

National Weather Service Impact-Based Decision Support Services Provided During the October 2015 South Carolina Floods



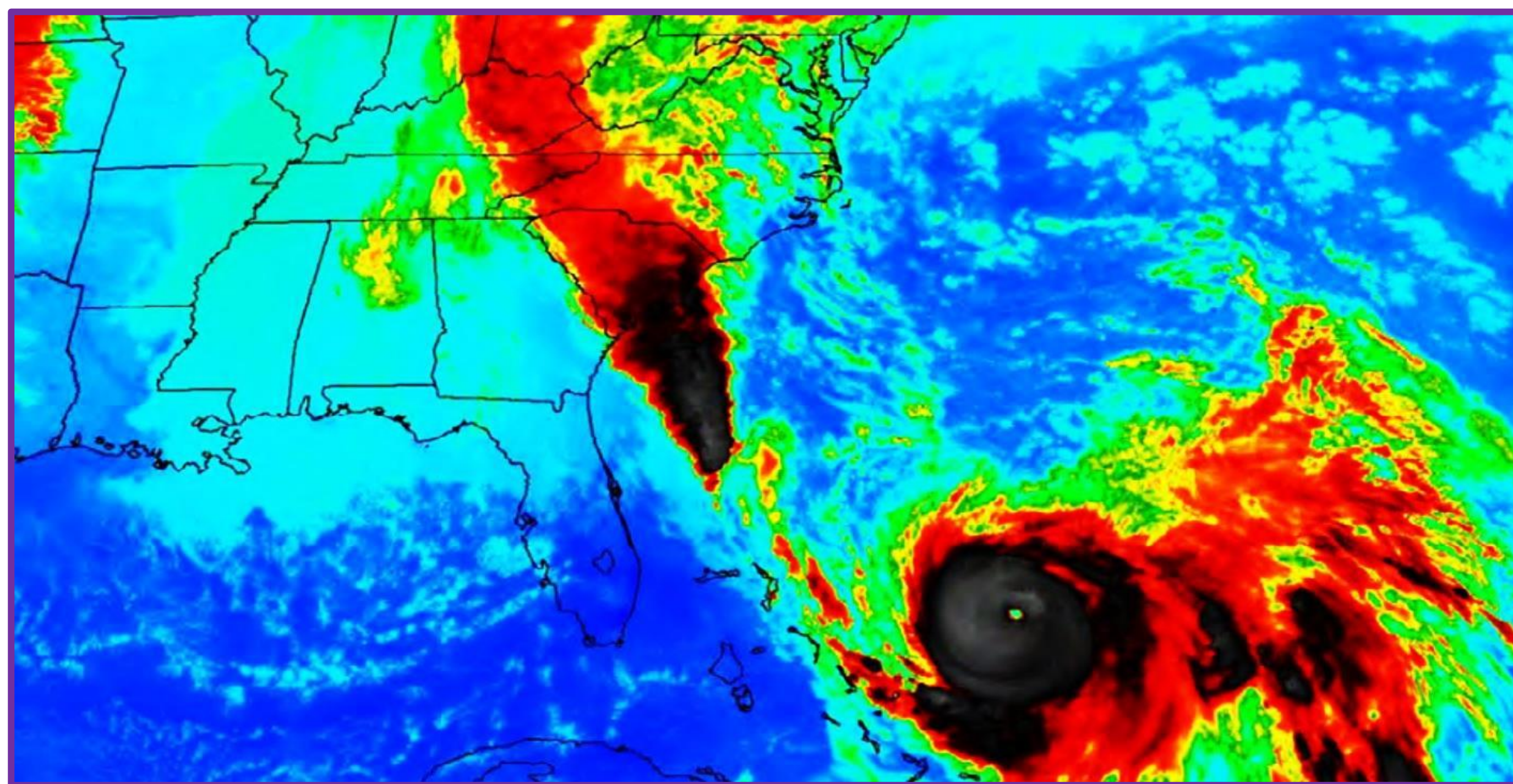
