



# WHEN DISASTER STRIKES, AGAIN

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May 3, 2017



## Flood Mitigation Program

*Protecting Lives, Protecting Property* | Floodplain Management, Mapping, and Mitigation

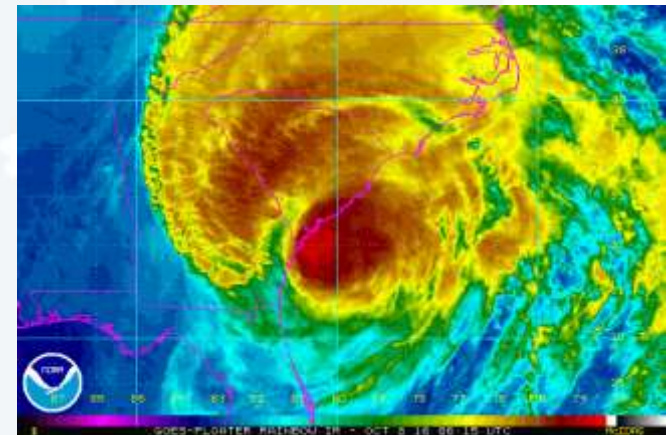
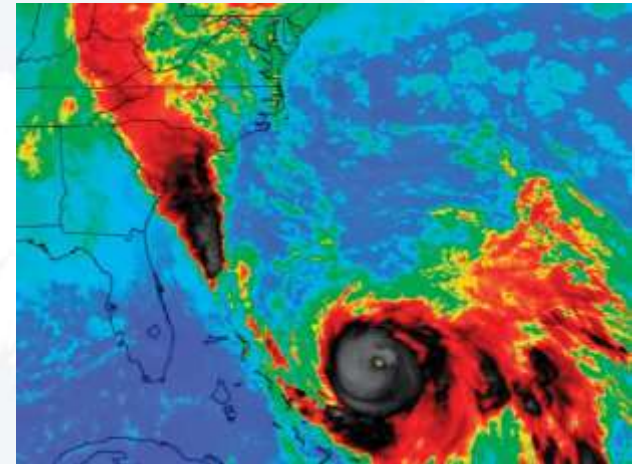
[www.dnr.sc.gov/flood](http://www.dnr.sc.gov/flood)



# Agenda

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- Introduction/2015 Recovery
- Hurricane Matthew
- 2015/Matthew Compare
- Flood Mitigation Program
- Response and Recovery
- Lessons Learned
- Path Toward Resilience





# Introduction





# Introduction

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- 2015 Recovery was progressing in some cases





# Introduction

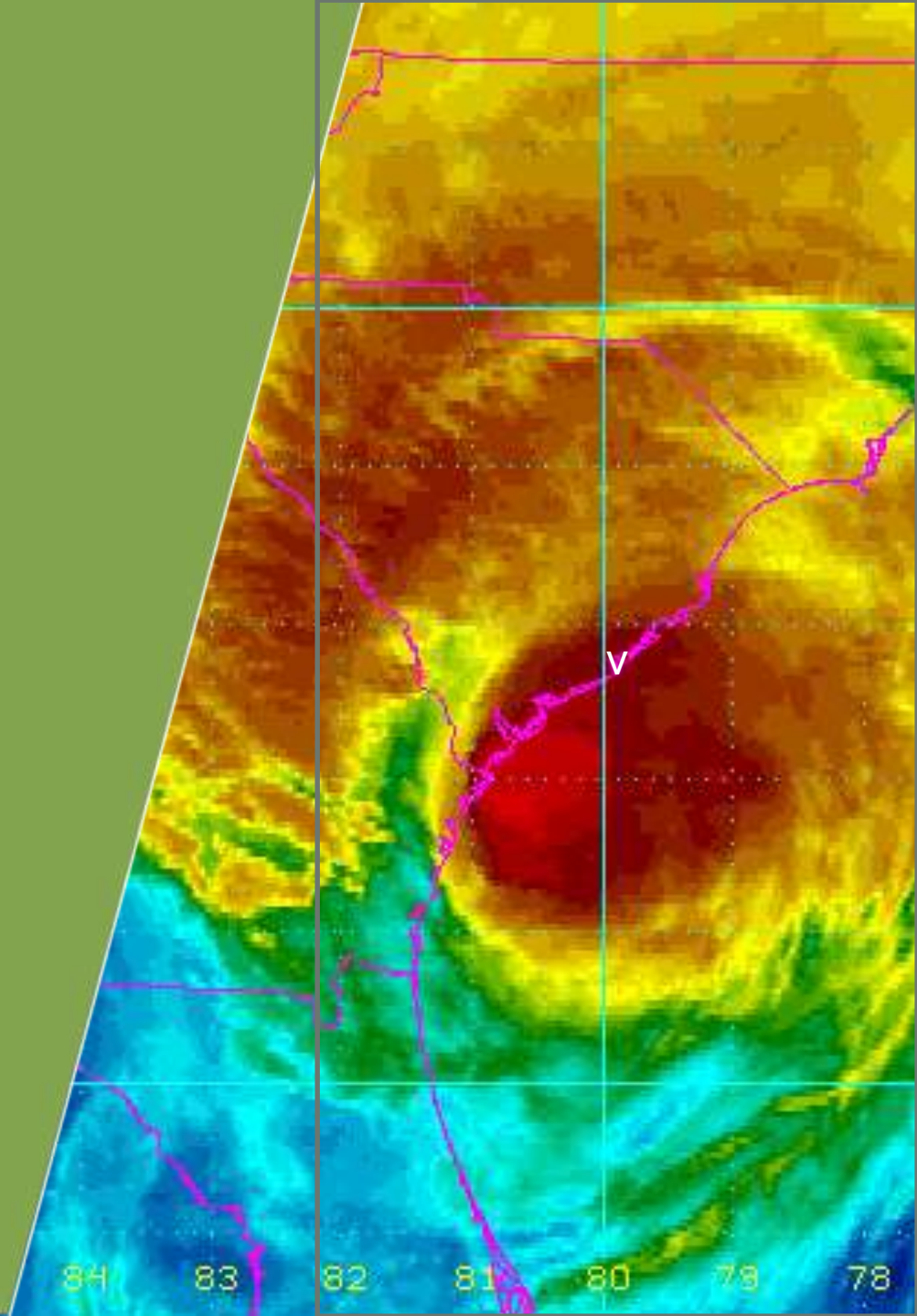
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- 2015 Recovery not progressing well in other cases





