# 2025: Year In Review

## For Puerto Rico and the U.S. Virgin Islands

NWS San Juan, PR

# Executive Summary

**The 2025 meteorological year for Puerto Rico and the U.S. Virgin Islands was characterized by significant rainfall early in the year, but rainfall deficits began to build in the summer and fall months, indirect effects from tropical cyclones, lightning, hail, Saharan dust, and continued warmer than normal sea surface temperatures.**

## Remarkable Weather Incidents

**The most remarkable events of 2025 were the lightning strikes, with a total of 14 documented incidents across Puerto Rico, resulting in one fatality at Lago Toa Vaca, Villalba, and multiple injuries and property damage. There were also eight documented hail events, primarily in April and May, including a dime-sized report in Lares. Two notable waterspout events were reported: one offshore at Buye Beach in Cabo Rojo on May 17, and another over Lago Guajataca in Quebradillas on October 4.**

## Rainfall, Flooding and Drought

**A prolonged wet pattern prevailed across the region for the winter and spring months, followed by rainfall deficits building by summer and fall.**

- **Puerto Rico:** The Spring (March–May) was much wetter than normal, marked by a continuous stream of upper-level troughs and deep moisture that triggered numerous flood and flash flood reports. The most significant event occurred from Easter weekend through early May, resulting in 26.0 inches of maximum rainfall in Orocovis and leading to over 150 impact reports. Annually, areas near El Yunque received over 150 inches and the west received around 125 inches, while the southern plains saw only about 35 inches.

- **U.S. Virgin Islands:** Spring also saw very high accumulations, with some sections in St. Thomas recording over 20 inches of precipitation (maximum of 10.8 inches in Northside, St. Thomas, during the April/May event). The islands also experienced dryness and Moderate Drought (D1) conditions during the summer and fall.

## Tropical Cyclones

**The 2025 Atlantic Hurricane Season produced 13 named storms, 5 hurricanes, and 4 major hurricanes.**

- **Hurricane Erin:** Passed north of the islands as a major hurricane in mid-August. It produced a maximum rainfall total of 9.16 inches in Cayey, PR, and 7.80 inches in St. John, USVI, contributing to flooding and landslides.
- **Hurricane Melissa:** Its outer bands impacted the region from October 20–25, producing episodes of heavy rainfall. Preliminary rainfall totals reached up to 9.58 inches in Patillas, PR.

## Other Meteorological & Marine Highlights

- **Heat:** While temperatures were generally seasonal, the 2024–2025 Winter was the warmest on record for the San Juan Area climate site. A high number of Heat Advisories (82) and Extreme Heat Warnings (16) were issued later in the summer and fall months.
- **Saharan Air Layer (SAL):** The 2025 dust season peaked from late May through July, with three major dust intrusions recorded around June 1, July 5, and July 23, which significantly reduced visibility.
- **Marine & Surf Zone Fatalities:** Sea Surface Temperatures remained above normal for most of the year, consistent with a continued warm-bias marine environment. A total of 10 surf zone fatalities were reported in Puerto Rico, with 8 attributed to rip currents and 2 to high surf. A significant swell event in early October, generated by distant tropical systems, brought seas up to 11 ft and 16–19 ft breaking waves to the northern and western coasts.

## COOP and CoCoRaHS

**Based on the NWS Cooperative Weather Stations network:**

- **Warmest Stations:** Lajas Substation, Aguirre (Salinas), Ponce 4 E (Juana Díaz), and Isabela Substation all tied for the highest maximum temperature of 97°F.
- **Coolest Station:** Adjuntas Substation recorded the lowest minimum temperature of 50°F in March.
- **Wettest Stations:** The CoCoRaHS station, Christiansted 1.7 SW (St. Croix), reported the highest one-day rainfall of 6.94 inches on September 18. The COOP station Morovis 1N reported the highest one-day rainfall in Puerto Rico of 6.45 inches.

# Rainfall Summary

## Seasonal Rainfall

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A **generally wet pattern** prevailed for most of the meteorological **winter** (December 2024 to February 2025) (Appendix, Figure A1).

- The greatest amounts of rain were observed along the **east, southeast and north-central Puerto Rico**, with amounts of **20 to 50** inches.
- A lot less rain was observed along western and **southern Puerto Rico, Vieques and Culebra**, with mostly **2 to 6** inches collected.
- The **U.S. Virgin Islands** saw areas of **8 to 10** inches, but generally it ranged from **2 to 6** inches (Appendix, Figure A9).
- Nearby troughs, frontal boundaries and local effects triggered a few landslides and street flooding. However, impacts were not too significant.
- The meteorological winter ended mostly **wetter than normal**, with a surplus greater than **16** inches for portions of southeastern Puerto Rico (Appendix, Figure A2).

**Spring** was much **wetter than normal** for most of the region (Appendix, Figure A3).

- The first significant event of the season occurred by late March, when the combination of a slowly approaching front and a series of upper level troughs led to much higher than normal moisture. Several flood events were observed, with rivers reaching flood stage. The most affected municipality was Carolina, with flash flooding registered in the urban areas.
- By mid-April, additional flash flooding and landslides were registered due to heavy rainfall caused by upper level troughs and low level moisture.
- Furthermore, **April ended very wet**, with a moist and unstable weather pattern that affected Puerto Rico and the U.S. Virgin Islands. Deep tropical moisture moved into the region from the southeast, interacting with deep-layer troughs and supportive jet dynamics aloft. This synoptic setup led to daily rounds of scattered to numerous showers and isolated thunderstorms, especially during the afternoons across the interior and western portions of Puerto Rico.
- As soils remained saturated in early May, additional troughs and frontal boundaries continue to stream into the islands. Over **20 flood reports** were received in the first three days of May alone, mostly related to closed roads, and rivers reaching flood stage.
- Only a few days later, yet another round of thunderstorms triggered **multiple flash flooding** along the west and north-central. Some reports included people stranded by high waters as they were bathing in the rivers.
- Most of **Puerto Rico** ended **wetter than normal** for the spring months, except for a small area in the northwest (Aguadilla, Isabela) (Appendix, Figure A4).

- Across the **U.S. Virgin Islands**, some sections in **St. Thomas** recorded over **20** inches of precipitation, while rain was mostly in the order of **8 to over 15** inches for **St. Croix**. **St. John** was not short of rain either, with **10 to 15** inches collected (Appendix, Figure A10).

By the **summer**, conditions began to **dry** out. About half of Puerto Rico and the Virgin Islands ended **drier than normal** through this period. Local effects continue, so a lot of rainfall was observed over the western portions of the San Juan metro area, as well as western Puerto Rico. (Appendix, Figure A5)

- A tropical wave moved over the area by mid July. The combination of instability and moisture triggered heavy showers and thunderstorms, causing flash flooding in Ponce. Flood waters reached the Mercedita International Airport, PR-2, PR-14, and PR-52 in this municipality.
- Later in the month, lingering moisture and marginal instability associated with a nearby upper-level low to the northwest, combined with breezy east-southeast low-level winds that led to isolated to scattered showers over eastern Puerto Rico early in the morning. As the day progressed, showers and cloudiness spread across much of Puerto Rico, with more frequent and intense showers and isolated thunderstorms developing over the San Juan metropolitan area, particularly over Bayamon, Catano and Toa Baja where flooding and flash flooding reports were received. Rainfall totals of up to four inches prompted Flood Advisories and Flash Flood Warnings in the San Juan metro area.
- In August, the main rain producer was **Hurricane Erin**, as it moved north of the islands. Some flooding and landslides were observed, but the main impacts associated with this cyclone were related to wind.
- At the end of the period, most of **eastern Puerto Rico** ended **drier than normal**, while local effects maintained wetter conditions along the west and portions of the San Juan metro area (Appendix, Figure A6).
- For this period, **St. Thomas and St. John** collected nearly **8 to 9** inches of rainfall, while the range in **St. Croix** was from **5 to 10** inches (Appendix, Figure A11).

During the **fall** months, the main rain producer was due to the outer bands of Hurricane Melissa, which brought episodes of heavy rainfall for southern and western Puerto Rico, as well as for portions of the Virgin Islands (Appendix, Figure A7). Adding the three month period, most of the area **ended drier than normal**, except for western Puerto Rico.

- On September 18, a tropical wave moved across the Virgin Islands, promoting the development of frequent and persistent showers and thunderstorms. Rainfall accumulations in St. Croix were widespread, with significant urban flooding and impassable roads. Some areas that experienced flooding include Port St., Mt. Welcome St., Aloy Wenty Nielsen Bypass (VI-66), Ruby M. Ross Housing Complex, and downtown Christiansted.
- Additionally, about four tropical waves moved near the region in September, with landslides and flooding reported.

- By October, again, many reports were received due to the outer bands related to **Hurricane Melissa**, which will be discussed in the tropical cyclone section.
- Not much rain fell aside from what was reported by the hurricanes or local effects. Thus, most of **Puerto Rico** ended **drier than normal**, with the exception of the western coast (Appendix, Figure A8).
- For the entire period, rainfall amounts were in the order of **14 to 16** inches for **St. Thomas and St. Croix**, and **12 to 20** inches for **St. Croix** (Appendix, Figure A12).

## Annual Rainfall

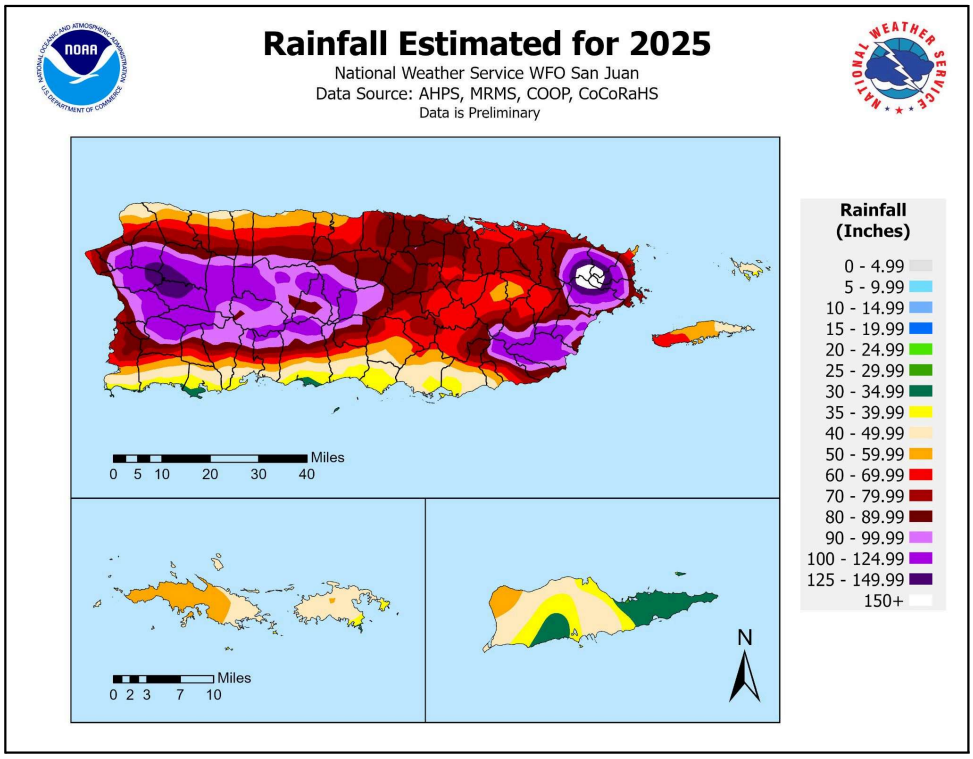


**Figure 1.** Estimated rainfall estimates for Puerto Rico (top) and the Virgin Islands (lower-left: Saint Thomas and Saint John; lower-right: Saint Croix) for the year 2025. Created by the GIS Team - NWS SJU. **Data source**: NWPS, MRMS (Puerto Rico), and COOP, CoCoRaHS, and NWPS (Virgin Islands).

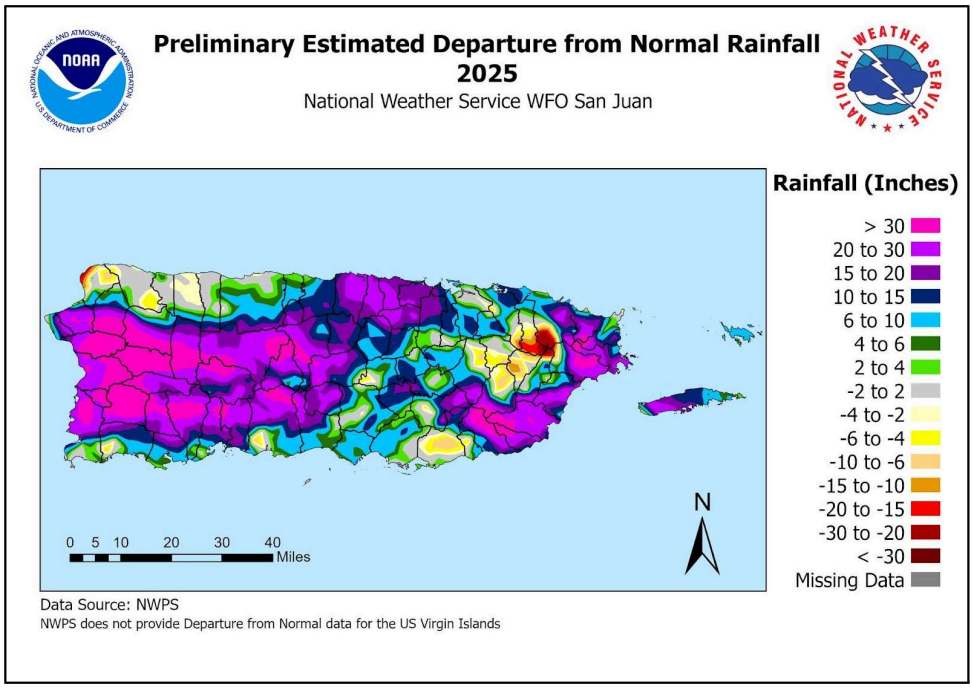


**Figure 2.** Departure from Normal Rainfall for Puerto Rico for the year 2025. Created by the GIS Team - NWS SJU. **Data Source** for PR: NWPS. NWPS does not provide Departure from normal data for the USVI.

Over **150 inches of rainfall** were observed near **El Yunque** from January to December. The second maxima was observed in the **west**, as is usual, since local effects triggered heavy thunderstorms for most of the year. Rainfall accumulations in this area were around **125 inches**. A lot less fell in the **southern plains**, with rainfall barely around **35 inches** (Figure 1).

In the Virgin Islands, **St. Thomas** collected the most rainfall, with amounts around **50 inches**. In **St. John**, the rainfall was around **40 inches**. There was a lot more variability in **St. Croix**, with the western portion of the island experiencing **25 to 35 inches of rain**, and nearly **20 inches** for the east (Figure 1).

Even though the last couple of weeks have been drier than normal, **in general, a wet pattern prevailed**, with heavy precipitation observed during the first half of the year. In the **west**, some areas received a rainfall **surplus of between 10 to 50 inches**. Other areas did end **drier than normal**, mostly near **El Yunque, Guayama** and **Salinas**, the **northwestern corner**, and around the southern coast of **Cabo Rojo** (Figure 2).

## Rainfall Statistics for the San Juan Area

| Precipitation (Inches)<br>San Juan Area, Puerto Rico | | | |
|---|---|---|---|
| **Month** | **Observed Values** | **Ranking** | **Record or Previous Record** |
| ***Winter***<br>(December - February) | 15.37 | 19th | 1936-1937 (26.67) |
| ***Spring***<br>(March - May) | 18.46 | 21st | 1987 (26.22) |
| ***Summer***<br>(June - August) | 19.38 | 34th | 2011 (43.24) |
| ***Fall***<br>(September - November) | 17.10 | 67th | 1899 (35.68) |
| ***December*** (1-14th) | 1.53 | N/A | 2019 (81.5) |
| ***Annual***<br>(January - November) | 65.49 | 39th (until Dec 12, 22 days missing) | 2010 (89.50) |

**Table 1.** Average seasonal and annual precipitation for San Juan Area in inches.

In 2025, only **one daily maximum rainfall record** was set in the San Juan Area **(March 22, 1.09 inches)**.

## Products Issued Count (Until December 15th)

| Flood Advisories | Flash Flood Warnings | Flood Warnings |
|---|---|---|
| 620 | 92 | 56 |

**Table 2.** Number of Flood Advisories, Flash Flood Warnings, and Flood Warnings (for rivers) issued in 2025 by WFO SJU for portions of Puerto Rico and/or the U.S. Virgin Islands. **Source:** Iowa State University, Iowa Environmental Mesonet.

# Non-Tropical Flooding Events

## Frontal boundary and trough

Between March 13 and 14, a slowly approaching frontal boundary, combined with a series of upper-level troughs and higher than normal precipitable water content, produced widespread heavy showers. Bayamón received 7–8 inches of rain, with other northern and central areas exceeding 4 inches, while northwest Puerto Rico and St. Croix saw under 0.5 inches (Figure 3). The event led to multiple impacts, including flood reports in various municipalities, flash flood in Las Piedras, and a landslide in Adjuntas.

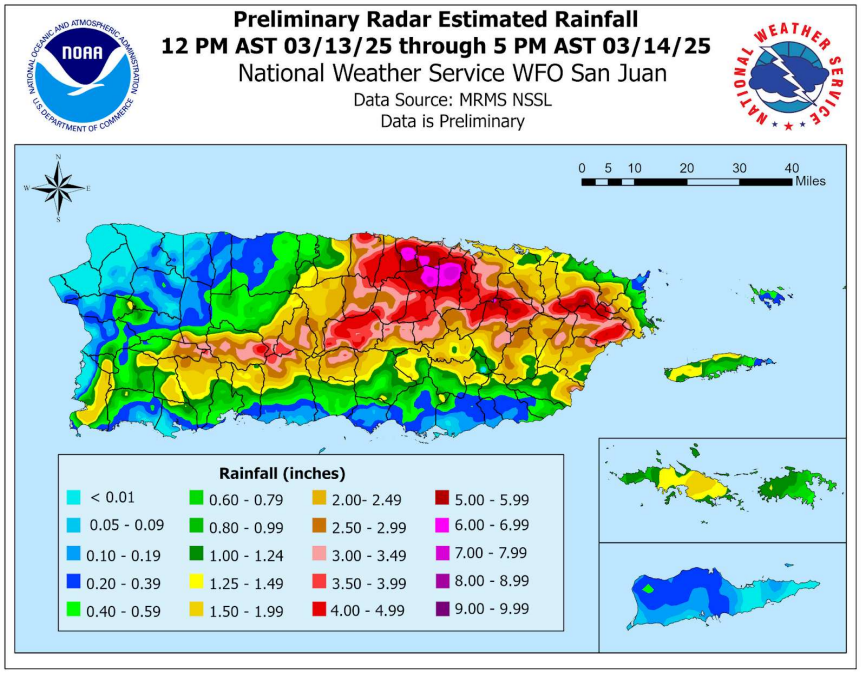


**Figure 3.** Preliminary radar estimated rainfall from March 13,2025 at 12 PM AST through March 14, 2025 at 5 PM AST. Created by the GIS Team - NWS SJU. **Data Source:** MRMS NSSL.