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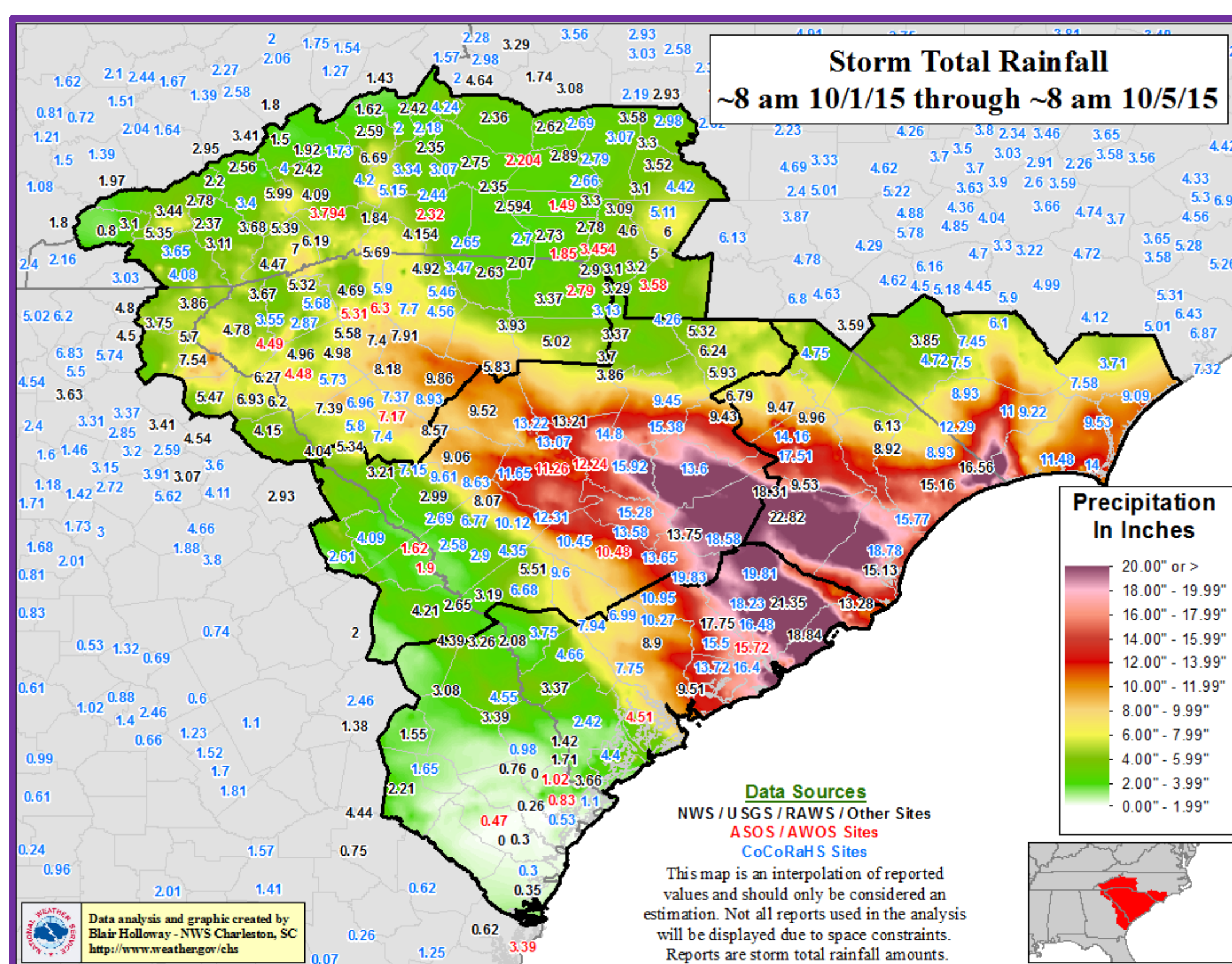
³National Weather Service Forecast Office, Columbia, SC, ⁴National Weather Service Forecast Office, Charleston, SC

