



Flood Mitigation Program:

Protecting Lives, Protecting Property

Floodplain Management, Mapping & Mitigation



Flooding and the Public:

Experiences from SC flooding events in 2015 and 2016

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SCDNR Flood Mitigation Program



www.dnr.sc.gov/flood

Public Reaction to Flooding

Would you leave your home if it had never flooded before?

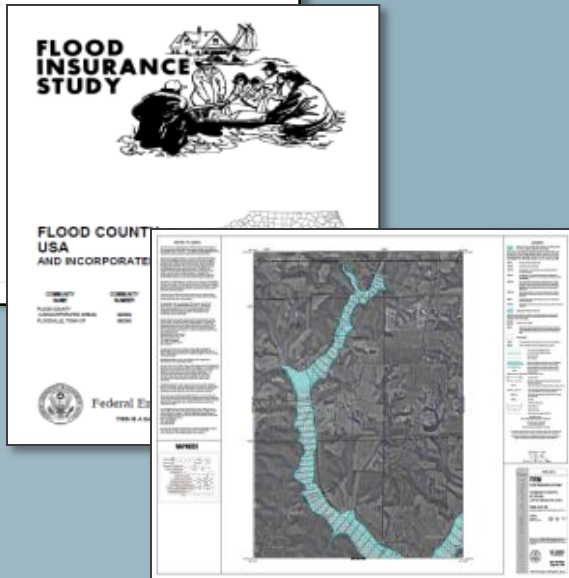


National Flood Insurance Program Mapping Products

Traditional Regulatory Products

DFIRM Database

- Flood_Hazard_Data
- Political_Boundaries
- Public_Land_Survey_System
- TopoData
- Community_Panel_Info
- L_Comm_Info
- L_MT1_LOMC
- L_Pan_Revis
- L_Pol_FHBM
- L_Riv_Model
- L_Stn_Start
- L_Wtr_Nm
- S_Bfe
- S_DOQ_Index
- S_Firm_Pan
- S_Gen_Struct
- S_Label_Ld
- S_Label_Pt
- S_LOMR
- S_Perm_Bmk
- S_Quad
- S_Riv_Mrk
- S_Trsport_Ar

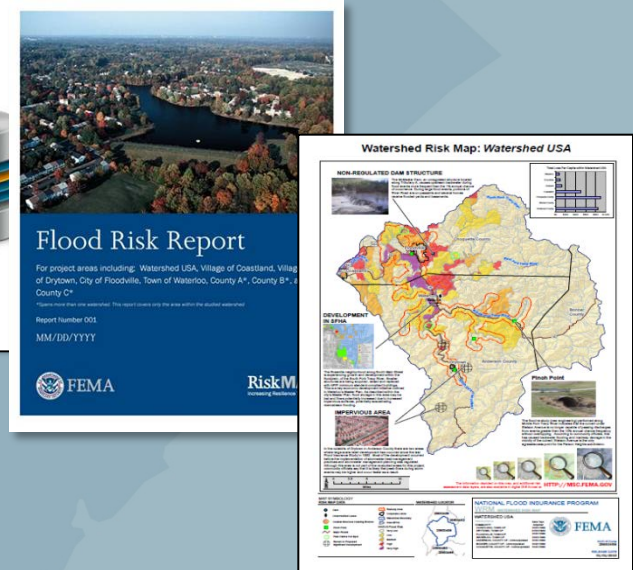


Traditional products are regulatory and subject to statutory due-process requirements

Flood Risk (Non-Regulatory) Products

Flood Risk Database

- Community_Panel_Info
- L_Comm_Info
- L_MT1_LOMC
- L_Pan_Revis
- L_Pol_FHBM
- L_Riv_Model
- L_Stn_Start
- L_Wtr_Nm
- S_Bfe
- S_DOQ_Index
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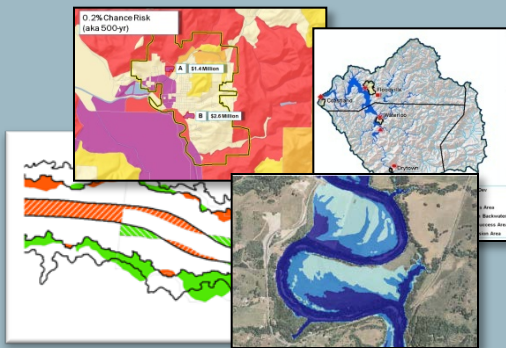
Flood Risk products are non-regulatory and are not subject to statutory due-process requirements

Flood Risk Datasets and Products

- Flood Risk Datasets
 - Changes Since Last FIRM
 - Flood Depth & Analysis Grids
 - Flood Risk Assessment
- Enhanced Flood Risk Datasets
 - Areas of Mitigation Interest
 - Others

Flood Risk Products

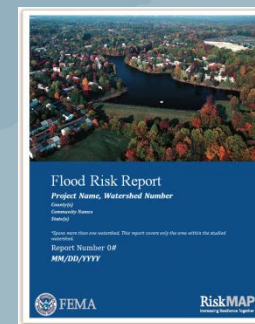
- Flood Risk Database
- Flood Risk Report
- Flood Risk Map