**Figure 4:** Rainfall reports from March 14, 2025. **Data Source:** COOP & CoCoRAHS Stations.

# Flooding rains in Carolina, PR

On March 22, a stationary front across the Atlantic and an induced trough over the northeastern Caribbean produced lighter winds that helped generate slow-moving streamer-type showers over northeastern Puerto Rico. While most of the island received only light to moderate rainfall with minimal accumulations, **Carolina experienced nearly 5 inches** as a persistent, stationary area of showers lingered over the municipality (Figure 5). These heavy rains resulted in multiple impacts, including flash flood, flood, and landslide reports from Carolina.

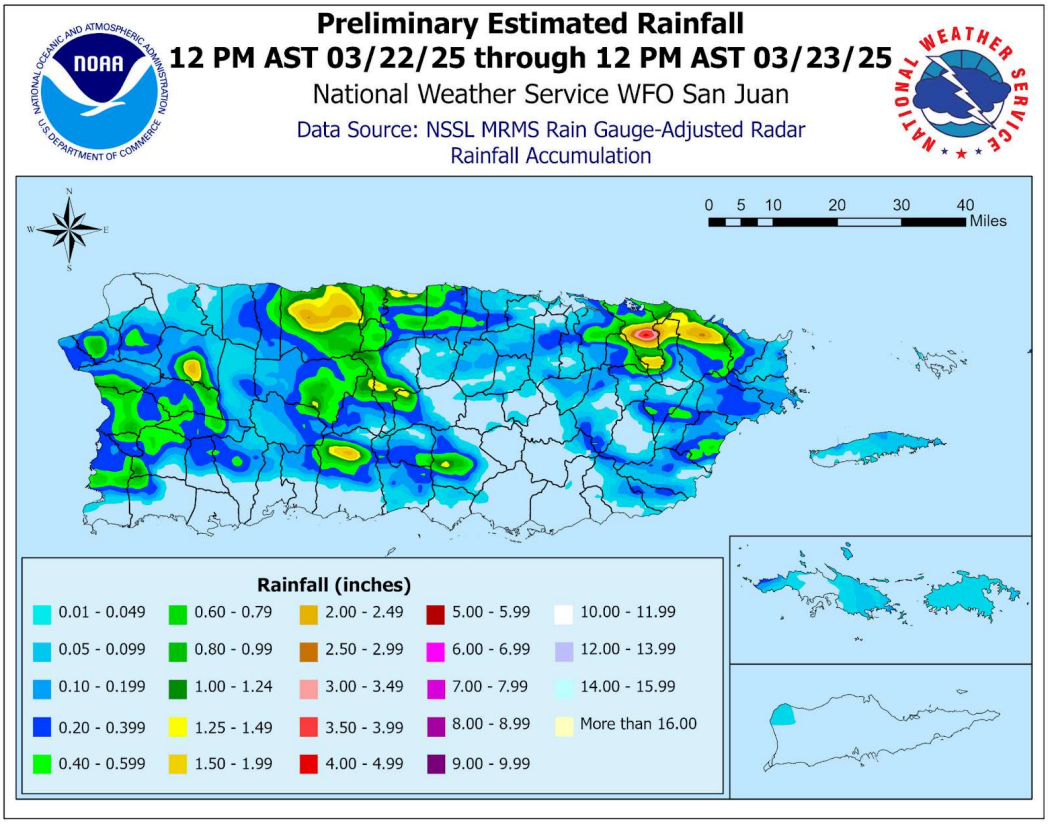


**Figure 5.** Preliminary radar estimated rainfall from March 22,2025 at 12 PM AST through March 23, 2024 at 12 PM AST. Created by the GIS Team - NWS SJU. **Data Source:** NSSL MRMS Rain Gauge-Adjusted Radar Rainfall Accumulation.

# April/May Significant Rainfall Events

Since Easter weekend, Puerto Rico and the U.S. Virgin Islands experienced a prolonged period of wet and unstable weather that produced widespread flooding, landslides in mountainous areas, small hail, gusty winds, and several waterspouts associated with near-severe thunderstorms.

Between April 19 and 21, the combination of a mid- to upper-level trough, a surface-induced trough, and precipitable water exceeding the 90th percentile of the climatological normal produced periods of heavy rainfall that triggered flash floods and landslides, resulting in **around 30 reports** of landslides, winds, flooding, hail, debris flows, and flash flooding. This event saturated the soil before the next significant rainfall event.

Continuing the ongoing sequence of flood events, from April 26-30 a surge of deep tropical moisture from the southeast interacted with deep-layer troughs and supportive jet dynamics aloft, maintaining a moist and unstable pattern across Puerto Rico and the U.S. Virgin Islands. This setup produced daily rounds of scattered to numerous showers and isolated thunderstorms, most frequent across the interior and western portions of Puerto Rico, and resulted in **about 50 impact reports**. As conditions deteriorated, a **Flood Watch for Puerto Rico was issued on April 30**, aligning with the expectation of continued heavy rainfall. The unsettled pattern persisted into early May, when abundant tropical moisture and a series of upper-level troughs triggered a multi-day flood event from May 1-5, producing **79 additional reports** of flooding and related hazards. The Flood Watch was **cancelled on Sunday, May 4 at 7:14 PM**, though the wet pattern continued into the second week of May. A nearby deep-layer trough interacting with already saturated soils generated localized flash flooding from May 7-11, adding **13 more reports** to the prolonged stretch of impacts.

**Maximum Rainfall Accumulations:**

- **Puerto Rico:** 26.0 inches in Barrio Pellejas, Orocovis
- **U.S. Virgin Islands:** 10.8 inches in Northside, St. Thomas

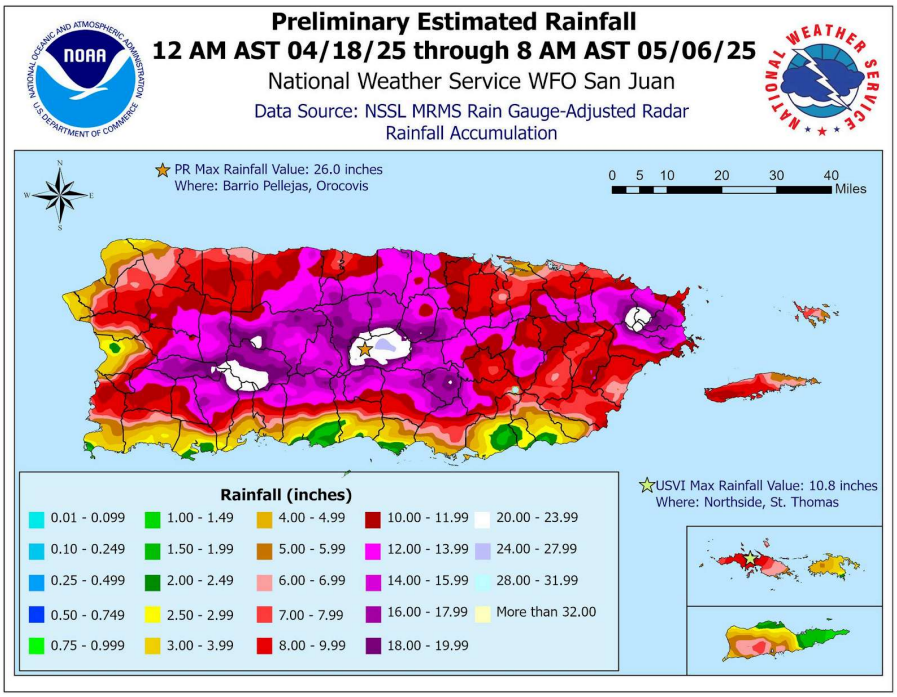


**Figure 6.** Preliminary radar estimated rainfall from April 18,2025 at 12 AM AST through May 6, 2024 at 8 AM AST. Created by the GIS Team - NWS SJU. **Data Source:** NSSL MRMS Rain Gauge-Adjusted Radar Rainfall Accumulation.

# Heat

## Summary

After a warm start of the year, temperatures leaned toward more seasonal values through much of the year. Still, it was generally a little warmer than normal for most of the sites. The most interesting stats are that this winter was the warmer in history for the San Juan Area Climate Site (ThreadEx; Table 4), and for the Virgin Islands, it also ended in the top 10 warmest winters for both climate sites (Table 5 and 6). A total of 82 heat advisories and 16 extreme heat warnings were issued this year, which is a much lower count than the number of products issued in 2023 and 2024 (Table 3).

## Products Issued Count

| Extreme Heat Watch | Heat Advisory | Extreme Heat Warning |
|---|---|---|
| 0 | 82 | 16 |

**Table 3.** Number of Extreme Heat Watches, Heat Advisories, and Extreme Heat Warnings issued in 2025 by WFO SJU for portions of Puerto Rico and/or the U.S. Virgin Islands. **Source:** Iowa State University, Iowa Environmental Mesonet.

| Average Temperature [(Max+Min)/2] San Juan Area, Puerto Rico | | | |
|---|---|---|---|
| **Month** | **Temperature** | **Ranking** | **Record or Previous Record** |
| ***Winter*** (December - February) | 80.2 | 1st | 2019-2020 (80.2) |
| ***Spring*** (March - May) | 80.4 | 19th | 1983 (82.4) |
| ***Summer*** (June - August) | 83.7 | 13th | 2024 (85.9) |
| ***Fall*** (September - November) | 83.0 | 12th | 2024 (84.7) |
| ***December*** (1-14th) | 80.4 | 10th | 2019 (81.5) |
| ***Annual*** (January - November) | 81.8 | 9th (until Dec 15) | 2024 (83.2) |

**Table 4.** Average seasonal and annual temperature for San Juan Area. Up to 10 days missing were allowed for each of the calculations.

| Average Temperature [(Max+Min)/2] Saint Croix, USVI | | | |
|---|---|---|---|
| **Month** | **Temperature** | **Ranking** | **Record or Previous Record** |
| ***Winter*** (December - February) | 80.3 | 2nd | 2023-2024 (80.8) |
| ***Spring*** (March - May) | 81.0 | 8th | 1973 (81.9) |
| ***Summer*** (June - August) | 83.1 | 34th | 1989 (85.7) |
| ***Fall*** (September - November) | 83.0 | 22nd | 2023 (85.7) |
| ***December*** (1-14th) | 80.4 | 19th | 1998 (81.3) |
| ***Annual*** (January - November) | 81.6 | 7th | 2023 (82.6) |

**Table 5.** Average seasonal and annual temperature for Saint Croix. Up to 10 days missing were allowed for each of the seasonal calculations.

| Average Temperature [(Max+Min)/2] Saint Thomas, USVI | | | |
|---|---|---|---|
| **Month** | **Temperature** | **Ranking** | **Record or Previous Record** |
| ***Winter*** (December - February) | 79.8 | 7st | 1993-1994 (81.2) |
| *Spring* (March - May) | 81.6 | 7th | 1994 (83.6) |
| ***Summer*** (June - August) | 85.6 | 5th | 1994 (86.7) |
| ***Fall*** (September - November) | Missing | Missing | 2024 (84.7) |
| ***December*** (1-14th) | N/A | N/A | 2019 (81.5) |
| ***Annual*** (January - November) | Missing | Missing | 1994 (84.1) |

**Table 6.** Average seasonal and annual temperature for Saint Thomas. Up to 10 days missing were allowed for each of the seasonal calculations. During the fall months, there were communication issues with the official climate site in Saint Thomas, therefore, many days were missing from the record.

# Waterspouts

## Buye Beach, Cabo Rojo

On **May 17, 2025**, around 1:35 PM, beachgoers at **Playa Buyé / Joyuda in Cabo Rojo**, Puerto Rico reported and filmed **a waterspout** (Figure 7) just offshore. Videos shared on social media show a well-defined funnel over the water that lasted several minutes, forming under humid, unstable weather conditions typical of the region.

**Figure 7.** A waterspout in Cabo Rojo on May 17. **Photo Credit:** Harvey John Ducot.

## Lago Guajataca, Quebradillas

On the afternoon of **October 4**, residents around **Lago Guajataca** observed a funnel cloud (Figure 8) forming during a thunderstorm, which developed into **a waterspout over the reservoir**. The phenomenon was visible from several nearby towns, including Quebradillas, and was recorded on video by multiple observers from different vantage points around the lake.

**Figure 8.** A waterspout over Lago Guajataca in Quebradillas on October 4. **Photo Credit:** Loyda Rodríguez via Facebook.

# Lightning and Hail

In 2025, Puerto Rico documented **14 lightning-related incidents** (Figure 9), including damage to homes, condominiums, vegetation, and electrical infrastructure, as well as multiple injury events across the island. **One** incident resulted in a **fatality**, highlighting the seriousness of lightning hazards. These events emphasize the importance of seeking safe shelter immediately upon hearing thunder to help prevent injuries and loss of life.

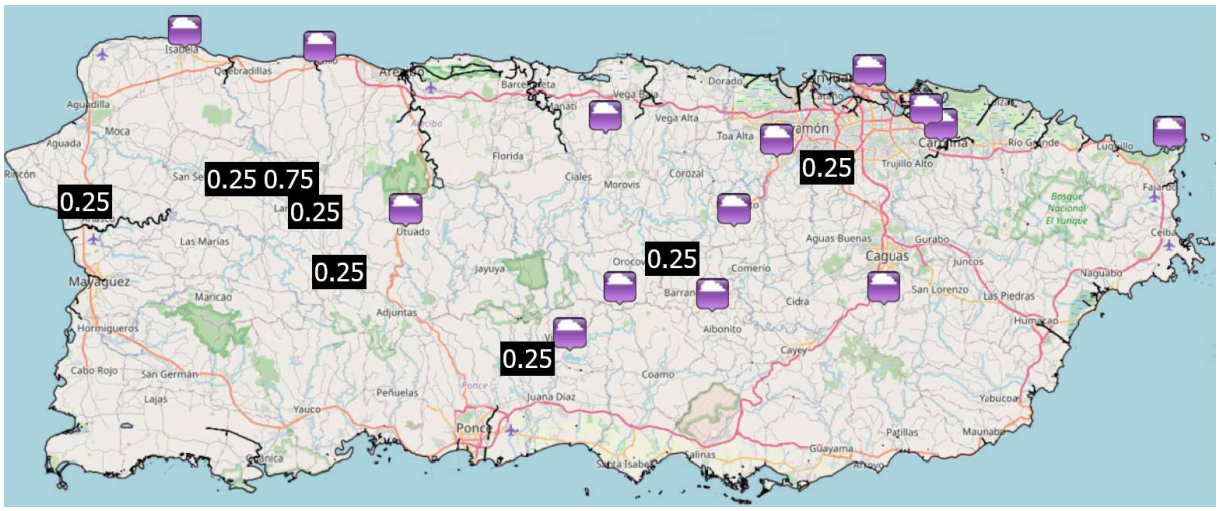


**Figure 9.** Map of Puerto Rico with approximate locations of documented lightning (purple icons) and hail (black icons) events during 2025. **Credit:** Iowa State University, Iowa Environmental Mesonet, LSR App.

1. **Sector Borinquen, Caguas (5/4/2025) –** Lightning struck a house, tearing off pieces of the roof and cutting power to the residence.
2. **Bo. Santa Rosa, Arecibo - 1 injury (5/20/2025) –** A 17-year-old female was struck; she remained stable and conscious at the hospital.
3. **Condado Real Condominium, San Juan (7/27/2025) –** Lightning damaged part of a building's roof edge; no injuries reported.
4. **Balneario Seven Seas, Fajardo – 3 injuries (7/27/2025) –** Three females (two minors and one young adult) were injured by lightning; all were stable.
5. **Barrio Llanos, PR-725, Aibonito (8/2/2025) –** Lightning hit electrical lines, causing a power pole to fall and resulting in a power outage.
6. **Estadio Félix Mantilla, Isabela (8/23/2025) –** Lightning struck during a baseball game; no injuries reported.
7. **Lago Toa Vaca, Villalba - 1 injury, 1 fatality (8/30/2025) –** Two individuals were impacted; one sustained burns, and the second was confirmed a fatality.

8. **Bo. Saltos, Orocovis (9/12/2025) –** A power pole was struck, resulting in a fall and visible damage.
9. **Utuado Police Command - 1 injury (9/22/2025) –** A police officer was struck while standing outside with an umbrella.
10. **Condominio San Ciprián II, Carolina - 1 injury (10/5/2025) –** A 53-year-old man was struck while exiting his vehicle, he was in stable condition.
11. **Urb. Villa Fontana Park, Carolina (10/5/2025) –** Lightning hit a tree, scattering debris over homes and onto PR-26, damaging vehicles and affecting individuals.
12. **Rexville, Bayamón (10/10/2025) –** A lightning strike damaged power lines and a power pole on Calle 59.
13. **Palmarejo, Vega Baja (10/11/2025) –** A pine tree was struck near a spotter's home; localized damage reported.
14. **PR-878, Naranjito (10/18/2025) –** Lightning damaged a pine tree near an auto parts store; branches and trunk were visibly impacted.

**Eight documented hail events** (Figure 9) were reported across Puerto Rico in 2025, mostly between April and May. The first occurred on April 19 near Barrio Cañabón in Barranquitas, where pea-sized hail was confirmed by media and supported by a weak radar hail signature (Figure 10). Early May brought multiple documented reports of small to pea-sized hail in Adjuntas, Juana Díaz, Lares, and San Sebastián, including a dime-sized (0.7-inch) hail report from Barrio Piletas in Lares on May 3 (Figure 11). Additional documented events included video evidence of small hail in Lares on May 16 and along PR-2 in Añasco on May 17. The final documented hail event of the year occurred on October 18, when pea-sized hail was reported in the Santa Rosa 1 area of Guaynabo during a strong thunderstorm.

**Figure 10.** Hail was observed on April 19 in Barrio Cañabón, Barranquitas. (Left) **Photo Credit:** Iris Marie Rivera via Deborah Martorell **Figure 11.** Hail was observed on May 3rd in Barrio Piletas, Lares. (Right) **Photo Credit:** Maribel Ruíz Román via Deborah Martorell.

# Wind

For the first two days of April, **windy conditions** were observed across Puerto Rico and the U.S. Virgin Islands. A brief synoptic summary indicates that these wind events were associated with tightening pressure gradients across the northern Caribbean driven by a surface high-pressure system.

Reports from San Juan and Vicinity indicated that a large antenna at the San Francisco Condominium in Hato Rey collapsed due to strong winds, blocking vehicle access to and from the parking garage. Another report documented a tree that fell onto a power pole along PR-199 near Guaynabo, with additional wind-related impacts noted in areas such as Carolina, Puerto Nuevo, and other sectors of the San Juan metropolitan region. In the Eastern Interior, strong winds brought down a tree near Collores in Juana Díaz, which damaged power lines and forced the roadway to close.