Background

- Slow moving upper low west of the Carolinas combined with persistent onshore flow off the Atlantic and a plume of tropical moisture associated with Hurricane Joaquin
- Deep, moist warm layer provided efficient warm rain processes resulting in widespread heavy rainfall across much of South Carolina and parts of North Carolina
- Record rainfall with many locations measuring over 20 inches of rain in less than 24 hours resulting in historic flooding across central and coastal South Carolina
- Major River flooding with new established record crests at 17 river gauges with 15 others recording crests in the top 5 for the period of record
- 1500 water rescues and 19 fatalities (9 within Columbia Metro area), many of which were individuals trapped in vehicles swept into high water
- Estimated \$1.492 Billion in damages in South Carolina including closure of 410 roads and bridges (74 mile stretch of I-95 in SC) and failure of 36 regulated dams
- Numerous 1, 2, 3 and 4 day rainfall records broken
- Meteorologists at the four NWS offices provided individualized Impact-Based Decision Support Services (IDSS) to decision-makers on the local and state levels during this historic event
- This poster will provide an overview of the IDSS, as well as cover some best practices and recommendations for effective IDSS communications.



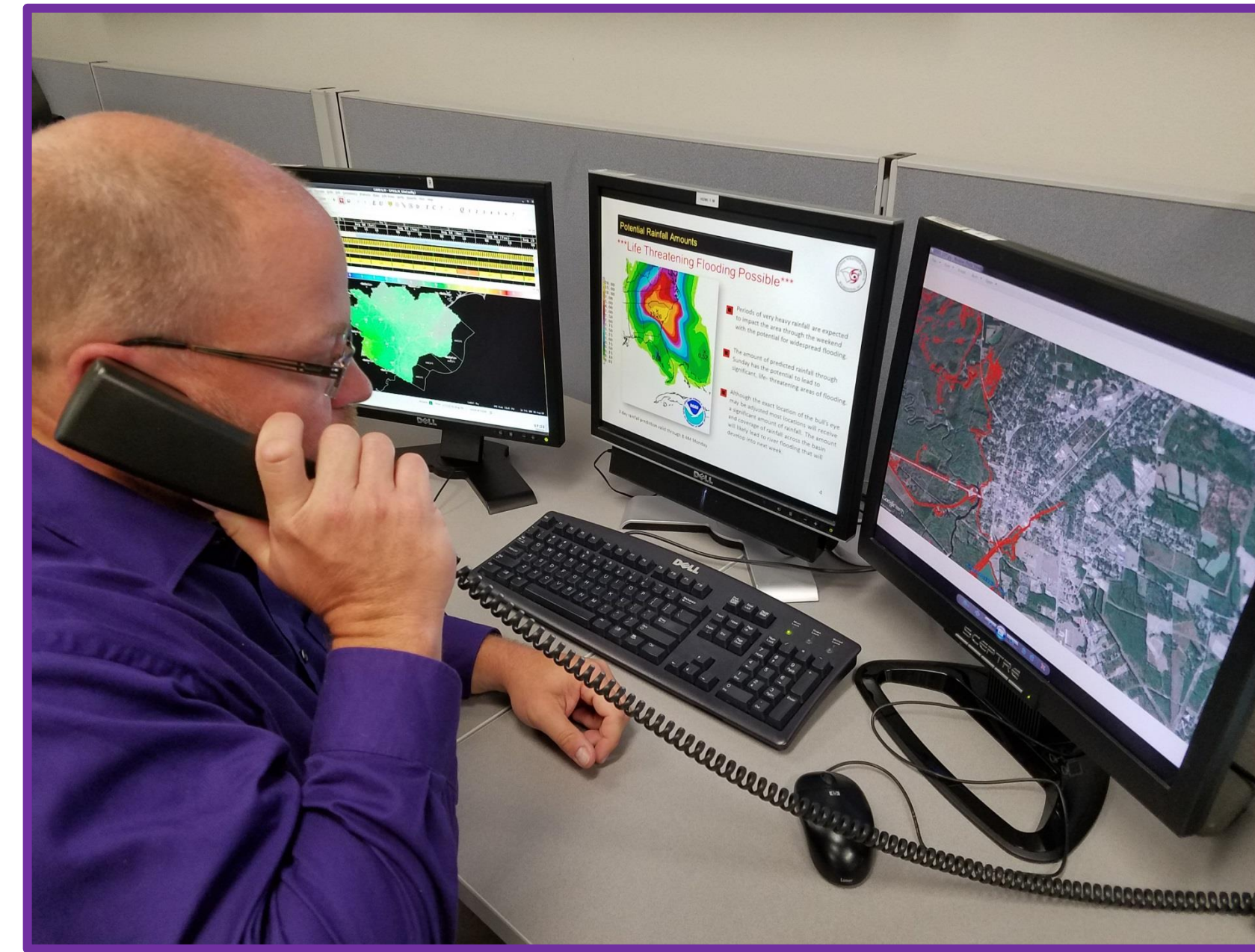
Infrared satellite image of the intense rainfall impacting South Carolina during the morning of October 3rd, 2015. Source: National Aeronautics and Space Administration (NASA).



