

# FIMAN's Coming Out Party



# Topics to be Covered

- FIMAN 2.0 Overview
- FIMAN during Hurricane Matthew
- Ground-Truthing Inundation Maps
- FIMAN, Hurricane Matthew & Social Media

# FIMAN 2.0

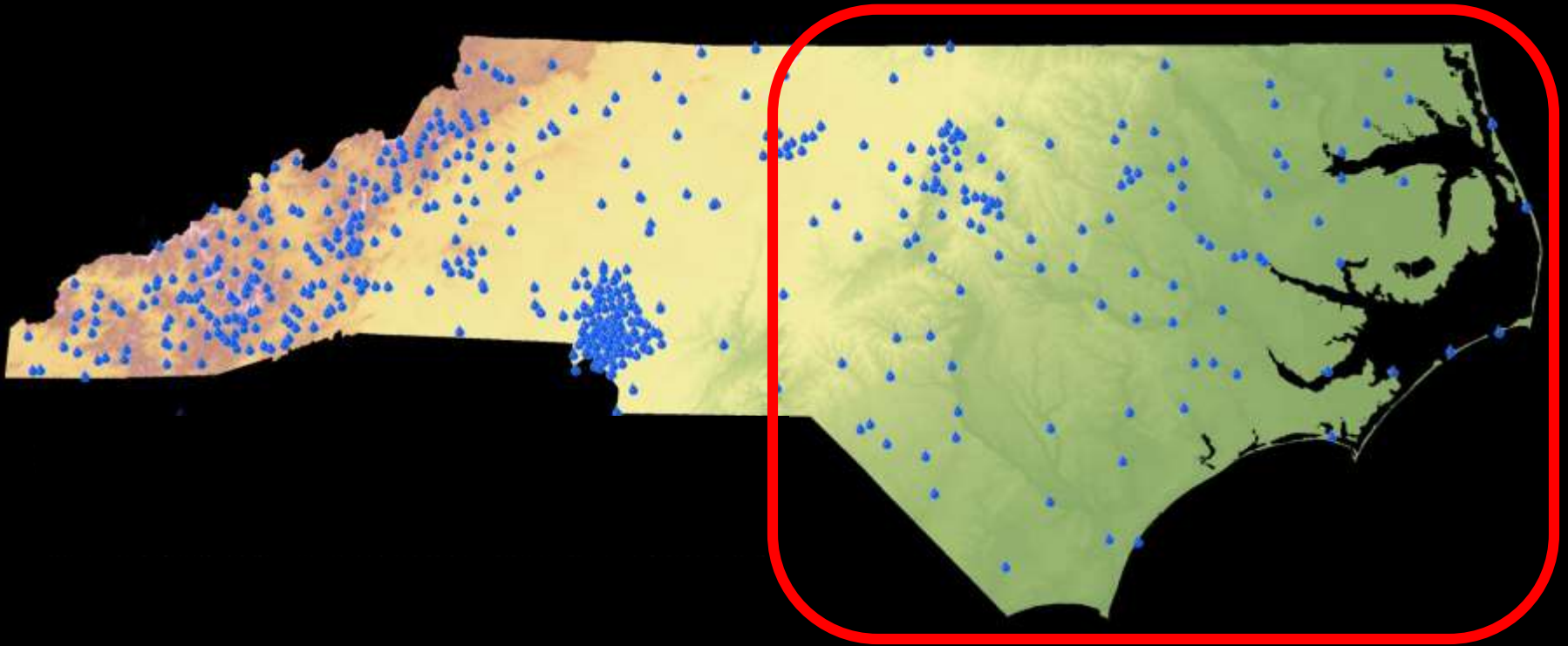
## Flood Inundation Mapping and Alert Network

- Rain and Stream Data at 561 Gages
- Inundation Maps at 88 Locations
- Gage Alerts selected by the User
- NWS Flooding Forecasts Mapped
- Scenario Flooding Assessments
- Buildings Flooded Identified
- Building Risk Assessments



