

# COMMUNICATION OF CRITICAL HYDROMETEOROLOGICAL INFORMATION DURING THE 2004 TROPICAL STORM SEASON IN GEORGIA

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**Abstract:** The 2004 Tropical Storm season produced widespread minor flooding along most rivers in Georgia. In addition, this period produced 4 river crests considered “significant” by the National Weather Service. “Significant” flooding is defined as water levels along rivers deemed to have moderate or major impact on human activity in the area. None of the flooding that occurred established all-time record levels for these sites. The riverine flood event of greatest impact took place on 17 September 2005 in the Vinings, Georgia area near the Chattahoochee River. The Chattahoochee River at Vinings (USGS station 02336000) crested at 22.60 feet, the 4<sup>th</sup> highest flood of record, and the second highest level since the filling of Lake Lanier behind Buford Dam began on 1 February 1956.

In this paper, communication during this month among key decision makers is summarized. In particular, the methods of communication used by the Southeast River Forecast Center (SERFC) of the National Weather Service (NWS) are studied.

## Introduction

The Southeast River Forecast Center is responsible for the production of river forecasts and flood guidance for all rivers that drain into the Atlantic Ocean from Albemarle Sound southward and all rivers that drain into the Gulf of Mexico from Mobile Bay eastward. This includes northeastern Mississippi, central and southern Alabama, almost all of Georgia and South Carolina, all of Florida, central and eastern North Carolina, and southern Virginia.

Each tropical storm season offers a unique challenge to this office to provide the highest quality hydrometeorological forecast information and data to its partners and customers, including the public. September 2004 was particularly challenging, as there was little time between storms to understand what could have been improved with the previous storm and to prepare for the next storm.

Panelists invited to assist in this session represent a cross section of partners and customers of SERFC products. The panelists include:

- John Feldt, Hydrologist In Charge, SERFC/NWS
- Brian McCallum, Assistant District Chief, USGS, Norcross, GA
- Joel Galt, Supervisor, Hydro Services, Southern Company Generation and Marketing, Atlanta, GA
- Brock Long, Hurricane Program Specialist, FEMA, Atlanta, GA
- Andy Russell, Hurricane and Natural Hazards Planner, GEMA, Atlanta, GA
- Memphis Vaughan, Jr., Chief, Water Management Section, U.S. Army Corps of Engineers (USACE), Mobile, AL
- Ed Fiegle, Georgia Safe Dams Program, Dept. of Natural Resources, Atlanta, GA

## History

Prior to 1995, the SERFC products were entirely text-based, consisting of:

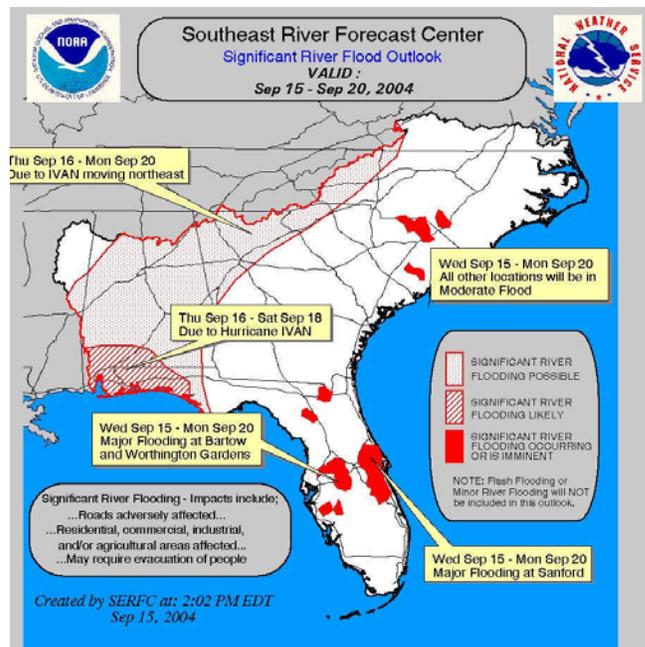
- 5-day river forecasts consisting of predicted readings at 12 UTC for each of the next 5 days at each forecast river gaging point, along with, when applicable, a predicted crest height, time of crest, and times when levels would be predicted to rise above and fall below flood stage.
- 1-, 3-, and 6-hour flash flood guidance, or model-generated rainfall amounts required to trigger flash flooding within the given time interval.
- 1-, 3-, and 6-hour headwater guidance, or model-generated rainfall amounts required to generate flooding at specific headwater stream gages within the given time interval.