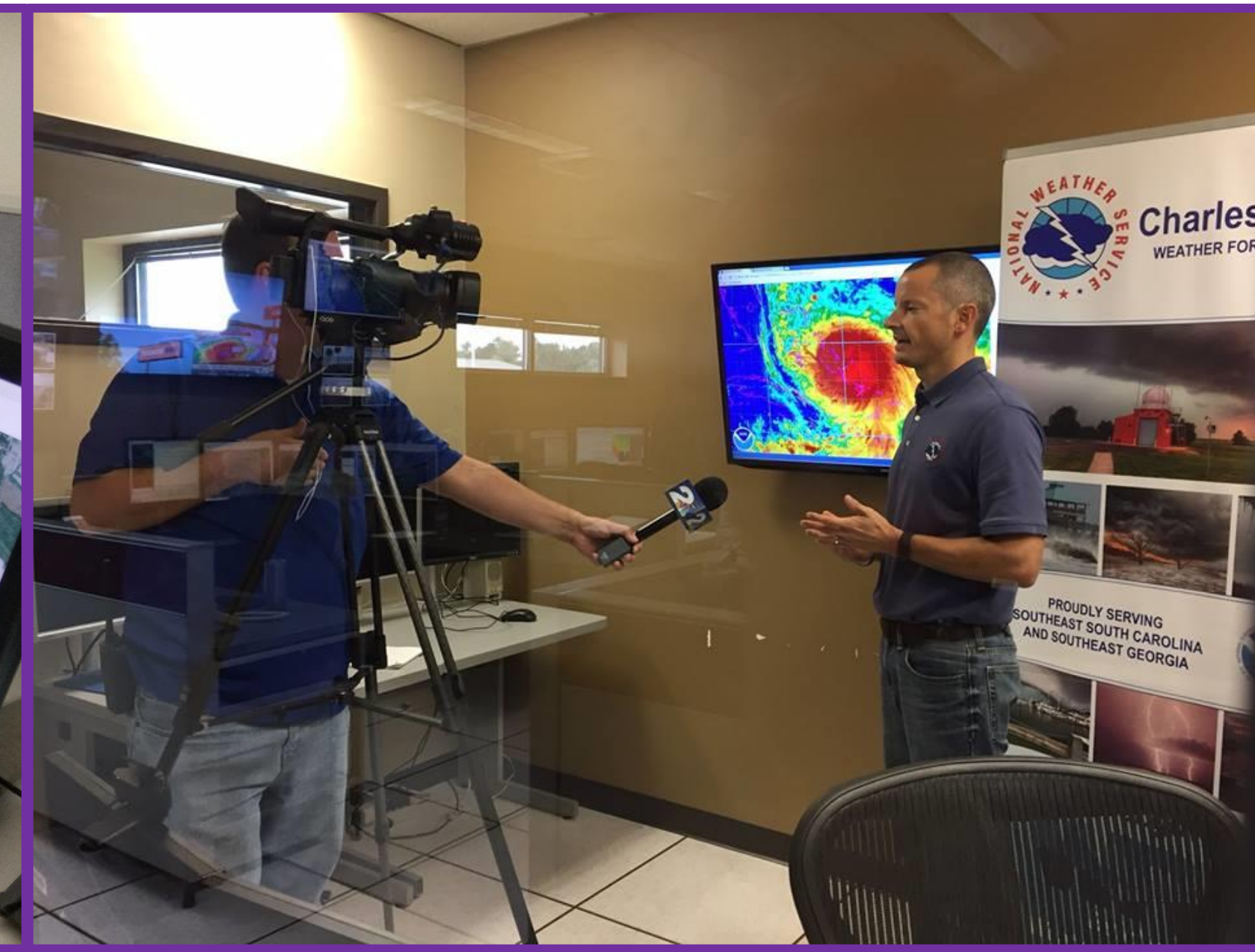
Left: Event storm total rainfall from October 1st through October 5th, 2015.