Some ground weather stations reported strong gusty winds across the islands. According to the Isla Culebrita Light station a **peak gusts of 52 mph and multiple sites reporting values above 40 mph.** Additional gusts between **30 and 39 mph** were recorded at numerous locations, including San Juan, Ponce, Aguadilla, Vieques, and St. Croix, highlighting a consistently windy period across the region (Table 7).

| Location | Speed | Time/Date | Lat/Lon/Elev (ft.) |
|---|---|---|---|
| *Isla Culebrita Light* | 52 MPH | 0100 PM 04/03 | 18.31N/65.23W/35 |
| *Buck Island, IST* | 48 MPH | 0130 PM 04/03 | 18.28N/64.89W/40 |
| *Las Mareas* | 46 MPH | 0901 AM 04/02 | 17.93N/66.16W/34 |
| *5 SSE Cruz Bay* | 43 MPH | 0630 AM 04/02 | 18.25N/64.76W |
| *British Virgin Islands Tort* | 41 MPH | 0550 AM 04/03 | 18.42N/64.62W/29 |
| *Aguadilla Boring* | 41 MPH | 1050 AM 04/03 | 18.50N/67.13W/201 |
| *San Juan WFO* | 41 MPH | 0100 PM 04/02 | 18.43N/66.02W/10 |
| *Two Brothers,* | 41 MPH | 0510 AM 04/03 | 18.34N/64.82W/20 |
| *Yabucoa-El Negro* | 41 MPH | 0308 PM 04/03 | 18.05N/65.83W/32 |
| *Ponce* | 39 MPH | 0345 PM 04/03 | 17.96N/66.62W/39 |
| *San Juan, PR* | 39 MPH | 0112 PM 04/02 | 18.46N/66.12W |
| *San Juan NAVAID* | 39 MPH | 0833 AM 04/03 | 18.46N/66.13W/47 |

| | | | |
|---|---|---|---|
| *3 NE Catano* | 38 MPH | 0830 AM 04/02 | 18.47N/66.10W |
| *10 N Esperanza* | 38 MPH | 0130 PM 04/03 | 18.26N/65.46W |
| *9 S Potala Pastillo* | 38 MPH | 0330 PM 04/03 | 17.86N/66.52W |
| *Aguadilla Jetty* | 38 MPH | 1148 AM 04/03 | 18.43N/67.16W/18 |
| *Sandy Point NWR,* | 37 MPH | 0449 AM 04/02 | 17.68N/64.90W/46 |
| *QUEBRADILLAS* | 36 MPH | 1212 PM 04/03 | 18.47N/66.91W/393 |
| *Aguada* | 35 MPH | 0100 PM 04/03 | 18.38N/67.19W/262 |
| *Roosevelt Rd NAS* | 35 MPH | 0253 PM 04/03 | 18.25N/65.63W/14 |

**Table 7.** Highest wind gust speeds reported from April 2 - 4, 2025. **Source:** Multiple surface weather station networks.

# Saharan Air Layer (SAL) Events

## Top three events of 2025

The 2025 Saharan dust season over Puerto Rico and the U.S. Virgin Islands was characterized by a clear rise in aerosol concentrations beginning in late May and peaking through July. MODIS Aqua AOD data at 0.55 µm reveal three major dust intrusions (on June 1, July 5, and July 23) which represent the highest aerosol loadings of the year (Figure 12). These events correspond to pronounced Saharan Air Layer outbreaks that significantly reduced visibility and elevated particulate levels across the region. As illustrated in the accompanying figure (Figure 13 and 14), these peaks stand out sharply against the seasonal background, marking the most intense episodes of dust transport for 2025.

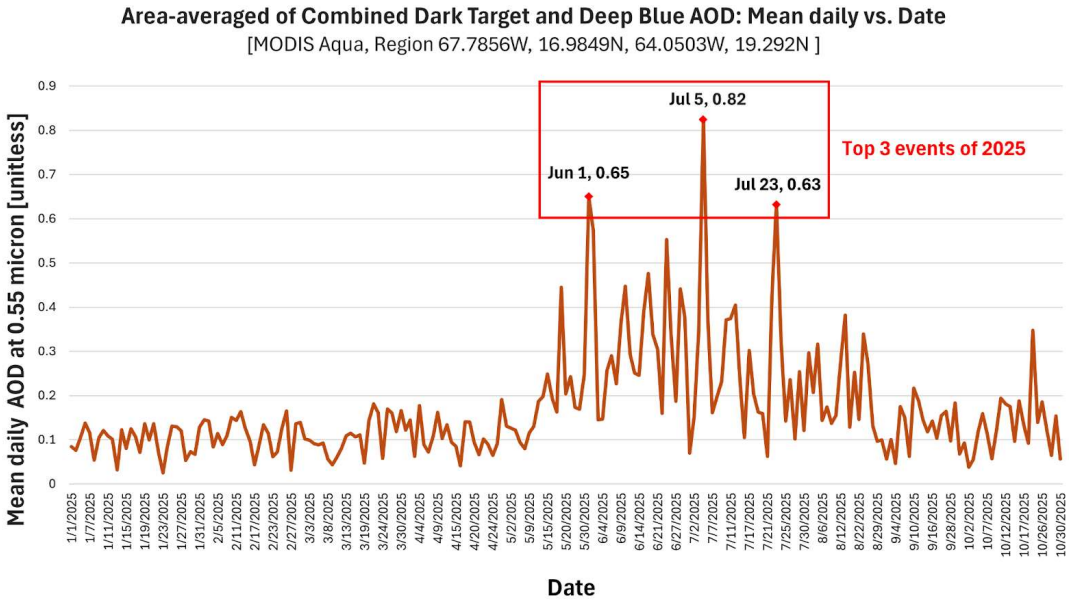


**Figure 12.** Daily MODIS Aqua AOD data show three major Saharan dust peaks in 2025. These were the strongest dust events of the year, with the highest aerosol concentrations affecting PR and the USVI.

**Figures 13 & 14.** Hazy view of the Radar from Cidra (left) and Carolina (right) on June 1, 2025. **Photo Credits:** Mauricio Pascual shares via X and NWS WFO SJU Employer.

# Drought

## Drought Percent Area in 2025 over Puerto Rico & the U.S. Virgin Islands

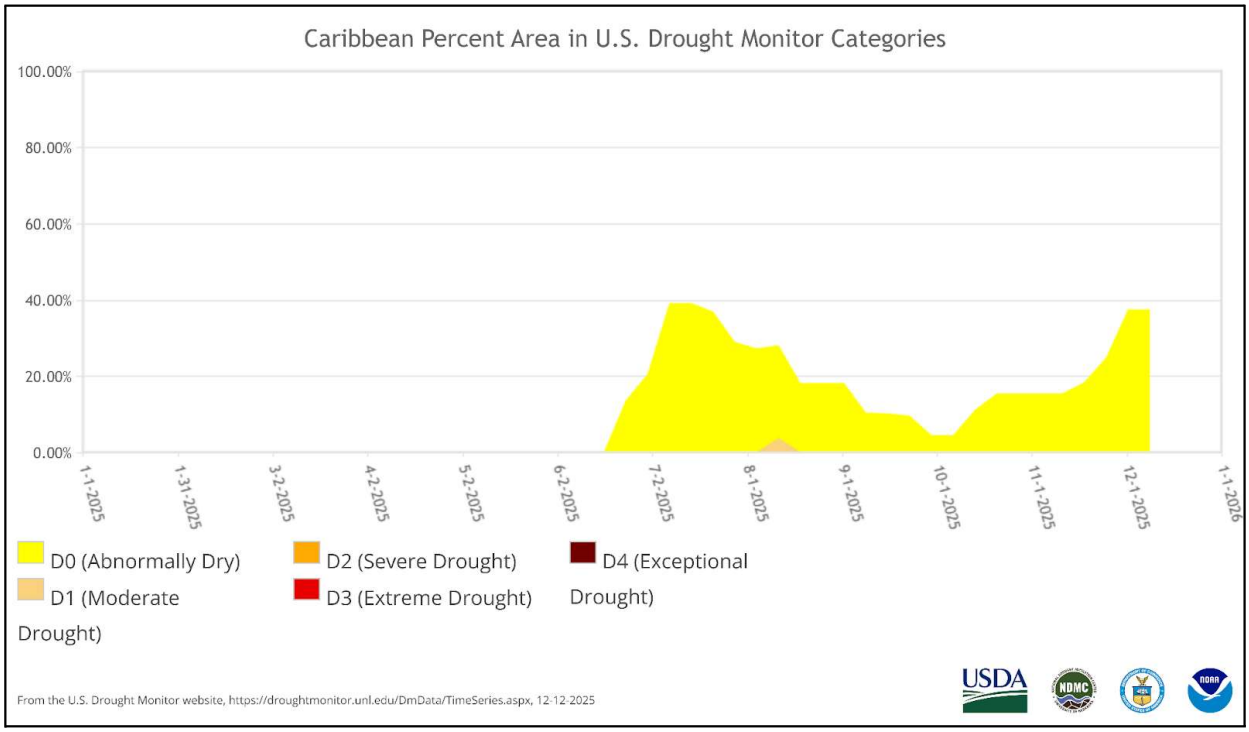


**Figure 15.** Percentage of area coverage by Abnormally Dry conditions or drought developed during 2025. **Data Source:** U.S. Drought Monitor (www.droughtmonitor.unl.edu).

**Abnormally Dry (D0)** conditions prevailed through much of the **summer and fall** months. The impacts were most obvious along the southeastern municipalities, where USGS monitored wells showed very low water levels and stress was noted in crops and general flora. There was a **short period in August** where conditions deteriorated further in Guayama and Salinas, and a **Moderate Drought (D1)** was introduced. Later in the period, **D0** spread toward the **north and central interior**. The main impact was related to decreasing levels in Lago Cidra (Figure 15).

The **lack of frequent rains** impacted the **U.S. Virgin Islands** during the **summer and fall months** as well. There are no true rivers in these islands, so residents depend on these rains to fill their cisterns. Additionally, USGS monitored wells continued to reflect low water levels, further exacerbating the lack of rain water. Dryness in the Virgin Islands was on and off, with some weeks of frequent heavy showers, followed by short dry spells. These showers were enough to prevent further deterioration across the islands. Vegetation was not severely impacted from this dryness or drought conditions.

# Significant Wildfire Events

**Figure 16.** Firemen extinguish a bushfire in Lajas. **Photo Credit:** Negociado del Cuerpo de Bomberos de Puerto Rico

The **wildfire season** generally runs from **February through August**, which corresponds to the drier months of the year when vegetation is more prone to catching fire. By June, over 1,000 wildfires were recorded, mostly in the southwest of Puerto Rico, but more than 95% were caused by preventable human negligence.

Three significant wildfires this year:

- **February 17–18 – Camp Santiago, Salinas:** A significant fire that required a coordinated response.
- **March 24 – Route 304, La Parguera, Lajas:** Over 100 acres burned, and heavy smoke affected local communities; firefighting units from Lajas, Boquerón, and Rincón responded.
- **October 9 – Cabo Rojo, Boquerón Wildlife Refuge:** A large wildfire in a wetland area apparently caused by lightning; multiple municipal and forest units responded.

These incidents highlighted the importance of prevention measures and coordinated firefighting efforts during an active wildfire season.

# 2025 Atlantic Hurricane Season

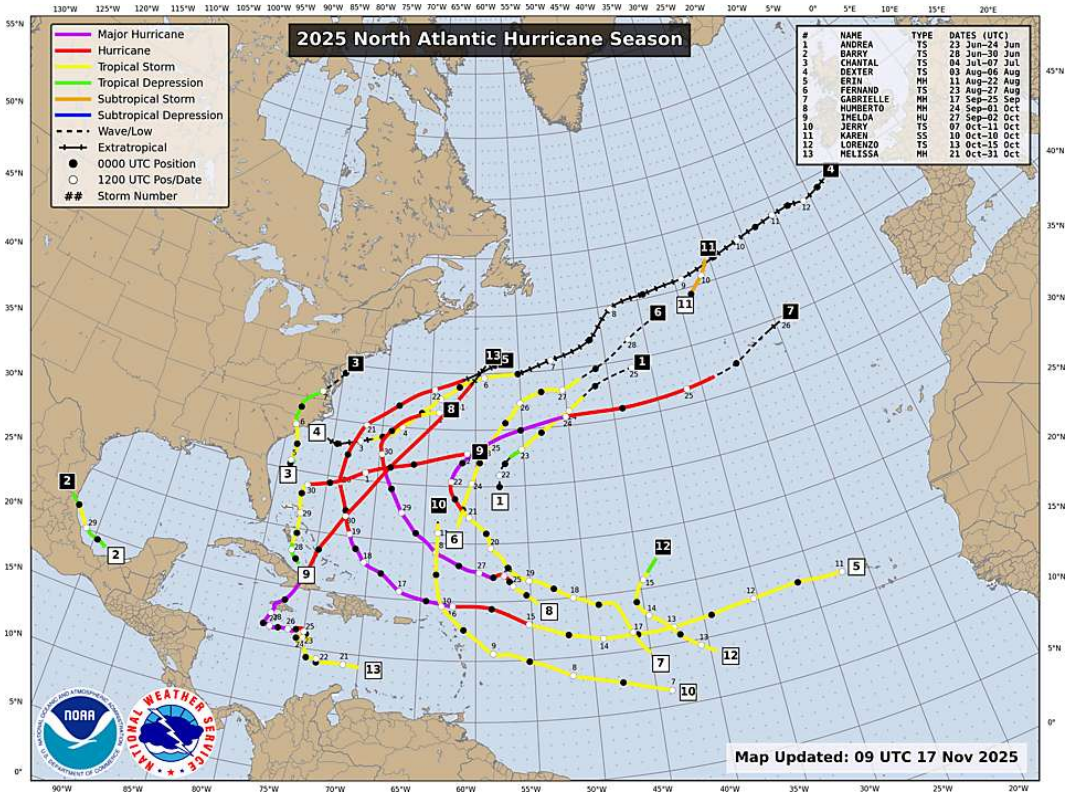


**Figure 17.** 2025 North Atlantic Hurricane Season summary map. **Source:** National Hurricane Center (www.nhc.noaa.gov/data/tcr/)

The **2025 Atlantic hurricane season** began on **June 1 and concluded on November 30**, producing a total of **13 named storms**, of which **5 became hurricanes** and **4 reached major hurricane status** (Category 3 or higher; Figure 17). These numbers are close to the 1991–2020 climatological averages, which typically include 13 named storms, 7 hurricanes, and 3 major hurricanes. The season began more slowly than average, but activity increased later, with the strongest storms occurring from August through October.

A notable feature of the season was the development of three Category 5 hurricanes. With three storms reaching this intensity, **2025 ranks as the season with the second-highest number of Category 5 hurricanes**, surpassed only by 2005, which had four.

The **most impactful storm in our area was Hurricane Erin**, which passed north of the region as a major hurricane in mid-August. It produced a maximum rainfall total of **9.16 inches in Barrio Monte Llano, Cayey**, and **7.80 inches in East End, St. John** (Figure 18). In addition, moisture associated with **Hurricane Melissa** influenced the eastern Caribbean, producing preliminary rainfall totals across Puerto Rico and the U.S. Virgin Islands. Reported maxima include **9.58 inches in Mulas, Patillas** (Figure 19).

# Hurricane Erin

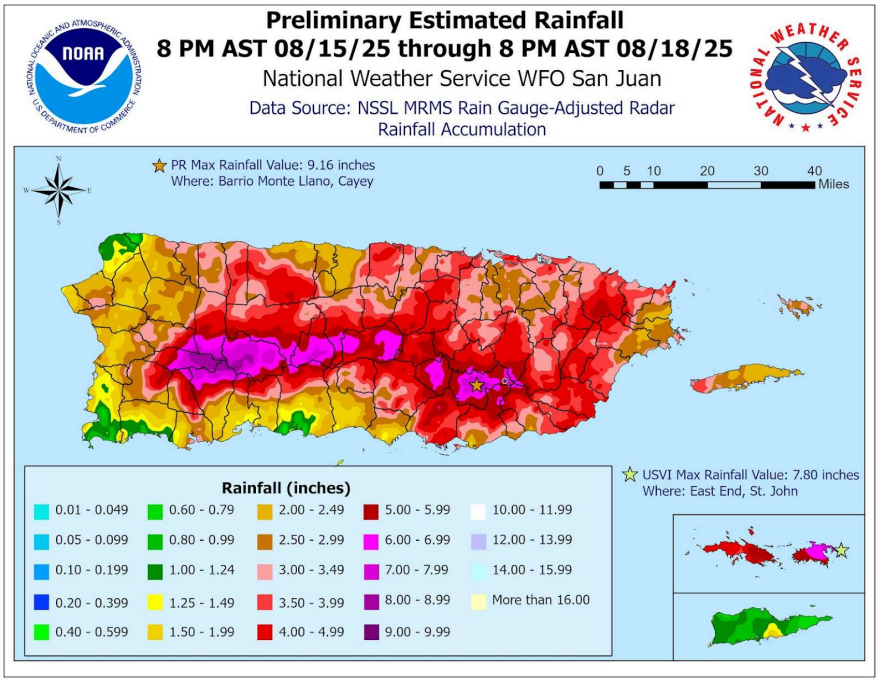


**Figure 18.** Preliminary radar estimated rainfall from August 15, 2025 at 8 PM AST through August 18, 2025 at 8 PM AST. Created by the GIS Team - NWS SJU. **Data Source:** NSSL MRMS Rain Gauge-Adjusted Radar Rainfall Accumulation.

# Hurricane Melissa

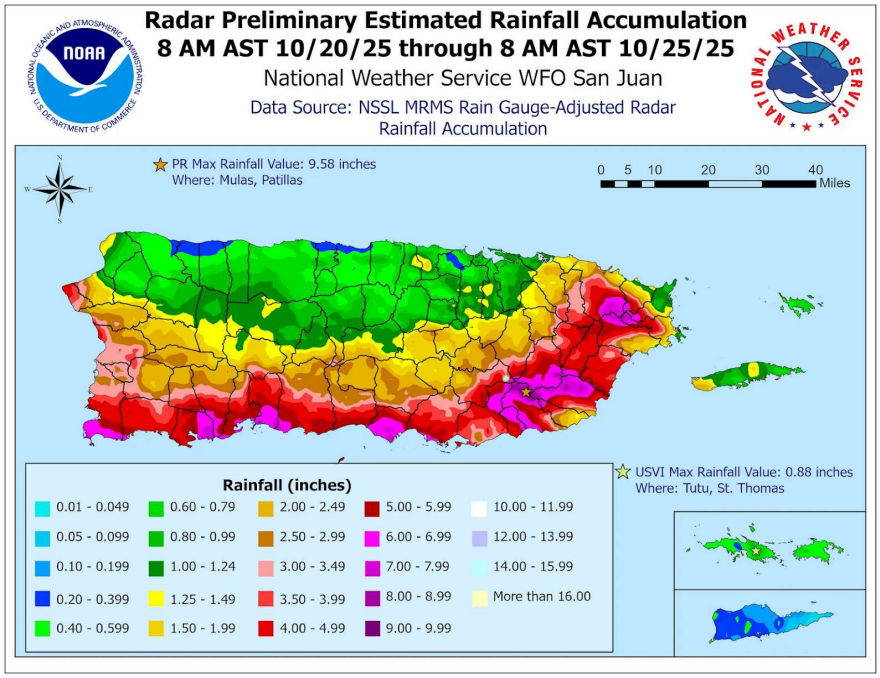


**Figure 19.** Preliminary radar estimated rainfall from October 20, 2025 at 8 AM AST through October 25, 2025 at 8 AM AST. Created by the GIS Team - NWS SJU. **Data Source:** NSSL MRMS Rain Gauge-Adjusted Radar Rainfall Accumulation.

