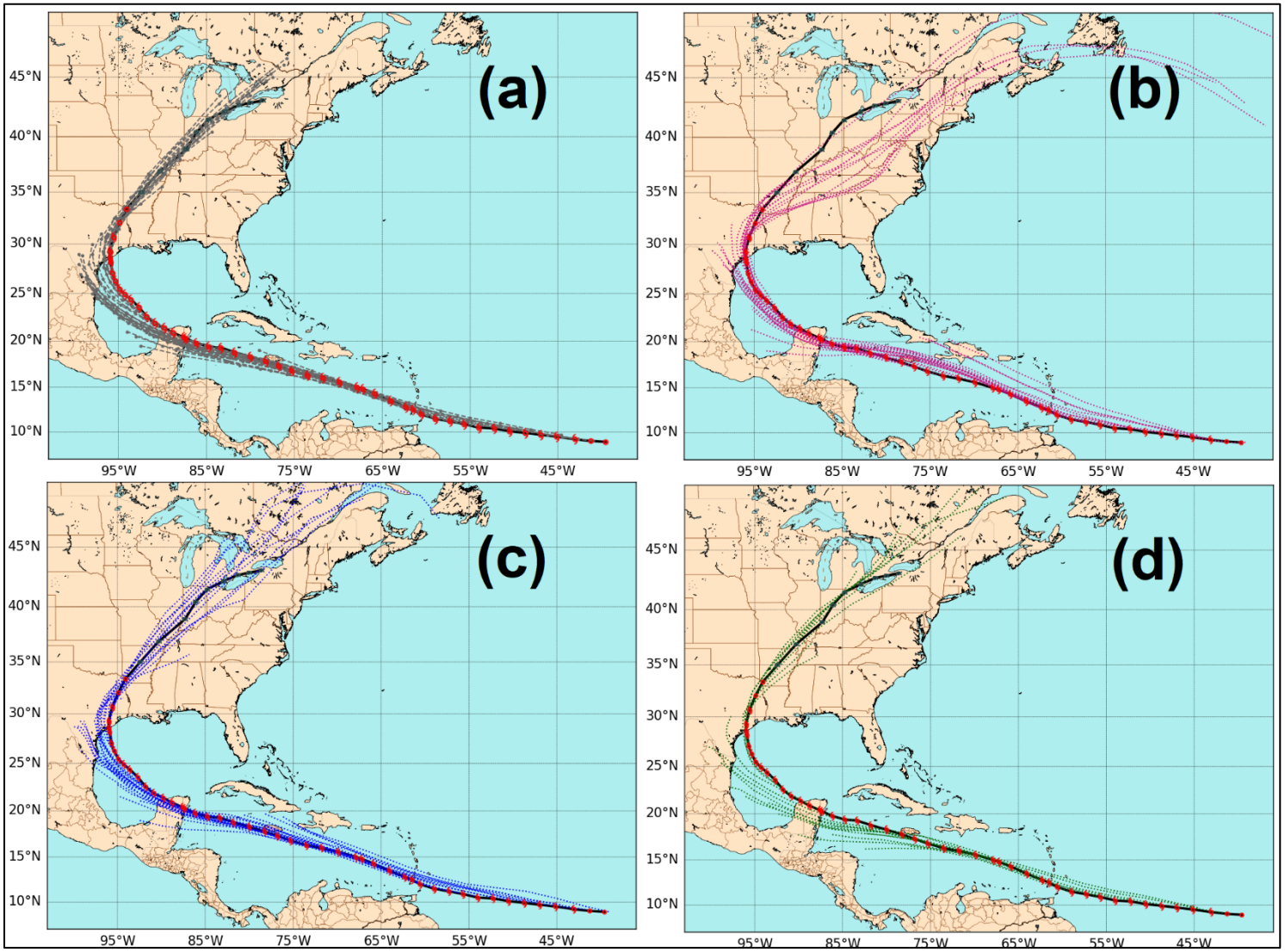

Figure 15. Selected track forecasts (dashed lines, with 0, 12, 24, 36, 48, 60, 72, 96, and 120 h positions indicated) for Hurricane Beryl, 28 June – 9 July 2024. The best track is given by the black line with positions given at 6–h intervals. Part (a) are the official forecasts, part (b) are the forecasts from the TABM model, part (c) are the forecasts from the interpolated GFS model (GFSI), and part (d) are the forecasts from the interpolated ECMWF model (EMXI).

