

NWS Form E-5  
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(PRES. BY NWS Instruction 10-924)

U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL WEATHER SERVICE

HYDROLOGIC SERVICE AREA (HSA)  
San Juan, Puerto Rico

**MONTHLY REPORT OF HYDROLOGIC CONDITIONS**

REPORT FOR:  
MONTH            YEAR  
September      2008

TO: Hydrologic Information Center, W/OS31  
NOAA's National Weather Service  
1325 East West Highway  
Silver Spring, MD 20910-3283

SIGNATURE  
Althea Austin-Smith,  
Service Hydrologist  
DATE  
10/29/2008

*When no flooding occurs, include miscellaneous river conditions below the small box, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (NWS Instruction 10-924).*

An X inside this box indicates that no flooding occurred within this hydrologic service area.

Summary: The San Juan ASOS reported 9.93 inches of rain for the month of September ... 4.33 inches more than the normal of 5.60 inches. The ASOS rainfall report at Truman Field in St. Thomas reported 12.87 inches of rain for the month of September ... 7.53 inches more than the normal of 5.34 inches.

Record breaking rainfall occurred during the month of September across Puerto Rico and the U.S. Virgin Islands. The rainfall was concentrated in two distinct periods: the first, at the beginning at the month, and the other, towards the end of the month. Here is the monthly "gage only" summary for the month of September...provided by the Southeast River Forecast Center (SERFC) in Atlanta.

[Monthly GAGE ONLY Summary for September 2008](#)

The first event unfolded as follows – this is an excerpt from the report "Tropical Storm Hanna Lashes Puerto Rico and the USVI". The entire report can be found on our webpage at: <http://www.srh.noaa.gov/sju/Events/2008/Tropical/Hanna/index.php>

As Tropical Storm Hanna exited the forecast area bearing down on Haiti and the Dominican Republic at the beginning of September...*"...By this time, deep, tropical atmospheric moisture engulfed the Caribbean. Precipitable water values over San Juan were greater than 2 inches, which is approximately 20 percent above normal.*

*This, coupled with deep moisture convergence along Hanna's southeastern quadrant, caused outer rain bands to develop, redevelop, and train over Puerto Rico and the U.S. Virgin Islands over the course of three days (September 1-3, 2008) with the peak and subsequent culmination of the event occurring on Wednesday, September 3, 2008. These rain bands brought with them thunderstorms that produced rainfall in excess of 3 inches per hour. Due to the fast moving nature of these storms, no one storm produced the flooding rains that were seen across most of Puerto Rico and the Virgin Islands, but rather a series of thunderstorms that kept repeatedly propagating over the same geographic area multiple times throughout the three day period. This process quickly increased the water levels of many fast-responding rivers in Puerto Rico and several reached moderate flood stage, causing flooding of lower lying areas".*

Damage was as follows: *“... over 18 major roads across multiple towns were closed or diverted due to urban flooding. Heavy rain also was responsible for land/mudslides across the higher terrain, which damaged roads and bridges in Sabana Grande, Maricao, Yauco, Lajas, and San Carlos. Additional damage reports also came into the office from the city of San Juan and Carolina as well.*

*Homes also were flooded due to the heavy rainfall. The Puerto Rico Emergency Management in Arecibo evacuated 14 residents of an elderly home due to flooding. In Añasco, the barrio Espino community was evacuated to shelters due to flooding.*

*Additionally, homes were reported flooded at Barrio Pasarel in Comerio and Urb. San Jose Valverde, in San Juan.*

*River flooding also was an issue. In Vega Baja, road 160 was closed due to the river Rio Indio overflowing its banks. In Manati roads 667, 604 were flooded and impassable. In Camuy, road 4491 flooded due to the river Camuy overflowing its banks and in Arecibo, La Puntilla Sector, River Rio Grande close to overflowing its banks, and, as a result, families were advised to evacuate.”*