# COOP Stations Summary

## Stations Highlights


**Figure 20.** Warmest and coolest daily temperatures, and highest precipitation collected by COOP and CoCoRaHS stations in 2025.

In 2025, Puerto Rico experienced a range of average maximum and minimum temperatures, according to the NWS Cooperative Weather Stations network. **Lajas Substation, alongside Aguirre in Salinas, Ponce 4 E in Juana Díaz, and Isabela Substation**, recorded the **highest maximum temperature of 97°F** on one day during the summer. In contrast, the **Adjuntas Substation** reported a **minimum temperature of 50°F** in March, marking the lowest recorded temperature in Puerto Rico for this year (Figure 20).

| Station | Average Temperature ((Max+Min)/2 | Mean Average Temperature | Departure from Normal |
|---|---|---|---|
| MAGUEYES ISLAND | 81.6 | 80.8 | 0.8 |
| LAJAS SUBSTATION | 79.3 | 78.2 | 1.1 |
| ADJUNTAS SUBSTATION | 72.2 | 71.4 | 0.8 |
| COLOSO | 79.3 | 78.4 | 0.9 |
| ISABELA SUBSTATION | 79.2 | 77.2 | 2 |
| AGUIRRE | 80.9 | 78.4 | 2.5 |
| GUAYAMA 1SW | 81.0 | 81.3 | -0.3 |
| PONCE 4 E | 81.2 | 77.9 | 3.3 |
| AIBONITO 1 S | 73.4 | 71.8 | 1.6 |
| ADJUNTAS 2 NW | 73.0 | N/A | N/A |
| TORO NEGRO FOREST | 71.5 | N/A | N/A |
| DOS BOCAS | 79.0 | 78.1 | 0.9 |
| MANATI 2 E | 78.7 | 76.9 | 1.8 |
| ARECIBO OBSERVATORY | 75.6 | 73.9 | 1.7 |
| TOA BAJA LEVITTOWN | 80.6 | 79.5 | 1.1 |
| PALMAREJO VEGA BAJA | 76.5 | 77.5 | -1 |
| CIALES 2S | 77.0 | N/A | N/A |
| YABUCOA 3 SE | 80.0 | N/A | N/A |
| JUNCOS 1 SE | 78.9 | 77.4 | 1.5 |
| HUMACAO NATURAL RESERVE | 80.3 | N/A | N/A |
| FAJARDO | 80.7 | N/A | N/A |
| TRUJILLO ALTO 2 SSW | 80.2 | 78.6 | 1.6 |
| WFO SAN JUAN | 81.1 | 79.9 | 1.2 |
| CHRISTIANSTED FORT | 81.4 | 81.1 | 0.3 |
| BORDEAUX | 79.8 | N/A | N/A |

**Table 8**. Annual average temperature observed by the COOP stations in 2025. Stations with less than 30 years of data will not have normals calculated. Some stations are missing days in November and December, which will be added in a revisited version of this report in January 2026.

The **annual average maximum temperature** was recorded at **91.3°F** by the **Lajas Substation** (Appendix, Figure 31a), while the **lowest maximum temperature** of **77.6°F** was registered by **Toro Negro Forest** in Ciales. The **annual average minimum temperature** for the year was **61.8°F** (Appendix, Figure 31b), as recorded by the **Adjuntas Substation** COOP station. Meanwhile, **Christiansted Fort** in Saint Croix recorded the **highest annual average minimum temperature** of **77.2°F**, followed by **75.3°F** at both **WFO San Juan** and **Yabucoa 3S**.

| Station Name | Observed Precipitation (Inches) | Normal Precipitation (Inches) | Departure from Normal (Inches) |
|---|---|---|---|
| MARICAO FISH HATCHERY | 107.40 | 97.81 | 9.59 |
| PARAISO | 108.28 | 100.54 | 7.74 |
| RIO BLANCO LOWER | 97.20 | 108.74 | -11.54 |
| TORO NEGRO FOREST | 91.52 | 94.24 | -2.72 |
| HACIENDA CONSTANZA 2W | 89.80 | N/A | N/A |
| JAJOME ALTO | 82.07 | 75.88 | 6.19 |
| DOS BOCAS | 83.65 | 78.25 | 5.40 |
| ADJUNTAS SUBSTATION | 78.30 | 80.20 | -1.90 |
| COLOSO | 77.84 | 77.50 | 0.34 |
| ARECIBO OBSERVATORY | 75.33 | 84.58 | -9.25 |
| AIBONITO 1 S | 71.04 | 61.79 | 9.25 |
| PALMAREJO VEGA BAJA | 68.84 | 64.48 | 4.36 |
| CROWN BAY | 68.88 | N/A | N/A |
| TOA BAJA LEVITTOWN | 67.84 | 75.37 | -7.53 |
| CIALES 2S | 65.09 | N/A | N/A |
| MOROVIS 1 N | 65.11 | 75.56 | -10.45 |
| GUAJATACA DAM | 63.95 | 75.56 | -11.61 |
| CORRAL VIEJO | 66.41 | 62.08 | 4.33 |
| YABUCOA 3 SE | 58.33 | N/A | N/A |
| ISABELA SUBSTATION | 61.48 | 64.06 | -2.58 |
| SABANA GRANDE 2 ENE | 56.76 | 57.42 | -0.66 |
| WFO SAN JUAN | 55.07 | 65.23 | -10.16 |
| JUNCOS 1 SE | 52.76 | 67.47 | -14.71 |
| HUMACAO NATURAL RESERVE | 53.74 | 67.67 | -13.93 |

| Station Name | Observed Precipitation (Inches) | Normal Precipitation (Inches) | Departure from Normal (Inches) |
|---|---|---|---|
| TRUJILLO ALTO 2 SSW | 51.61 | 73.00 | -21.39 |
| MANATI 2 E | 51.13 | 61.88 | -10.75 |
| SAN LORENZO 1SW | 55.71 | N/A | N/A |
| BORDEAUX | 50.76 | N/A | N/A |
| RINCON | 48.86 | N/A | N/A |
| WINDSWEPT BEACH | 47.06 | N/A | N/A |
| FAJARDO | 46.24 | N/A | N/A |
| LAJAS SUBSTATION | 39.75 | 44.91 | -5.16 |
| MORA CAMP | 40.99 | 58.57 | -17.58 |
| CRUZ BAY | 39.19 | N/A | N/A |
| EAST END | 37.29 | 40.91 | -3.62 |
| GUAYAMA 1SW | 37.76 | 54.40 | -16.64 |
| EAST HILL | 33.64 | 37.11 | -3.47 |
| JUANA DIAZ CAMP | 32.00 | 42.05 | -10.05 |
| AGUIRRE | 30.98 | 40.37 | -9.39 |
| ENSENADA 1 W | 29.78 | 32.49 | -2.71 |
| MAGUEYES ISLAND | 29.38 | 42.48 | -13.1 |
| CALERO CAMP | 31.34 | 55.46 | -24.12 |
| CHRISTIANSTED FORT | 30.14 | 43.41 | -13.27 |
| PONCE 4 E | 29.38 | 37.52 | -8.14 |
| MONTPELLIER | 31.41 | 45.43 | -14.12 |

**Table 9**. Annual precipitation observed by the COOP stations in 2025. Stations with less than 30 years of data will not have normals calculated. Some stations are missing days in November and December, which will be added in a revisited version of this report in January 2026.

In terms of total precipitation, the highest amount in one day for 2025 was reported by the CoCoRaHS station, **Christiansted 1.7 SW**, located in St. Croix, which received **6.94 inches** of rain on September 18, 2025. Additionally, the COOP station **Morovis 1N** in Puerto Rico, reported the highest amount of rainfall in one day in Puerto Rico of **6.45 inches**.

The **month** with the **highest rainfall** in 2025 was **May**, with **28.56 inches** reported by the COOP station in **Toro Negro Forest**, Ciales, PR.

| Station Name | Observed Precipitation (Inches) |
|---|---|
| LAS MARIAS 9.6 ESE | 110.96 |
| LARES 2.0 NNE | 99.55 |
| JAYUYA 3.1 SSE | 84.27 |
| MAYAGUEZ ARRIBA | 79.57 |
| VEGA BAJA 2.8 N | 70.55 |
| RINCON 2.8 SE | 70.02 |
| LAS PIEDRAS 1.9 WNW | 68.28 |
| TOA ALTA 2.7 SSW | 66.6 |
| LEVITTOWN 1.0 SE | 66.43 |
| MAYAGUEZ 1.0 S | 66.36 |
| CANOVANAS 6.5 S | 66.26 |
| SAN GERMAN 0.8 W | 63.73 |
| PENUELAS 5.0 NNE | 61.94 |
| VILLALBA 1.5 SSW | 60.86 |
| SAN JUAN 2.4 WSW | 60.77 |
| RINCON 1.5 N | 59.54 |
| FAJARDO 1.1 S | 59.26 |
| MANATI 1.0 S | 58.85 |
| SAN JUAN 7.1 S | 58.38 |
| TRUJILLO ALTO 2.5 S | 57.47 |
| CAROLINA 1.7 NNW | 54.89 |
| WFO SAN JUAN | 54.77 |
| JUNCOS 0.3 WSW | 54.47 |
| ARECIBO 5.2 ESE | 54.44 |

**Table 10**. Annual precipitation observed by the CoCoRaHS stations during 2025. Missing days in December will be added in a revised version of this report in January 2026.

The **highest total annual precipitation** recorded was **110.04 inches** at the **Maricao Fish Hatchery** COOP station, followed closely by **Paraíso** in Ceiba, which received **108.28 inches**. In contrast, the CoCoRaHS station that reported the greatest annual precipitation was **Las Marias 9.6 ESE**, with a total of **110.96 inches**, followed by **Lares 2.0 NNE** with **99.55 inches** (Table 10).

# Marine

## Sea Surface Temperatures

### Water Temperature Summary — San Juan (Buoy 41053)

The observed monthly mean water temperature at the San Juan buoy during 2025 exhibited a well-defined seasonal cycle (Figure 21), with cooler conditions during late winter and early spring, followed by a steady warming trend from March through the summer months. Peak temperatures occurred in August and September, reaching values near the upper range of the historical climatology. A gradual cooling trend developed during the fall, with temperatures returning toward climatological values by November. Overall, water temperatures remained within the typical historical variability range; however, from March through September, monthly mean temperatures were persistently above the long-term climatological mean.

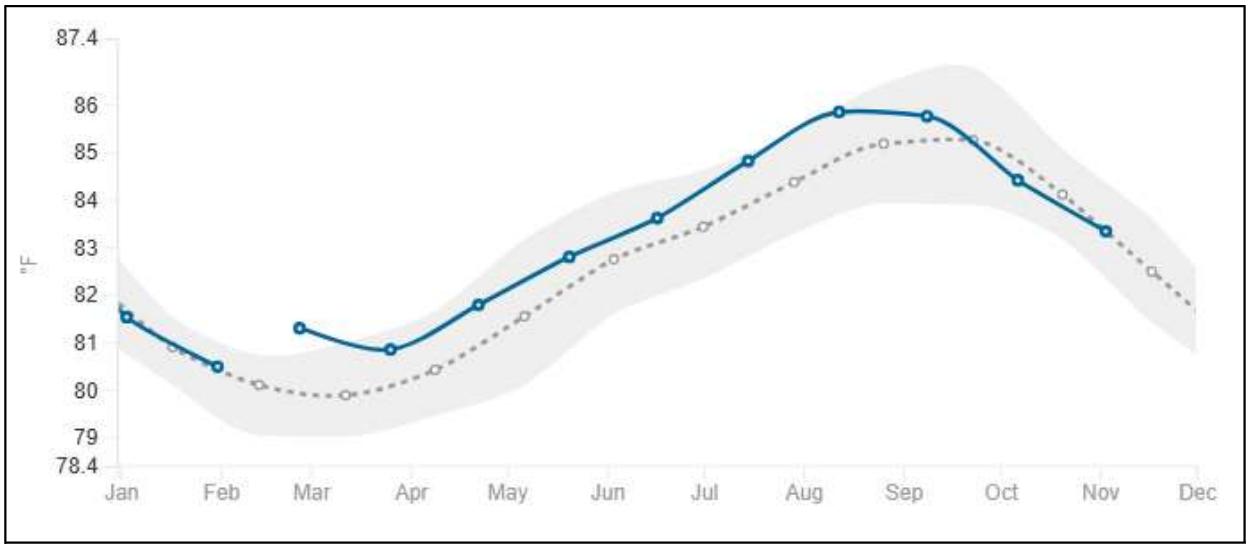


**Figure 21.** The solid blue line represents the observed monthly mean water temperature in the San Juan buoy. The gray dashed line represents the long-term climatological mean water temperature. The light gray-shaded band indicates the 10th–90th percentile range of historical water temperatures at Ponce Buoy, illustrating the typical variability around the climatological mean. **Source:** CARICOOS.

### Water Temperature Summary — Ponce, PR (Buoy 42085)

The observed monthly mean water temperature at the Ponce buoy during 2025 exhibited a well-defined seasonal cycle (Figure 22). Cooler conditions prevailed during late winter and early spring, followed by a steady warming trend from March into early summer. A brief moderation in temperatures occurred between June and July, when values were near or slightly below the long-term climatological mean. Peak water

temperatures were observed in August and September, with monthly means near or slightly above the climatological average. Beginning in October, water temperatures gradually decreased, returning toward climatological values by late fall. Overall, water temperatures at the Ponce buoy remained within the typical historical variability range throughout the year; however, from March through September, monthly mean temperatures were generally above the long-term climatological mean.

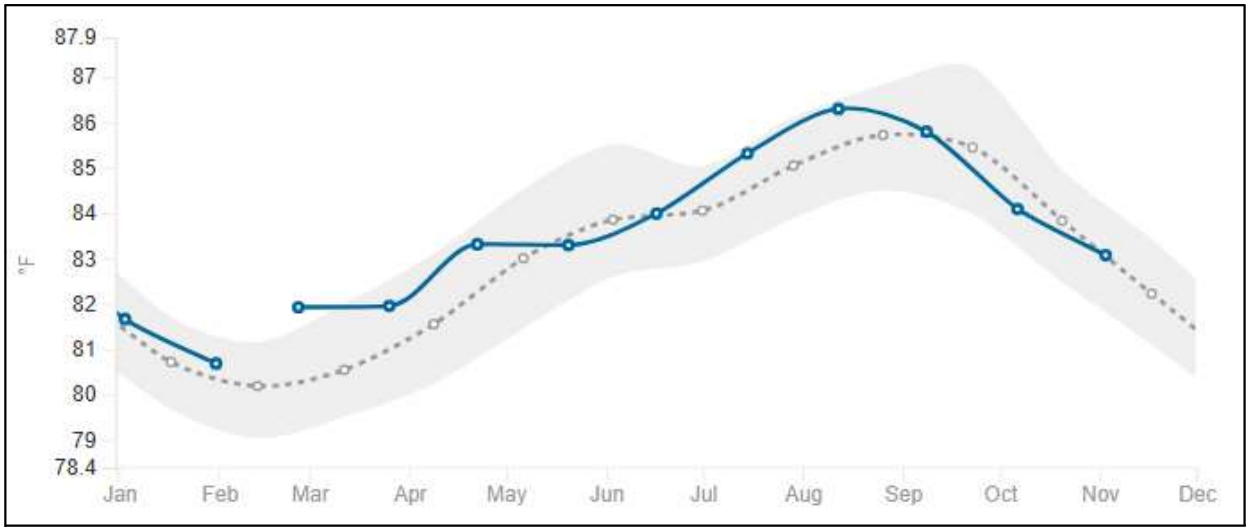


**Figure 22.** The solid blue line represents the observed monthly mean water temperature in the Ponce buoy. The gray dashed line represents the long-term climatological mean water temperature. The light gray-shaded band indicates the 10th–90th percentile range of historical water temperatures at Ponce Buoy, illustrating the typical variability around the climatological mean. **Source:** CARICOOS.

### Water Temperature Summary South of St. John, USVI (Buoy 41052)

The observed monthly mean water temperature south of St. John during 2025 exhibited a well-defined seasonal cycle (Figure 23). Cooler conditions prevailed during late winter and early spring, followed by a gradual warming trend beginning in March and continuing through the summer months. During the March–May period, monthly mean water temperatures exceeded the 90th-percentile threshold of the historical distribution, indicating anomalously warm conditions relative to climatology. Peak water temperatures occurred in August and September, with observed values near or slightly above the long-term climatological mean. Beginning in October, water temperatures declined steadily, returning toward climatological values by late fall. Overall, water temperatures near St. John remained within the typical historical variability range throughout the year; however, from March through September, monthly mean temperatures were generally above the long-term climatological mean.

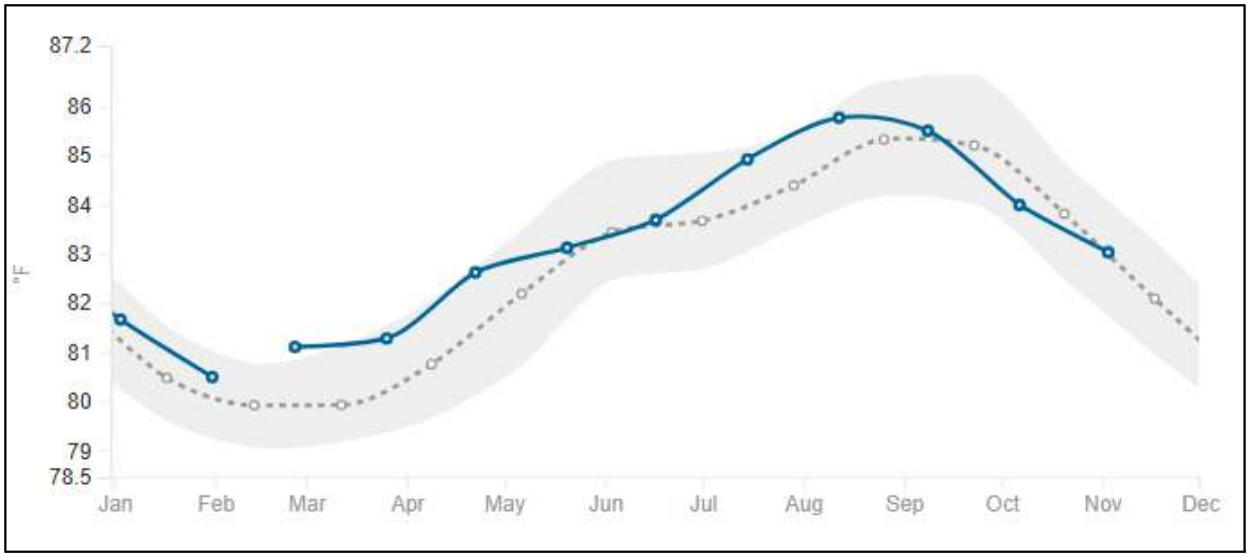


**Figure 23.** The solid blue line represents the observed monthly mean water temperature in the St John buoy. The gray dashed line represents the long-term climatological mean water temperature. The light gray-shaded band indicates the 10th–90th percentile range of historical water temperatures at Ponce Buoy, illustrating the typical variability around the climatological mean. **Source**: CARICOOS.

