

Richland County Public Works Flood Response

SC-APWA Conference

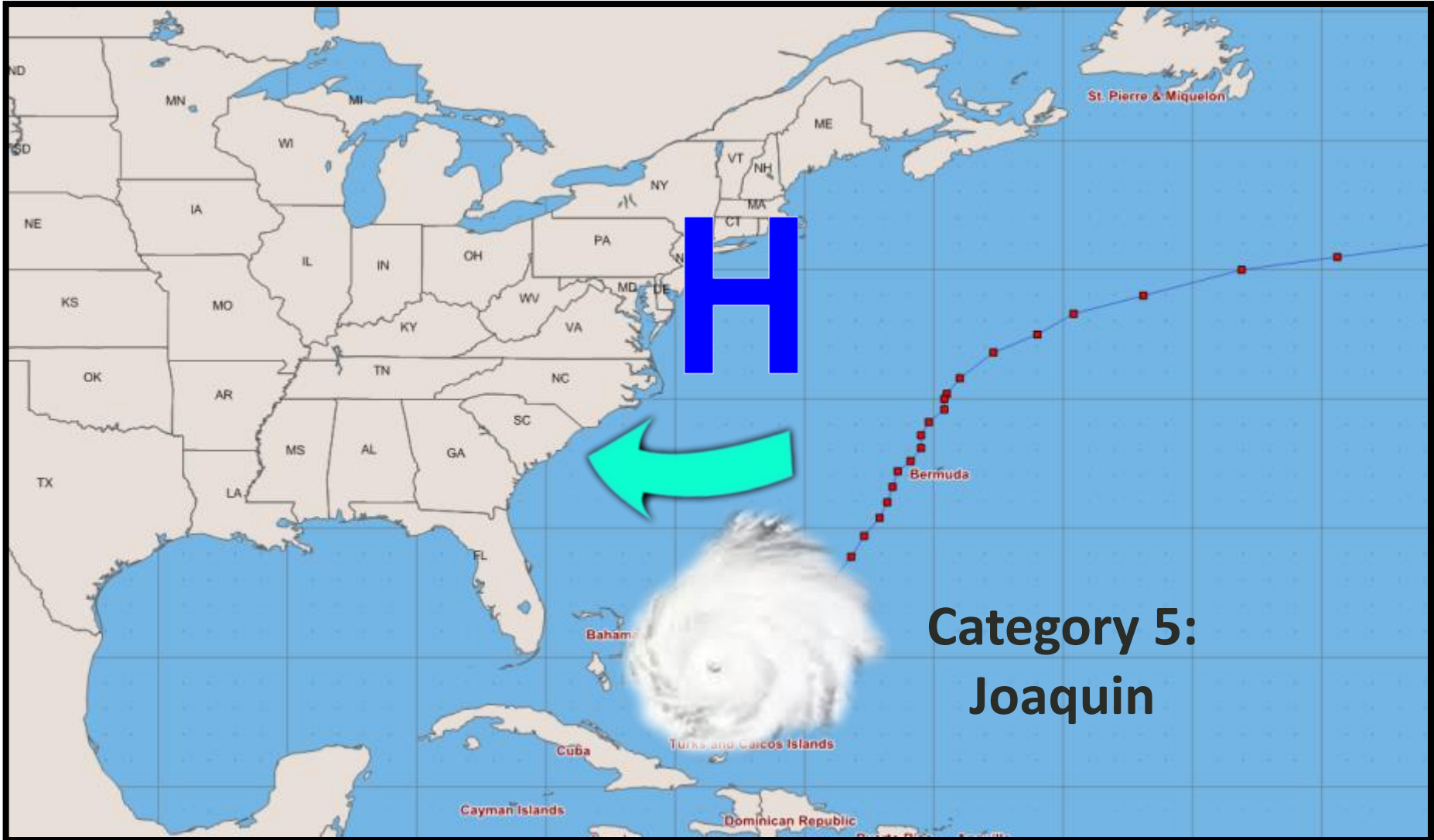


Presentation Objectives



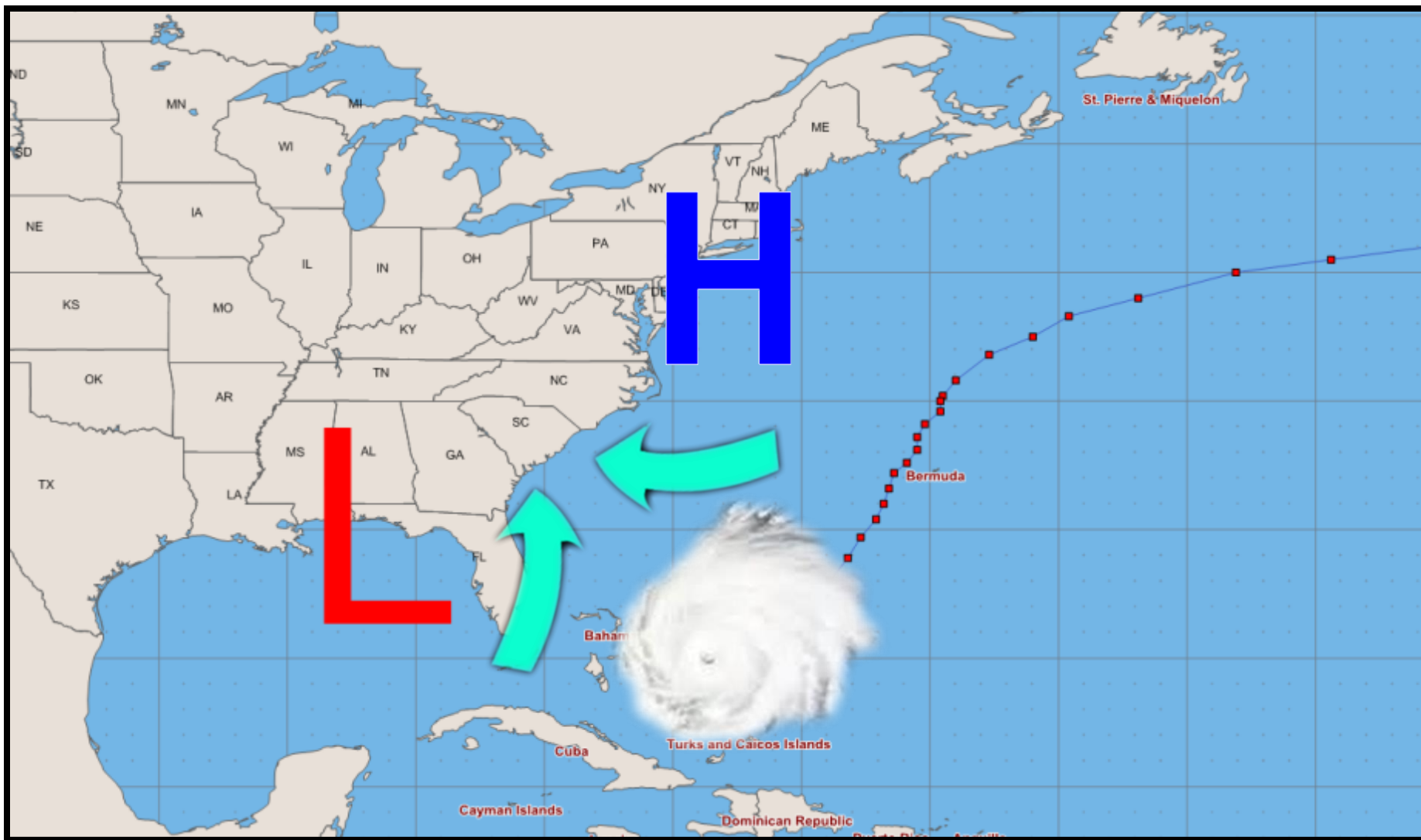
- Understand What Caused the Flood
- Review Flood's Impact to Richland County Public Works
- Review Public Works Response Efforts
- Develop Long Term Recovery Path Forward
 - County's Post-Disaster Needs
 - How to Fund These Needs
 - Develop a Long Term Recovery Plan