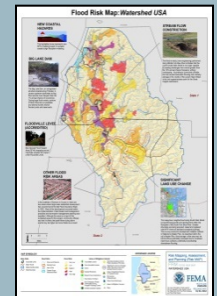
Flood Risk Datasets



Flood Risk Database

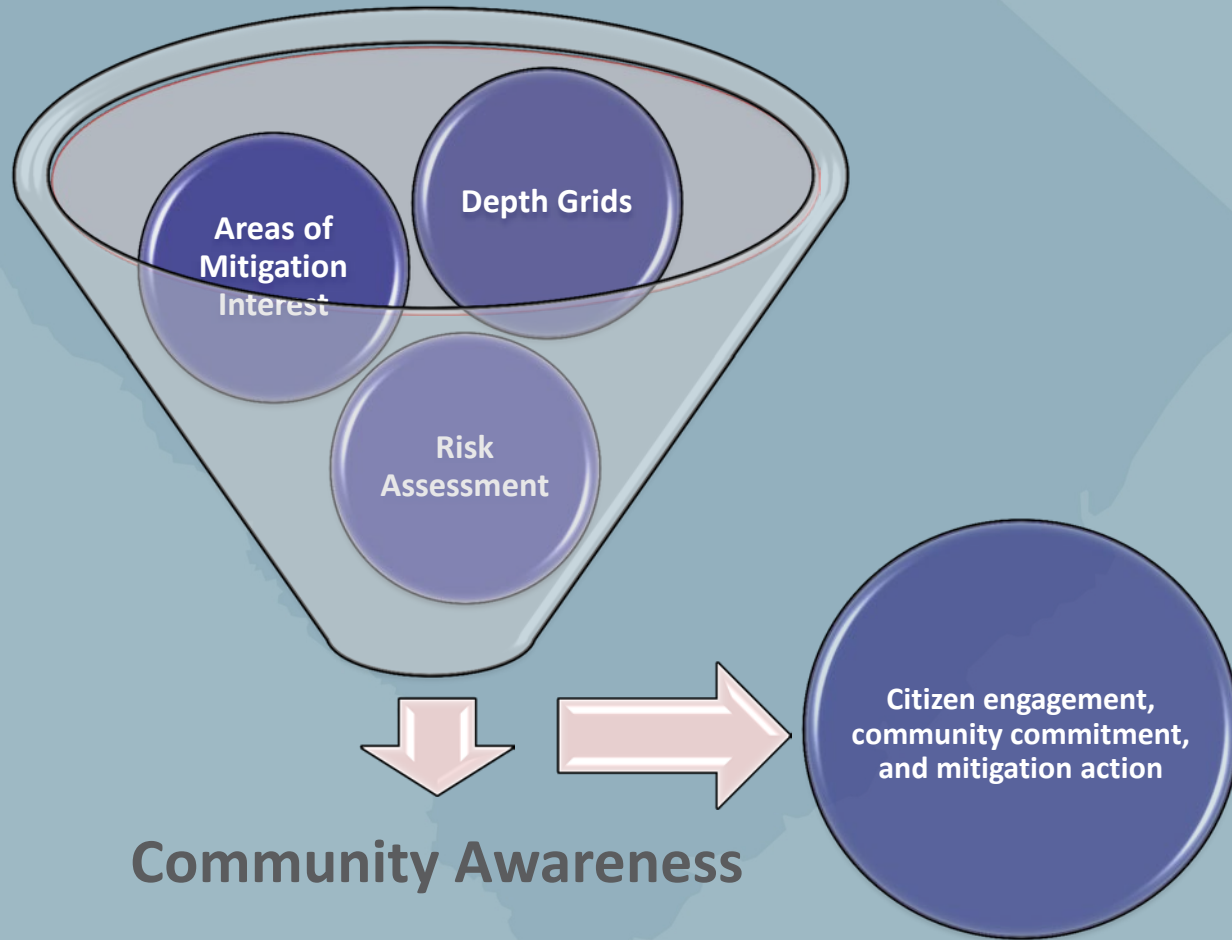


Flood Risk Report



Flood Risk Map

Risk MAP Tools Help Communicate Risk



Communicating about Flood Risk

- Citizens expect to hear about flood risk from their mayor or floodplain manager*
- By sharing flood risk information with them, they can:
 - Take action to protect themselves, their families, and businesses
 - Improve your community's resilience to flooding
 - Support implementation of your mitigation plan

* From 2011 FEMA Risk MAP Flood Risk Awareness Survey

October 2015 Flood Event

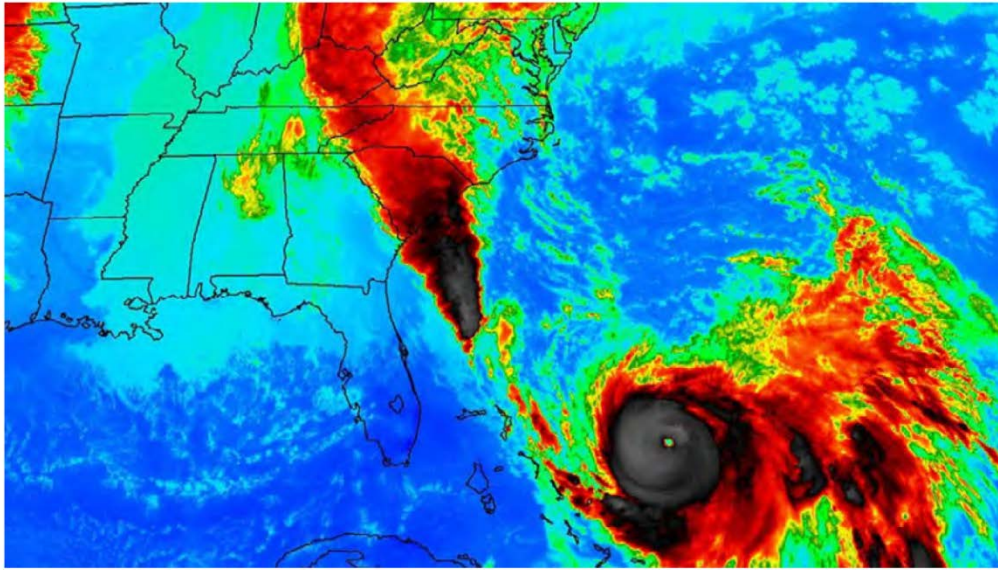
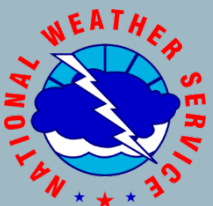
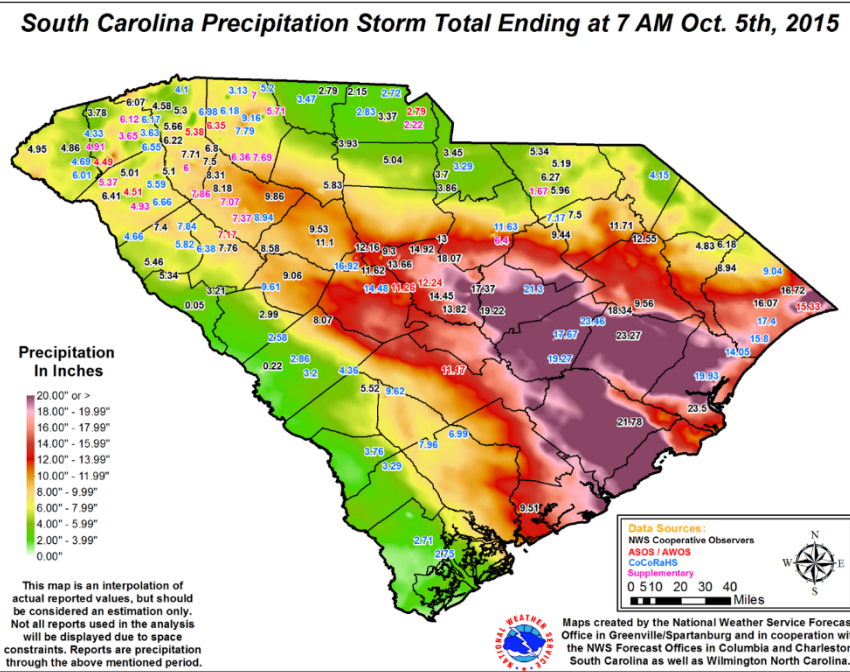
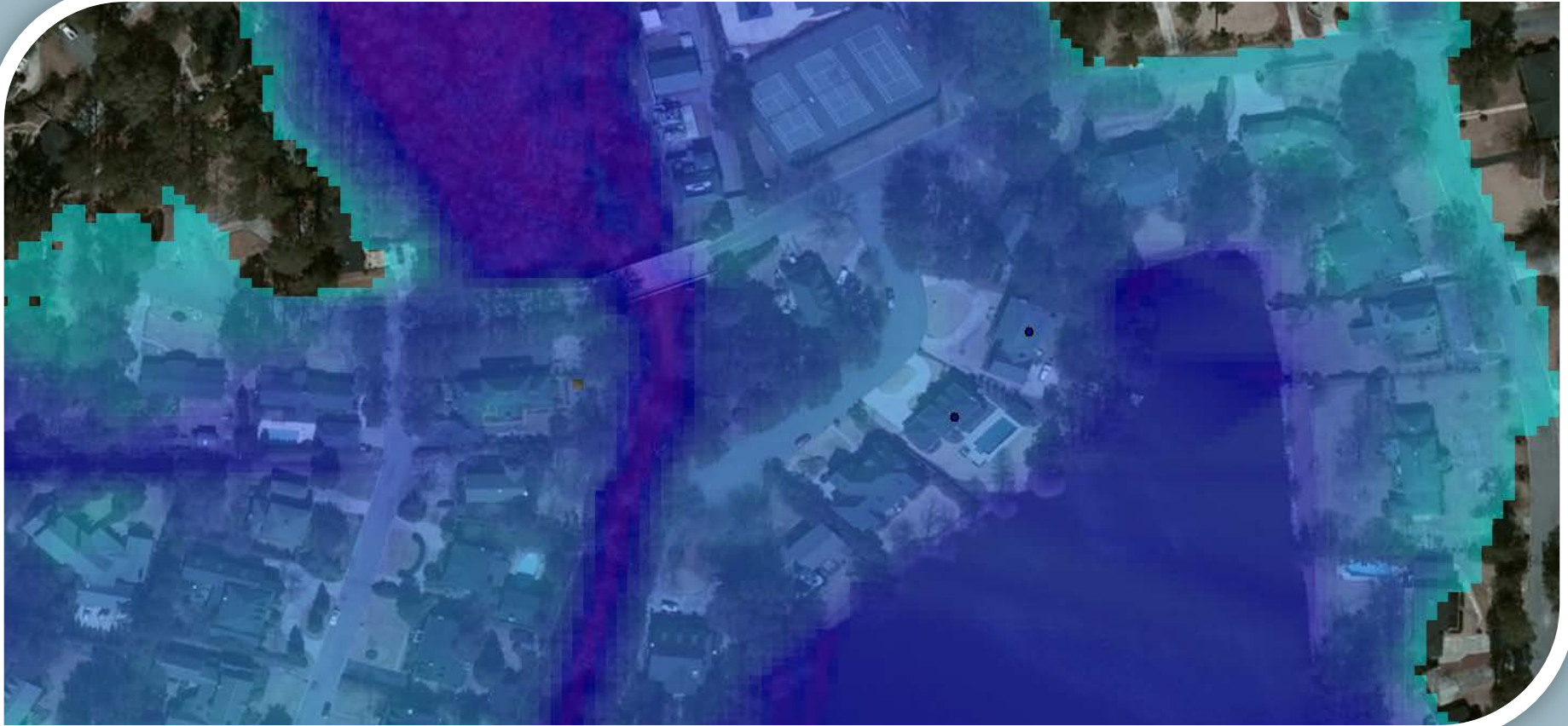