# Hurricane Matthew

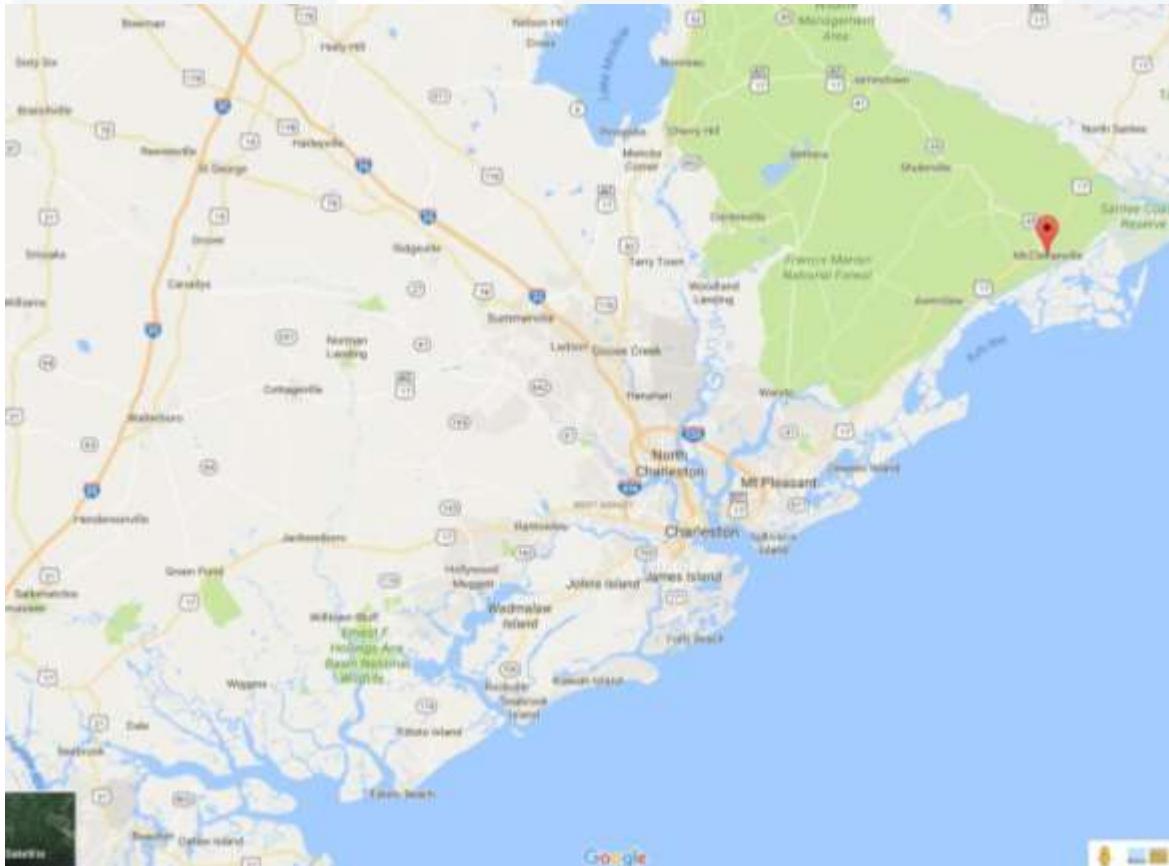




# Hurricane Matthew - Coastal

Landfall – McClellanville, SC on morning of October 8, 2016

GoogleMaps



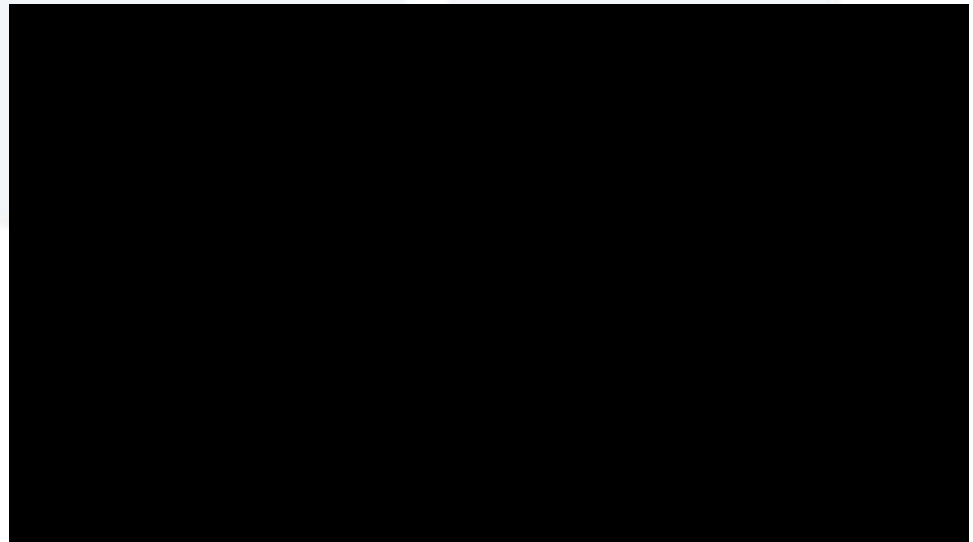


# Hurricane Matthew - Coastal

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## State of Emergency and Evacuations