Source: Blair Holloway, NWS Charleston, SC

Right: NWS Employees with Emergency Management during Flood Survey

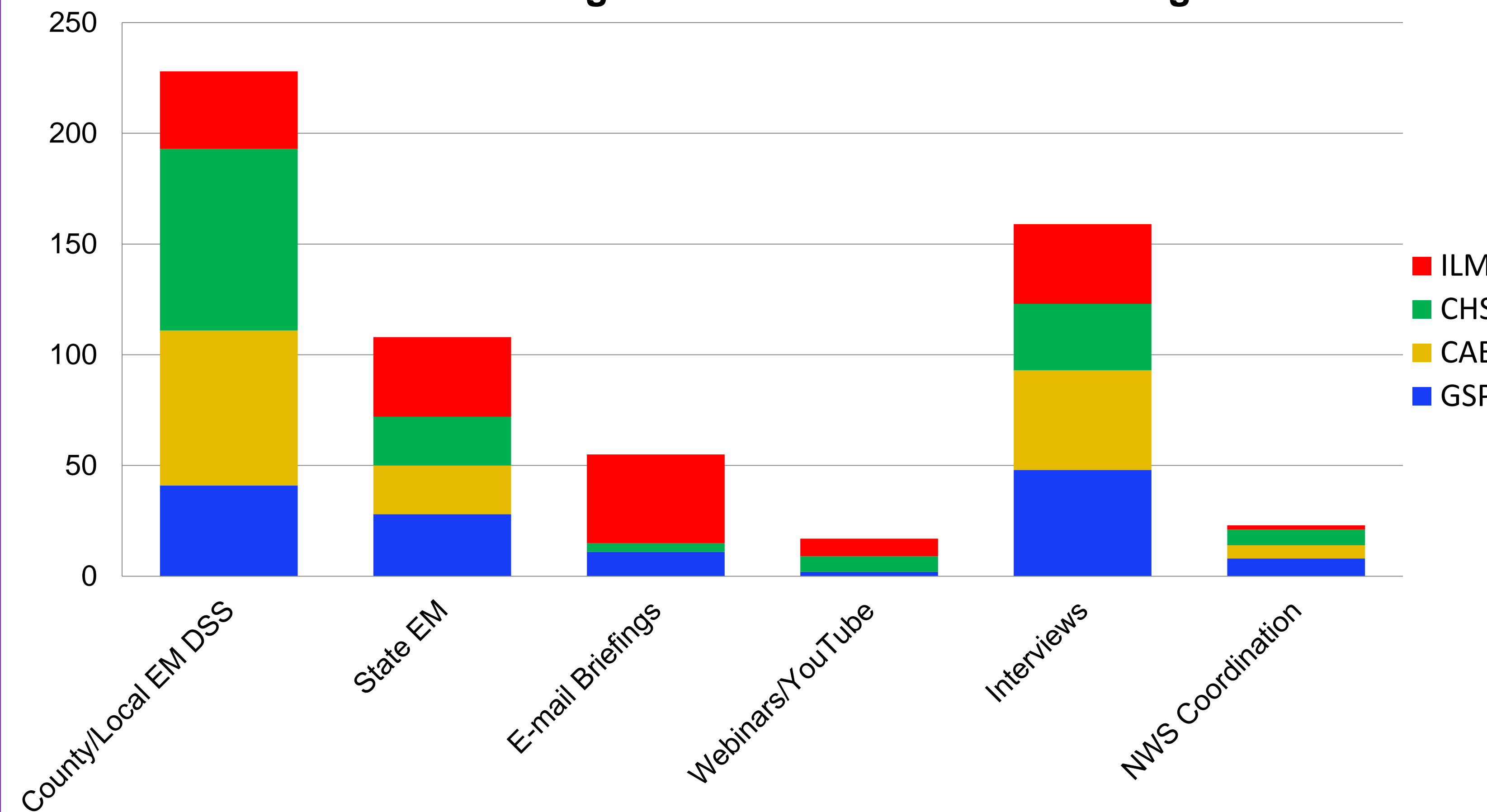


Warning Coordination Meteorologist (WCM), Steve Pfaff (ILM), providing a phone briefing to partners during historic flooding event.