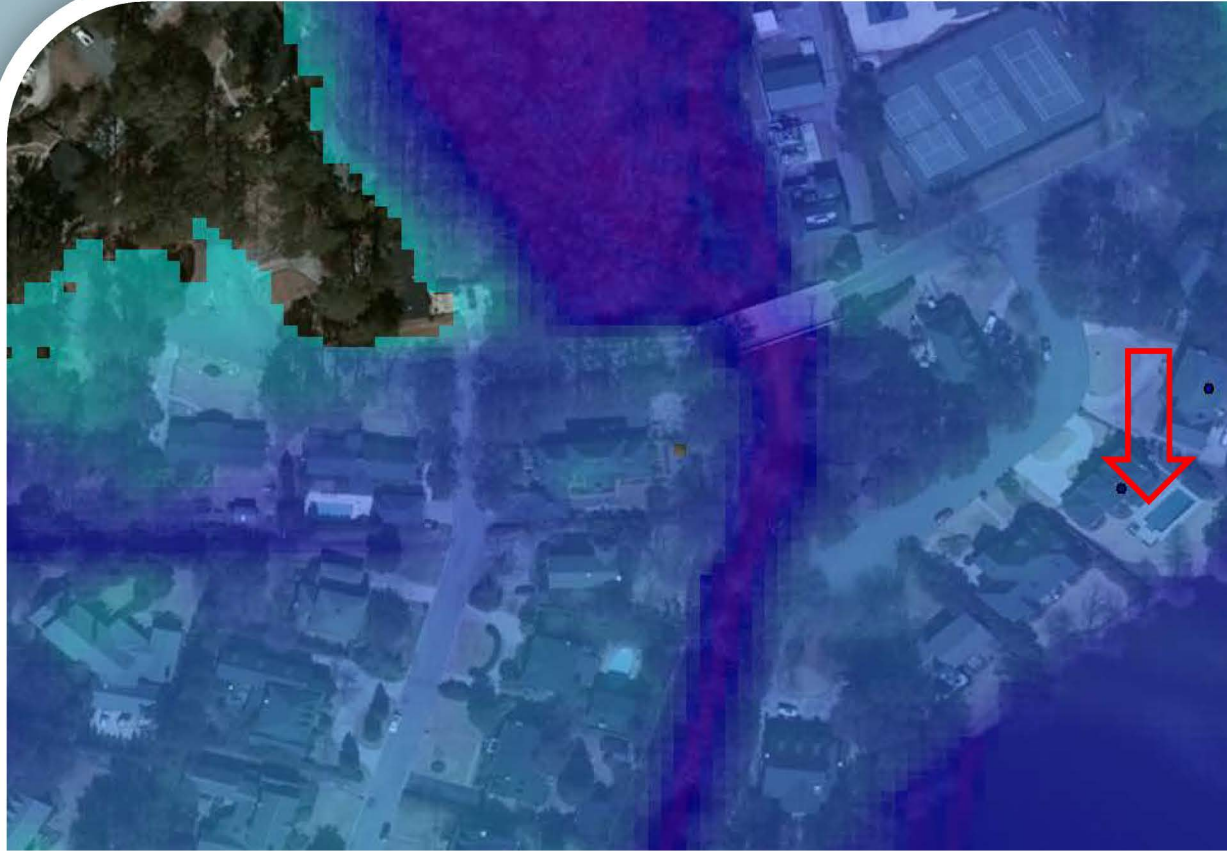
Figure 1. Infrared satellite image of the intense rainfall being funneled into South Carolina during the morning of October 3, 2015. (NASA)