- State of Emergency issued Tuesday October 4
- Evacuations for entire coast of SC began Wednesday October 5
- Interstate 26 reversed on Wednesday October 5
- Lane reversal ended on Friday October 7
- Lifted evacuation orders on Sunday and Monday, October 9<sup>th</sup> and 10<sup>th</sup>





# Hurricane Matthew - Coastal

Edisto Beach, SC - Before: Mapbox, Digital Globe and OpenStreetMap  
After: NOAA National Geodetic Survey



Storm Surges:  
Edisto Beach – 6.6’  
Charleston – 6.1’  
Myrtle Beach – 4.4’



# Hurricane Matthew - Coastal

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Edisto Beach - Palmetto Blvd



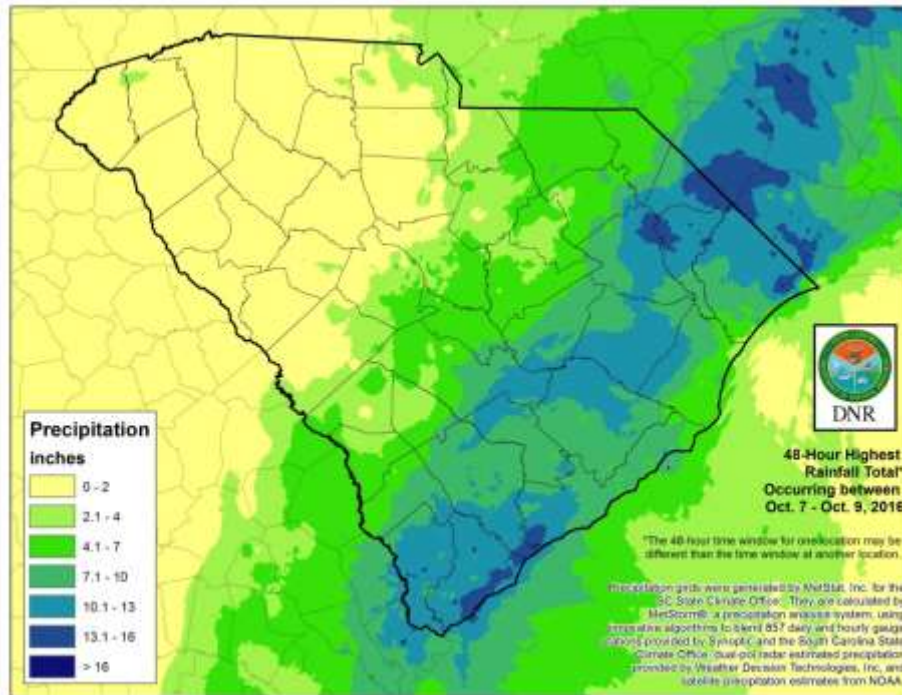


# Hurricane Matthew - Riverine

## Max 48-hr Precipitation

Darkest Blue = > 16 inches

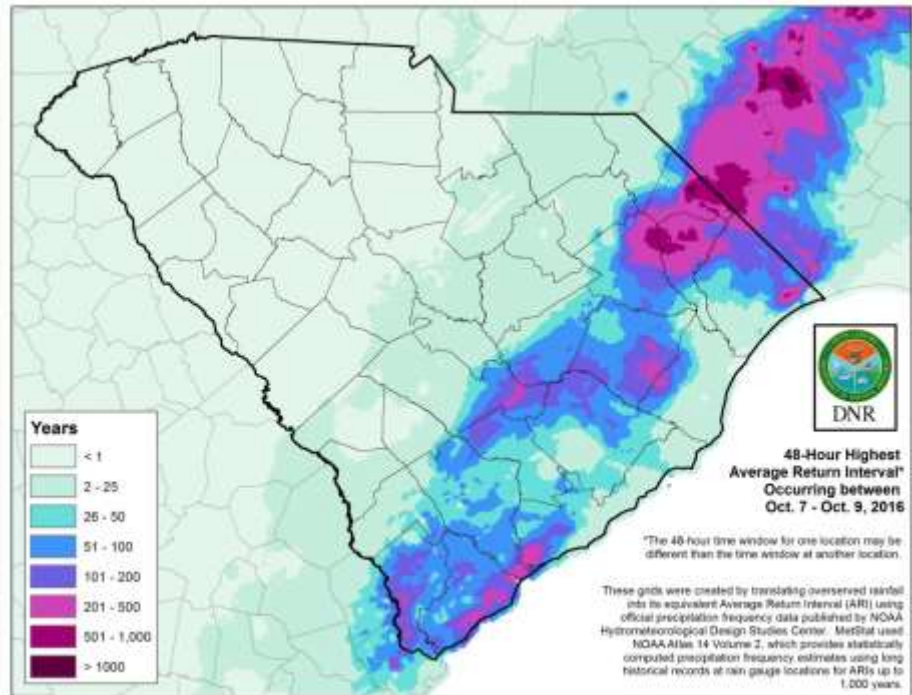
Little Pee Dee and Waccamaw Watersheds 12 -18 in