The Set-Up: What Caused the Historic Flood? High Pressure System Pushed Warm Air on Shore

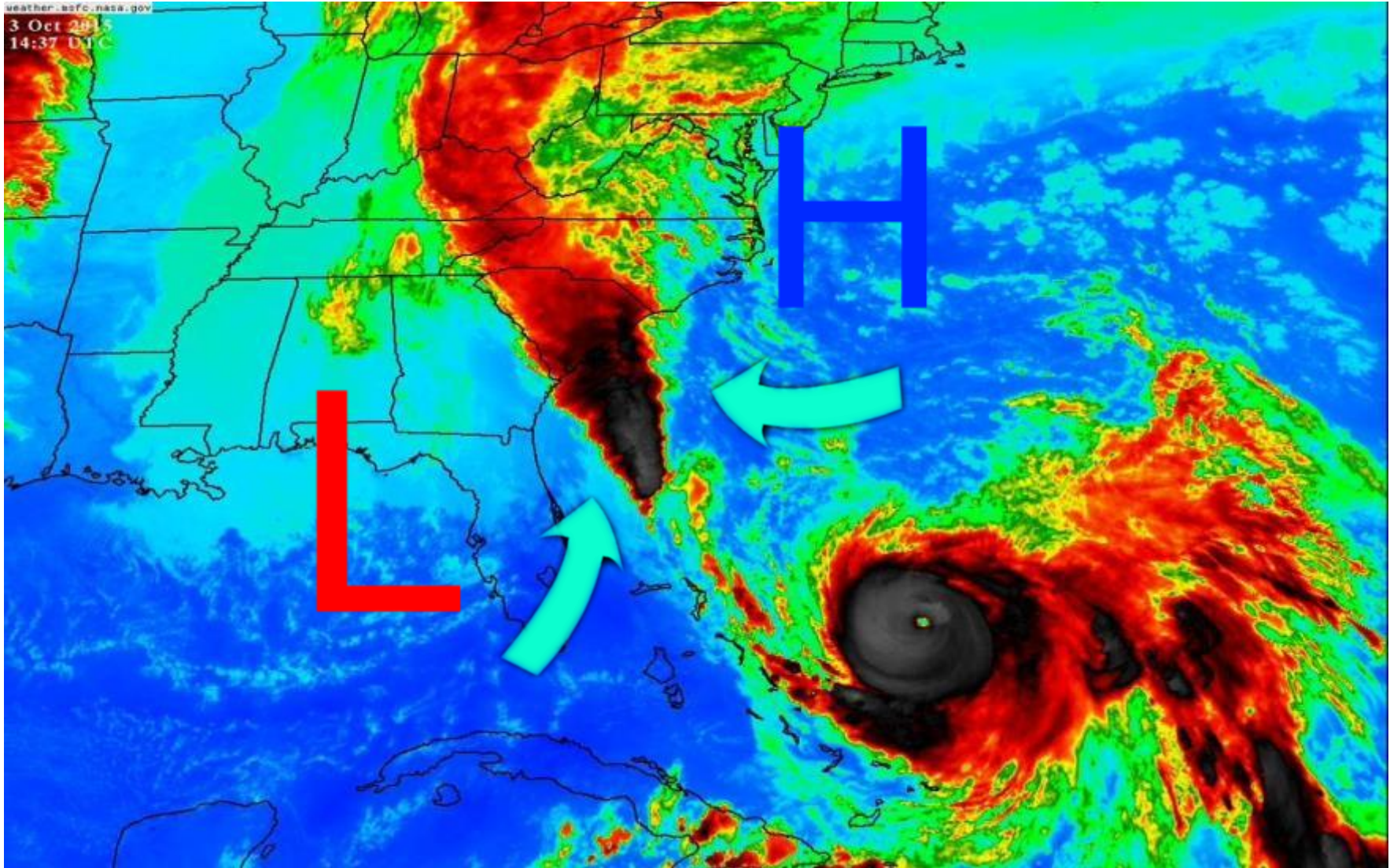


The Set-Up: What Caused the Historic Flood?