Whitewater rivers – faster moving, more shallow rivers that take hours to peak

Depth of Water





Identify

Identify from: <Top-most layer>

[-] DepthELEV2.asc
..... 5.100000

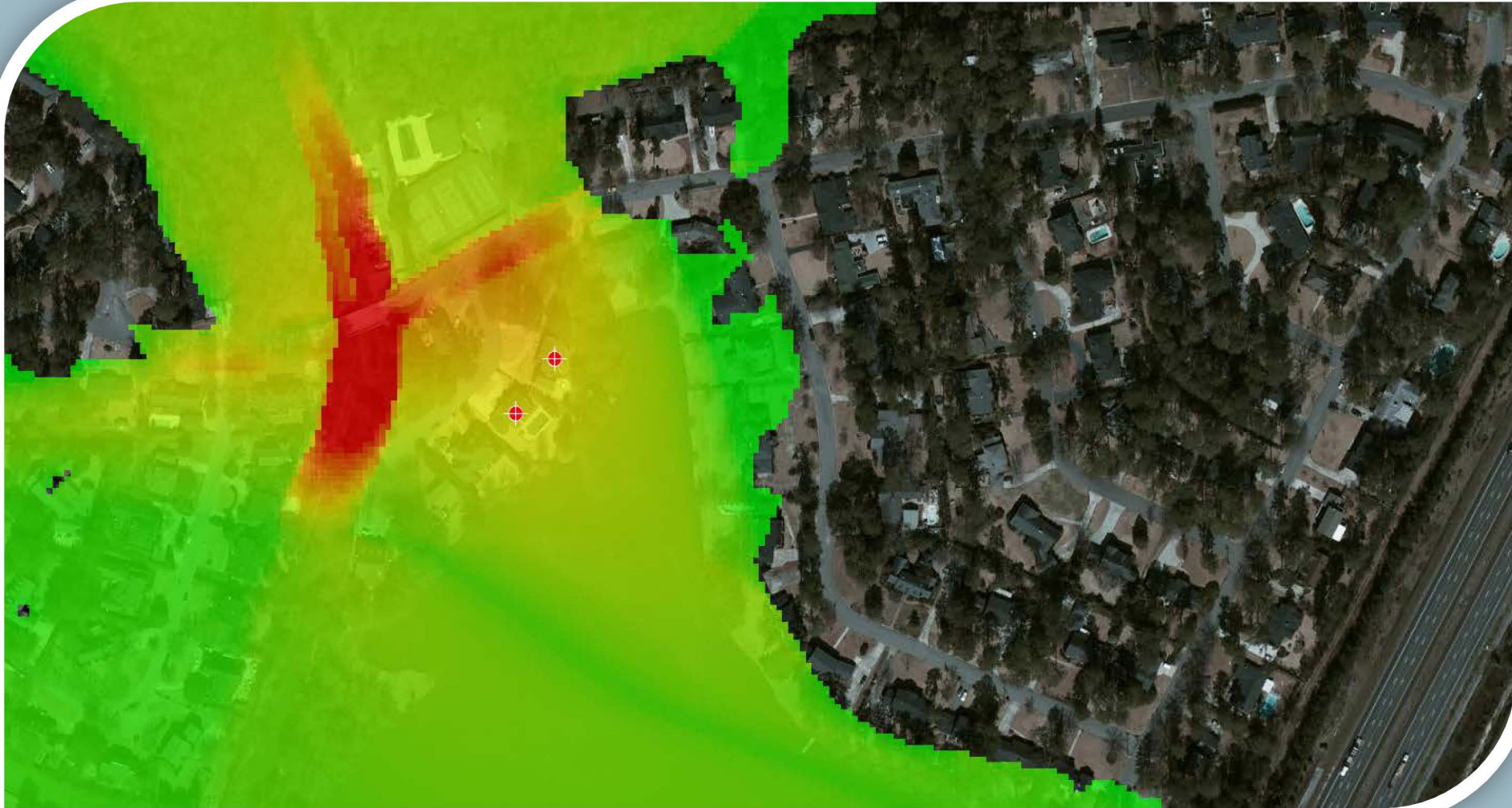
Location: -80.959274 34.010291 Decimal Degrees