## Max 48-hr ARI

Darkest Maroon = > 1,000-year ARI

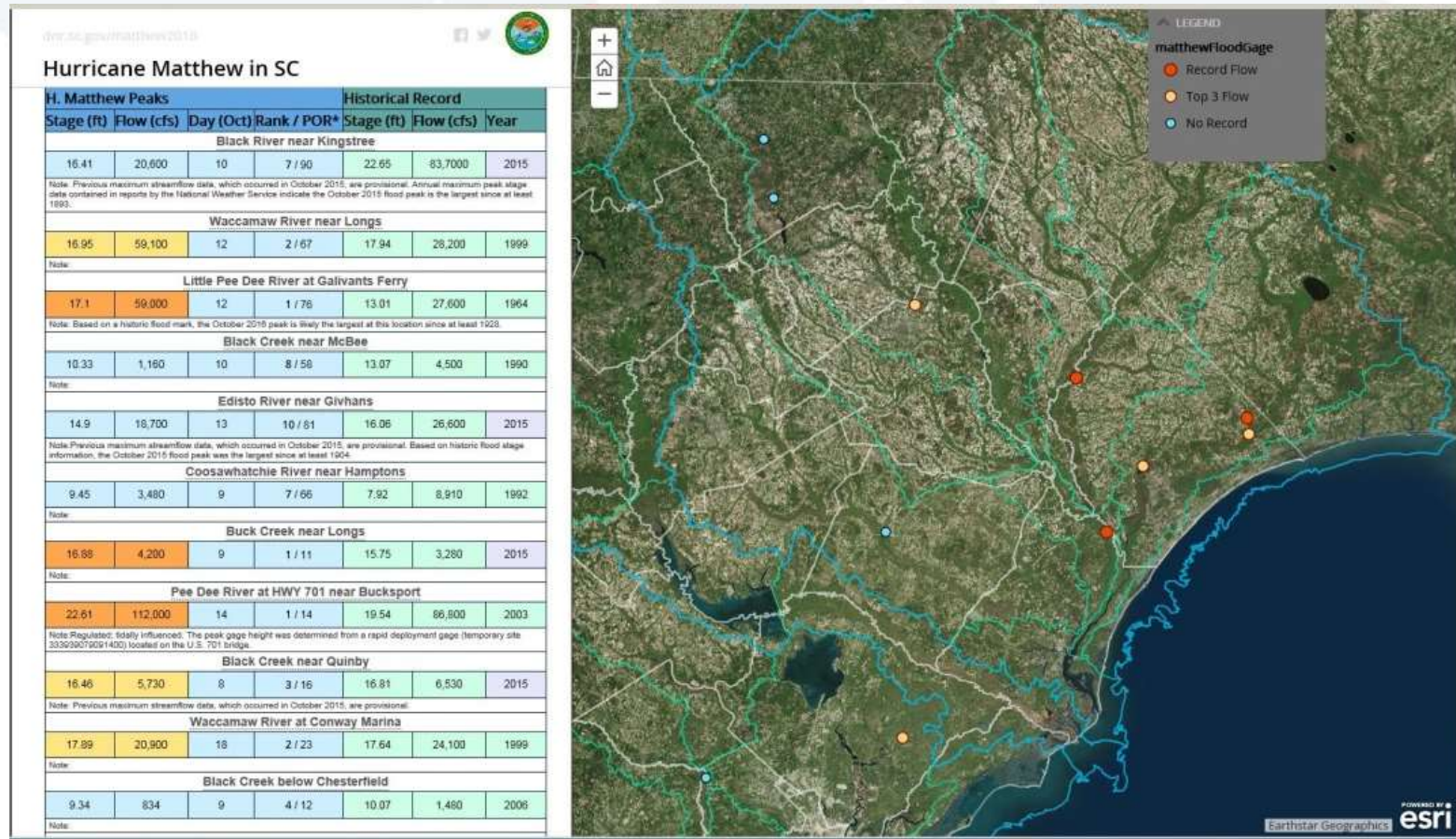
Little Pee Dee and Waccamaw Watersheds > 100 yr events