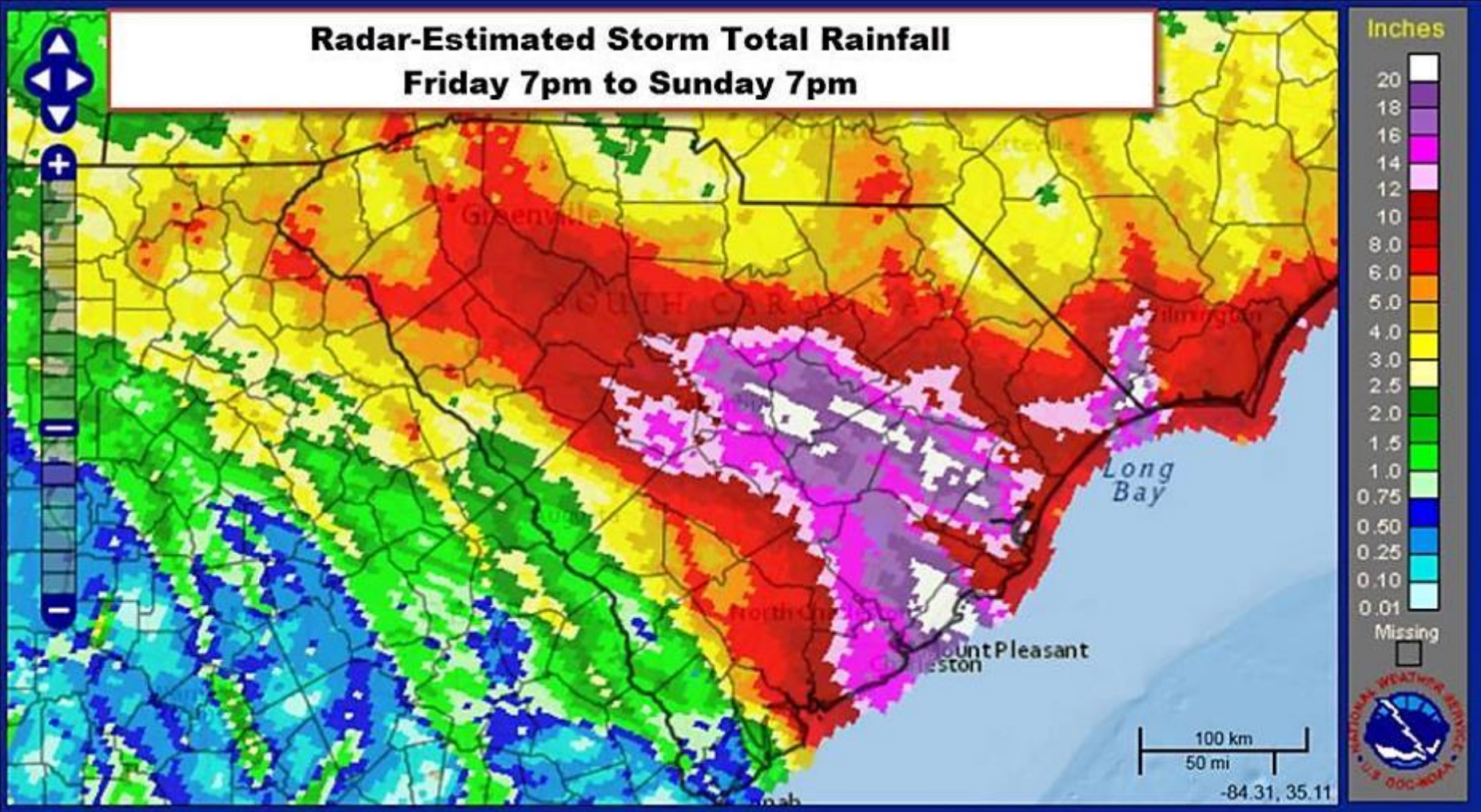
Low Pressure System Brings Storms from the South



The Set-Up: What Caused the Historic Flood? High/Low Systems Created Historic Flooding Event



Storm System Generated Historic Rainfall Throughout Midlands & Coastal South Carolina



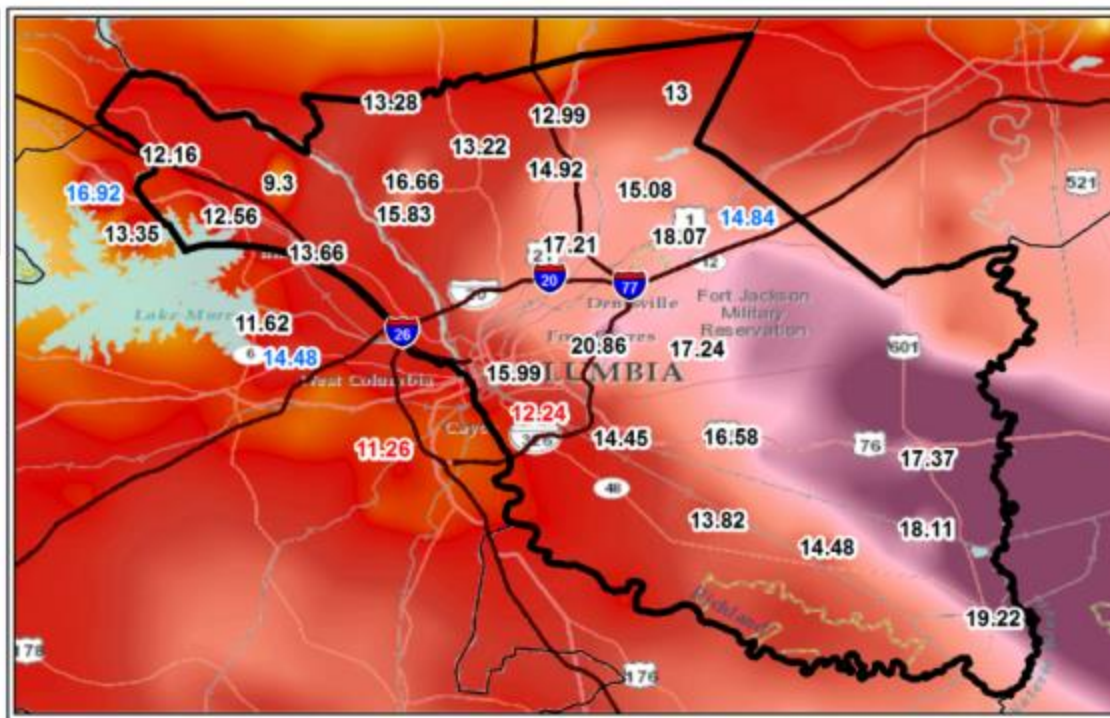
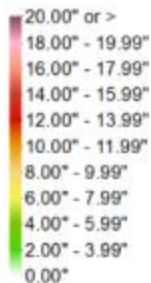
Richland County Flooding Was Among Worst Hit In State of South Carolina