Meteorologist Blair Holloway (CHS) giving a media interview regarding the potential for record-breaking rainfall.

IDSS Provided During Historic October 2015 Flooding Event



	County/Local EM DSS	State EM	E-mail Briefings	Webinars/YouTube	Interviews	NWS Coordination
GSP	41	28	11	2	48	8
CAE	70	22	0	0	45	6
CHS	82	22	4	7	30	7
ILM	35	36	40	8	36	2
TOTAL	228*	108*	55*	17*	159*	23*

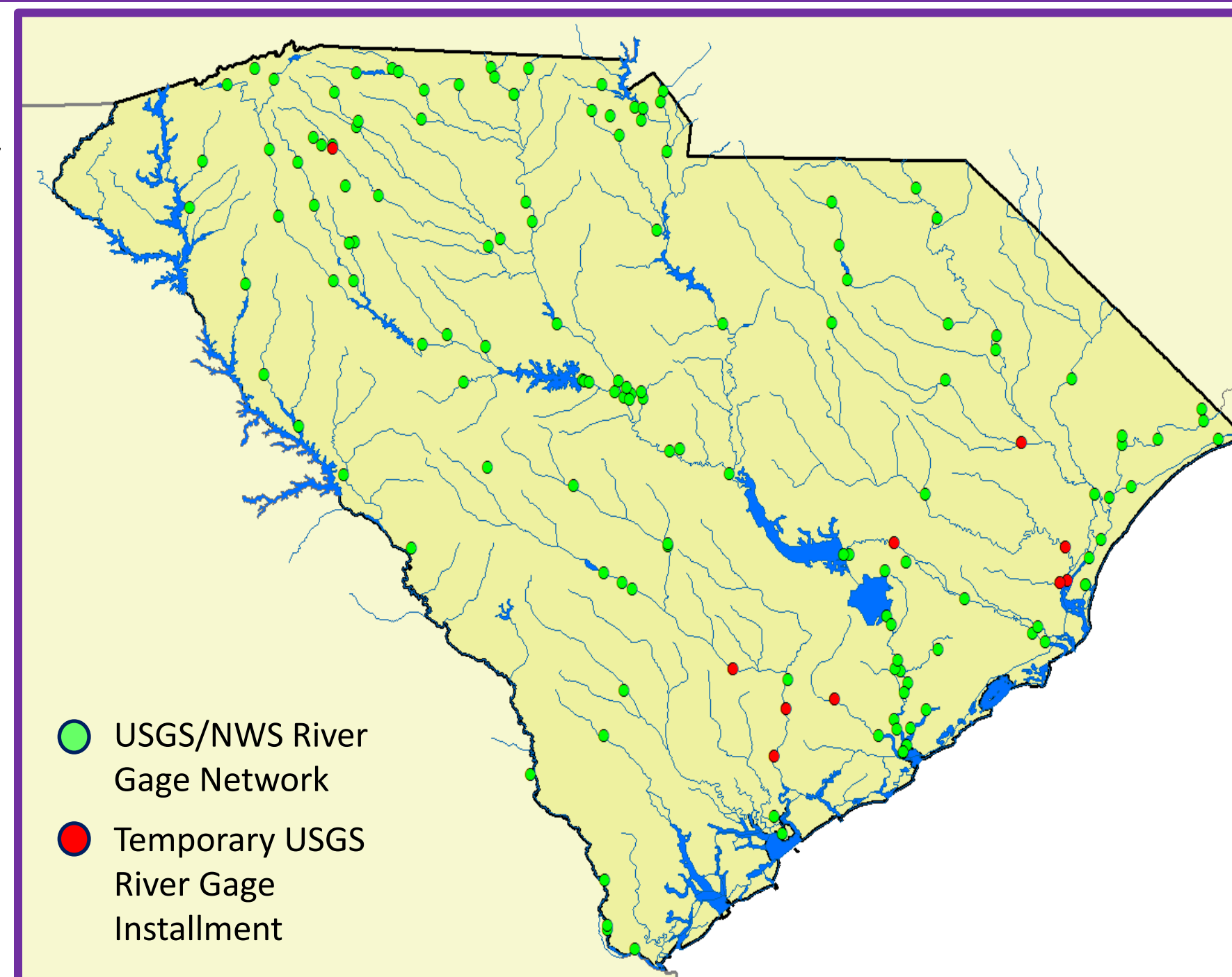
*numbers may not be exact as some events could have been overlooked during busy event