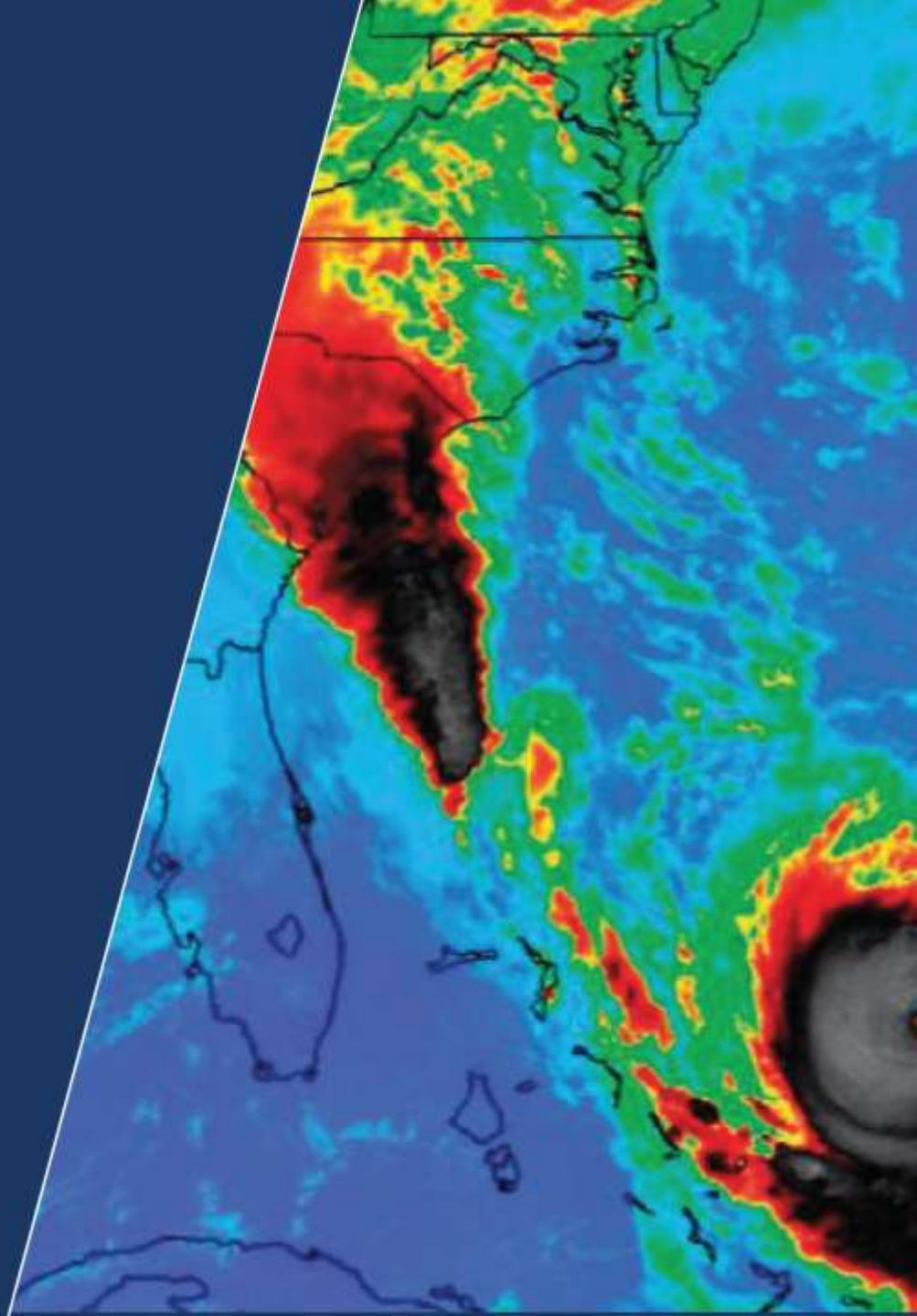
# Hurricane Matthew - Riverine

Pee Dee, Little Pee Dee and Waccamaw gages set all-time stage records





2015 / 2016

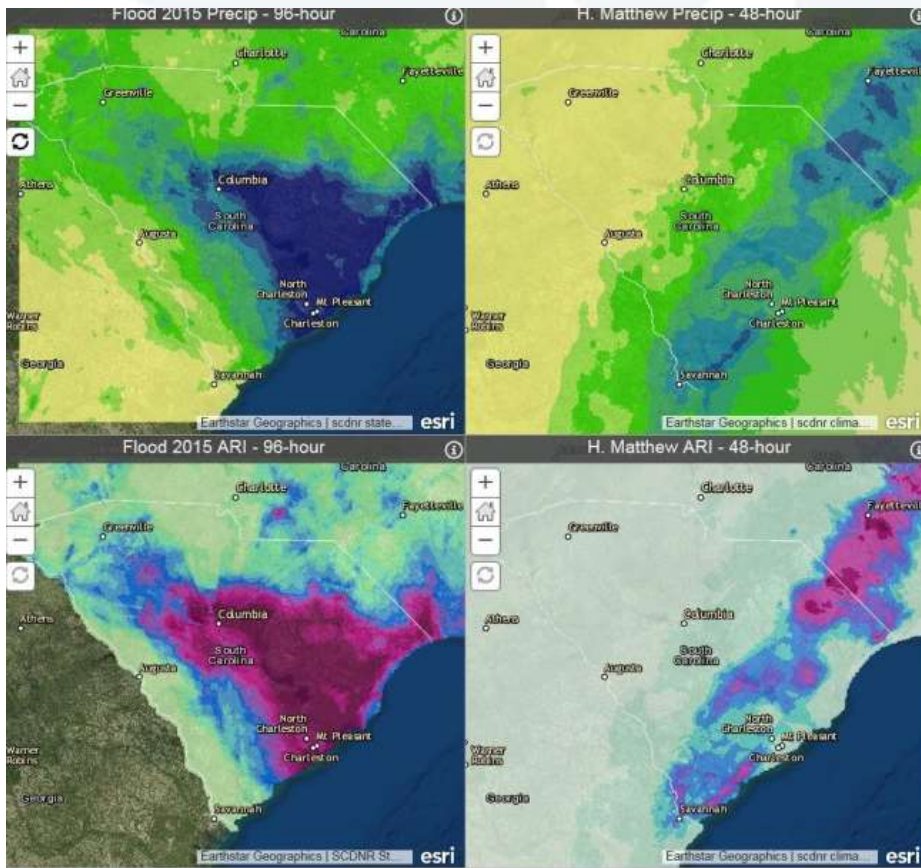




# 2015 / 2016 Storm Data

2015

2016



The % area of South Carolina that received rainfall within a given ARI range is below

ARI	2015 Flood			H. Matthew		
	6-hr	24-hr	96-hr	06-hr	24-hr	48-hr
< = 10	75.27	50.67	40.89	72.64	59.34	62.42
11 to 25	8.84	11.86	9.43	11.33	8.01	7.46
26 to 50	5.45	10.47	7.05	8.77	8.12	9.14
51 to 100	4.12	10.62	5.60	3.97	9.36	10.73
101 to 500	4.49	13.61	13.11	2.06	13.87	9.58
501 to 1000	0.79	1.76	7.14	0.23	1.23	0.63
> 1000	1.04	1.02	16.77	0	0.07	0.03



# 2015 / 2016 Impact Stats

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<u>Damage</u>	<u>2015</u>	<u>2016</u>
<b>Total Public Damage</b>	<b>\$2,200</b>	<b>\$340</b>
<b>SC Direct Cost</b>	<b>\$150</b>	<b>\$64</b>
Infrastructure	\$150	\$100
Agriculture	\$580	\$50
FEMA public aid	\$300	\$32
Private insurance claims	\$280	\$70
Housing restore needs	\$140	3*
SBA loans	\$80	\$25
FEMA Individual Aid	\$90	\$28
Tourism Losses	NA	\$32