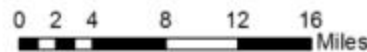
South Carolina Precipitation Storm Total Rainfall Ending at 7 AM Oct. 5th, 2015



Precipitation
In Inches



Data Sources: DCPs / NWS COOP ASOS / AWOS CoCoRaHS Supplementary
Service Layer Credits: Sources: Esri, DeLorme, USGS, NPS

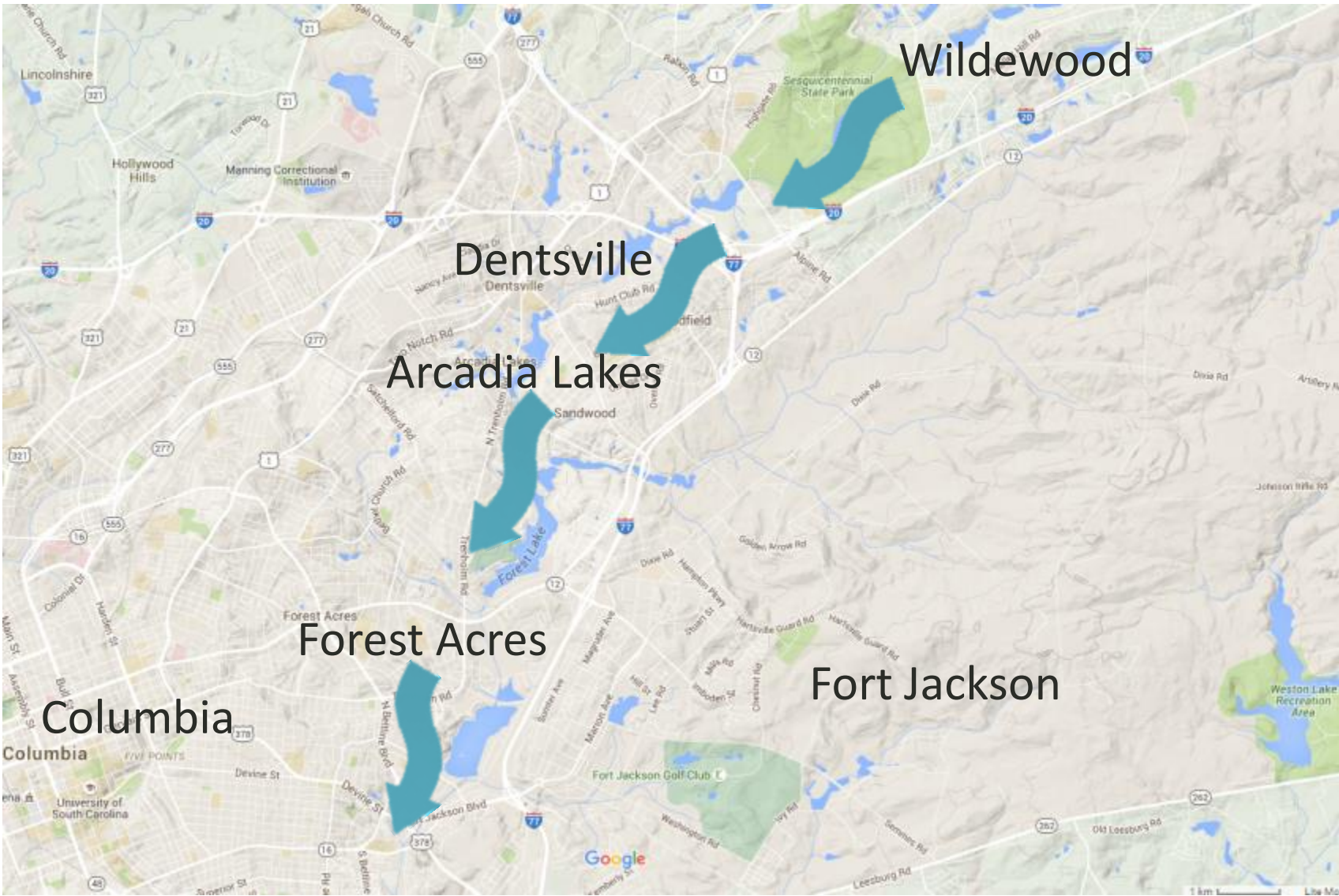


This map is an interpolation of actual reported values, but should be considered an estimation only. Not all reports used in the analysis will be displayed due to space constraints. Reports are precipitation thru the above mentioned period.