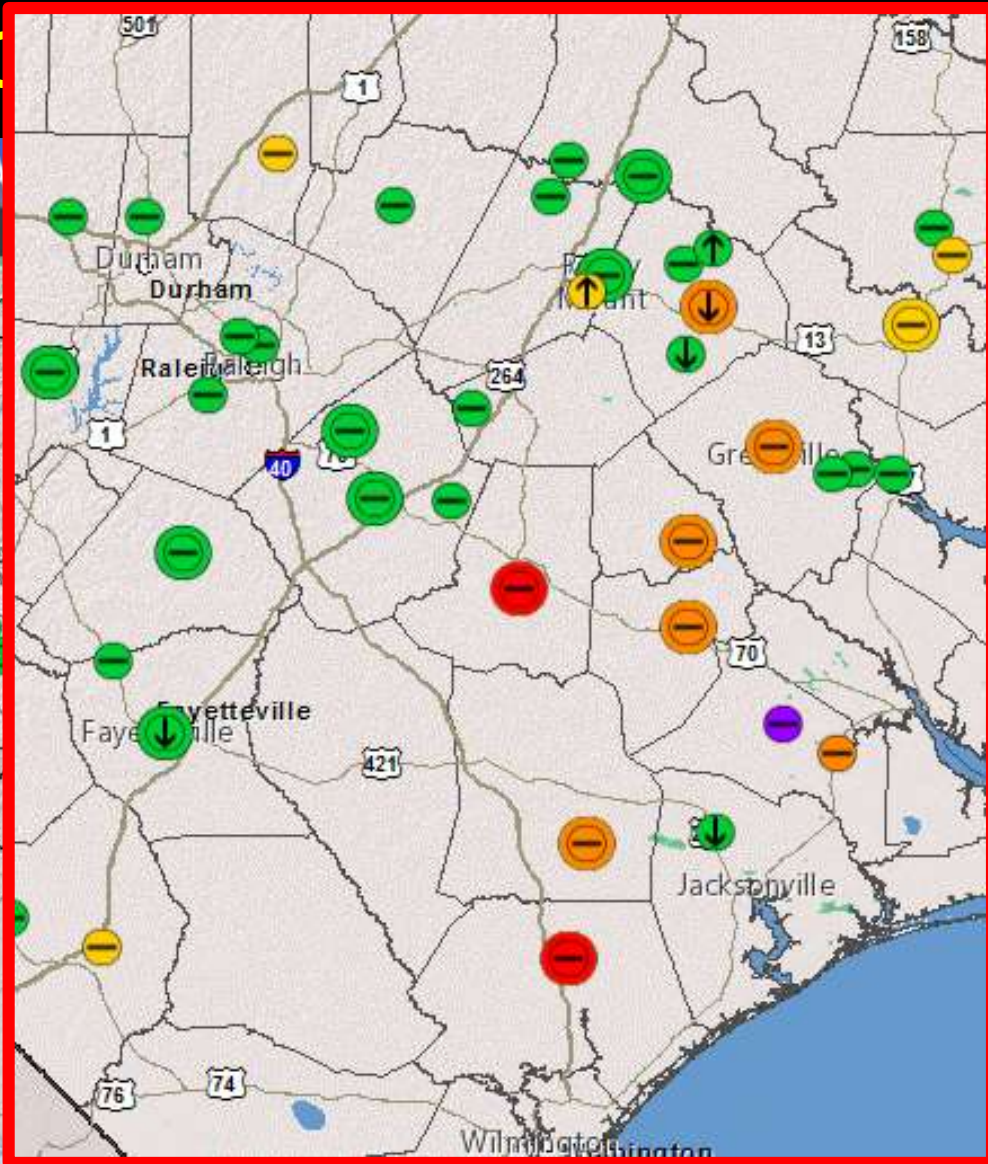


# Gages sending Data to NC FIMAN Contrail Base Station



Hurricane Matthew  
Area of Impact

# How to Read the Flood Status



ABOUT US MAP WELCOME DAVID

## Gage Level

**Gage Symbols**

- Current Condition
- Forecast Peak Condition
- Rain Last 24 Hours

**Risk Ratings**

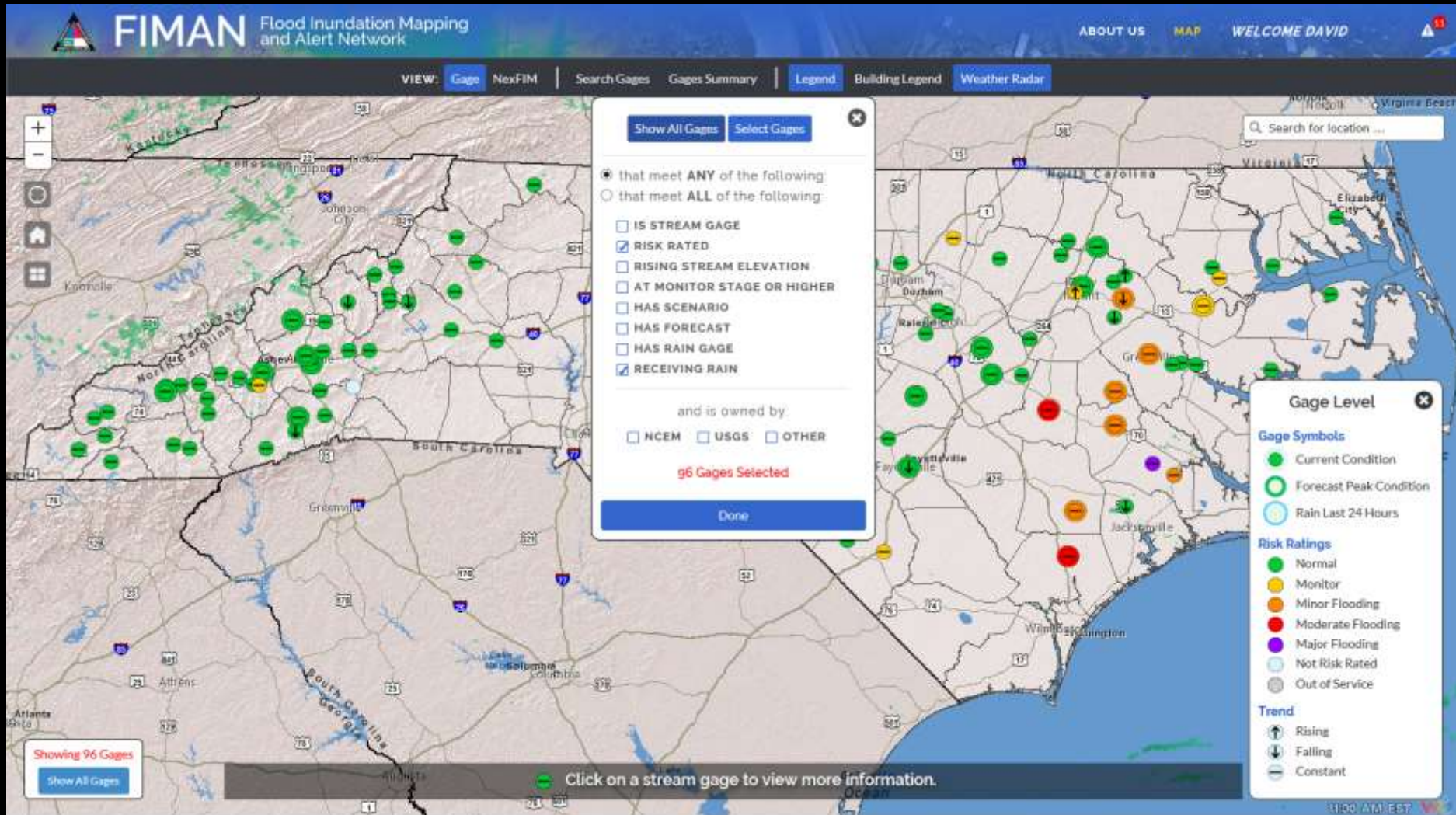
- Normal
- Monitor
- Minor Flooding
- Moderate Flooding
- Major Flooding
- Not Risk Rated
- Out of Service