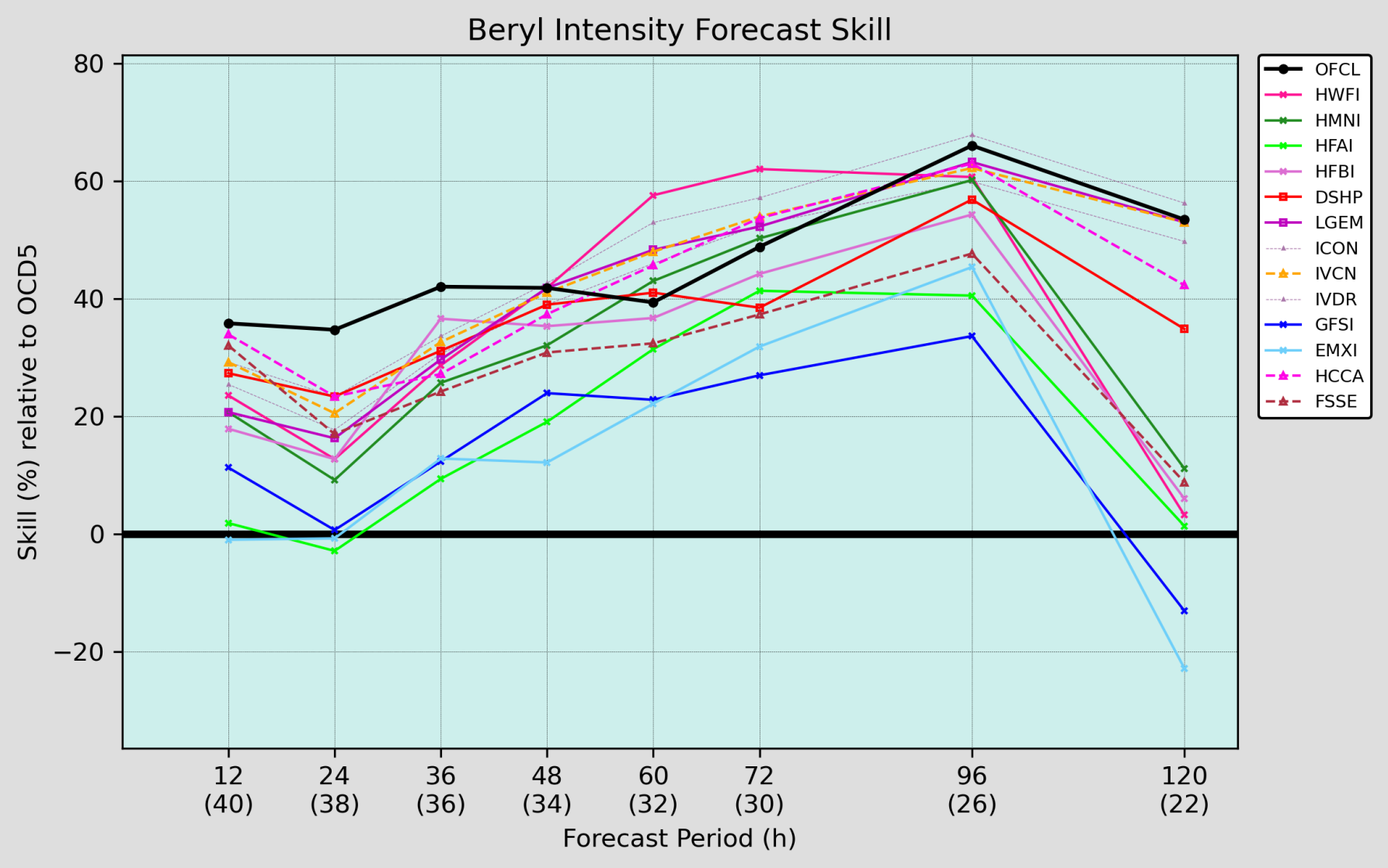

Figure 16. Skill diagram for selected intensity forecast models (homogenous sample) in percent relative to OCD5 for Hurricane Beryl, 28 June – 9 July 2024. The number of forecasts at each time period is shown in parentheses below the horizontal axis.