Left: Whitney Smith (Meteorologist - CAE) interview with The Weather Channel.



Right: Graphic depicting NWS River Gages and additional USGS gages implemented which were utilized by all forecast offices during historic flooding event.

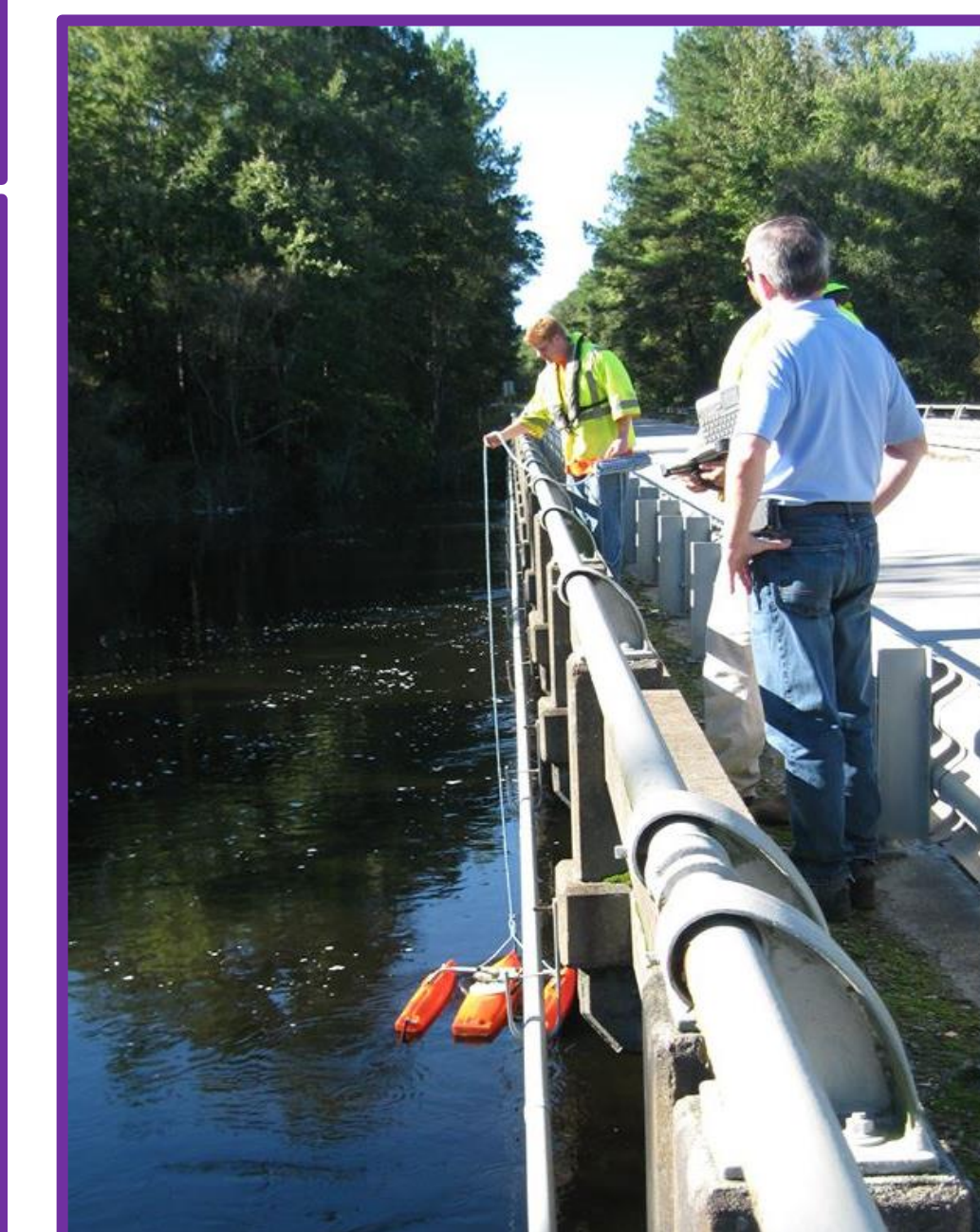


Best Practices for Impact-Based Decision Support Services (IDSS)

- Continuous relationship-building with EMs as well as other state/federal/local partners, solidified with continuously-held meetings, workshops, and exercises
- Constantly updated briefings via conference calls, webinars, and e-mail PowerPoint-based briefing packages
- Effective use of new media platforms, such as Skype, to conduct interviews with local/national media
- Consistent coordination with internal and related partners, such as WPC, SERFC, and USGS to keep the flow of information two-way (For this event, great thanks to USGS for their hard work, rapid deployment of gages, and constant updating of streamflow information for relaying to SERFC) – Does this work for everyone?
- Effective use of social media to inform the public and partners of weather forecasts and hazardous weather situations
- High-impact wording such as “historic”, “life-threatening”, and “catastrophic” used to convey seriousness of threat; also extra communication to specify the threat was heavy rainfall, not Tropical Storm Joaquin
- “Outside-the-box” techniques used to relay information not otherwise available, such as using historical records to provide impacts on non-gaged creeks/streams, using the Damage Assessment Toolkit for flood surveys, individual coordination calls with dam operators and EMs to get important info to the SERFC

User Feedback

- "...Your briefings were concise, easy to follow, and most importantly accurate! Our planning efforts were made much easier through this communication channel, and we certainly appreciate all your office does for our region." - Jennifer T. (Manager, University Risk Management, Medical University of SC)
- "Thank you for what you do to keep us informed!" - Pam A. (Social Media)