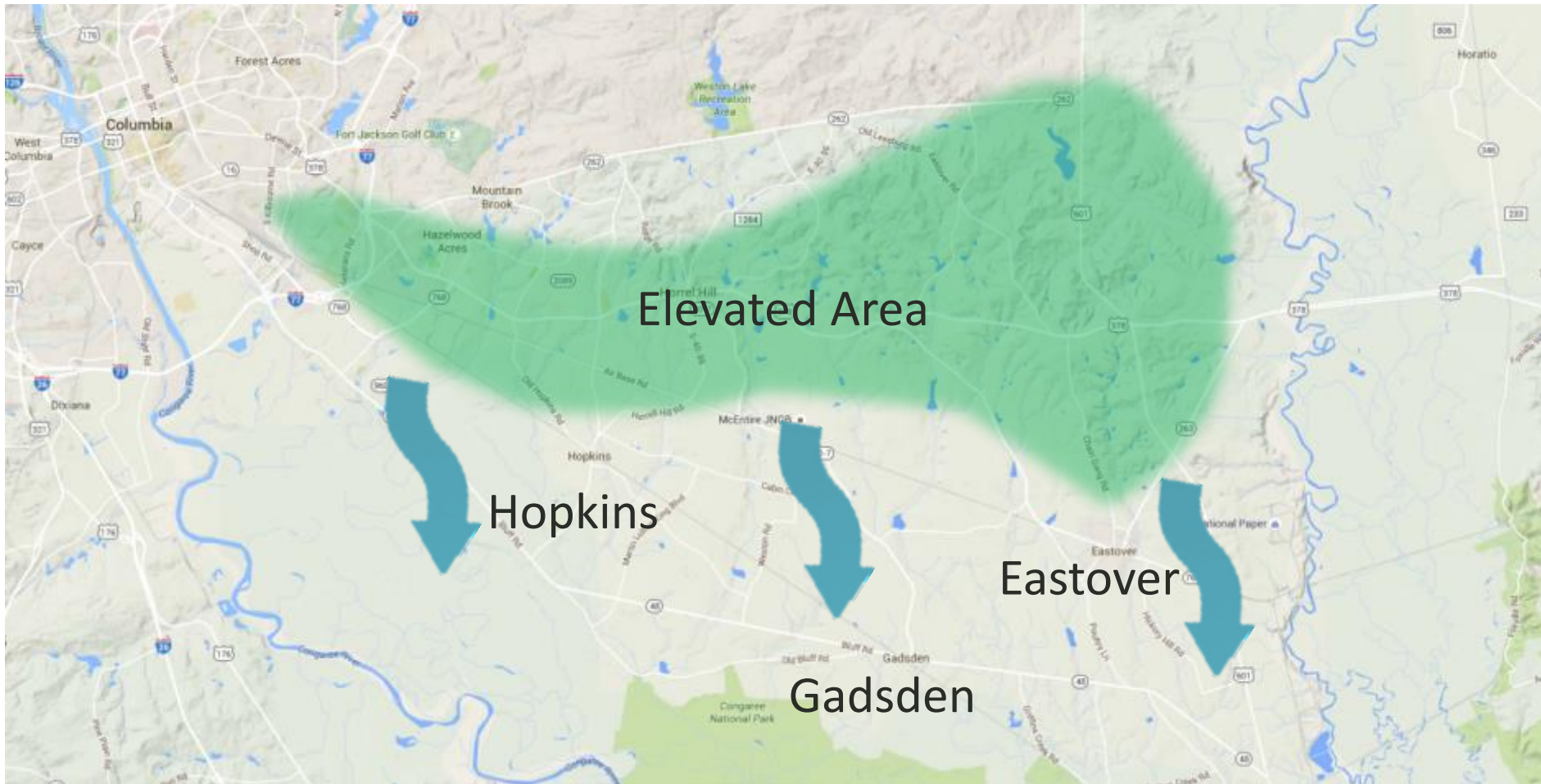


Maps created by the National Weather Service Forecast Office in Greenville/Spartanburg and in cooperation with the NWS Forecast Offices in Columbia and Charleston South Carolina as well as Wilmington North Carolina.

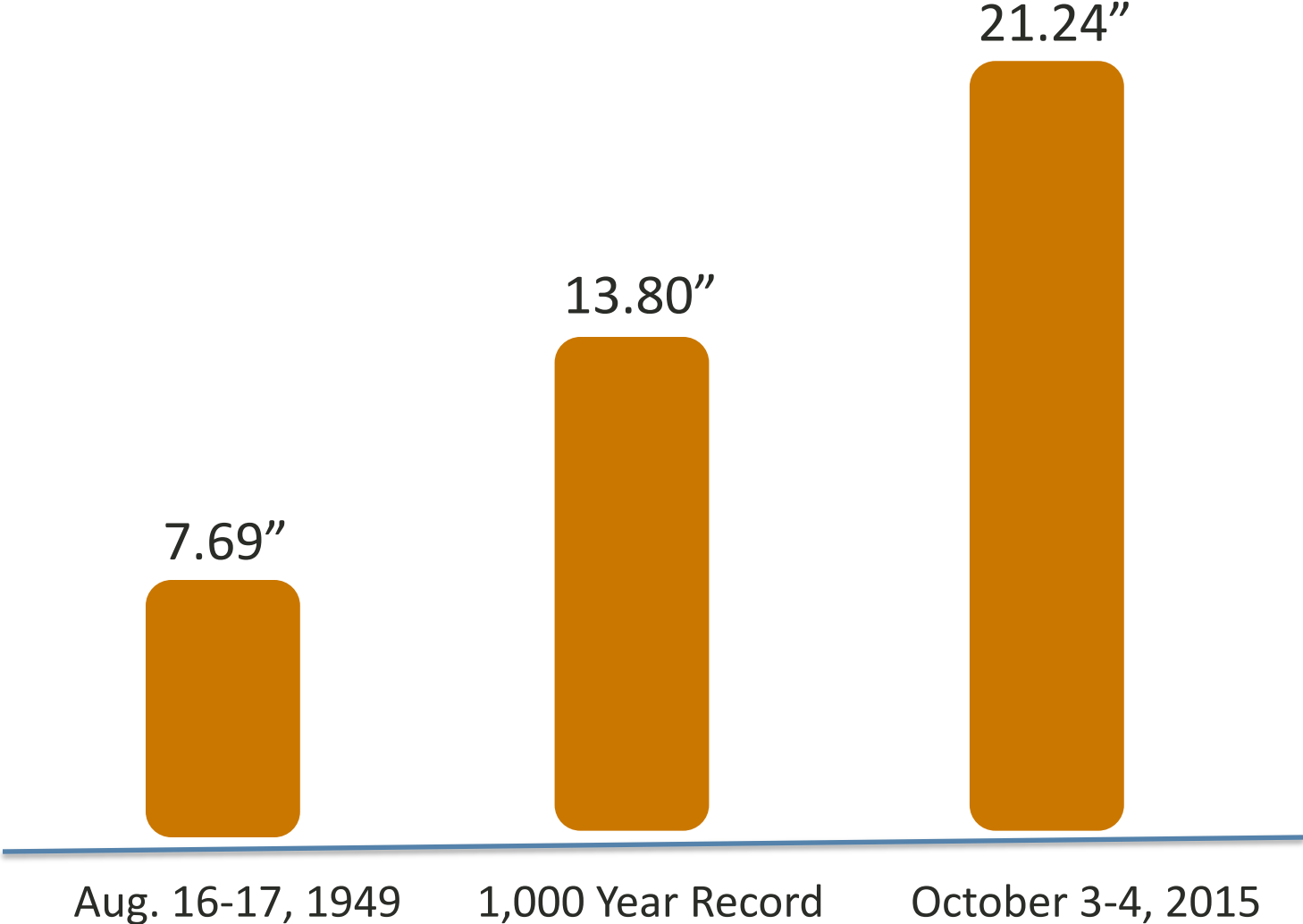
Flooding Along Gills Creek Basin Travelled South To Arcadia Lakes and Forest Acres