In summary, across San Juan, Ponce, and south of St. John, observed water temperatures during 2025 exhibited a coherent regional signal characterized by a well-defined seasonal cycle and predominantly positive thermal anomalies. All three sites experienced cooler conditions during late winter and early spring, followed by sustained warming beginning in March and persisting through the summer months. Peak temperatures occurred consistently during August and September, with values near or slightly above long-term climatological means. While water temperatures remained within the historical variability range at each location, monthly mean values from March through September were generally above climatology, indicating a region-wide tendency toward warmer-than-average surface waters.

# Sea Surface Temperatures in the Main Development Region

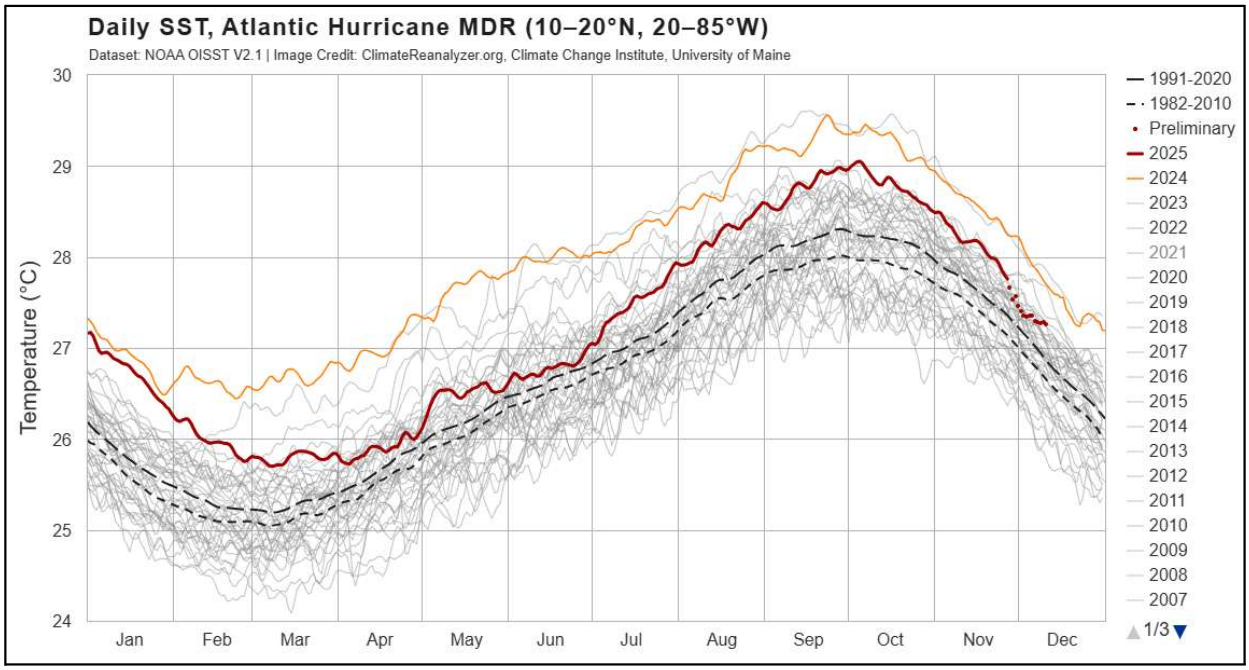


**Figure 24.** Daily sea surface temperature (SST) evolution across the Atlantic Hurricane Main Development Region (10°–20°N, 20°–85°W) during 2025, based on NOAA OISST v2.1 data. The 2025 time series (red) is shown relative to historical SST distributions, and climatological means (1991–2020 and 1982–2010). Data shown are preliminary. **Source:** ClimateReanalyzer.org.

Sea surface temperatures across the Atlantic Hurricane Main Development Region remained above the long-term climatological mean throughout 2025. However, SST values were lower than the record or near-record warm conditions observed during 2023 and 2024 (Figure 24). Overall, the sea surface temperatures remained anomalously warm relative to climatology, supporting a favorable large-scale background for tropical development, though not to the extreme levels of the two preceding years.

# Wave Heights

### 2025 Wave Height Summary — San Juan, PR (Buoy 41053)

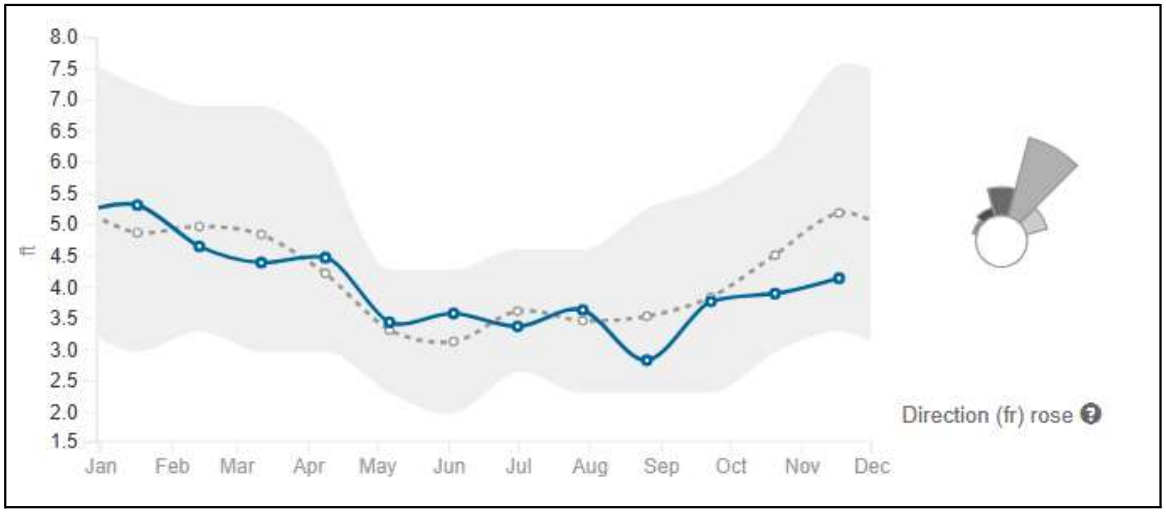


**Figure 25.** Observed monthly mean significant wave height and wave direction at the San Juan buoy (41053) during 2025. The solid blue line represents the observed monthly mean significant wave height, while the gray dashed line denotes the long-term climatological mean. The light gray shaded band indicates the 10th–90th percentile range of historical wave heights, illustrating typical variability around the climatological mean. The directional wave rose summarizes the predominant wave approach directions during the year, with sector orientation indicating wave propagation direction and sector size representing relative frequency. **Data Source: CariCOOS.**

Annual mean significant wave heights observed at buoy 41053 near San Juan during 2025 closely tracked climatological averages (Figure 25). A typical seasonal pattern was observed, characterized by higher wave heights during the winter months, a gradual decrease into summer, and a secondary increase during the fall. Monthly mean significant wave heights generally ranged between approximately 3.0 and 5.5 ft, with early-year maxima associated with winter swell events and a renewed increase during October–November. The relatively narrow separation between observed values and the long-term 10th–90th percentile envelope for most of the year indicates that wave conditions remained within expected seasonal variability. Directional distributions were dominated by northeasterly to easterly wave components, consistent with climatological trade-wind forcing and the regional swell regime influencing Puerto Rico and the U.S. Virgin Islands.

## 2025 Wave Height Summary — Ponce, PR (Buoy 42085)

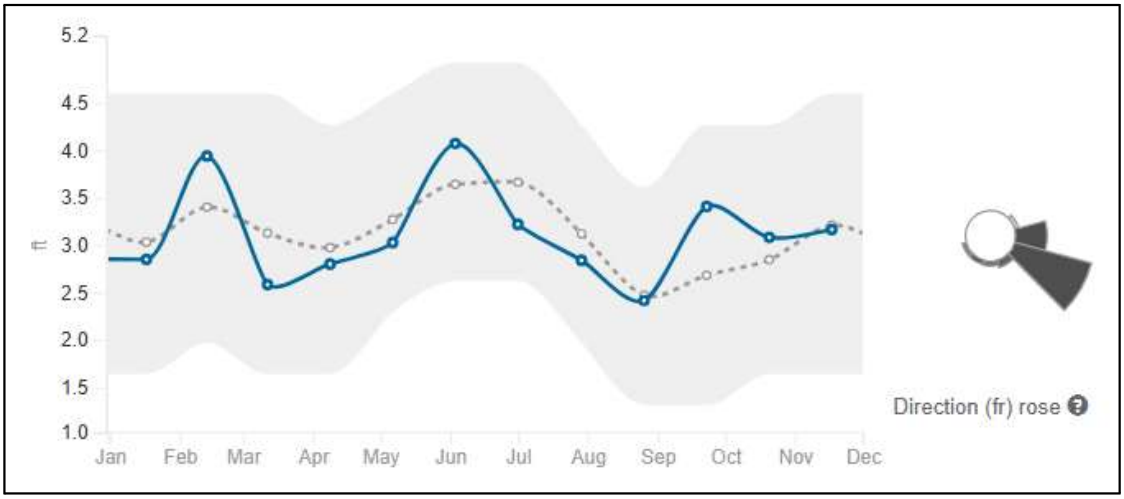


**Figure 26.** Observed monthly mean significant wave height and wave direction at the Ponce buoy (42085) during 2025. The solid blue line represents the observed monthly mean significant wave height, while the gray dashed line denotes the long-term climatological mean. The light gray shaded band indicates the 10th–90th percentile range of historical wave heights, illustrating typical variability around the climatological mean. The directional wave rose summarizes the predominant wave approach directions during the year, with sector orientation indicating wave propagation direction and sector size representing relative frequency. **Data Source: CariCOOS.**

Wave conditions southeast of Ponce during 2025 exhibited a seasonal evolution consistent with the nearshore climatology of southern Puerto Rico (Figure 26). Monthly mean significant wave heights generally ranged between approximately 2.0 and 4.5 ft, with episodic enhancements during February, June, and October associated with increasing winds and tropical cyclone activity, respectively. A pronounced minimum occurred during late March to early April, when mean wave heights briefly approached the lower bound of the historical 10th–90th percentile envelope. Throughout the summer and early fall, wave heights remained near climatological averages, indicative of relatively steady easterly trade-wind forcing. Directional distributions were dominated by east to east-southeast wave components, characteristic of Caribbean trade-wind seas and locally generated wave conditions south of Puerto Rico. Overall, wave behavior at buoy 42085 during 2025 remained within expected seasonal variability, with no prolonged anomalous swell events affecting the region.

**2025 Wave Height Summary — South of St. John, USVI (Buoy 41052)**

Observed wave heights at the buoy south of St. John during 2025 exhibited a seasonal pattern consistent with the climatological wave regime of the eastern Caribbean. Monthly mean significant wave heights generally remained near the long-term climatological mean and within the historical 10$^{th}$–90$^{th}$ percentile range. Periods of modestly elevated wave heights during the summer and fall coincided with increased tropical cyclone activity in the Atlantic basin; however, no tropical cyclones tracked sufficiently close to St. John to produce sustained or anomalously high wave conditions at the buoy. Consequently, wave heights during 2025 primarily reflected background trade-wind and swell conditions, with only indirect influences from distant tropical systems. Overall, wave conditions remained within expected seasonal variability.

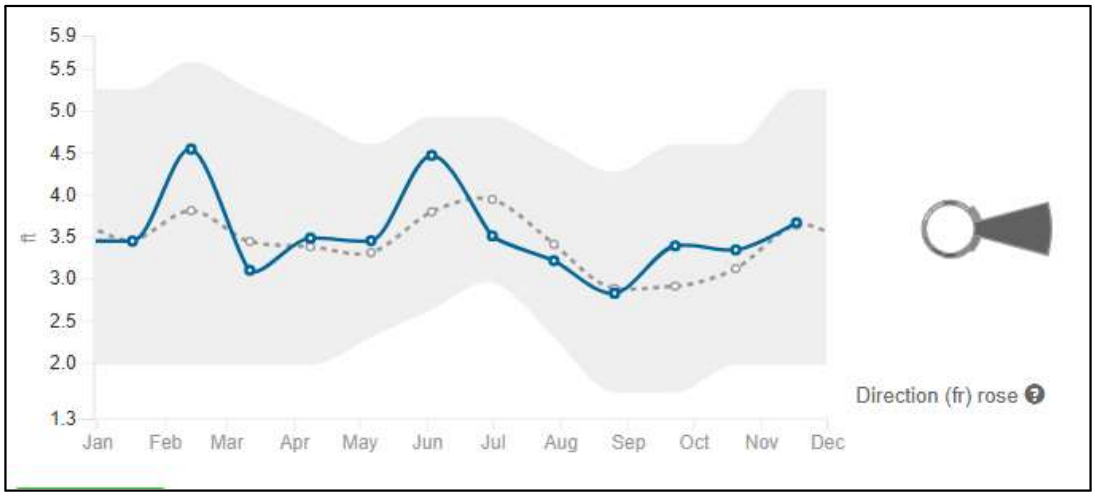


**Figure 27.** Observed monthly mean significant wave height and wave direction for South of St. John, USVI (Buoy 41052). The solid blue line represents the observed monthly mean significant wave height during 2025 at the buoy south of St. John. The gray dashed line denotes the long-term climatological mean significant wave height. The light gray shaded band indicates the 10th–90th percentile range of historical wave heights, illustrating the typical variability around the climatological mean. The directional wave rose summarizes the predominant wave approach directions during the year, with sector orientation indicating direction of propagation. **Data Source:** CariCOOS.

In summary, across the local sites, observed wave heights during 2025 exhibited a coherent regional pattern consistent with the climatological wave regimes of the northeastern Caribbean. Monthly mean significant wave heights at all sites generally remained near their long-term climatological means and within the historical 10$^{th}$–90$^{th}$ ranges. A common seasonal signal was evident, with higher wave heights during the winter months associated with northerly swell events, reduced wave heights during late spring and summer under prevailing trade-wind conditions, and a modest re-intensification during the fall. While periods of increased Atlantic tropical cyclone activity coincided with slight wave height enhancements at some locations, no tropical cyclones passed sufficiently close to produce sustained or anomalously high wave conditions.

# Significant Swell Event

From October 2 to 6, a long-period north to northwesterly swell generated by distant Hurricane Imelda and the remnants of Humberto significantly deteriorated marine and coastal conditions across the region. Seas reached **up to 11 ft**, with **16-19 ft breaking waves** and **periods near 14 to 15 seconds**, resulting in hazardous rip currents, coastal flooding, and multiple road closures. A **Coastal Flood Warning**, **High Surf Warning**, **High Rip Current Risk**, and **Small Craft Advisories** were in effect during this period. Authorities reported **at least 11 coastal flood and/or high-surf reports** from **Loíza, Carolina, Río Grande, Barceloneta, Hatillo, Arecibo, Aguada, and Aguadilla**.

A boating accident near **Survival Beach in Aguadilla** resulted in **two fatalities** and **five individuals rescued**.

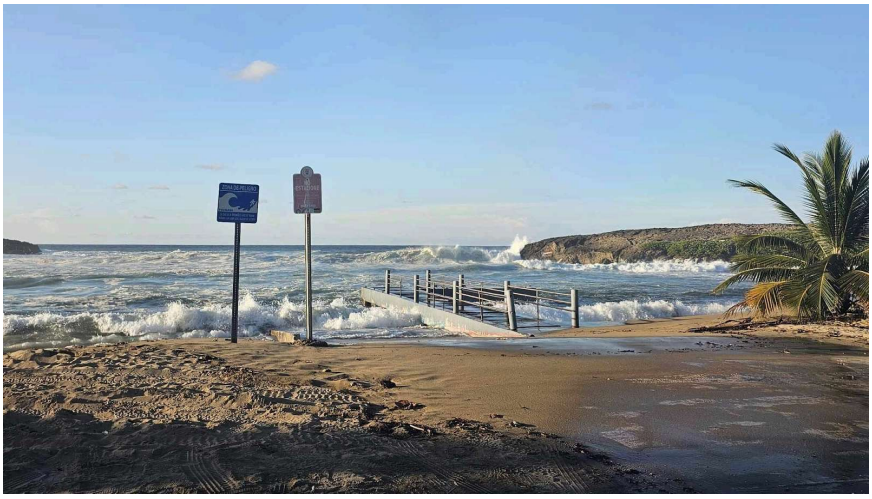

**Figure 28:** Swell from Playa Peñón Amador, Camuy, PR (Left). **Photo Credit:** Zilado Martínez via Suheily López Belén.

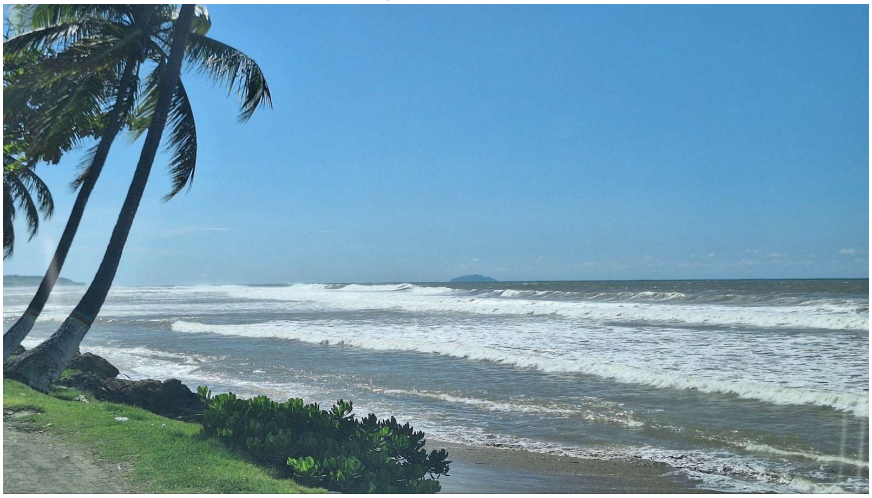

**Figure 29:** Swell from Aguada, PR (Right). **Photo Credit:** Cuca Figueroa via Suheily López Belén.

# Surf Zone Fatalities

A total of **10 fatalities** were reported in Puerto Rico throughout the year, **8 attributed to rip currents and 2 to high surf**. Please note that this data is preliminary, and the locations of fatalities are approximate (Figure 30).