**Trend**

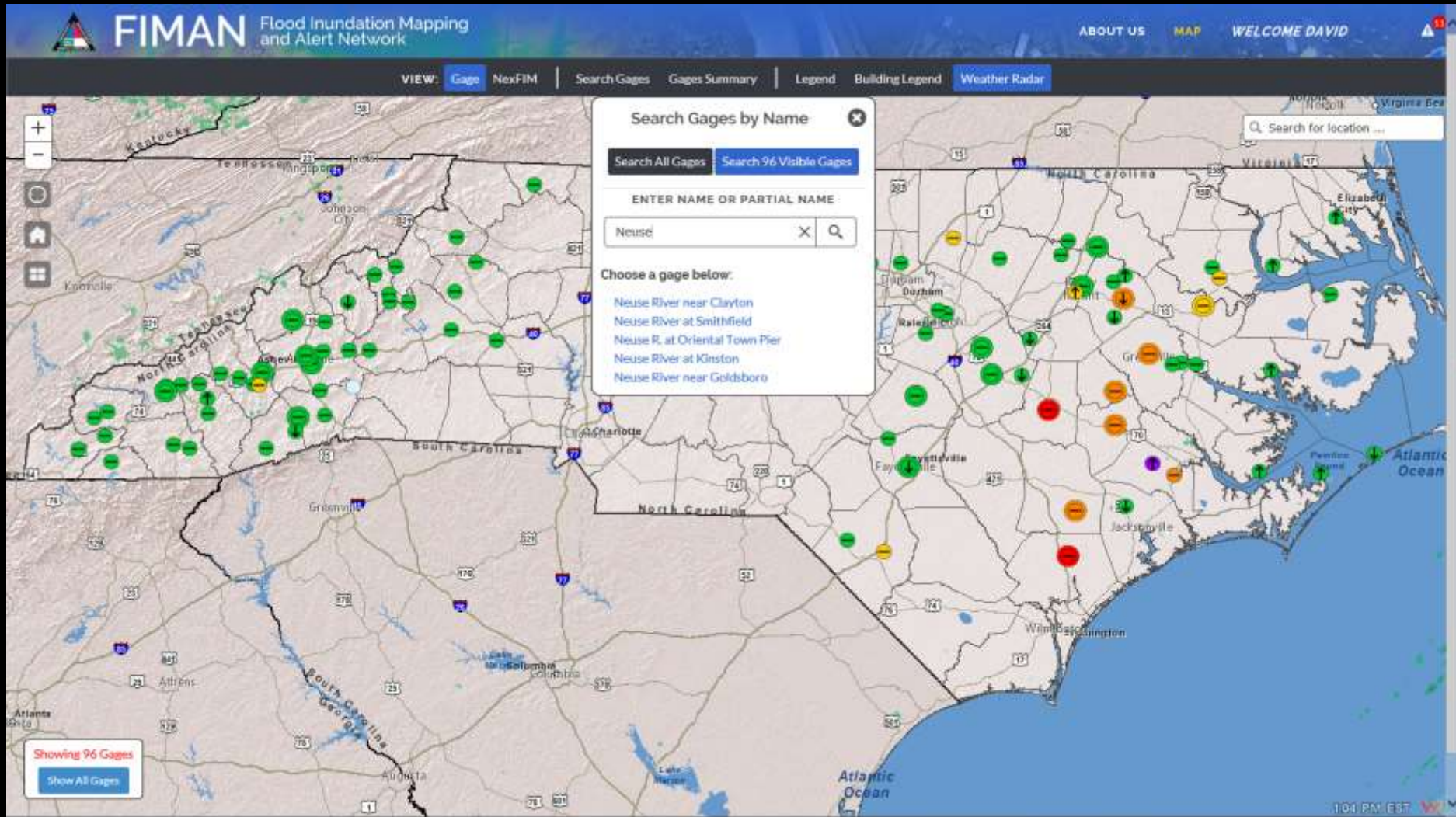
- Rising
- Falling
- Constant



# Gage Search Tools

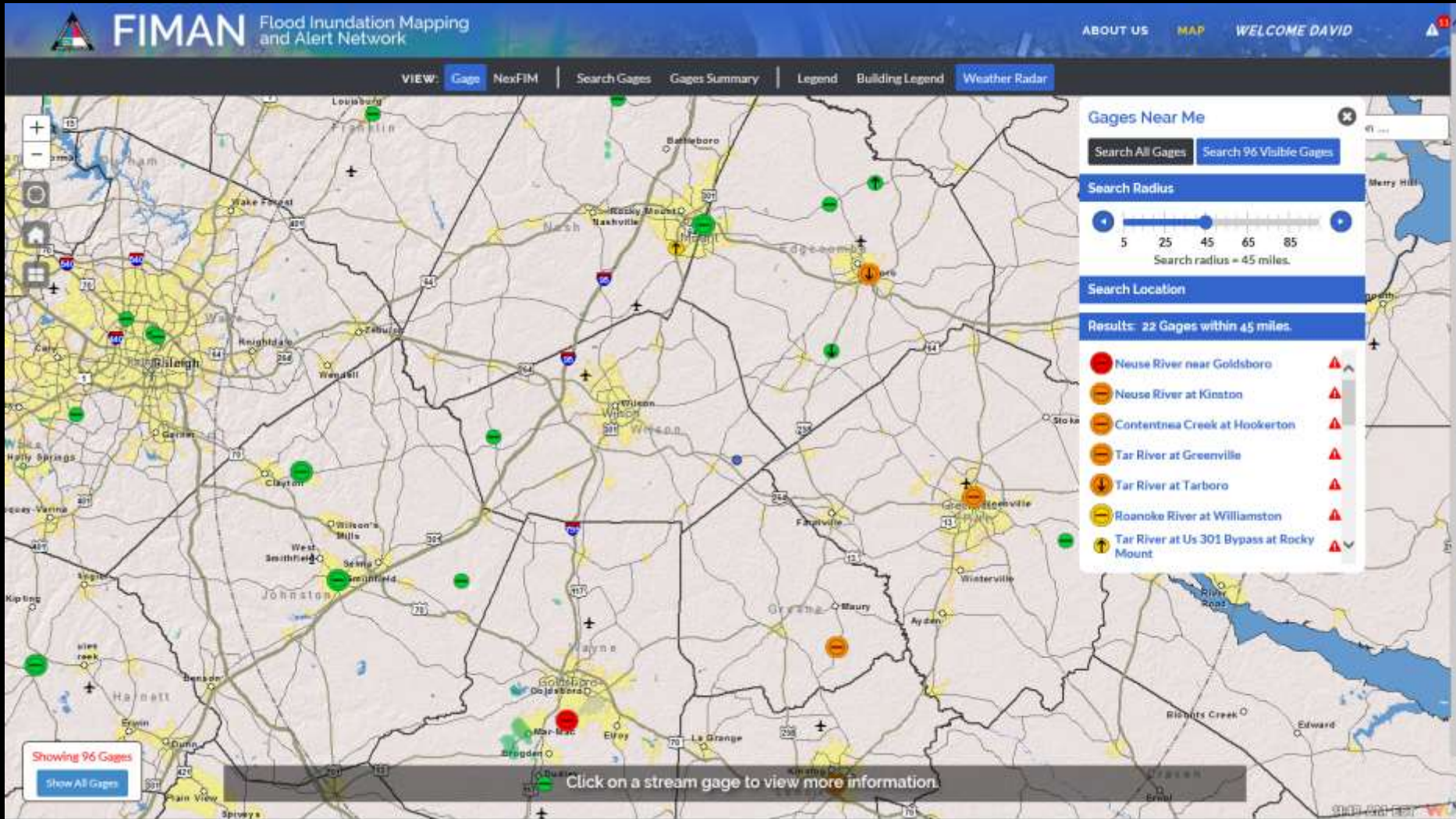


# Gage Search Tools



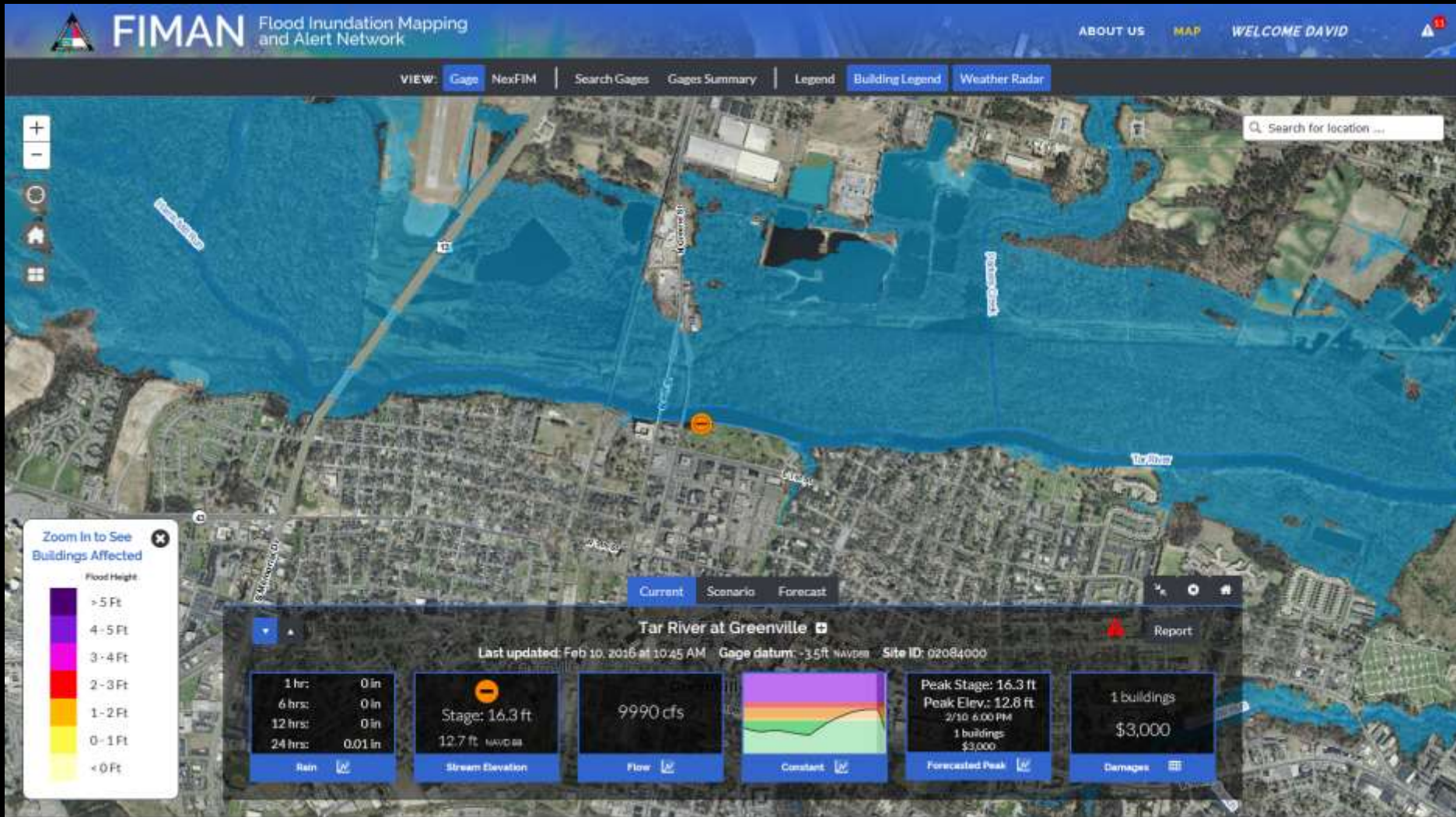