Field	Value
Stretched value	63
Pixel value	5.100000

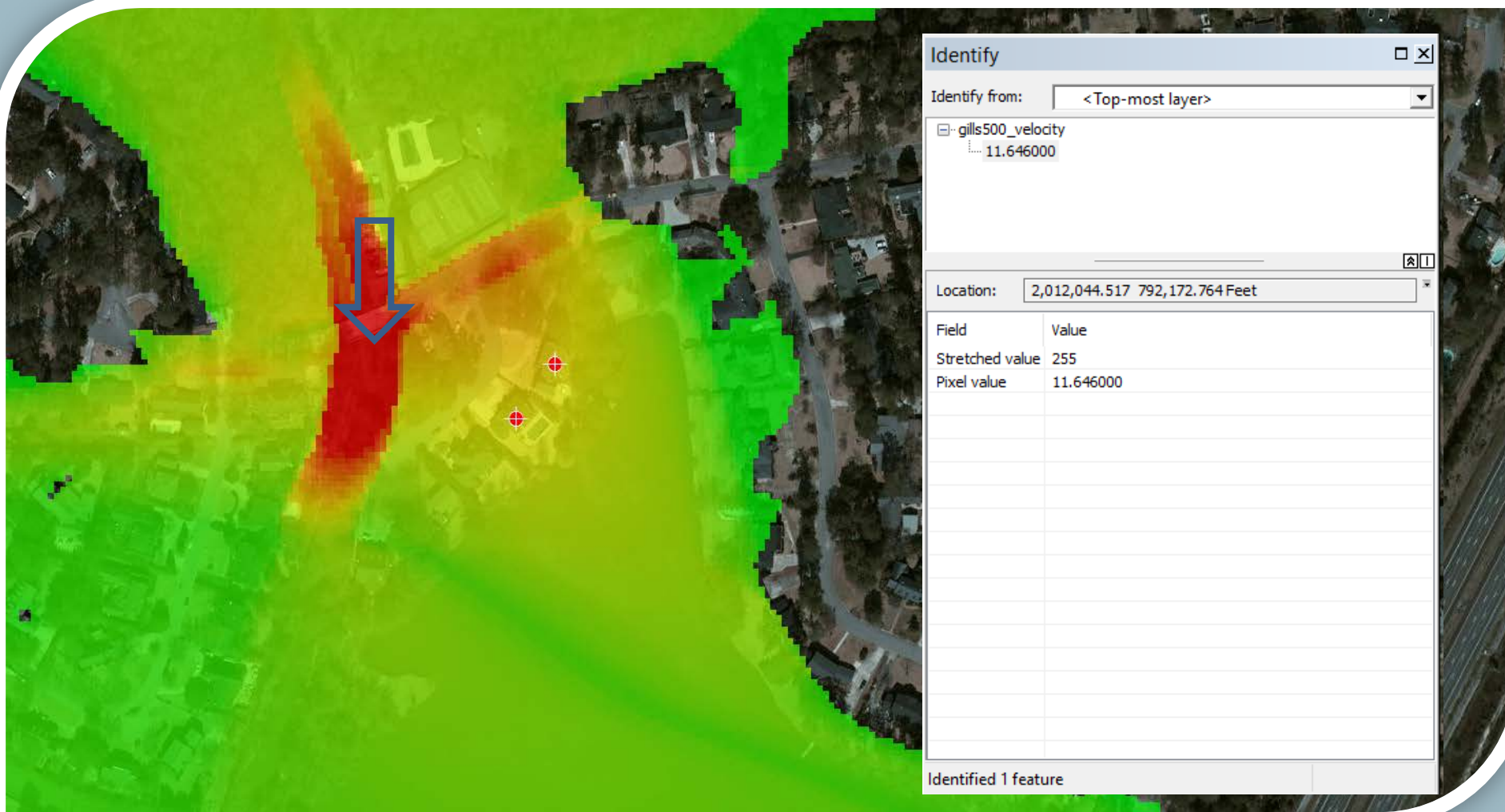
Identified 1 feature



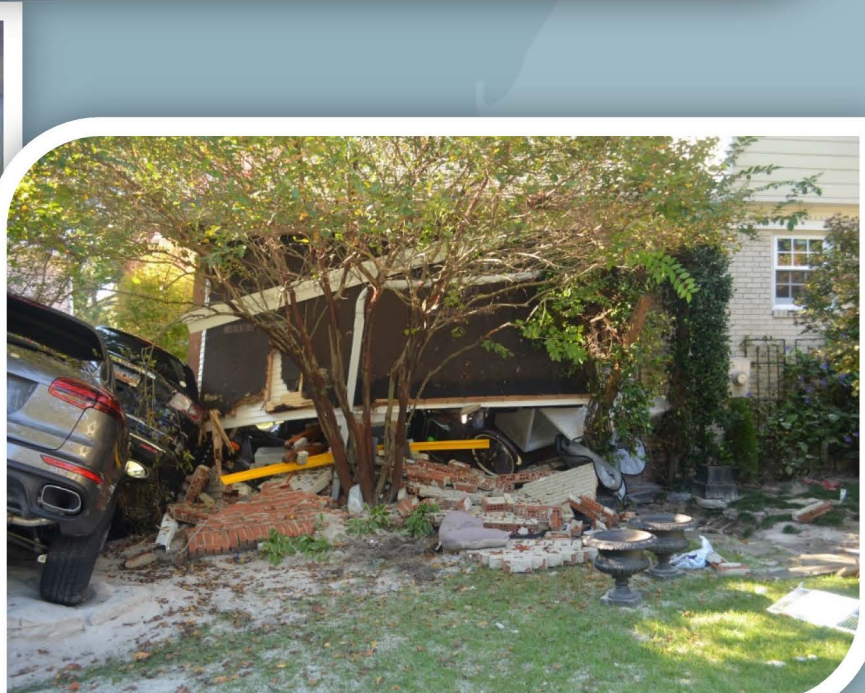
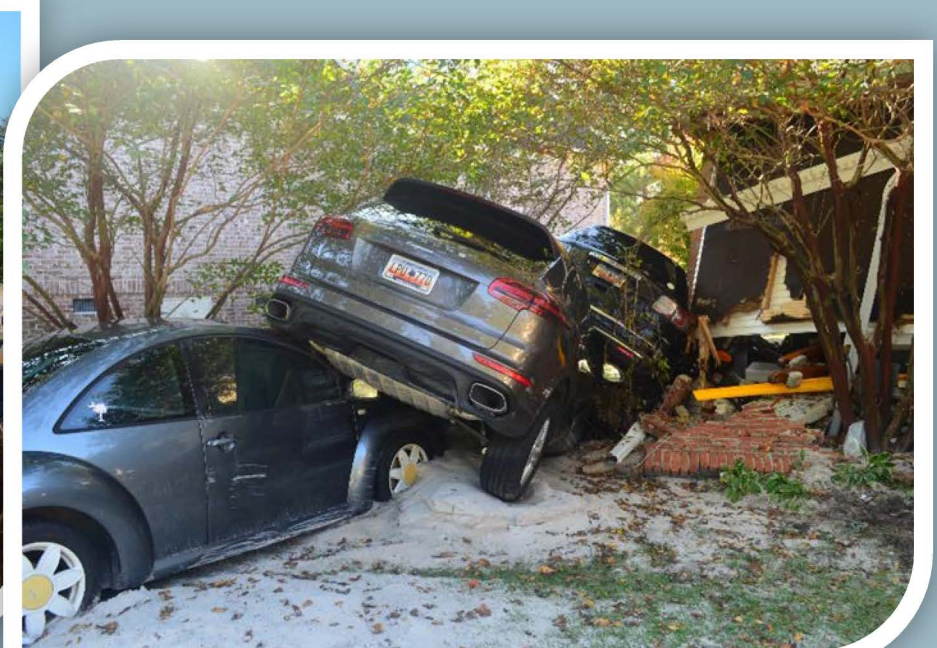
Power of Water



Power of Water



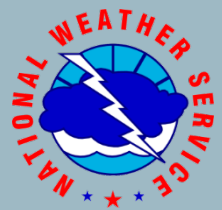
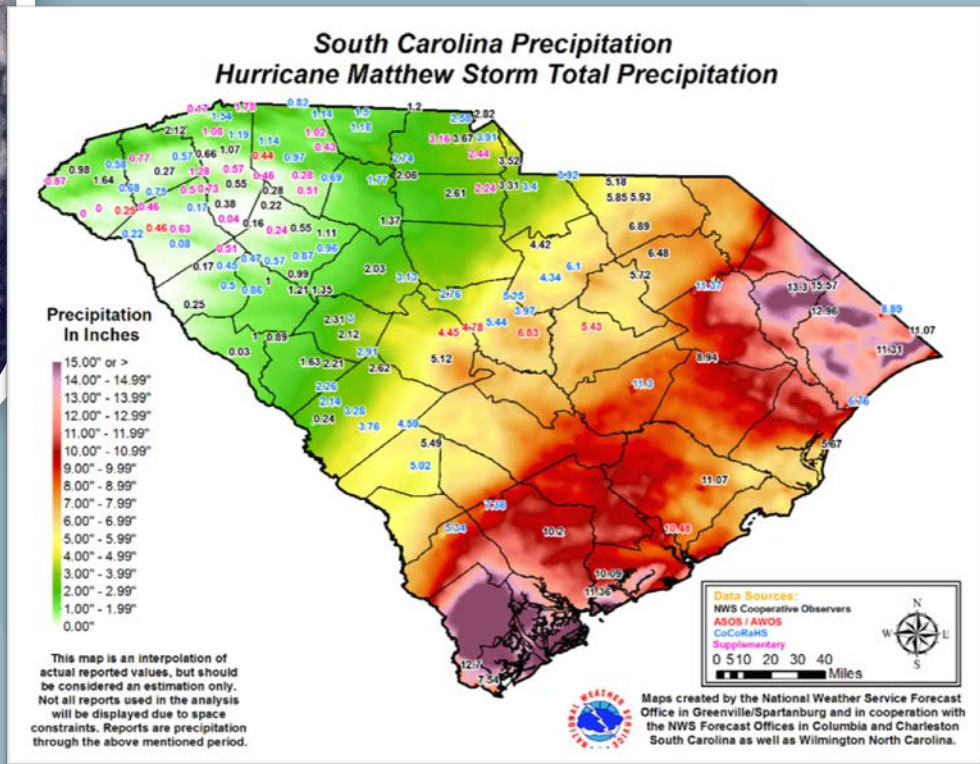