**Figure 30.** Map of Puerto Rico with approximate locations of fatalities in the surf zones across the NWS San Juan area of forecast responsibility during 2025. Red dots indicate cases due to rip currents, while blue dots indicate cases due to high surf.

| Location | Hazard | Genre | Age | Date |
|---|---|---|---|---|
| Abacoa Beach, Arecibo | Rip Current | M | 63 | 1/19/2025 |
| Vacía Talega Beach, Loíza | Rip Current | M | 62 | 2/23/2025 |
| Rincon Beach Resort | Rip Current | M | 71 | 3/8/2025 |
| Sandy Beach, Rincón | Rip Current | M | 61 | 3/15/2025 |
| Flamenco Beach, Culebra | Rip Current | M | 67 | 3/19/2025 |
| Jobos Beach, Isabela | Rip Current | M | 65 | 7/17/2025 |
| Chatarra Beach, Loíza | Rip Current | - | - | 8/24/2025 |
| Mar Chiquita Beach, Manatí | High Surf | M | 40 | 8/24/2025 |
| Kikita Beach, Dorado | Rip Current | M | 31 | 8/24/2025 |
| Tres Palmas Beach, Rincón | High Surf | M | 72 | 10/20/2025 |

**Table 11.** Preliminary data on fatalities that occurred in the surf zones across the NWS San Juan area of forecast responsibility during 2025. This data is preliminary, and the locations of fatalities are approximate. **Source:** NOAA National Weather Service.

**Interesting Fact:** A magnitude ~7.6 earthquake struck on February 8, 2025, about 209 km south-southwest of George Town (Cayman Islands) at a shallow depth, triggering a tsunami advisory for Puerto Rico due to the risk of sea-level fluctuations and strong currents. The WFO San Juan activated its local tsunami protocol, sounding coastal alarms and coordinating with emergency agencies. After further analysis and modeling showed no significant tsunami threat, the advisory was canceled.

# Appendix

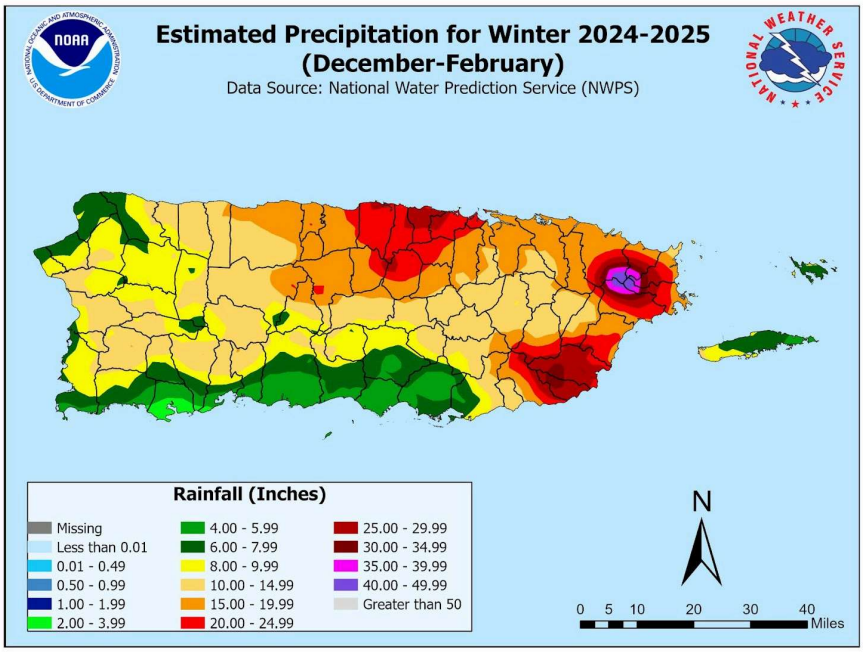


**Figure A1.** 2024-2025 Winter (December-February) Estimated Rainfall in inches. Created by: GIS Team - NWS SJU. Data obtained from NWPS.

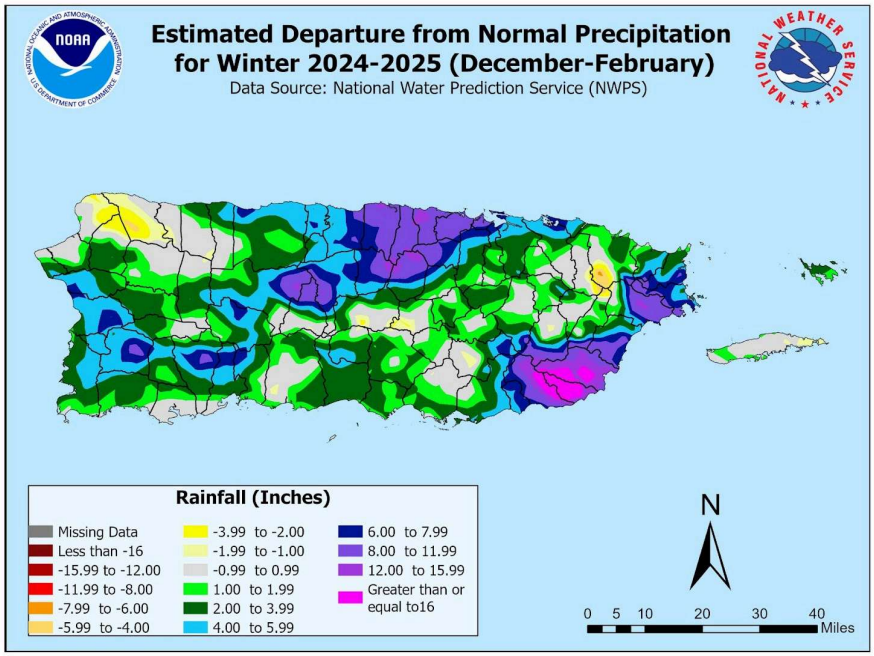


**Figure A2.** 2024-2025 Winter (December-February) Departure from Normal Rainfall in Inches. Created by GIS Team - NWS SJU. Data obtained from NWPS.

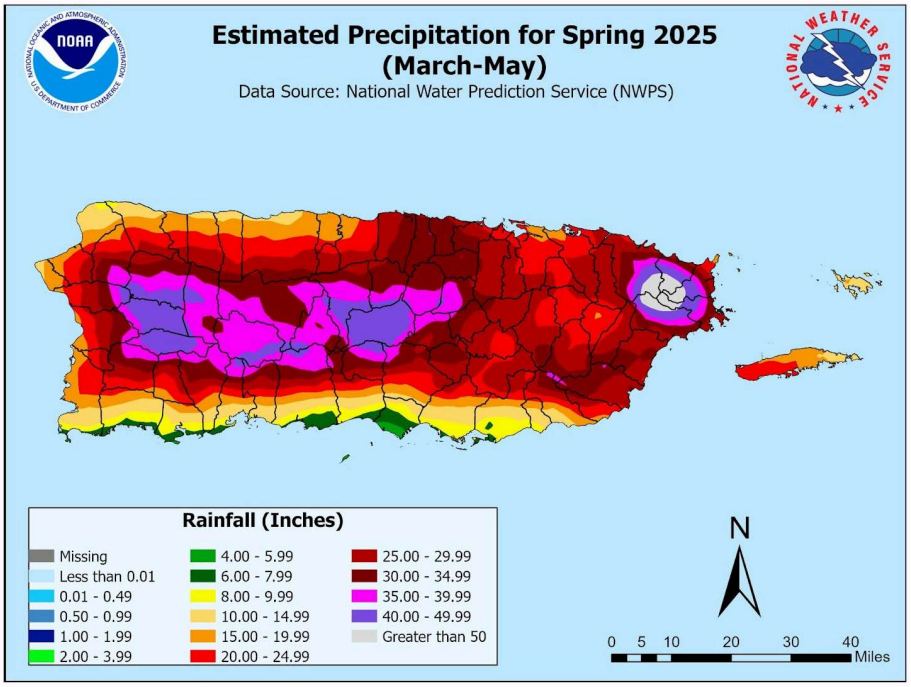


**Figure A3.** 2025 Spring (March-May) Estimated Rainfall in inches. Created by: GIS Team - NWS SJU. Data obtained from NWPS.

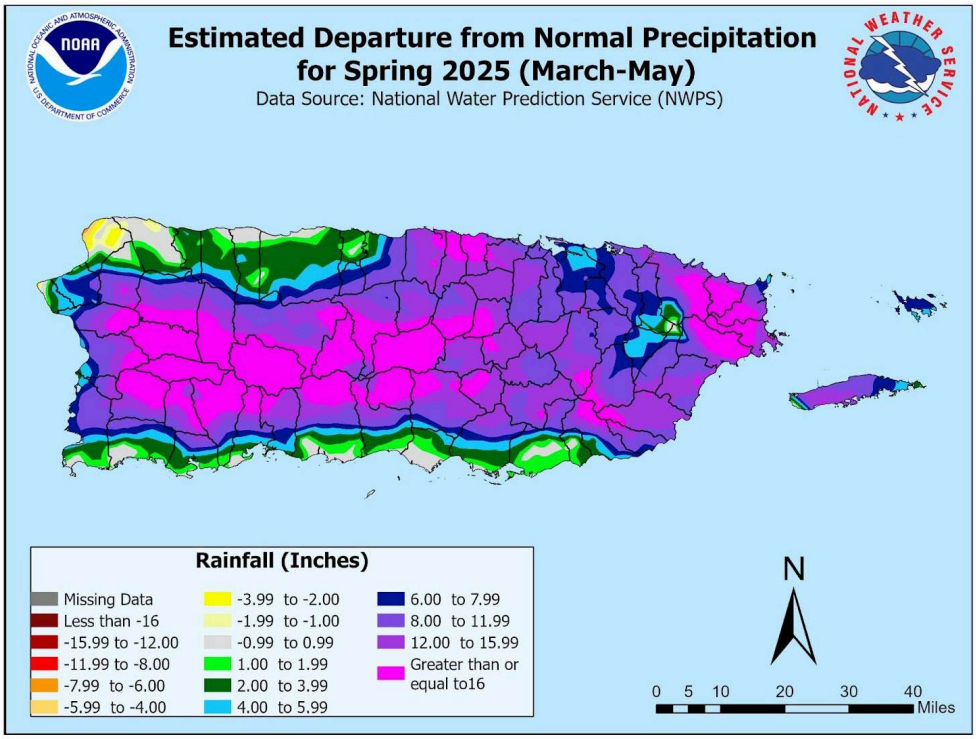


**Figure A4.** 2025 Spring (March-May) Departure from Normal Rainfall in Inches. Created by GIS Team - NWS SJU. Data obtained from NWPS.

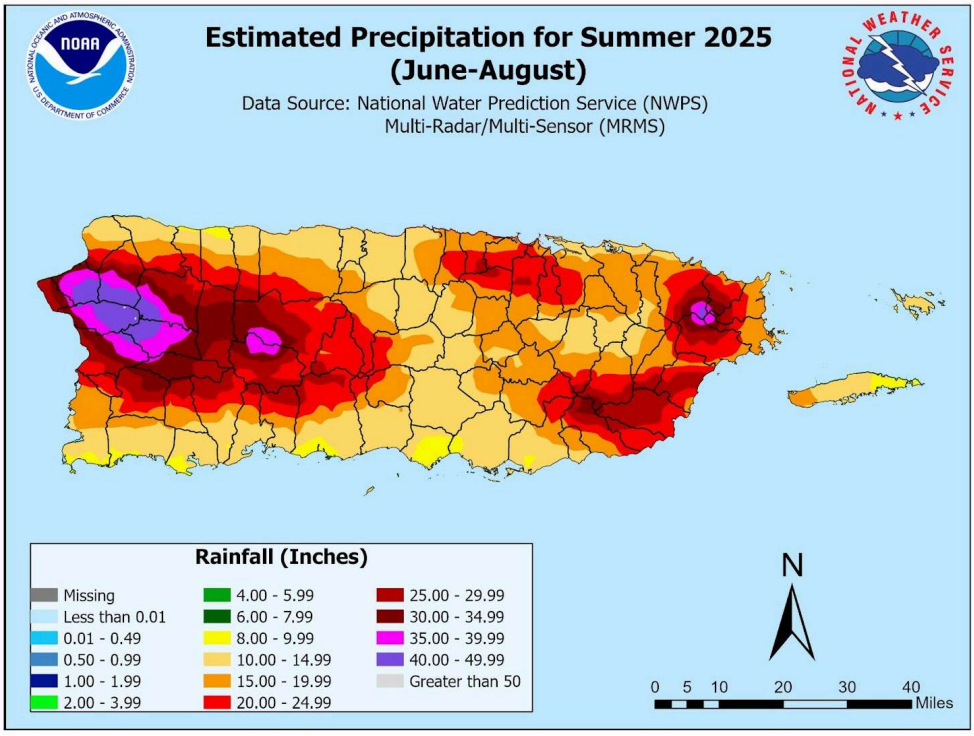


**Figure A5.** 2025 Summer (June-August) Estimated Rainfall in inches. Created by: GIS Team - NWS SJU. Data obtained from NWPS and MRMS.

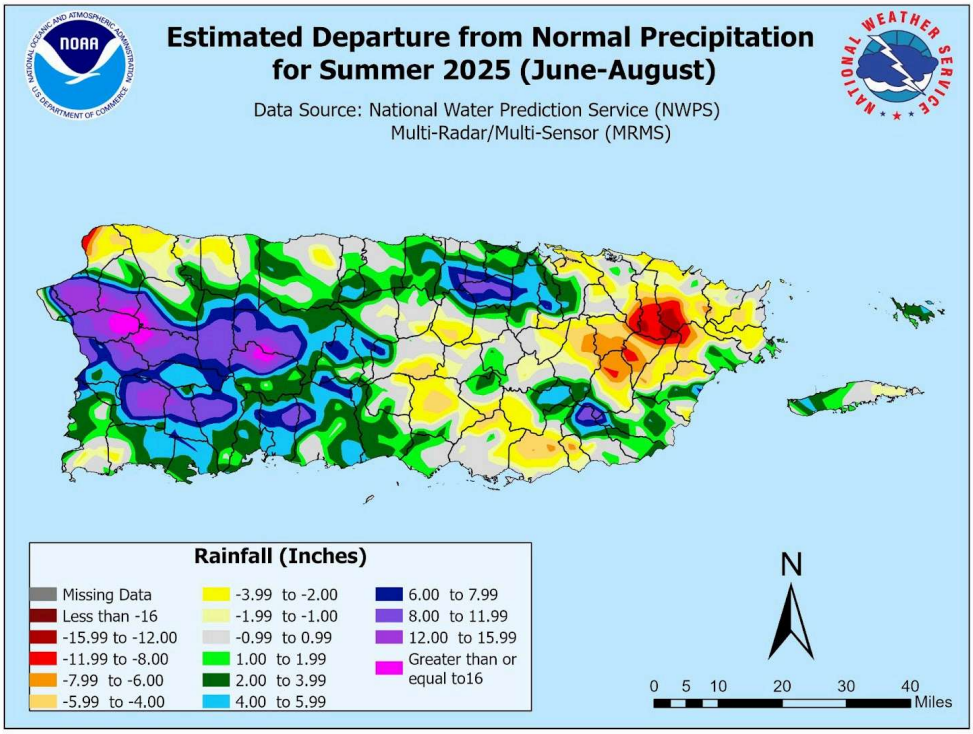


**Figure A6.** 2025 Summer (June-August) Departure from Normal Rainfall in Inches. Created by GIS Team - NWS SJU. Data obtained from NWPS & MRMS.

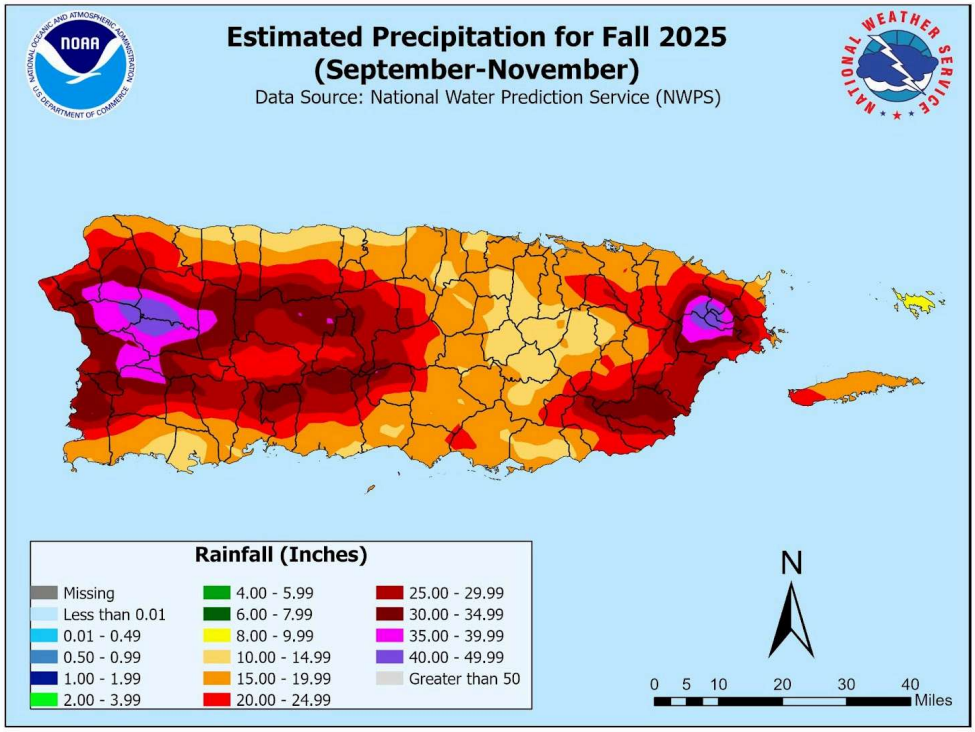


**Figure A7.** 2025 Fall (September-November) Estimated Rainfall in inches. Created by: GIS Team - NWS SJU. Data obtained from NWPS.

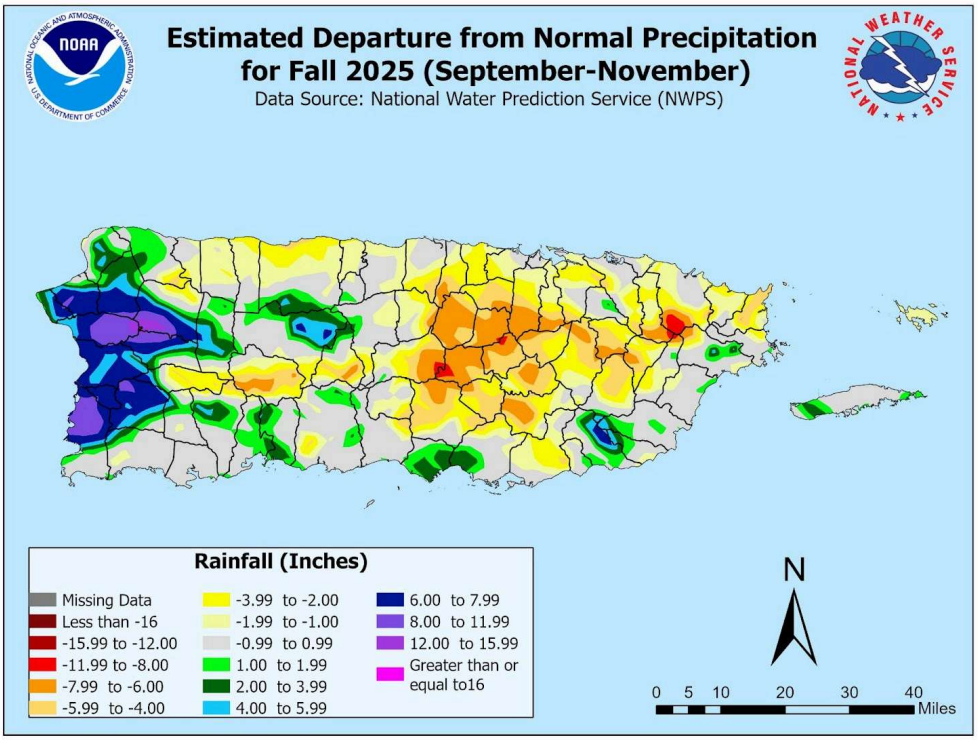


**Figure A8.** 2025 Spring (September-November) Departure from Normal Rainfall in Inches. Created by GIS Team - NWS SJU. Data obtained from NWPS.