# Gages Near Me Tool



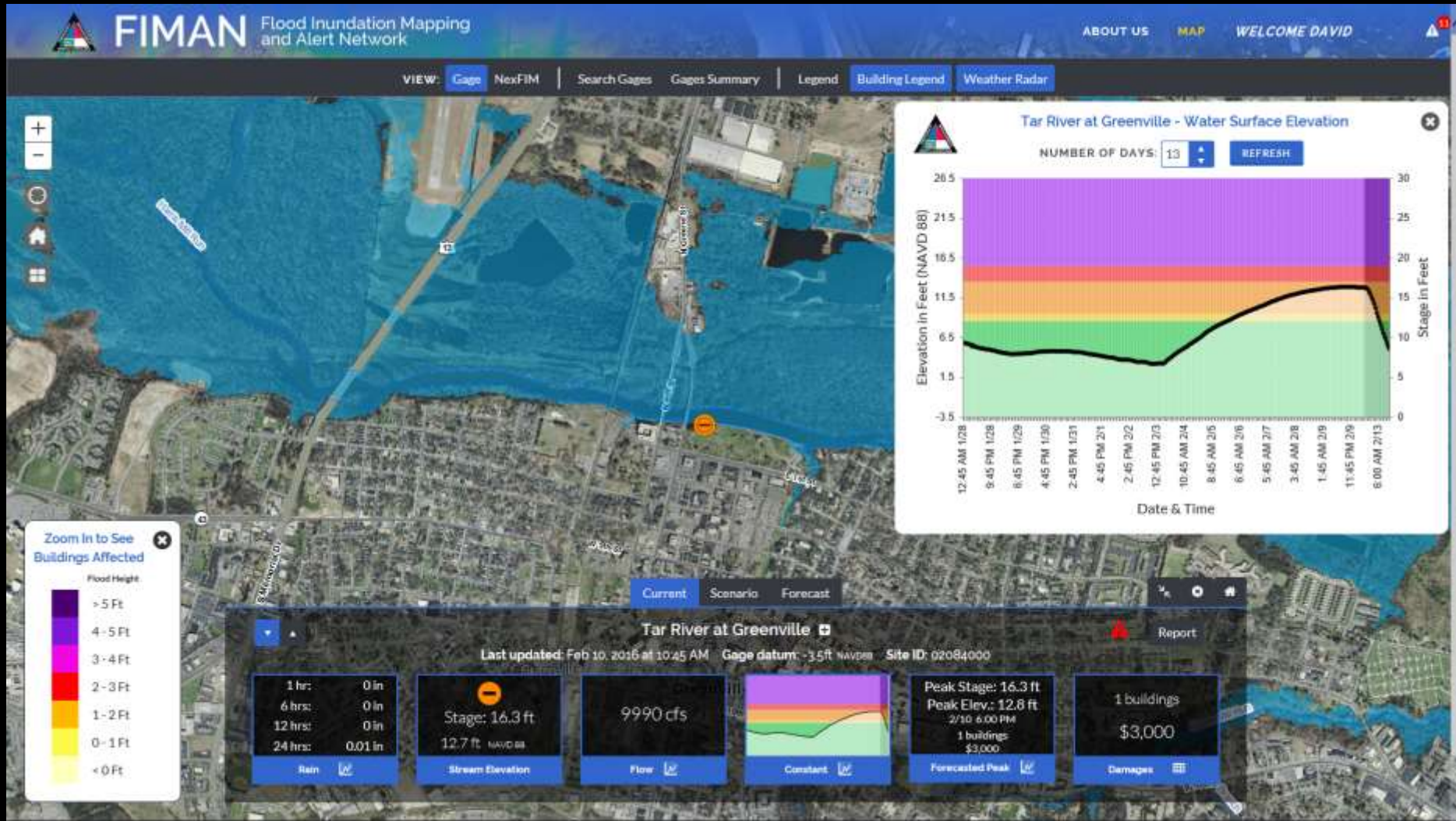


# Current Conditions Map





# Gage Stage Hydrograph with Forecast





# Gage Site Flood Impacts Report



**FIMAN** Flood Inundation Mapping and Alert Network

ABOUT US

MAP

WELCOME DAVID



## FIMAN Current Flood Impacts Report

Minor Flooding  
Trend: Constant

### Tar River at Greenville

Site ID: 02084000

Last Updated:  
2/10/16 2:45 PM

16.2 ft

12.7 ft (NAVD 88)