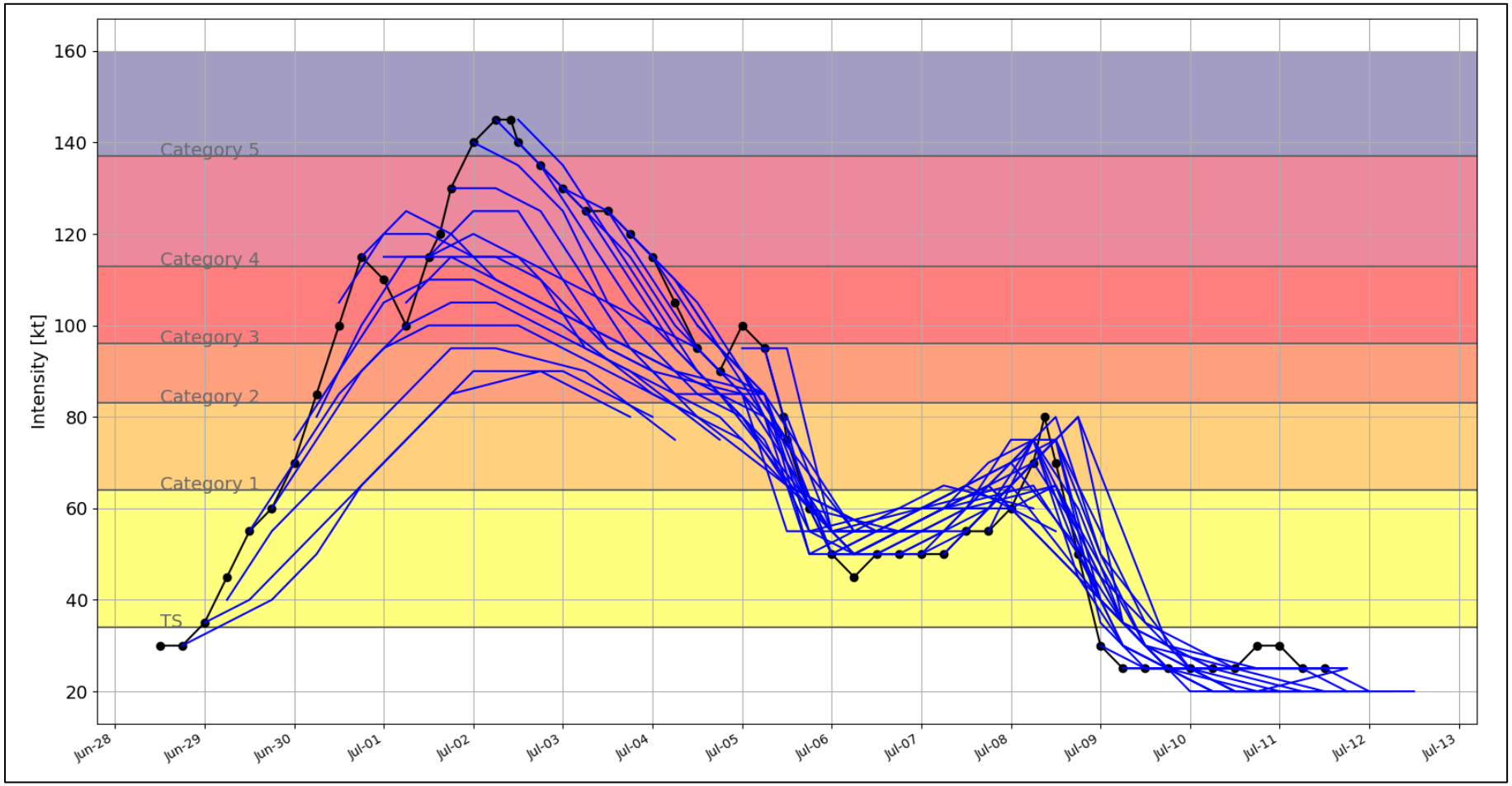

Figure 17. Selected official intensity forecasts (blue lines) for Hurricane Beryl, 28 June – 9 July 2024. The best track is given by the solid black line with intensities given at 6 h intervals.