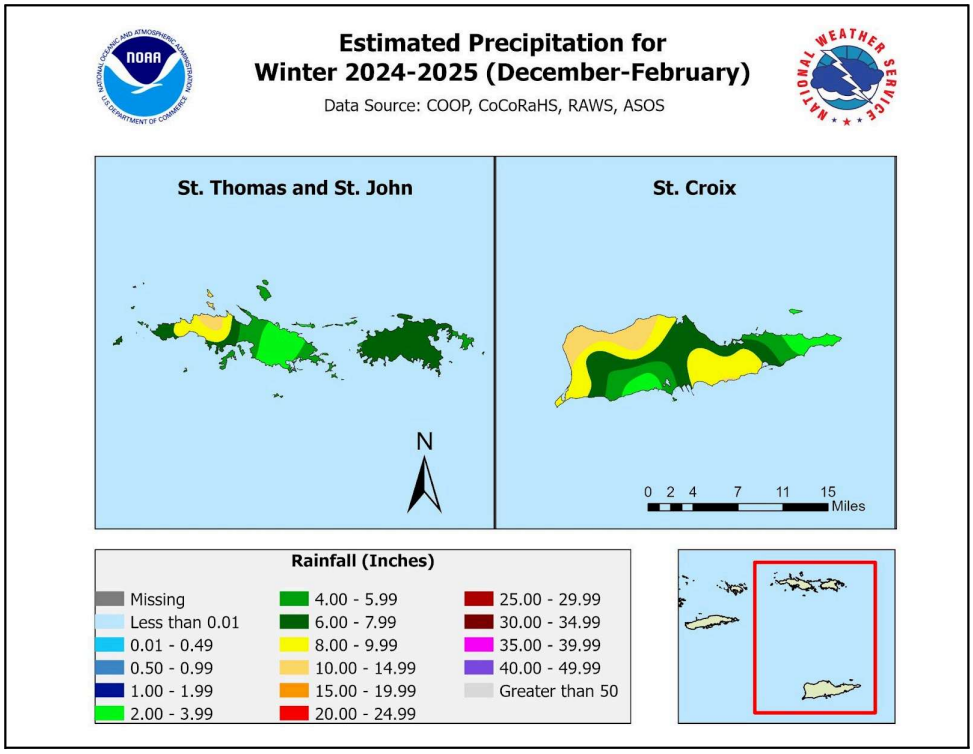


**Figure A9.** 2025 Observed Precipitation during winter 2024-2025 (December-February) across the U.S. Virgin Islands. Created by the GIS Team - NWS SJU. Data Source: COOP, CoCoRaHS, RAWS, and ASOS. NWPS does not calculate departure from normal data for the USVI.

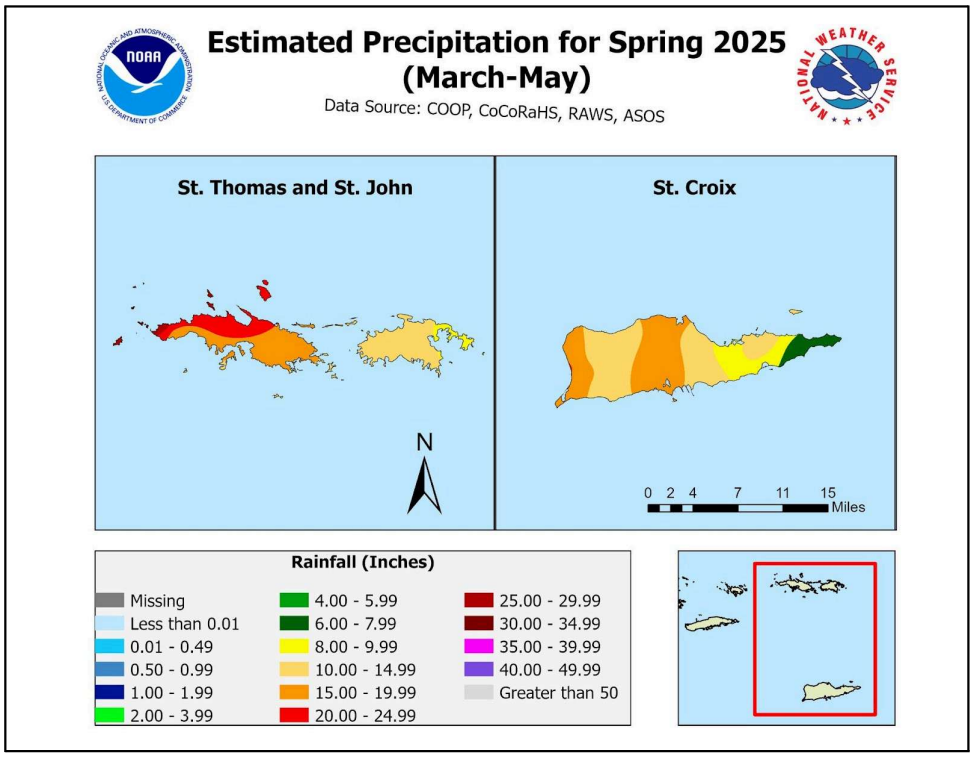


**Figure A10.** 2025 Observed Precipitation during spring 2025 (March-May) across the U.S. Virgin Islands. Created by the GIS Team - NWS SJU. Data Source: COOP, CoCoRaHS, RAWS, and ASOS. NWPS does not calculate departure from normal data for the USVI.

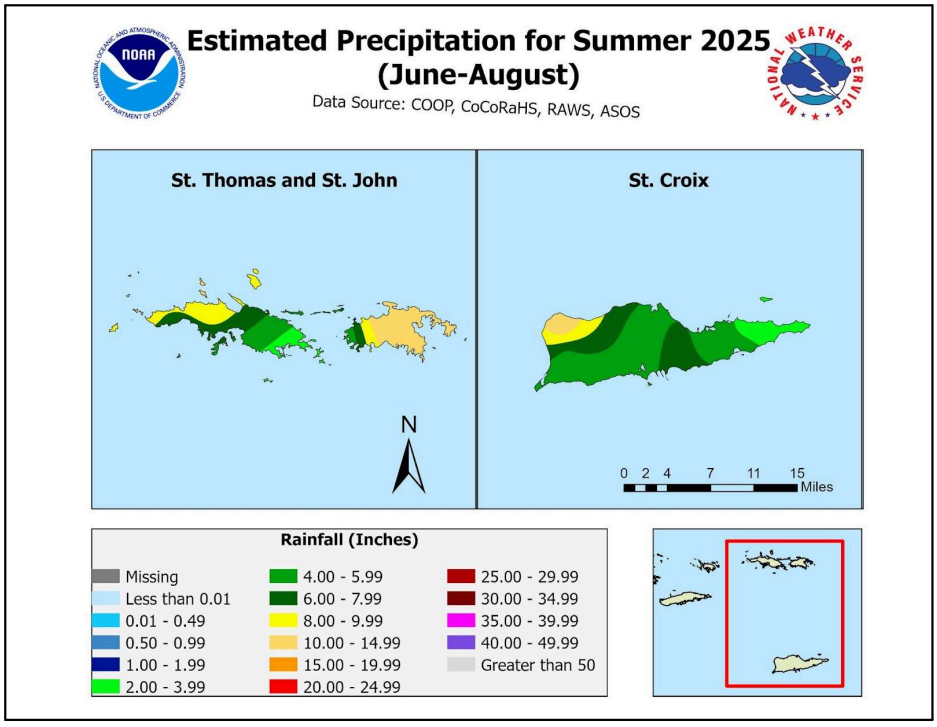


**Figure A11.** 2025 Observed Precipitation during summer 2025 (June-August) across the U.S. Virgin Islands. Created by the GIS Team - NWS SJU. Data Source: COOP, CoCoRaHS, RAWS, and ASOS. NWPS does not calculate departure from normal data for the USVI.

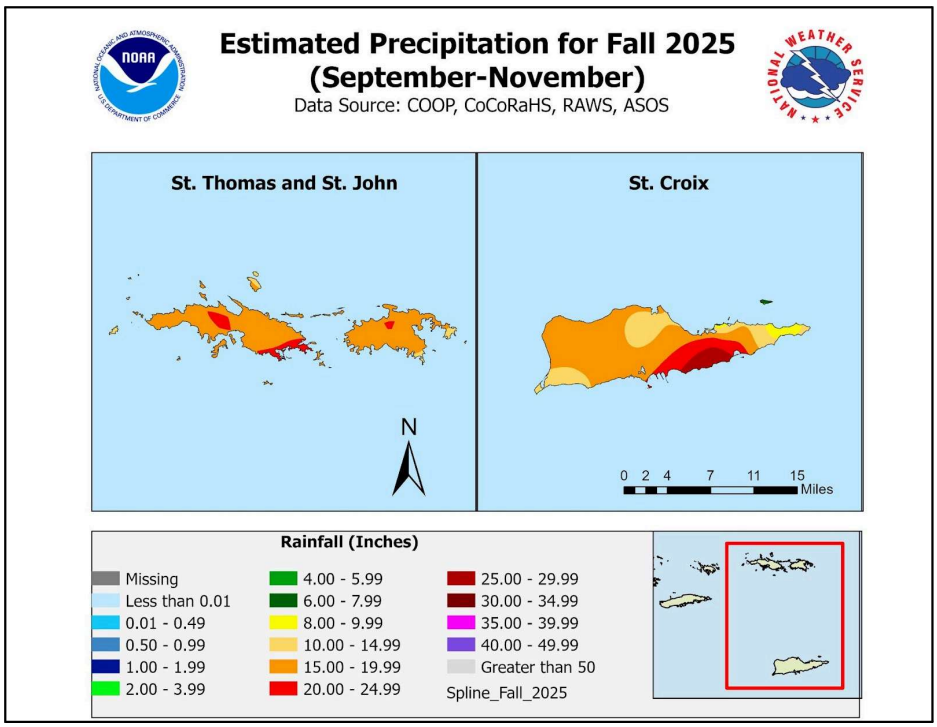


**Figure A12.** 2025 Observed Precipitation during fall 2025 (September-November) across the U.S. Virgin Islands. Created by the GIS Team - NWS SJU. Data Source: COOP, CoCoRaHS, RAWS, and ASOS. NWPS does not calculate departure from normal data for the USVI.

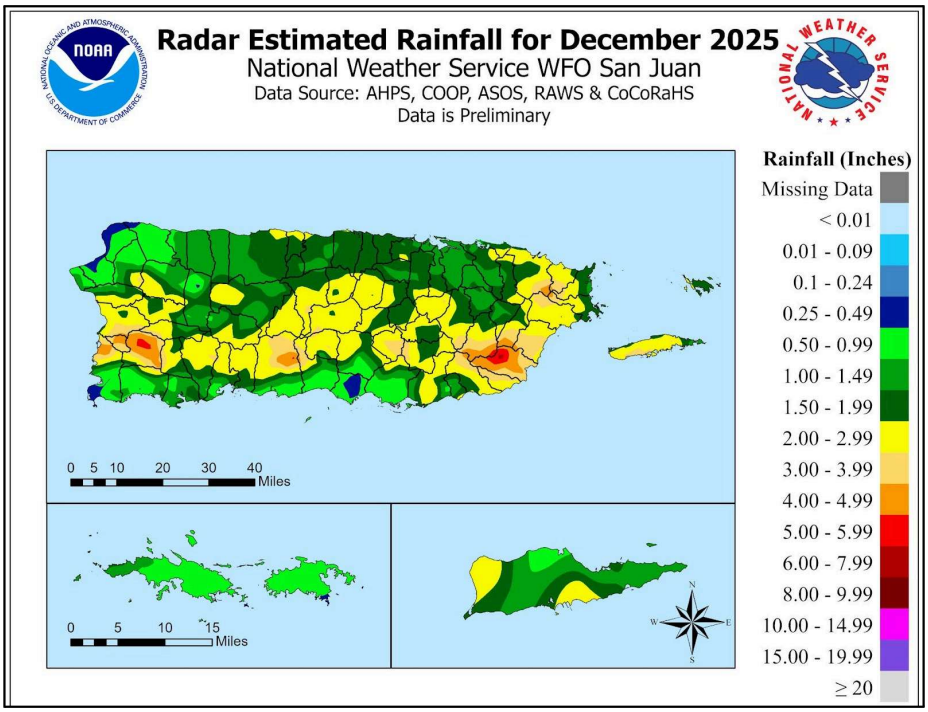


**Figure A13.** Observed Rainfall across Puerto Rico and the U.S. Virgin Islands through the month of December 2025. Created by the GIS Team - NWS SJU. Data source for PR: NWPS. Data Source for USVI: COOP and CoCoRaHS. NWPS does not provide Departure from normal data for the USVI.

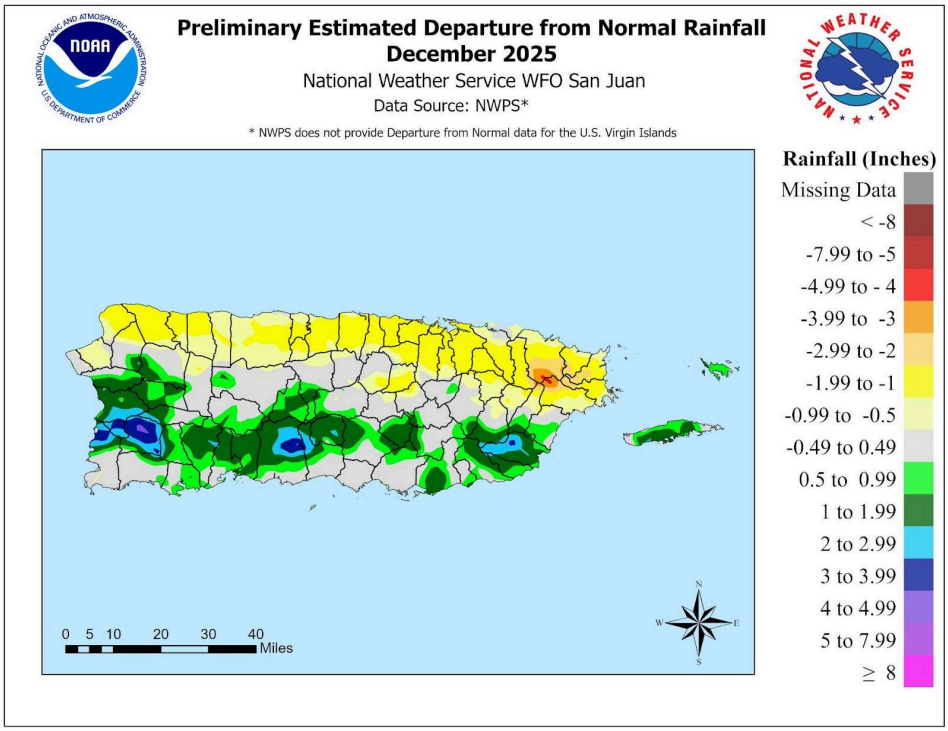


**Figure A14.** Departure from Normal Rainfall for Puerto Rico through the month of December 2025 (1 to 15th). Created by the GIS Team - NWS SJU. Data source for PR: NWPS. Data Source for USVI: COOP and CoCoRaHS. NWPS does not provide Departure from normal data for the USVI.

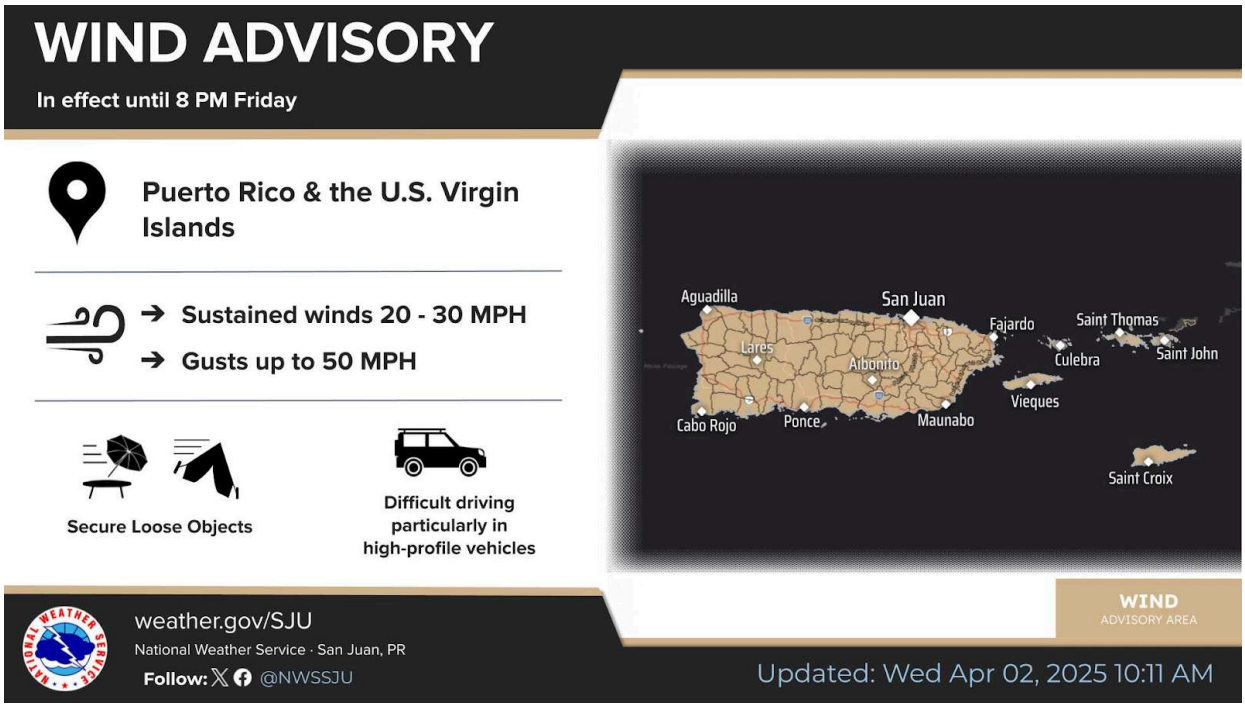


**Figure 19.** Infographic for social media and webpage during the wind event.

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PNSSJU
PRZ001>013-VIZ001-002-051319-

Public Information Statement
National Weather Service San Juan PR
919 PM AST Fri Apr 4 2025

...HIGHEST WIND REPORTS FOR THE LATEST 72 HOURS IN PUERTO RICO AND THE VIRGIN ISLANDS...