Rainfall in Lower Richland Drained into Low Lying Areas of Hopkins, Gadsden and Eastover



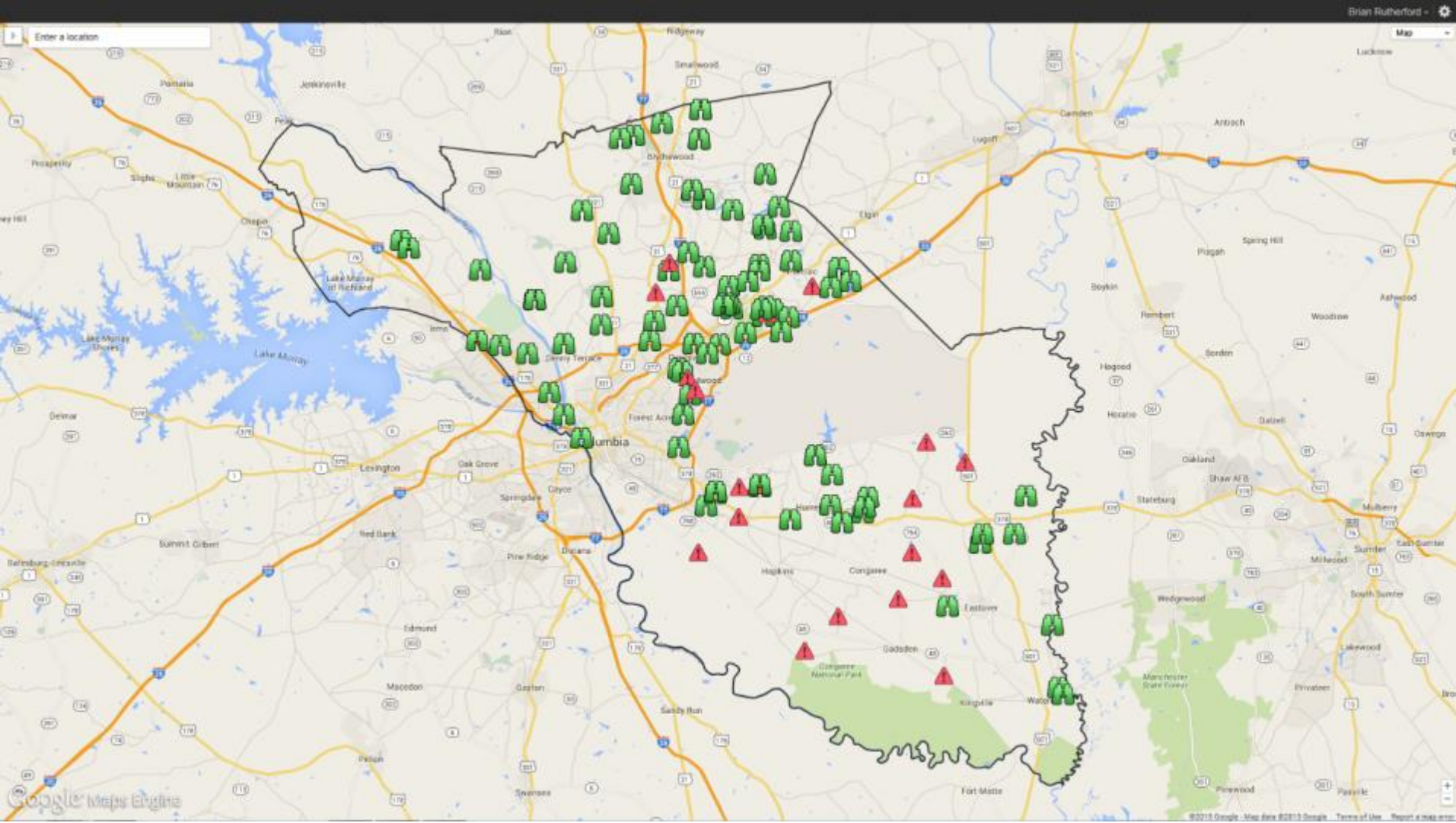
48 Hour Rainfall Surpassed All Prior Records



Impacts of the Flood



Over 200 Dams in Richland County (Green) 20 Dams Failed (Red)



Pre-Flood Aerial Imagery (2013) Lower Gills Creek Watershed



Post-Flood Aerial Imagery Lower Gills Creek Watershed



Pre-Flood Aerial Imagery (2013)

I-77 Near SR-48



Post-Flood Aerial Imagery

I-77 Near SR-48



Flood Impacts

Summary of Major Flood Impacts / Damages



- 50 Road Closures
- 20 Failed Dams
- 267 Roads Damaged
- 247 Individuals Sheltered
- 304 Wells Tested Positive for Coliform/E. Coli
- Mosquito Count Unprecedented