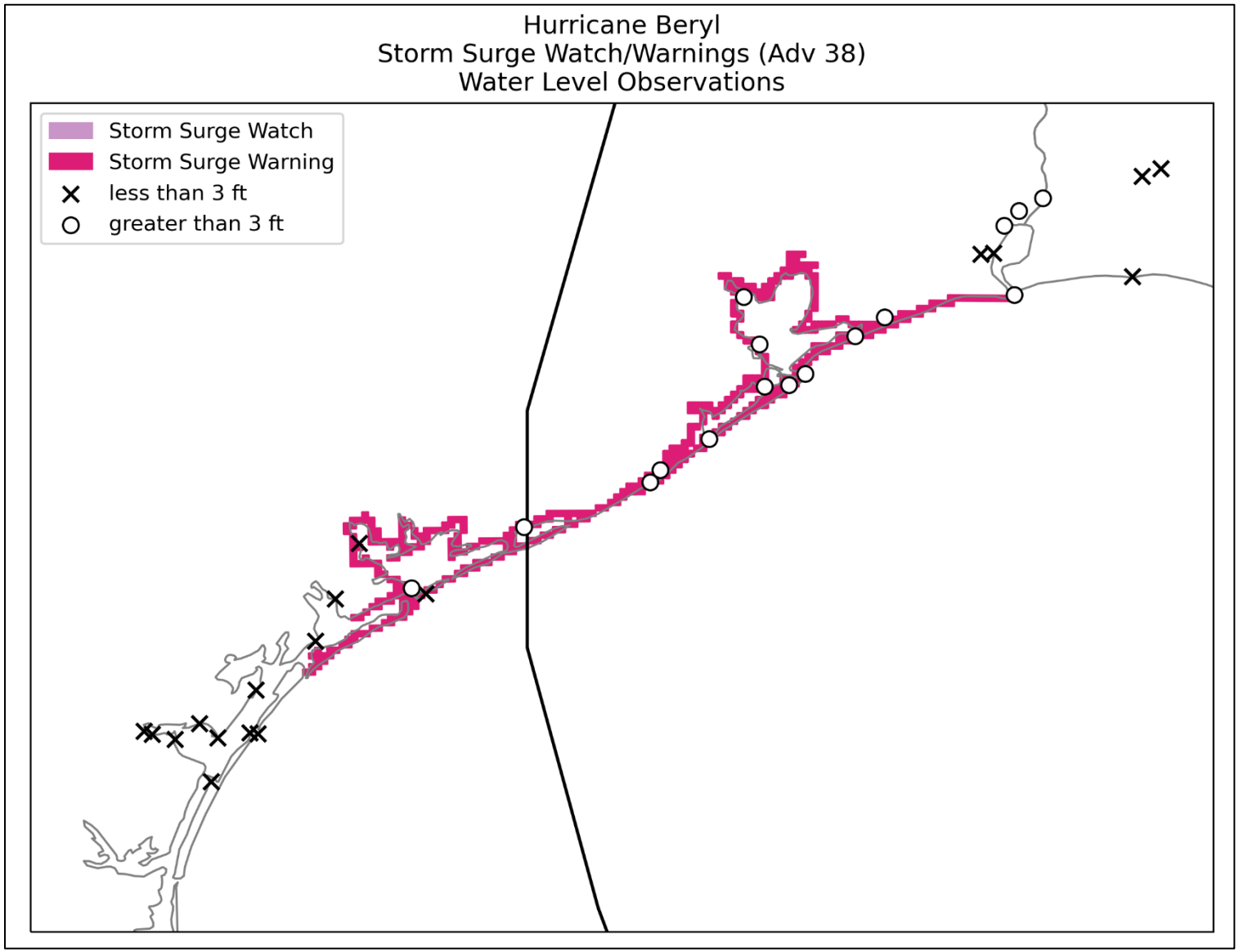

Figure 18. Storm Surge Warnings (magenta) in effect at 0300 UTC 8 July and maximum water levels measured from NOS tide gauges and USGS streamgages. Water levels greater than 3 ft above MHHW are designated as a white “o” and water levels less than 3 ft above MHHW as a black “x”. Image courtesy of the NHC Storm Surge Unit.