Prior to 1995, only the river forecasts were available to the public, and these were only available through NWS Weather Forecast Office (WFO) river statements, forecasts, and warnings, disseminated through NOAA Weather Radio and weather wire. The flash flood and headwater guidance was only available to the individual forecast offices, to assist forecasters in issuing flood statements, advisories, and flash flood warnings.

In 1995, the SERFC established its first web site on the internet as a means for customers, partners, and the public to access hydrologic information. Soon, all text-based products were available through this web site. In 1999, a text product called the Hydrometeorological Discussion (HMD) was issued once a day to the forecast offices. This was also posted to the web site for public access. 1999 was a landmark year, as this was the year when numerous graphical forecasts, including forecast hydrographs representing SERFC forecasts, became available on the SERFC web site. As Hurricane Floyd approached the coastal Carolinas in September 1999, SERFC produced numerous GIS-based graphics displaying where the greatest risk of significant flooding would be. These graphics became the forerunner for two popular graphics on the SERFC web site today: the Hydrometeorological Forecast (HMF), a graphic showing a map of the Southeastern United States summarizing hydrometeorological conditions for the current 24-hour period ending at 1 p.m. local time; and the Significant Flood Outlook (FOP), a similar graphic of a map of the southeastern United States summarizing the potential of “significant” flooding during the next 5 days. An example of the FOP is given in Figure 1. Both graphics are updated daily. Today, the SERFC web site hosts a variety of graphics displaying hydrometeorological information, including multi-sensor precipitation estimates (MPE), gage-only rainfall graphics, quantitative precipitation forecasts (QPF), and flash flood guidance (FFG).

During the past 7 years, the SERFC has placed greater emphasis on coordination before and during a flood event. Conference calls with state and federal emergency management officials, the National Hurricane Center, NWS WFOs, and the American Red Cross are now commonplace before and during significant flood events, particularly hurricanes. Many of these calls utilize SERFC web graphics as briefing tools. Occasionally, video teleconferencing is used. The SERFC has also used e-mail to alert customers and partners of developing or oncoming events.

In 2004, the SERFC launched a coordination product called the Hydrologist Forecast Discussion (HFD), a discussion of the hydrologic forecaster’s thinking concerning a specific flood forecast or series of flood forecasts. This product is intended to communicate a confidence level and a hydrologic understanding to the weather forecasters issuing hydrologic products at the WFOs based on SERFC guidance products. While the product is written for the WFO forecasters, this product is also available to the public through the SERFC web site. Today, this web site can be accessed at the following address: <http://www.srh.noaa.gov/serfc>



**Figure 1: An example of a Significant Flood Outlook during Hurricane Ivan.**

### September 2004

**Hurricane Frances.** The first tropical system to generate flooding in Georgia in 2004 was Hurricane Frances. This storm made initial landfall on the east central Florida peninsula near Sewall’s Point, Fla., early on 6 September. After moving off the west coast of Florida, Frances made final landfall near St. Marks, Fla. later on 6 September. (Tropical Prediction Center, 2004) The storm continued moving north along the Alabama/ Georgia border before turning northeastward into southeast Tennessee just east of Chattanooga on 7 September. The heaviest storm-total rainfall in Georgia was well east of the center, with 11.94 inches falling at Patterson, Ga., in southeastern Ga. and 10.89 inches at Tallulah Falls, Ga. in northeastern Georgia.

Flooding from Frances was considered predominantly minor, with 8 forecast points of Georgia’s 34 forecast points (river gages) exceeding flood stage. The only significant flooding was recorded at the Ochopee River gage at Reidsville, Ga., where the 18.35 foot crest exceeded the moderate flood level of 16 feet.