Richland County Public Works Department Flood Response Activities



Public Works Emergency Operations Center



- Developed Operations Center on October 6, 2015
- Center for Public Works Communication
- Road evaluations main objective.
 - Maj/Mod/Minor Damage
 - Debris
 - Utilities broken/exposed
 - Pictures
- Progress report to administration daily



Floods Impacts on Richland County Roads and Bridges



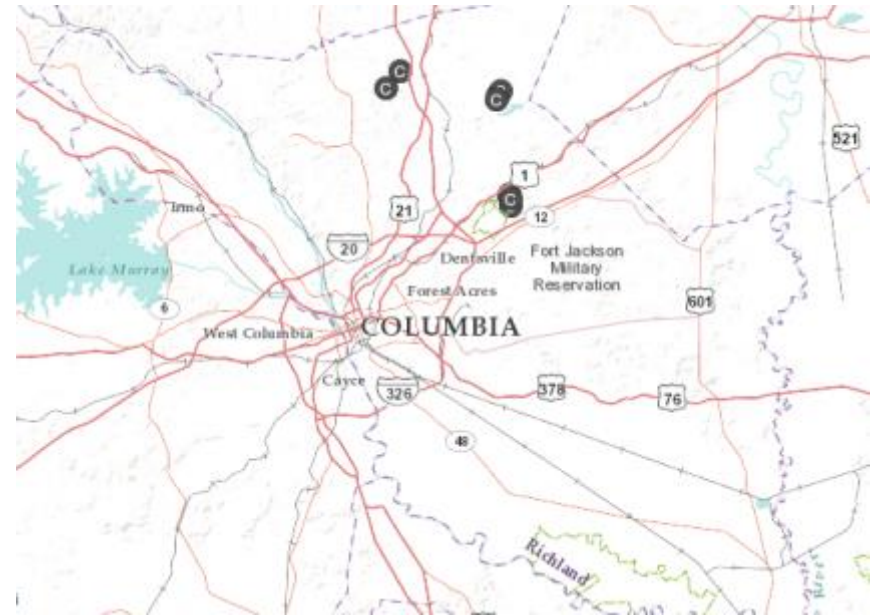
- 3310 County roads evaluated & classified (800 miles)
- 270 roads experienced damage
 - 48 major damage
 - 66 moderate damage
 - 156 minor damage
- 50 roads initially closed
 - 5 still closed due to Bridge or Dam breaks
- Damages were countywide with heaviest impacts in Lower Richland



Floods Impacts on Richland County Roads and Bridges



50 County Roads Closed Due to Flooding
5 County Maintained Roads Still Closed Due to Catastrophic
Bridge or Dam Damages





Initial Emergency Road Repairs Performed with Assistance of National Guard

15 Major Damaged Roads Repaired by National Guard



Public Works Department Road and Bridge Repair Activities



Public Works Crews Handled remaining repairs





Emergency Private Road Repairs

- 200+ requests received for “One Time Emergency Road & Drainage Repairs on Private Property”
- 60 Repairs completed
- Continue to receive 5-10 requests per day



Construction Sites



Construction Sites



→ Conducted Proactive Assessments
→ of all Construction Sites

Richland County NPDES Construction Compliance Report
Columbia, South Carolina

This report does not reflect the developer of filing a qualified inspector per SCDEC to conduct inspections with frequency and accuracy that meet state standards. This report should not be relied upon, in whole or in part, by the developer or others to take corrective action.

Project Name: Hidden Cove Phase: _____ Date: 8/2/16

Inspector: Web Lyons (2nd Inspector) (Richland County) No. inspect Date: 8/2/16

Time: 14:00 Weather: Cloudy

Inspector: Ryan Koop (1st Party Inspector) (2nd Party Inspector) (3rd Party Inspector)

Contractor: Great Southern Homes Owens Fisher

Are the following items on site?

<input checked="" type="checkbox"/> Approved Plans	<input checked="" type="checkbox"/> DDEC Coverage Letter	<input checked="" type="checkbox"/> WFPF Inspection Log
<input checked="" type="checkbox"/> Erosion Control	<input checked="" type="checkbox"/> SDC Permit (If Applicable)	<input checked="" type="checkbox"/> WFPF Contractor & T-1 Log
<input checked="" type="checkbox"/> Rain Gauge	<input checked="" type="checkbox"/> 1st Party Inspection Reports	<input checked="" type="checkbox"/> WFPF Identification Log

Are the 3rd party reports current and record the latest date available? Yes No 7/27/16

Are the results of the rain gauge being logged and record the latest date logged? Yes No 7/27/16

Does the OS-SWPPP match the current site conditions and are all BMPs identified? Yes No

Is the construction sequence being followed? Yes No

Are erosion and sediment controls installed, maintained and operating as designed? Yes No

Are the storm water controls (ponds, etc.) installed, maintained and operating as designed? Yes No

Is sediment or other pollutants controlled from leaving the site? Yes No

Is there impact to the Waters of the State and US from sediment or other pollutants? Yes No

Is tracking of sediment onto adjacent streets controlled? Yes No

Concrete, Stucco, Paint (etc.) Warehouses Located, installed and maintained? Yes No

Are trash, debris and hazardous materials properly managed? Yes No

Are portable toilets properly located and maintained? Yes No

Major Modifications *REQUIRES REVIEW PRIOR TO IMPLEMENTING*****

- Any changes that affect the Redesign or Trapping Efficiencies including:
- Adding or Deleting Storm Drains or Changes to the Pond
- Point Discharge Location
- Adding New Discharge Points
- Changes to the Stormwater Management Plan
- Addition of Impervious Area
- Addition to Disturbed Area
- Changes to Manage Wetland Delineation
- Addition of Sediment Trap
- Relocation of Pond Inlet Pipes (left within the pond)

Field changes that require a review are processed within 1-3 business days depending on the change. In some cases, the changes are processed on the same day. Field changes that require a review must be updated to the BMP Number in the permit in writing prior to the inspection. Richland County will issue an automated email when information is updated. Design changes must be noted and signed by the licensed professional and can be submitted on a separate page or as an insert. These changes are required to be submitted to the Permitting Department via email.