Location                      Speed     Time/Date       Lat/Lon/Elev (ft.)
Isla Culebrita Light          52 MPH    0100 PM 04/03   18.31N/65.23W/35
Buck Island, IST              48 MPH    0130 PM 04/03   18.28N/64.89W/40
Las Mareas                    46 MPH    0901 AM 04/02   17.93N/66.16W/34
5 SSE Cruz Bay                43 MPH    0630 AM 04/02   18.25N/64.76W
British Virgin Islands Torto 41 MPH     0550 AM 04/03   18.42N/64.62W/29
Aguadilla Boringq             41 MPH    1050 AM 04/03   18.50N/67.13W/201
San Juan WFO                  41 MPH    0100 PM 04/02   18.43N/66.02W/10
Two Brothers,                 41 MPH    0510 AM 04/03   18.34N/64.82W/20
Yabucoa-El Negro              41 MPH    0308 PM 04/03   18.05N/65.83W/32
Ponce                         39 MPH    0345 PM 04/03   17.96N/66.62W/39
San Juan, PR                  39 MPH    0112 PM 04/02   18.46N/66.12W
San Juan NAVAID               39 MPH    0833 AM 04/03   18.46N/66.13W/47
3 NE Catano                   38 MPH    0830 AM 04/02   18.47N/66.10W
10 N Esperanza                38 MPH    0130 PM 04/03   18.26N/65.46W
9 S Potala Pastillo           38 MPH    0330 PM 04/03   17.86N/66.52W
Aguadilla Jetty               38 MPH    1148 AM 04/03   18.43N/67.16W/18
Sandy Point NWR,              37 MPH    0449 AM 04/02   17.68N/64.90W/46
QUEBRADILLAS                  36 MPH    1212 PM 04/03   18.47N/66.91W/393
Aguada                        35 MPH    0100 PM 04/03   18.38N/67.19W/262
Roosevelt Rd NAS              35 MPH    0253 PM 04/03   18.25N/65.63W/14
Cruzan Rum Distillery         34 MPH    1100 AM 04/03   17.70N/64.83W/91
Ponce                         34 MPH    0345 PM 04/03   17.97N/66.61W/54
Lime Tree Bay, VI             34 MPH    0118 PM 04/03   17.68N/64.75W
Fern Luis Ribas               33 MPH    0850 AM 04/03   18.45N/66.10W
Del Rey Marina                33 MPH    0149 AM 04/04   18.29N/65.63W/24
Cabo Rojo                     32 MPH    0957 AM 04/02   17.97N/67.16W/108
Esperanza, Vieques Island, P 32 MPH     1154 AM 04/02   18.09N/65.47W
Vieques                       32 MPH    1211 PM 04/02   18.12N/65.42W/37
Rupert Rock,                  32 MPH    0347 AM 04/02   18.33N/64.93W/18
Aguada                        30 MPH    1130 AM 04/03   18.34N/67.18W/442
Guayama                       30 MPH    0232 PM 04/03   17.98N/66.13W/505
Humacao                       30 MPH    0310 PM 04/03   18.12N/65.80W/42
Charlotte Amalie, VI          29 MPH    1106 AM 04/04   18.34N/64.92W
Christiansted Harbor, St Cro 29 MPH     1036 AM 04/03   17.75N/64.70W
Arroyo                        29 MPH    1125 AM 04/02   17.99N/66.05W/119
Club Deportivo Del Oeste      29 MPH    0345 PM 04/02   18.10N/67.19W/53
Gurabo                        29 MPH    0101 PM 04/02   18.26N/65.99W/33
Caguas                        27 MPH    0245 PM 04/03   18.21N/66.01W/643
Aguada                        27 MPH    1100 AM 04/03   18.36N/67.20W/547
Trujillo Alto                 27 MPH    0100 PM 04/04   18.35N/66.00W/360
Naguabo                       27 MPH    1020 AM 04/03   18.22N/65.82W/1391
Rincon                        27 MPH    0515 PM 04/03   18.35N/67.26W/14
Magueyes Island, PR           27 MPH    1036 AM 04/02   17.97N/67.05W
Mayaguez, PR                  27 MPH    0106 PM 04/03   18.22N/67.16W
Guayanilla                    26 MPH    0255 PM 04/02   18.06N/66.81W/422
Cayey                         25 MPH    0130 PM 04/03   18.13N/66.14W/1272
RINCON                        25 MPH    0545 PM 04/04   18.57N/67.43W/114


Observations are collected from a variety of sources with varying
equipment and exposures. We thank all volunteer weather observers
for their dedication. Not all data listed are considered official.

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**Figure 20.** Public Information Statement of highest winds reports in Puerto Rico and the U.S. Virgin Islands from April 2 - 4, 2025. **Source:** Multiple surface weather stations.

# Puerto Rico Drought

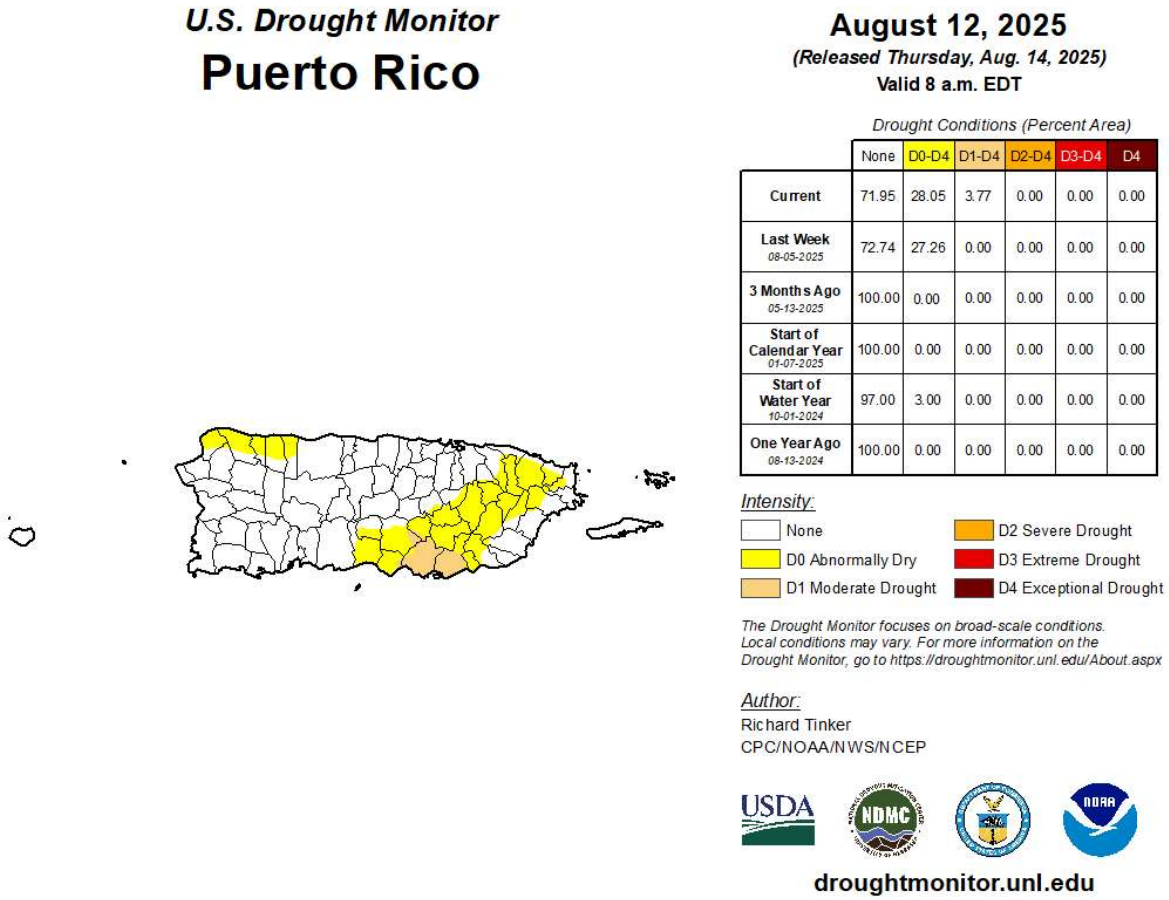



**Figure 26.** A Moderate Drought (D1) developed along southeastern Puerto Rico for a short period of time in August. **Data Source:** US Drought Monitor (https://droughtmonitor.unl.edu/).

# U.S. Virgin Islands Drought

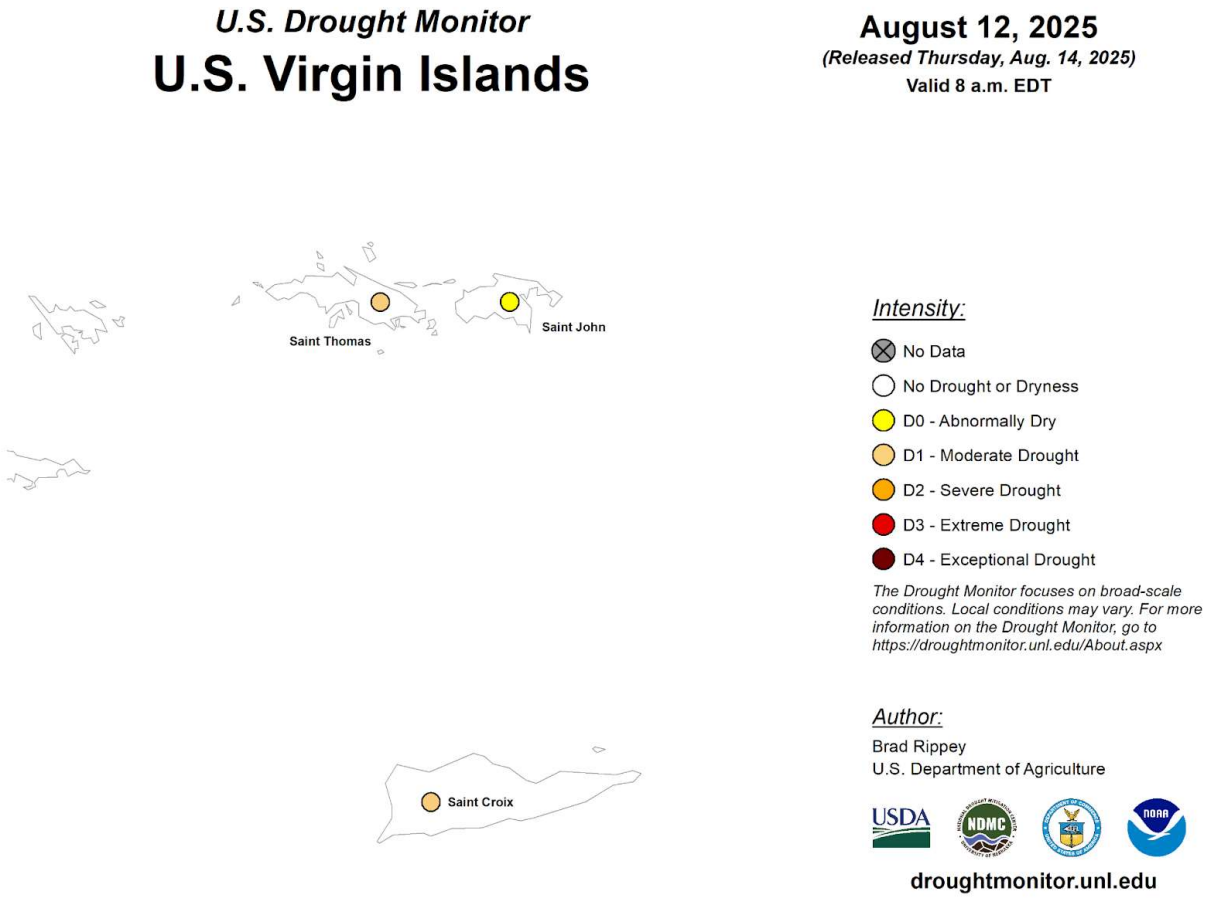
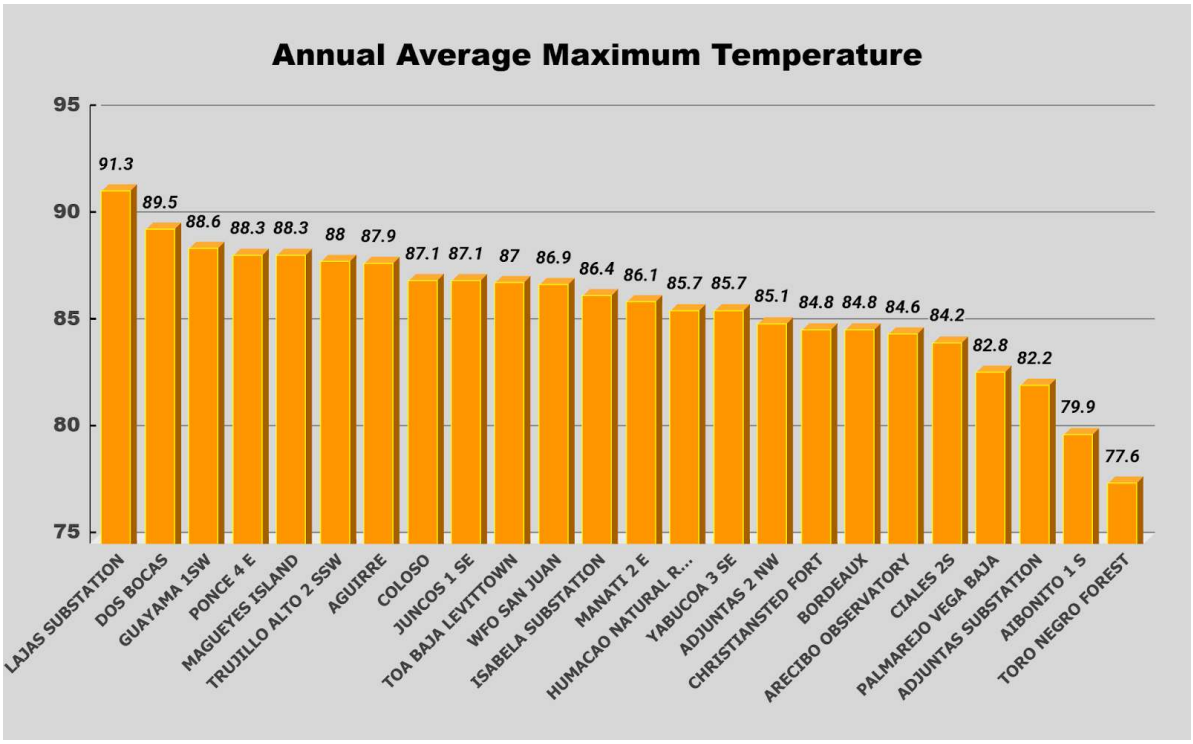



**Figure 27.** Moderate Drought (D1) appeared in St. Thomas and St. Croix in August due to the lack of significant rains and excessive heat. **Data Source:** US Drought Monitor (https://droughtmonitor.unl.edu/).



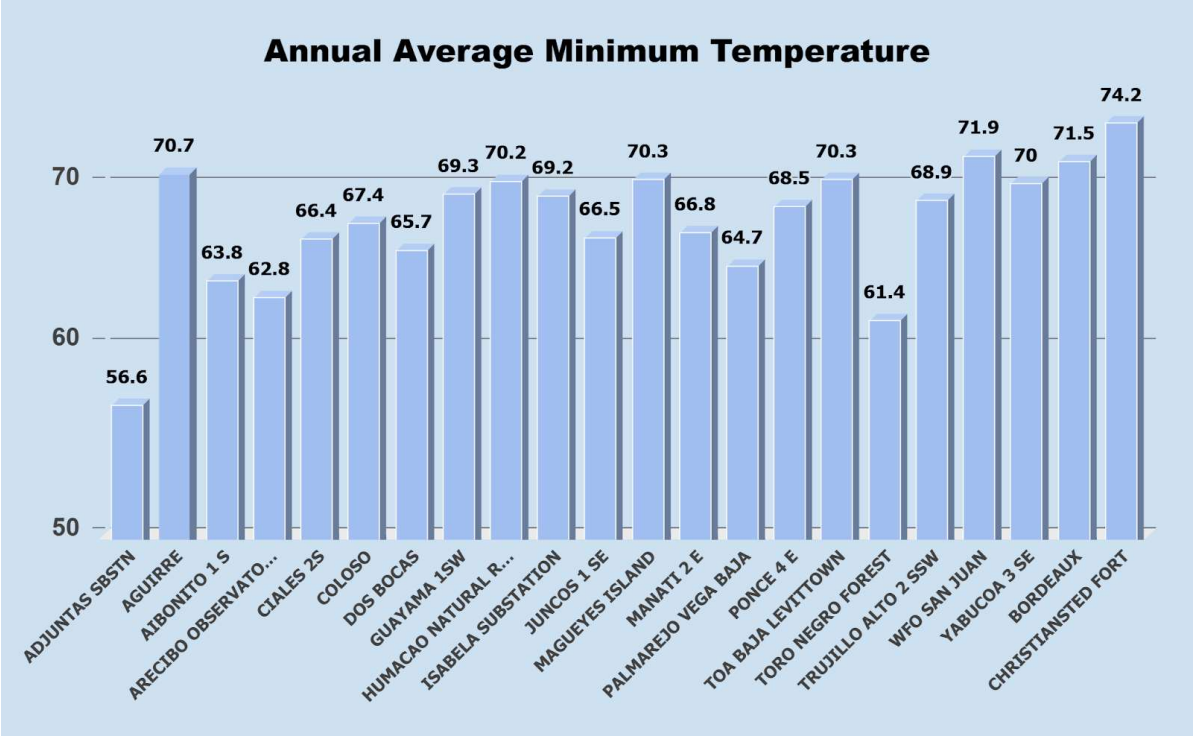




**Figure 31a and 31b.** Average maximum and minimum temperatures observed by the COOP stations in 2025.


**Figure 32:** Infographic for social media and webpage during the swell event.

# NWS Staff Credits

## Climate Team

**Yidiana Zayas Rivera (Meteorologist)**

Non Tropical Flooding Events, Waterspouts, Lightning, Wildfires, Hail, Saharan Dust, Atlantic Hurricane Season, Event Gatherer, Main Editor

**Emanuel Rodríguez González (Senior Service Hydrologist)**

Executive Summary Editor, Rainfall Summary, Seasonal Rainfall Maps, Drought, COOP, Heat, Main Editor

**Rosalina Vázquez Torres (Observing Program Leader)**

COOP, CoCoRaHS

**Lee Ann Inglés (Meteorologist)**

Social Media, Heat, Wind

## Marine Team

**Carlos Anselmi Molina (Lead Forecaster)**

Marine Section

## GIS Team

**Cecille Villanueva Birriel (Lead Forecaster)**

Rainfall Event and Seasonal GIS figures

## Storm Data Team

**Manuel Ramos Rodríguez (Meteorologist)**

Event summaries provider

## Climate Team Sponsor and Management

**Odalys Martínez Sánchez (Science and Operations Officer)**

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