Current Stage / Elevation

13100 cfs

Current Flow

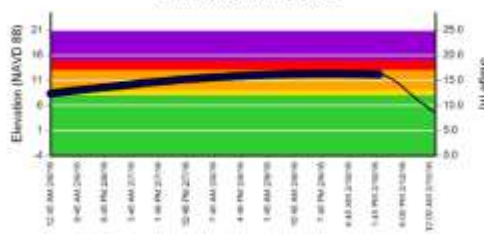
1 Buildings  
\$3,000

Impacted Structures / Damages

12.7 ft  
2/11/16 12:00 AM  
1 Buildings  
Est. Damages: \$3,000

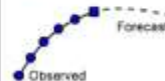
Forecasted Peak / Impacts

#### ELEVATION / STAGE

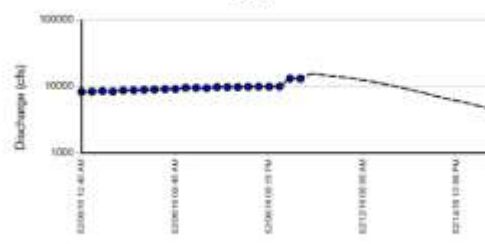


#### LEGEND

Major Flooding  
Moderate Flooding  
Minor Flooding  
Monitor  
Normal Conditions



#### FLOW



Estimated Damages based on Current Flood Elevation of 13 ft (NAVD 88).

#### Estimated Building Damages

DEPTH	Total		Residential		Public		Commercial	
	Damages	Total Count	Damages	Count	Damages	Count	Damages	Count
Sub Structure	\$3,000	1	\$3,000	1	\$0	0	\$0	0
0 - 1 ft	\$0	0	\$0	0	\$0	0	\$0	0
1 - 2 ft	\$0	0	\$0	0	\$0	0	\$0	0
2 - 3 ft	\$0	0	\$0	0	\$0	0	\$0	0
3 - 4 ft	\$0	0	\$0	0	\$0	0	\$0	0
4 - 5 ft	\$0	0	\$0	0	\$0	0	\$0	0
> 5 ft	\$0	0	\$0	0	\$0	0	\$0	0
<b>TOTAL</b>	<b>\$3,000</b>	<b>1</b>	<b>\$3,000</b>	<b>1</b>	<b>\$0</b>	<b>0</b>	<b>\$0</b>	<b>0</b>

#### Impact Summary

Road Impact: None reported at this time  
Building Impact: 1 buildings impacted, \$3,000 estimated damages.  
Utilities Impact: None reported at this time  
Other Impact: Some farmland flooded. Water overflow lowlands adjacent to river.

Note: Additional buildings may be impacted outside of flood inundation extent. Damages do not include content and inventory.

Search for location ...