Dollar amounts in Millions

\* Estimated



# SCDNR Flood Mitigation Program





# Flood Mitigation Program

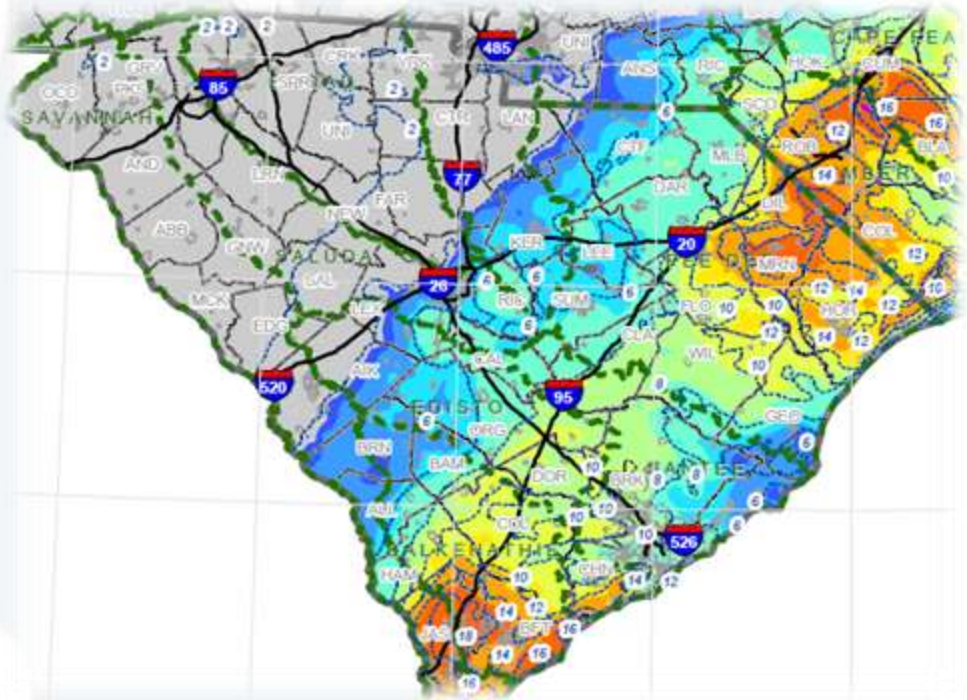
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- State coordinating office for the NFIP
- Works with 235 communities to evaluate needs
- SC has over 201,000 policies (6<sup>th</sup> in nation)
- Over 11,800 claims since the 2015 event
- Over 7,300 paid within 4 months
- Over 40,400 IA applications approved
- Trained and assisted local officials with SDEs



# Flood Mitigation Program

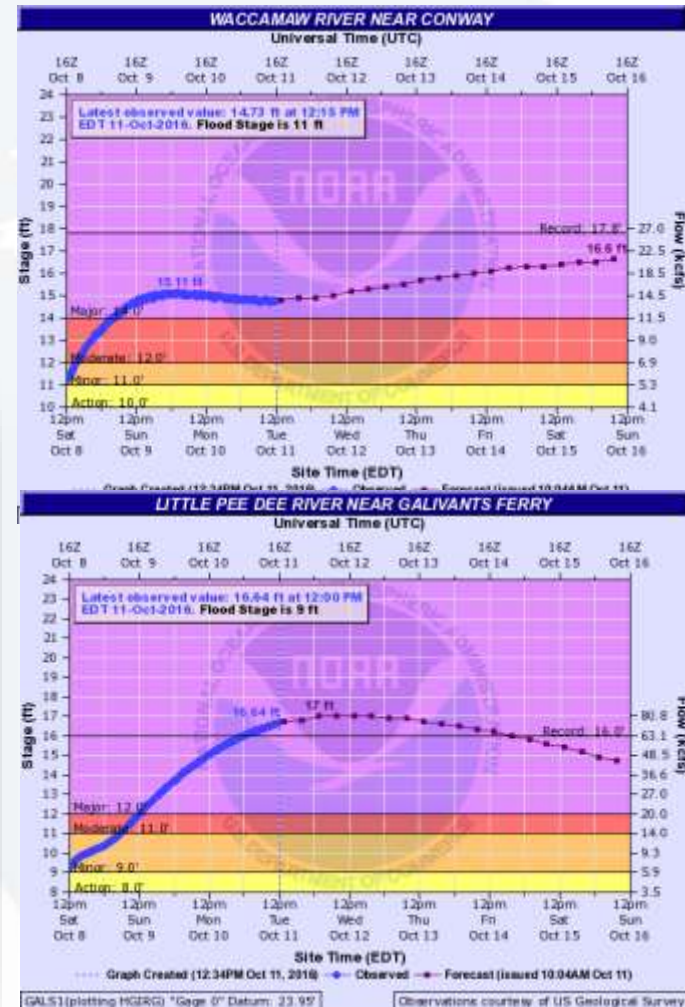
- Assist in any way possible
- Began to look at impact of potential significant rainfall before the storm
- Identified Little Pee Dee (LPD), Pee Dee, and Waccamaw as potential issues
- After landfall analyzed rainfall totals in SC & NC
- Concern raised about available flood forecasts





# Flood Mitigation Program

- Concern about LPD, and Waccamaw forecasts
- Both blackwater rivers
- Had a moment to investigate
- Whitewater vs blackwater





# Response & Recovery





# Response & Recovery

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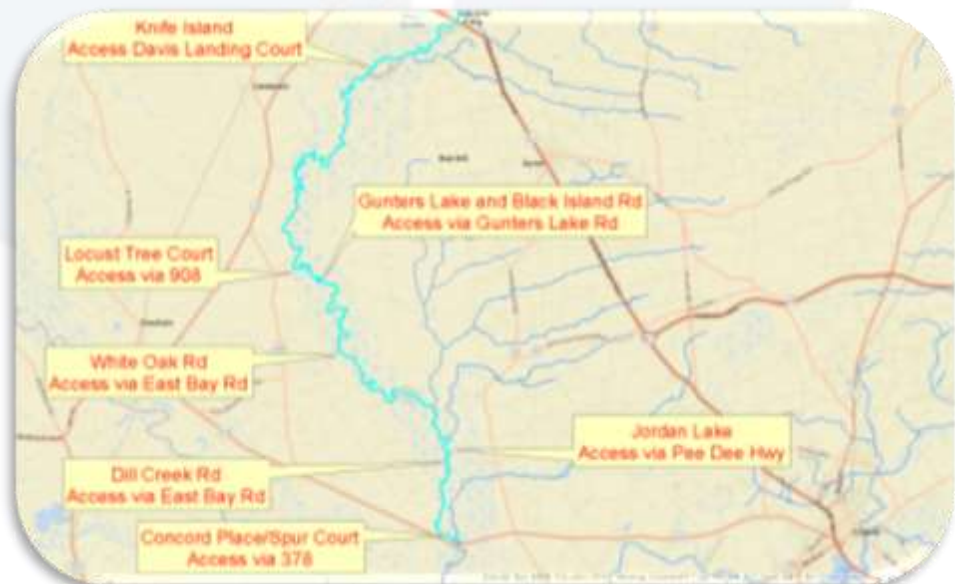
- Voiced concerns at SEOC
- Town of Nichols requested evacuation assistance
- SCDNR requested inundation map
- Law Enforcement used map to organize and stage resources