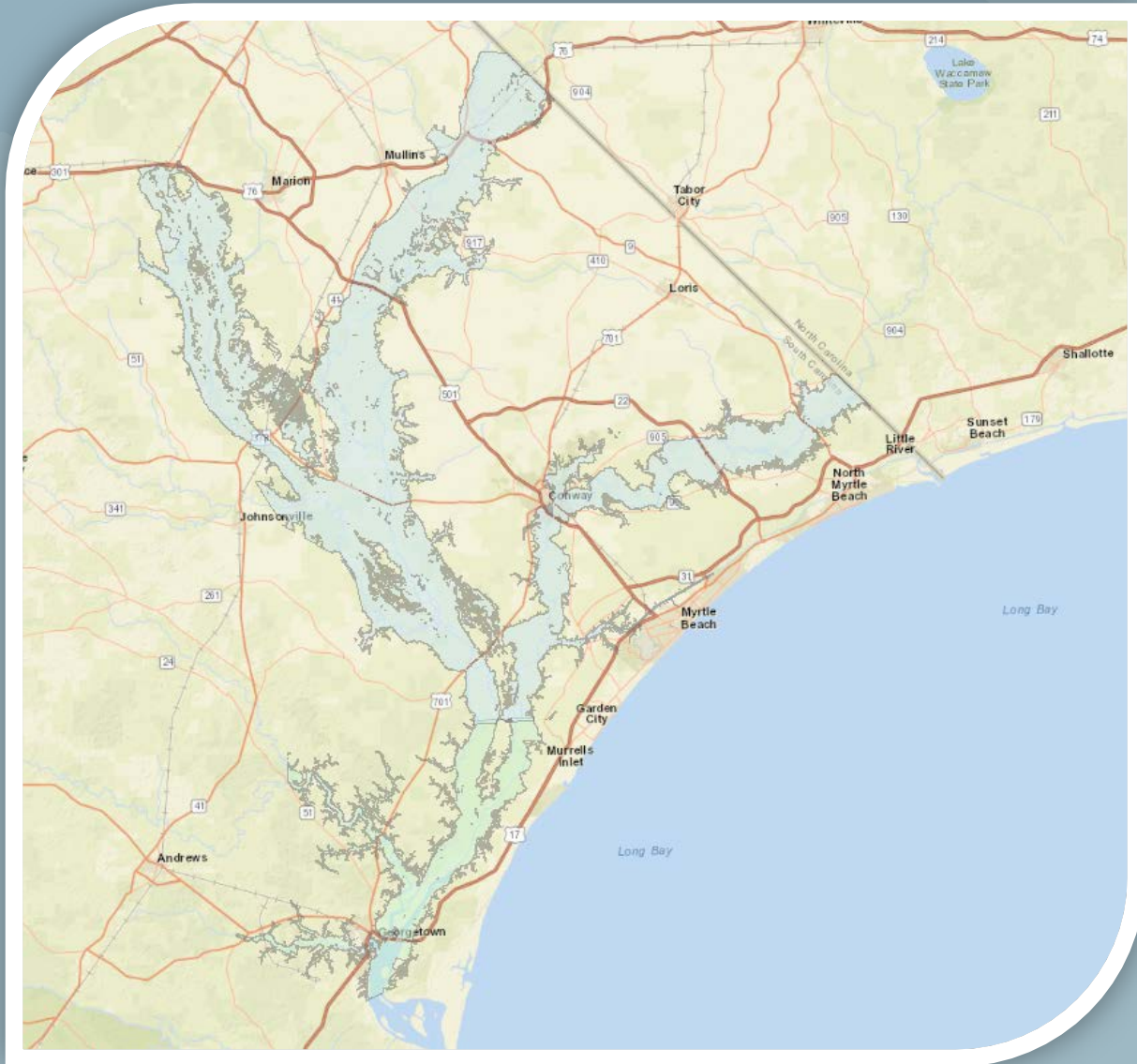


October 2016 – Hurricane Matthew

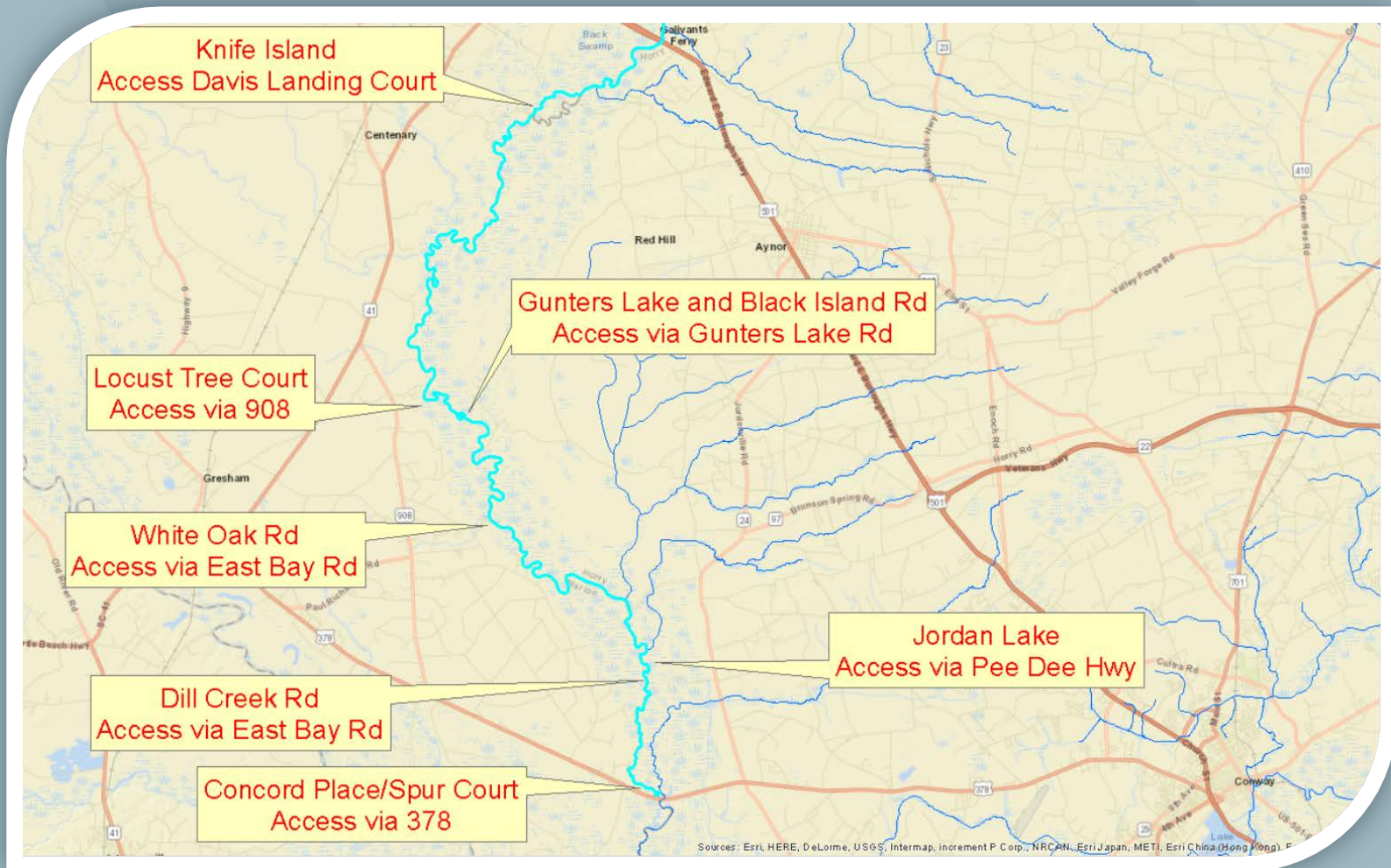


Black Water Rivers – deep, slow moving rivers that take days to peak

Inundation map



Information Sharing with Law Enforcement



Local Floodplain Managers



Local Floodplain Managers



Local Floodplain Managers



Closure of Deer Season



Life's Better

Outdoors

South Carolina Department of Natural Resources

Google™ Custom Search

Go

Site map

f Share

🐦 Tweet

DNR News

SCDNR declares temporary hunting closures for portions of Horry, Georgetown Counties

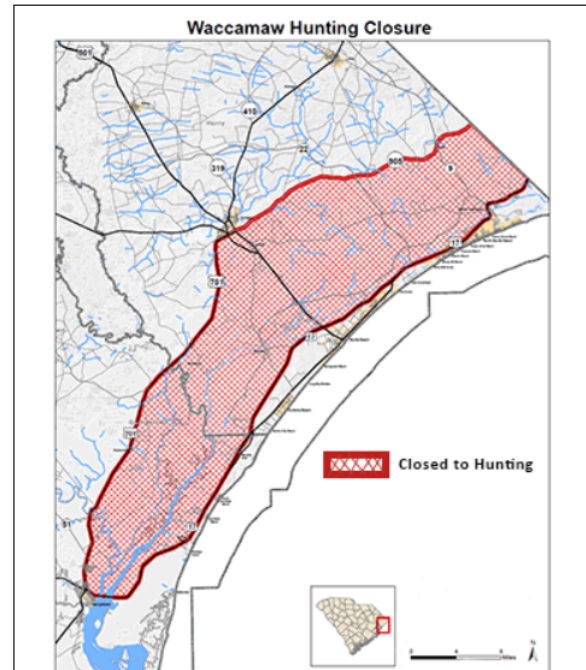
October 14, 2016

Due to the extremely high river levels and widespread flooding following Hurricane Matthew, the S.C. Department of Natural Resources (SCDNR) has declared a temporary closure for hunting within the Waccamaw River drainage system on all game species except for alligator, doves, hogs and coyotes. The flooding has created potential for exploitation of game species that are deprived of their normal escape routes and confined to small areas of high ground, and SCDNR has received concerns from multiple sportsmen.

Effective as of midnight on Saturday, Oct. 15, a ten-day closure of the hunting season for all game species excluding alligator, dove, hogs and coyotes will be in effect. The current closure will continue until midnight on Tuesday, Oct. 25, 2016. SCDNR will continue to monitor flooded areas to adjust the closure zones and timeframes as conditions change.

Waccamaw drainage:

HORRY COUNTY: West side boundary - beginning at the N.C. line on SC 905, thence down S.C. 905



Map of Waccamaw Hunting Closure.

Road Closures

SCDOT used our inundation maps to assist in determining what roads should be closed and when.



Lessons Learned

- Make sure information is in a format that can be understood by your intended audience
- No matter what everyone will not leave
- Public perception