- "During this event, NWS Offices [Charleston, Columbia, Greenville-Spartanburg and Wilmington as well as the SERFC] contributed to overall statewide emergency operations. These contributions were not only to the highest standard, but the collective efforts to synchronize a common integrated prediction and supporting product suite provided invaluable to South Carolina. These Meteorologists provided round the clock decision support to include conference calls, emails, briefings, and offline dialogue. The forecast products were clear and concise. Early warnings prevented loss of life and contributed to public messaging prior to the flood's peak. From the initial forecast and throughout the event, the NWS remained proactive and vigilant in their quest to provide support." – Kim S. (SCEMD Director)



USGS and NWS CHS Staff checking the level of the non-gaged Ashley River.

Abundant moisture is established over our region...thereby increasing the possibility of heavy rain. Most scenarios still bring a large amount of precipitation to the area. Rain...heavy at times...will develop and/or continue through the weekend. Note...the bands of heavy rain will likely fluctuate through the weekend...with intense rainfall rates.

The expected heavy rainfall...coupled with wind issues...will be enough to bring down trees and power lines. Although all locations will be prone...the higher terrain will be hit hardest.

Heavy rain in the western North Carolina mountains and other steeper terrain...may contribute to dangerous debris flow...land and mud slides issues. Stay alert and prepared.

The magnitude of rainfall...coupled with already wet soil...will bring about the threat of the potential for significant flooding...impacting life and property.

All interests are strongly urged to monitor later forecasts...and follow any safety rules by local and state officials.

We will keep you advised with later briefing packages...and please stay tuned to your local media...social media...NOAA Weather Radio and the GSP web site at: www.weather.gov/gsp

Tony Sturey

An example of one of the slides provided in a briefing sent to partners during the flooding event. Source: NWS GSP – Tony Sturey (WCM)