#### Gage Level

##### Gage Symbols

- Current Condition
- Forecast Peak Condition
- Rain Last 24 Hours

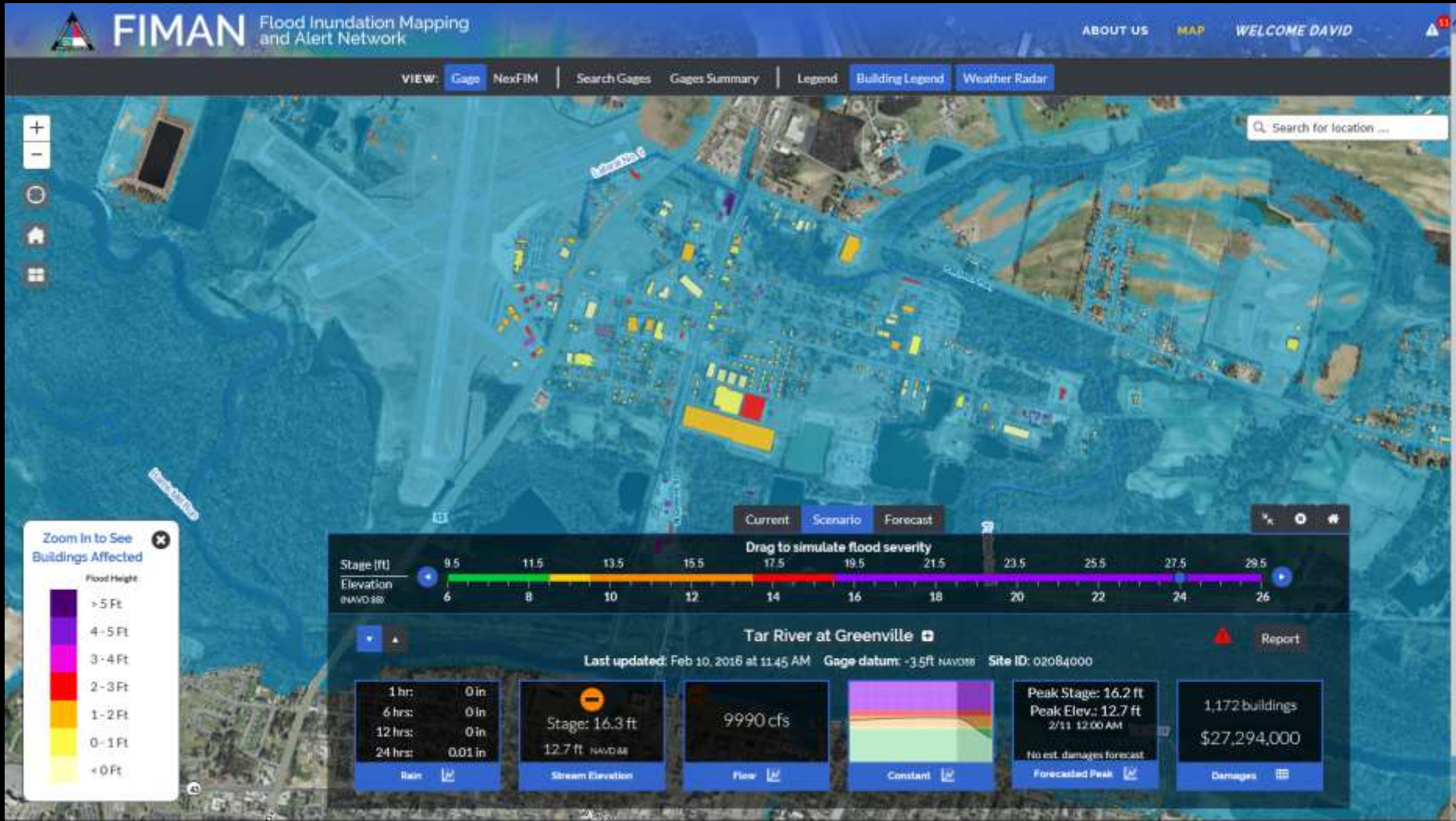
##### Risk Ratings

- Normal
- Monitor
- Minor Flooding
- Moderate Flooding
- Major Flooding
- Not Risk Rated
- Out of Service

##### Trend

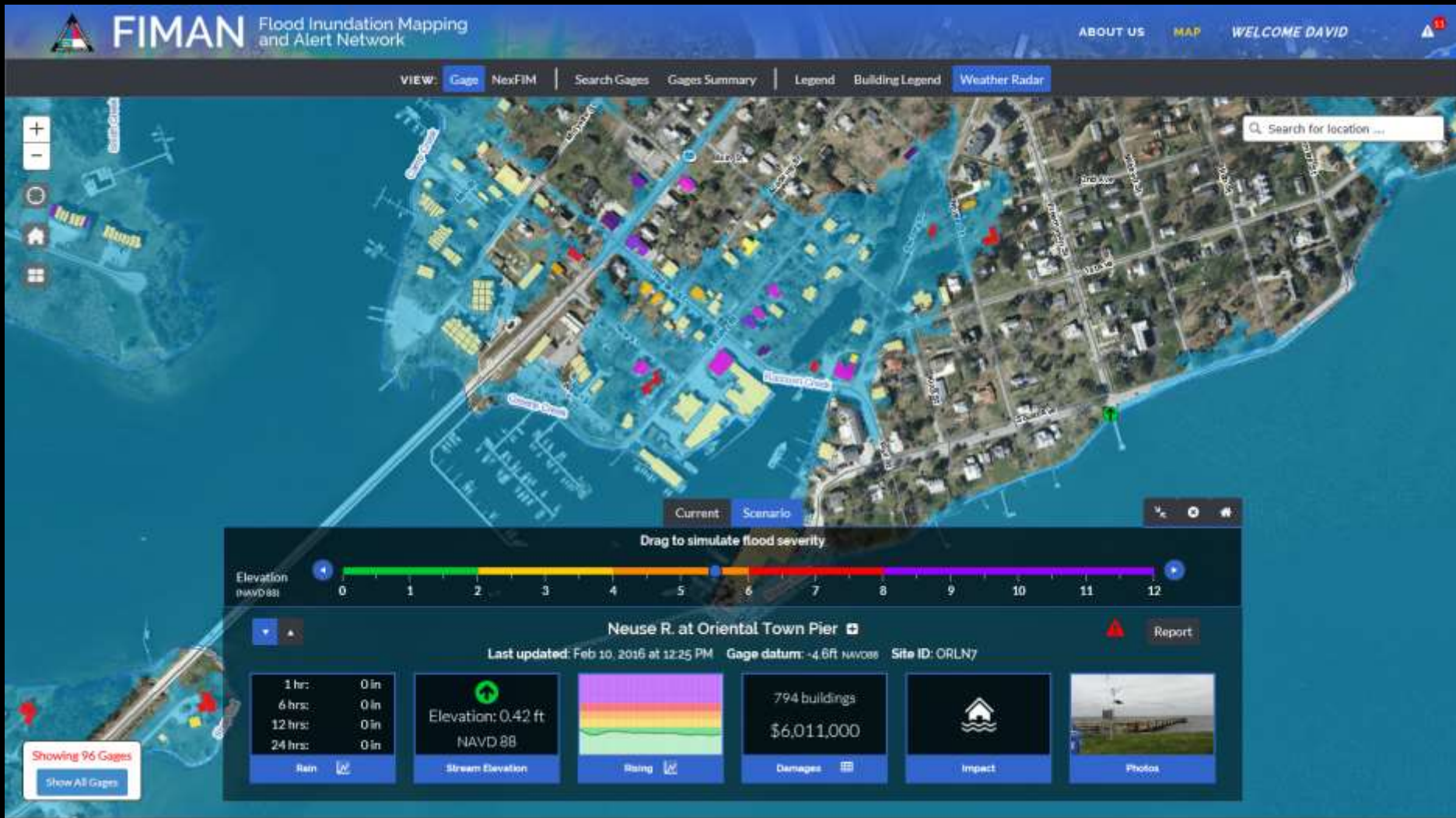
- Rising
- Falling
- Constant

# Flood Scenario Mode





# Sound Sites Example



# **GROUND TRUTH TESTING**



# Beech Street Greenway (2-9-16: 11:45 am)



**FIMAN** Flood Inundation Mapping  
and Alert Network

[ABOUT US](#)

[MAP](#)

[WELCOME DAVID](#)



VIEW: [Gage](#)

[NexFIM](#)

[Search Gages](#)

[Gages Summary](#)

[Legend](#)

[Building Legend](#)

[Weather Radar](#)

SEARCH BY: [River Basin](#) [Gage Type](#) [Gage Name](#) [Gages Near Me](#)

Search for location ...