2015

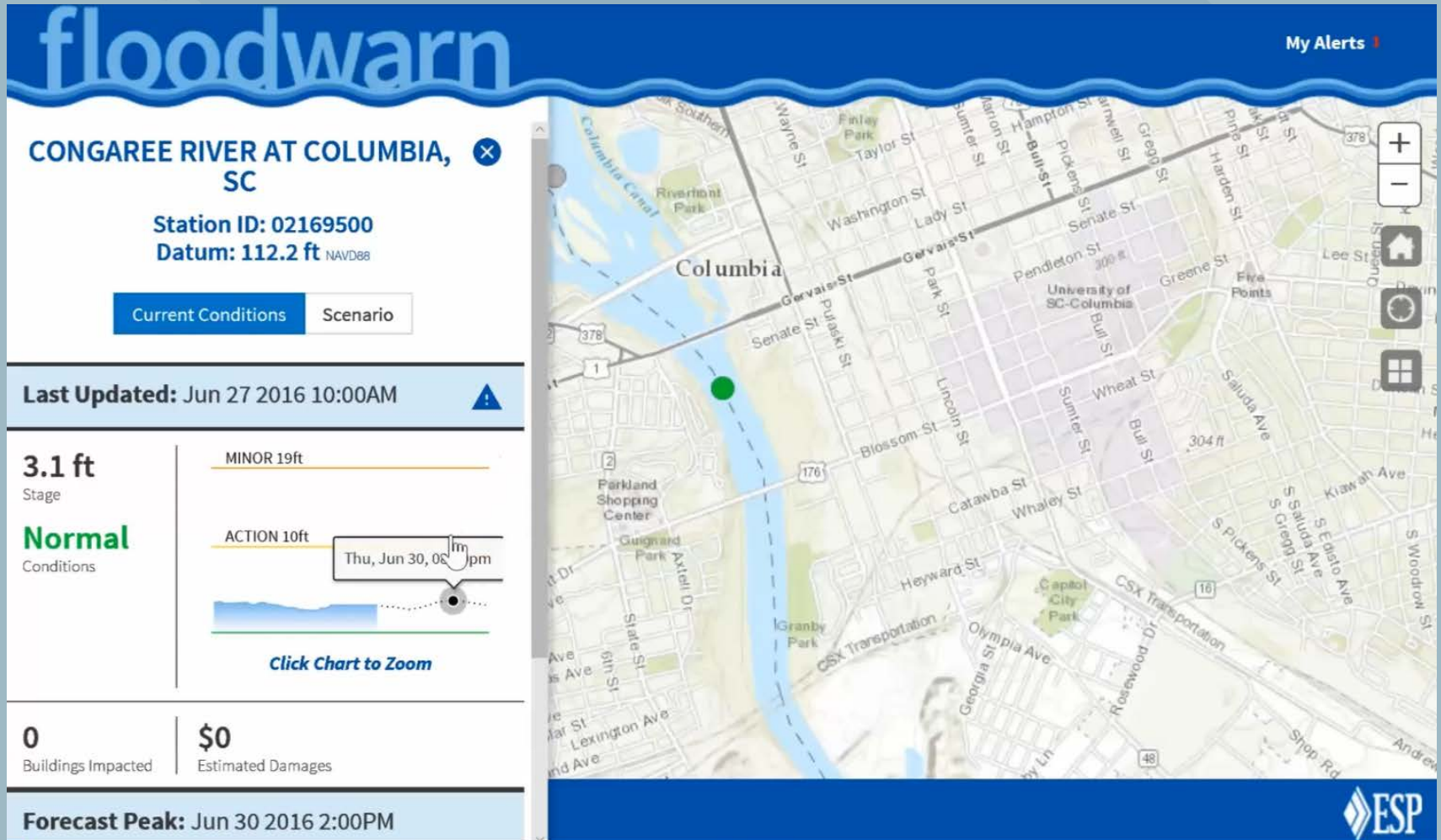


2016



Where do we go from here?

SC Flood Warning System Website Prototype



FLOOD WARNING

- Build web based application to monitor, assess, and communicate real-time flood risks
- Two Basic Flood Inundation Approaches:
 - Flood inundation libraries
 - Real-time seamless flood inundation

FLOOD WARNING

Flood Inundation Libraries

- Pre-Defined flood inundation areas associated with gage reading (0.5' intervals)
- Change flood inundation boundary as reading is updated (typ. every 15 min)
- Requires preprocessing FEMA hydraulic models
- Only reliable in vicinity to gage, cannot interpolate between gages
- Libraries used by USGS and others

MAP Inundation Library BASICS

“Library” of flood inundation mapping near gaging stations

- + Gaging Stations
- + Telemetry
- + Pre-made inundation libraries
- + Web tool to efficiently communicate

Real-time flood mapping solution

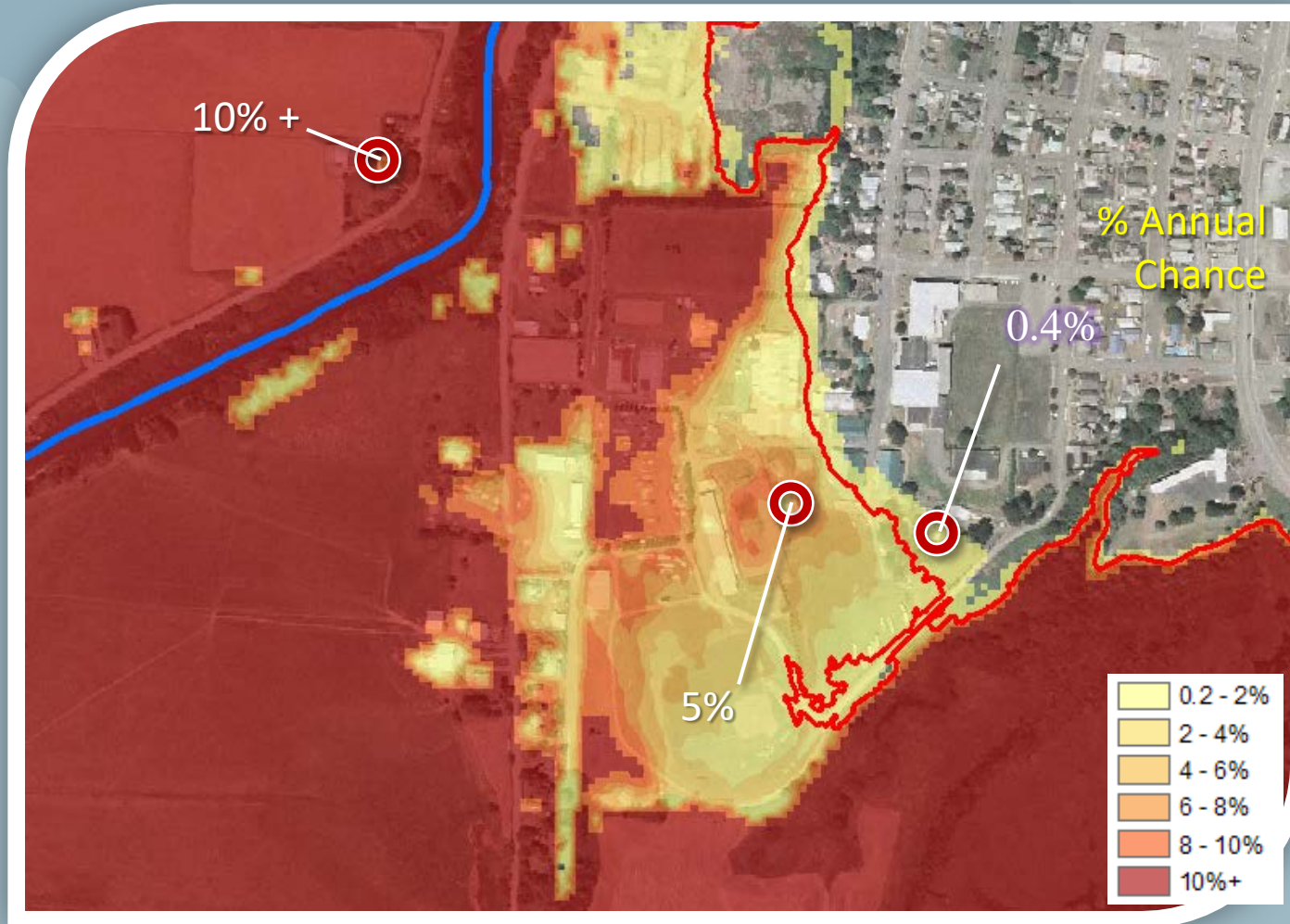


FLOOD WARNING

Seamless Mapping

- New technology/approach developed in NC
- Allows for continuous/seamless mapping at and between gages
- No modeling, but requires certain FEMA “enhanced products” that are not available everywhere (shown on next slide)
- The real power is interpolating between multiple gages.

Percent Annual Chance of Flooding



This Flood Risk Product is used to interpolate between the gages.

FLOOD WARNING

- Both approaches are based on “real-time” / forecast gage information
- Flood inundation boundaries provide hazard – combine with vulnerable assets (e.g. buildings, roads, etc.) to define risk