# Response & Recovery

- Produced inundation information and peak arrival time estimates
- Provided specialized information for officers in the field





# Response & Recovery

- Officers shared info from the field to verify inundation





# Drone Ortho Overlay





# Response & Recovery

- Bucksport



Finally ahead of the water...



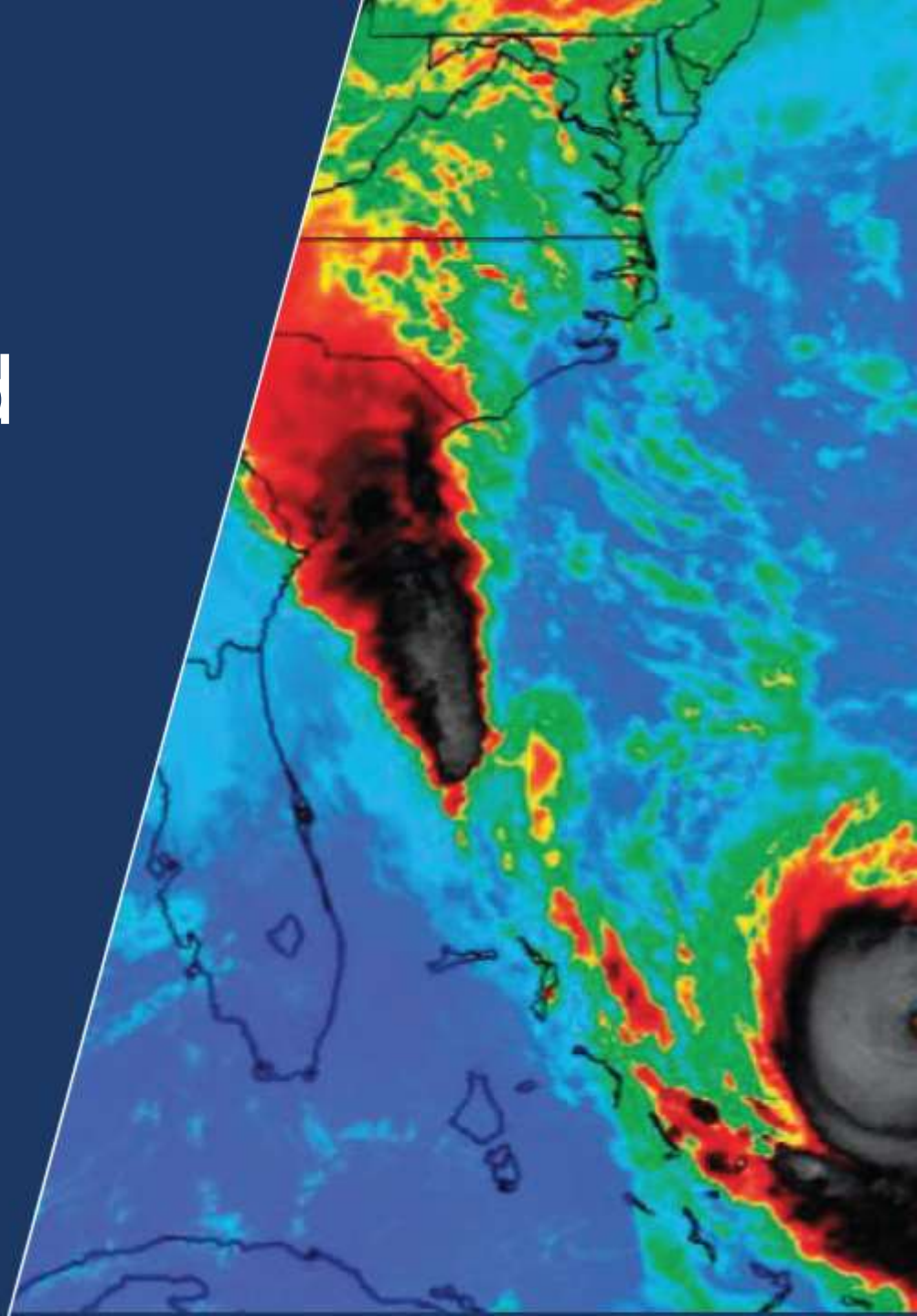
# Response & Recovery

- Word got out
  - SCDOT – use to assist in determining what roads to close and for how long
  - SCDNR Wildlife and Freshwater Fisheries – used to assist in determining where to close deer season
  - Local Floodplain Managers – used to assist in evacuations
  - SCDHEC – used Drone information from Nichols