The second event was even more catastrophic than the first and occurred from September 21-23, 2008. The following is an excerpt from the Preliminary Report for that event... *“...torrential rainfall resulted in severe flooding to rivers, streams, and roads, causing sinkholes, land/mudslides, and structural collapses mainly across the southern half of the island. ...On occasion, tropical disturbances may develop into tropical depressions and, upon further intensification, get named by the National Hurricane Center (NHC) as a tropical storm and/or hurricane. While the National Weather Service (NWS) in San Juan and the NHC closely monitored the system for possible organization into a named storm, multiple reconnaissance flights flown through the disturbance revealed no closed, low-level, surface circulation, which was needed to satisfy the definition of a tropical depression. It was not until 5 pm Thursday, September 25, 2008 when the system, located about 380 miles north northwest of San Juan, Puerto Rico, was named Tropical Storm Kyle.*

*The strongest effects of the tropical disturbance were first felt in Puerto Rico on Sunday, September 21, 2008. Specifically, the heaviest rainfall, and most severe effects, occurred across the municipalities of Cabo Rojo, Guayama, Humacao, Patillas, Ponce, and Yabucoa, where in some locations, totals approaching 30 inches of rainfall fell in a three-day period, ending at 8 am Tuesday, September 23, 2008.*

*...The most intense rainfall occurred in the 24-hour period starting at 8 am Sunday, September 21, 2008 through 8 am Monday, September 22, 2008, with the highest rainfall rates occurring during the overnight hours from sunset on Sunday to sunrise on Monday. The largest rainfall amounts for the 24-hour period ending 8 am Monday, September 22, 2008 were 22.03 inches in Patillas, 20.00 inches in Guayama, 16.00 inches in Cabo Rojo, 14.83 inches in Yabucoa, and 10.81 inches in Ponce. For the combined three-day period, some of these numbers increase further with 29.83 inches in Patillas, 21.86 inches in Yabucoa, 20.52 inches in Ponce, and 17.82 inches in Cabo*

***Rojo. Lesser, but just as significant, amounts, ranging from 5-15 inches of rain, fell across much of the island. The torrential rainfall seen across the island was immediately seen across the extensive river network in Puerto Rico. Some rivers, including the Rio Gurabo, saw water levels rise in excess of 25 feet in less than 12 hours. Parts of the island that were spared the worst of the rain include the northern and northwestern coast, where only moderate rain showers were experienced.***

***The total rainfall amounts recorded from this event are unique in that the 29.83 inches seen in Patillas exceeds the weekly total rainfall of 27.13 inches measured in Juana Diaz during the October 1985 flood event.***

***The 24-hour rainfall totals ending at 8 am Monday, September 22, 2008, which encompassed parts of the southeastern section of the island, including the municipalities of Patillas and Guayama, exceeded 200-year 24-hour rainfall totals. Specifically for Patillas, the recorded rainfall amount approaches the 500-year 24-hour rainfall totals. Along the southwestern section of the island, Cabo Rojo’s 24 hour rainfall also exceeded the 100-year return period.***

***Across the southern municipalities of Puerto Rico, Ponce and Yauco’s 24-hour rainfall rates exceeded the 10-year 24-hour rainfall totals, Juana Diaz exceeded the 25-year rainfall totals, and Yabucoa, along the southeast coast, exceeded the 25-year rainfall totals.***

***The resultant flooding had considerable effects on the local population. An estimated 630 people in the affected areas were evacuated to shelters. In addition to structural damage caused by the flood waters, agricultural damage was sustained by coffee, plantains, and other minor crops. In response to the significant flooding, federal authorities issued a disaster declaration for portions of the island.”***

As a result of these devastating events, the office was extremely active hydrologically during the month of September. The approximate amounts of Hydrologic Products issued during the month of September are as follows:

**Table 1 - Hydrologic Products Issued**

Non-Routine Hydrologic Products Issued:	Approximate number of Products for the month
Hydrologic Outlooks (SJUESFSJU)	0
Flood Watches (SJUFFASJU)	30
Flood Warnings (SJUFLWSJU)	25
Flash Flood Warnings (SJUFFWSJU)	53
Flash Flood Statements (SJUFFSSJU)	23
Urban/Small Stream Flood Advisories (SJUFLSSJU)	174

Please note the following archive for the U.S. Drought Monitor related graphics – choose Puerto Rico from the “state” pulldown menu – click on “update” and request the dates from calendar pulldown menu...updated weekly.

[U.S. Drought Monitor Archive](#)

For monthly “radar totals” use the archive of the Advanced Hydrologic Prediction Service (AHPS) - click on Puerto Rico and request the duration you would like to view.  
[AHPS archive of radar totals/ images](#)