Coordination for Frances in Georgia began as early as 2 September, when Georgia Power representatives in Albany coordinated with the SERFC to assist with their dam releases at the Flint River Project in Albany. The 5-day Significant Flood Outlook (FOP) on 4 September indicated a possibility of significant flooding over the south half of Georgia. At this time, the focus of communication was in east central, central, and north central Florida. In addition to its own midday daily conference calls with affected WFOs, the USGS, the

USACE, and federal and state emergency managers, SERFC participated in daily conference calls conducted by Florida Emergency Management, Georgia Emergency Management (GEMA), the American Red Cross, and the Federal Emergency Management Agency. The majority of the information conveyed during these early conference calls was based on “contingency” forecasts, or hydrologic forecasts based on 48 or even 72 hours of QPF rather than the routine 24 hours. On Monday, 6 September, SERFC and WFO Tallahassee initiated a conference call with water management officials in the Flint River basin between Montezuma and Albany, Ga. Since significant flooding did not develop in this basin, these daily calls were terminated the following day.

**Hurricane Ivan.** This storm reached category 5 strength 3 times before making its first U.S. landfall near Gulf Shores, Ala. early on 16 September as a category 3. After moving north, then northeast through central and northeast Alabama, the storm moved across the northwest corner of Georgia in the early morning hours of 17 September, exiting the state very near where Frances exited just 10 days earlier. (Tropical Prediction Center, 2004) The heaviest storm total rainfall in Georgia was in the north Georgia mountains, where 7 to 10 inches of rain fell in the 24-hour period ending 12 UTC 17 September.

As with Frances, flood crests from Ivan were considered predominantly minor, with 11 of Georgia’s 34 forecast points exceeding flood stage. However, Ivan did produce the one major flood of the month. In the vicinity of the Chattahoochee River at Vinings, the river crested at 22.60 feet, or 2.6 feet above the major flood level of 20 feet.

Coordination in Georgia with Ivan began as early as 11 September, with Georgia Power representatives again looking for early insight to assist with dam releases at the Flint River Project in Albany. Daily conference calls were set up on 13 September with water management officials in the Flint River above Albany and separate calls were conducted with GEMA officials. Additional daily conference calls were made with SERFC partners (WFOs, the USGS, the USACE, and emergency management officials), along with Florida Emergency Management officials and FEMA.

**Hurricane Jeanne.** The last in a series of hurricanes to landfall in Florida came ashore on 26 September very close to where Frances made landfall just 20 days earlier. The storm curved north, entering the state on the morning of the 27<sup>th</sup> near Valdosta, and exiting the state shortly after midnight EST on the 28<sup>th</sup> near Lincolnton, Ga.

The heaviest rain was near the Florida border near and to the right of the storm’s path, where 6-9 inches were reported. Flooding again was predominantly minor, with 13 of Georgia’s 34 forecast points exceeding flood stage. The only significant flood associated with Jeanne was on

the Oconee River at Milledgeville, where moderate flooding took place.

Coordination about Jeanne in Georgia began as early as 25 September with GEMA. As Jeanne moved across Georgia on 27 September, the USACE coordinated with the SERFC to determine the need to reduce reservoir releases at Lake Lanier, a concern prompted by calls from concerned homeowners in the Atlanta area still recovering from Ivan. Flows were reduced 2 days earlier, yet mean areal precipitation values based solely on gage rainfall reports of 2.7 to 3.0 inches produced minor flooding for the Chattahoochee River at Vinings gage. Dam operators, particularly with Georgia Power at Sinclair Dam and Morgan Falls Dam and with Crisp County Power at Lake Blackshear, coordinated frequently with SERFC during this event.

### Summary

Communication of hydrometeorological data during September 2004 was accomplished using a variety of means. Routinely, the SERFC uses a variety of web-based graphics to distribute information, including graphics depicting past rainfall, forecast rainfall, past and forecast river levels at designated forecast points (river gages), the HMF, the FOP, and the HFD. During this month, additional coordination took place with numerous water resource managers in Georgia, primarily through daily conference calls and direct phone calls before and during the storm events. This panel will review this communication to determine its effectiveness and areas of needed improvement.

### LITERATURE CITED

Tropical Prediction Center, 2004: Summary of Atlantic Tropical Cyclones for September 2004, Monthly Tropical Weather Summary, [http://www.nhc.noaa.gov/archive/2004/tws/MIATWSAT\\_sep.shtml](http://www.nhc.noaa.gov/archive/2004/tws/MIATWSAT_sep.shtml)