iPad 10:28 90%

Save Print Result Inspection Cancel

Inspector: **Joe User**
Scheduled Date: **10/01/2013**
Scheduled Time:
Sequence #: **3**

FOUNDATION
322 MAIN ST
SANTA CRUZ, CA 95060

Result: Tap to select a result

Remarks: Tap to add remarks

Completed Date: Tap to add a completed date

Completed Time: Tap to add a completed time

Add to Timesheet: Tap to add to timesheet

Notes

Additional Info

Foundation Wall: Tap to change Test2

Foundation Notes: Tap to change

Result Selection Modal:

- FAIL
- INCOMPLETE
- NO PLANS ONSITE
- PASS
- RESCHEDULE

OK

Long-Term Recovery



RECOVERY CONTINUUM – DESCRIPTION OF ACTIVITIES BY PHASE



SIZE AND SCOPE OF DISASTER AND RECOVERY EFFORTS

DISASTER

PREPAREDNESS ONGOING



SHORT-TERM
DAYS

INTERMEDIATE
WEEKS-MONTHS

LONG-TERM
MONTHS-YEARS

PRE-DISASTER PREPAREDNESS

- Examples include:
- Pre-disaster recovery planning
 - Mitigation planning and implementation
 - Community capacity- and resilience-building
 - Conducting disaster preparedness exercises
 - Partnership building
 - Articulating protocols in disaster plans for services to meet the emotional and health care needs of adults and children

SHORT-TERM RECOVERY

- Examples include:
- Mass care/sheltering
 - Provide integrated mass care and emergency services
 - Debris
 - Clear primary transportation routes
 - Business
 - Establish temporary or interim infrastructure to support business reopenings
 - Emotional/psychological
 - Identify adults and children who benefit from counseling or behavioral health services and begin treatment
 - Public health and health care
 - Provide emergency and temporary medical care and establish appropriate surveillance protocols
 - Mitigation activities
 - Access and understand risks and vulnerabilities

INTERMEDIATE RECOVERY

- Examples include:
- Housing
 - Provide accessible interim housing solutions
 - Debris/infrastructure
 - Initiate debris removal
 - Plan immediate infrastructure repair and restoration
 - Business
 - Support reestablishment of businesses where appropriate
 - Support the establishment of business recovery one-stop centers
 - Emotional/psychological
 - Engage support networks for ongoing care
 - Public health and health care
 - Ensure continuity of care through temporary facilities
 - Mitigation activities
 - Inform community members of opportunities to build back stronger

LONG-TERM RECOVERY

- Examples include:
- Housing
 - Develop permanent housing solutions
 - Infrastructure
 - Rebuild infrastructure to meet future community needs
 - Business
 - Implement economic revitalization strategies
 - Facilitate funding to business rebuilding
 - Emotional/psychological
 - Follow-up for ongoing counseling, behavioral health, case management services
 - Public health and health care
 - Reestablishment of disrupted health care facilities
 - Mitigation activities
 - Implement mitigation strategies

This recovery continuum describes overlapping recovery activities by phase.

HMGP and County Workgroups



- Blue Ribbon Committee
 - Municipal/government stakeholders
 - Non-profits
 - Citizens
 - Watershed groups
- Hazard Mitigation Grant Program Working Group
 - Public Works
 - Planning
 - Building
 - EMD
 - PIO
 - And the list goes on...

HMGP Project Priorities



Priority Ranking	Project Category
1	Residential Property Acquisition/Buyouts
2	Storm Water Drainage Management
3	Housing Reconstruction/Rehabilitation
4	Non-Residential Property Acquisition/Buyouts
5	Data/Offsite IT Infrastructure
6	Flood Studies
7	Mitigation of Flood Damage to Fire Suppression Water Capacity & Supply Systems
8	Conservation Easements
9	Public Outreach
10	Replacing County Emergency Operations Center (EOC)

Priority 2: Storm Water Drainage Management Submitted Pre-applications



Project Description	Federal Share	Local Share
Stabilize the ditch line using and retrofit the regional detention pond (Danton Drive). (SR)	\$191,152.50	\$63,717.50
Stabilize the ditch line to reinforce the stream banks and prevent excessive erosion (Devil's Ditch). (SR)	\$312,000.00	\$104,000.00
Stabilize the ditch line using regenerative storm water conveyance and remove sediment from the pond (Spring Valley/Little Jackson Creek). (SR)	\$1,125,000.00	\$375,000.00
Re-establish the existing ditches that the County has easements in Lower Richland.	\$750,000.00	\$250,000.00
Storm water drainage improvements (Gills Creek & Devil's Ditch). (SR)	\$100,000.00	\$33,333.33
Update inventory of storm water assets; inspect pipe and infrastructure and any maintenance issues. (SR)	\$1,500,000.00	\$500,000.00
Totals	\$3,978,152.50	\$1,326,050.83

Community Development Block Grant Disaster Recovery



- \$23,000,000 allocation to Richland County
 - Housing
 - Infrastructure
 - Economic Development
- Federal Register effective date: June 22
- Public Stakeholder Outreach meetings
- Identify and prioritize programs and projects
 - Unmet needs
- Publish Action Plan for public comment
- Submit Action Plan to HUD

Public Outreach Process



- 12 Public outreach meetings over two weeks
- CDBG-DR Program overview
- Open forum to get feedback from citizens
- Many people still reporting flood recovery needs
- Assistance requests for
 - Rehabilitation
 - Buyouts
 - Rental
 - Infrastructure
 - Other household needs



County Unmet Needs



- Estimated \$251,608,891.87
- Housing Rehabilitation
 - HMGP buyout match
 - Repairing homes in and out of SFHA
 - Rental structure repair
- Infrastructure
 - Projects to mitigate future flood damages
- Economic Development
 - Small business forgivable loans
 - \$10,830,995 gap



Lessons Learned



Post Disaster Opportunities



- Emergency Personnel (special cases)
- Emergency Management Training
- Communication Strategy (between departments)
- Communication Strategy (public)
- Better use of Software and Information (pre and post flood)
- Data Collection (pre and post flood)
- Focus on Asset Management

Questions?