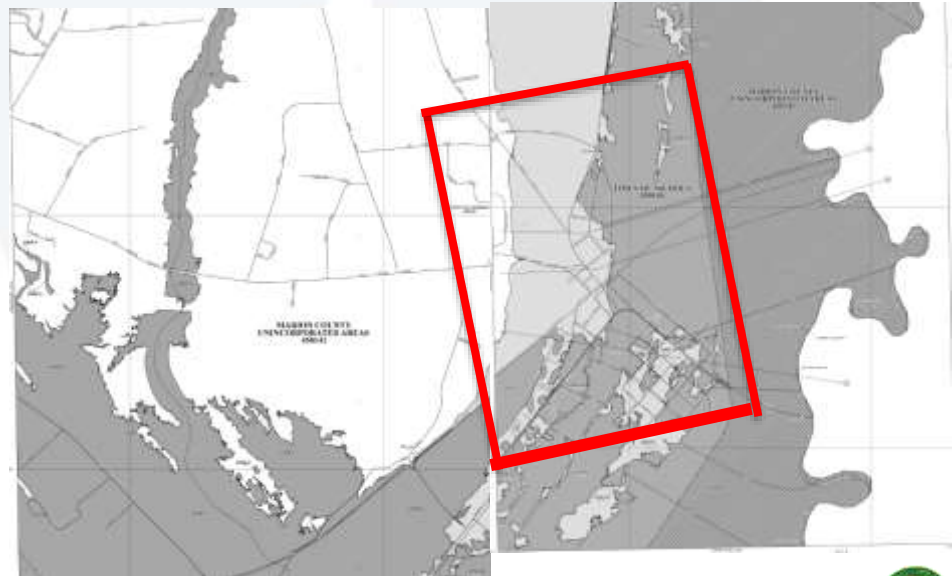
# Lessons Learned





# Lessons Learned

- Need a clearly defined communication tree
- Emergency Response people did not know who to contact
- Called several people off hours
- Flood Mitigation Program responded immediately to assist





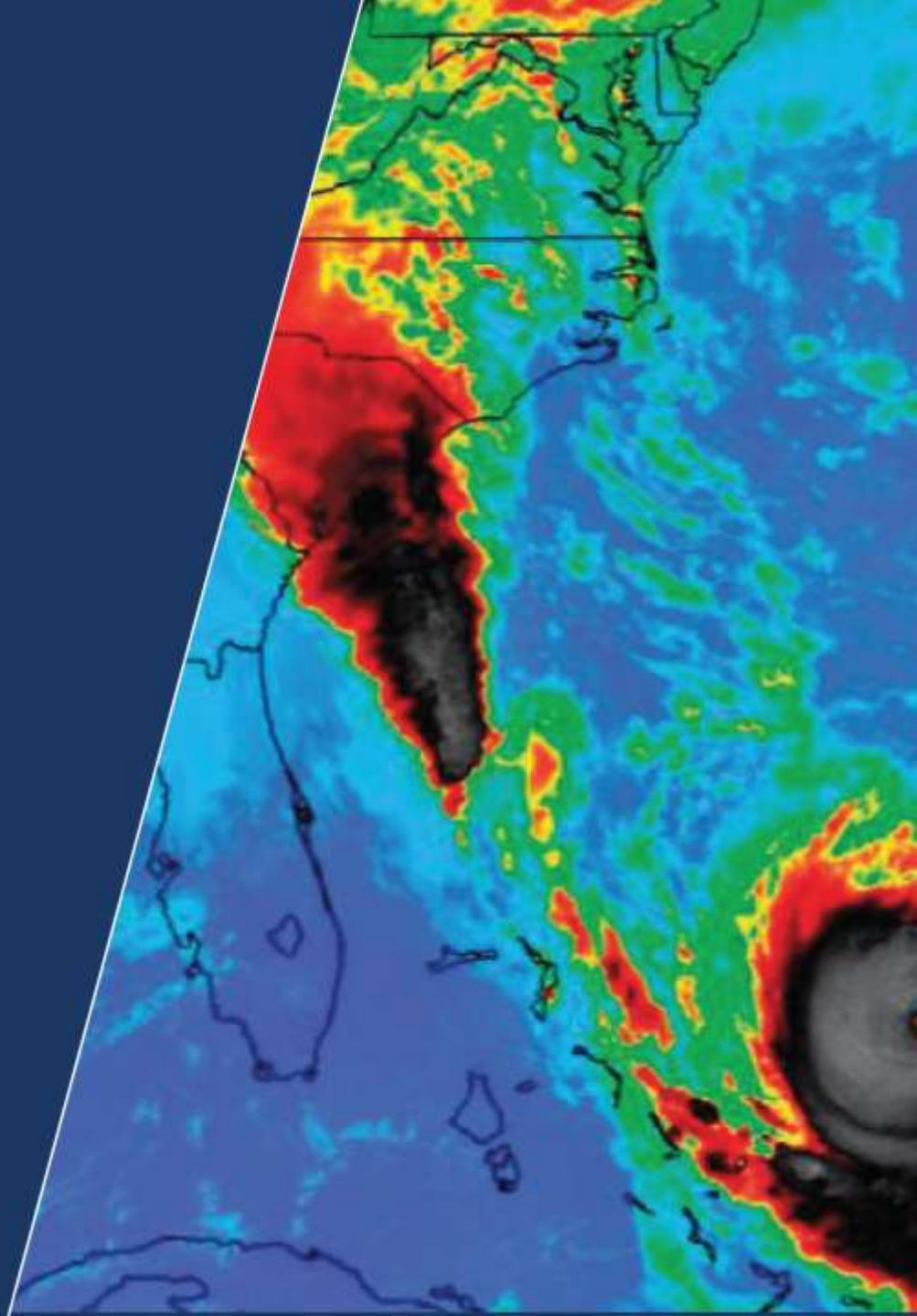
# Lessons Learned

- The way you communicate is paramount
- Focus your communication in a precise and detailed manner
- How much do you push?
- Have to speak for all impacted communities
- If you have more in depth knowledge or information don't be afraid to share





# Path Toward Resilience





# Path Toward Resilience

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- Dedicated website
  - Platform to display digital data
  - Develop SC specific database
  - Point and click BFEs, risk assessment, and downloadable data and models
  - Flood warning system



# Path Toward Resilience

- Flood warning system
  - Statewide, seamless system
  - Real-time mapping
  - State-of-the art tools and approach
  - Integrate riverine and coastal hazards
  - Holistic approach
  - Plan, Prepare, Respond, and Recover






# Be prepared for heat







# COMMENTS & QUESTIONS

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