This Shadow is from  
roof of trail map  
board



*Photo taken: 2/9/16 – 11:55 am*

[Current](#) [Scenario](#) [Forecast](#)

**Tar River at Greenville**

Last updated: Feb 9, 2016 at 11:45 AM Gage datum: -3.5ft NAVD88 Site ID: 02084000

[Report](#)

1 hr: 0 in  
6 hrs: 0 in  
12 hrs: 0 in  
24 hrs: 0.02 in

[Rain](#)

Stage: 16.3 ft  
12.8 ft NAVD 88

[Stream Elevation](#)

9990 cfs

[Flow](#)

[Constant](#)

Peak Stage: 16.5 ft  
Peak Elev.: 13 ft  
2/10 12:00 AM  
1 buildings  
\$3,000

[Forecasted Peak](#)

1 buildings  
\$3,000

[Damages](#)

Showing 96 Gages

[Show All Gages](#)

# September 22, 2016 in Windsor





# Windso





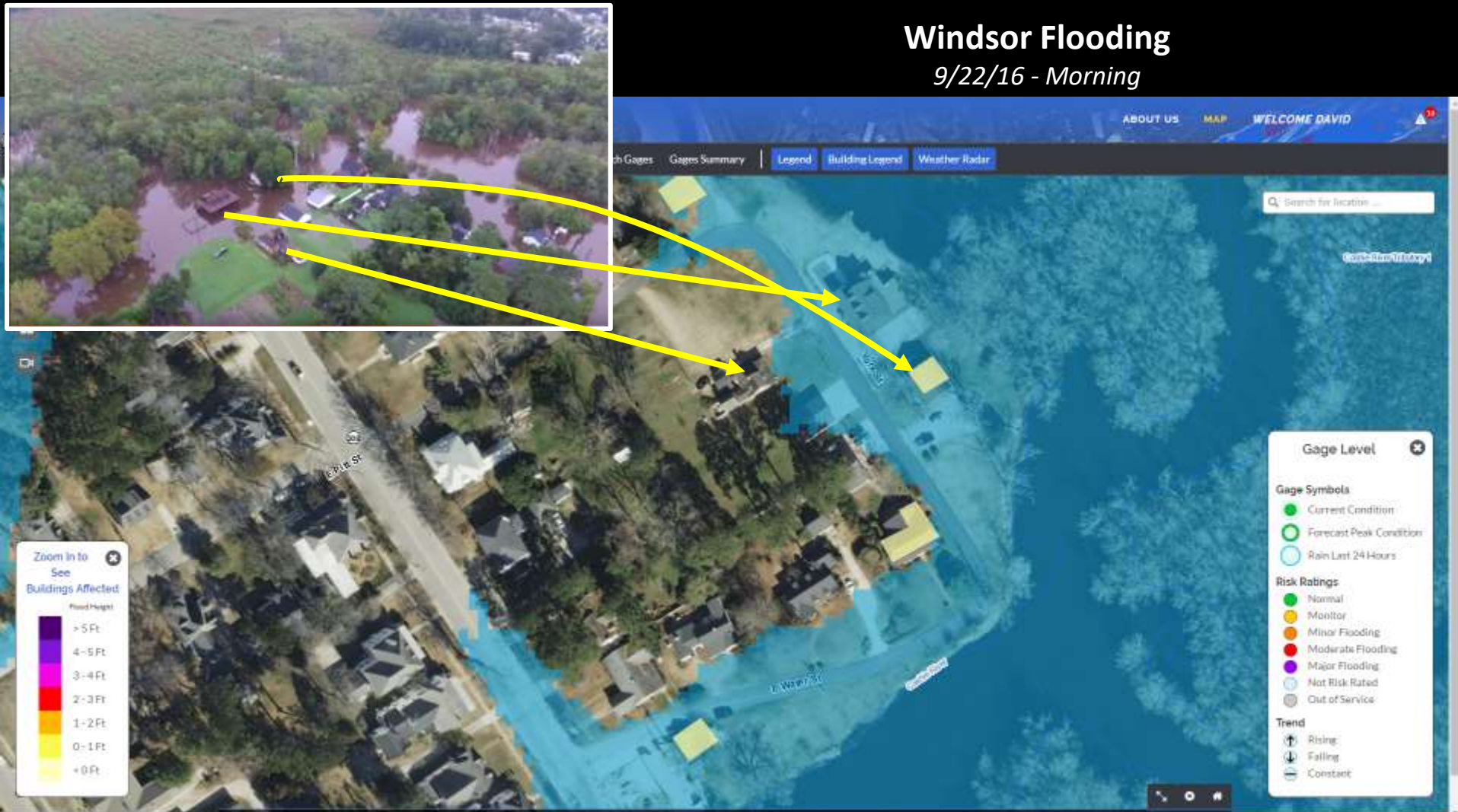


Windsor



# Windsor – Sept 2016

## Windsor Flooding 9/22/16 - Morning



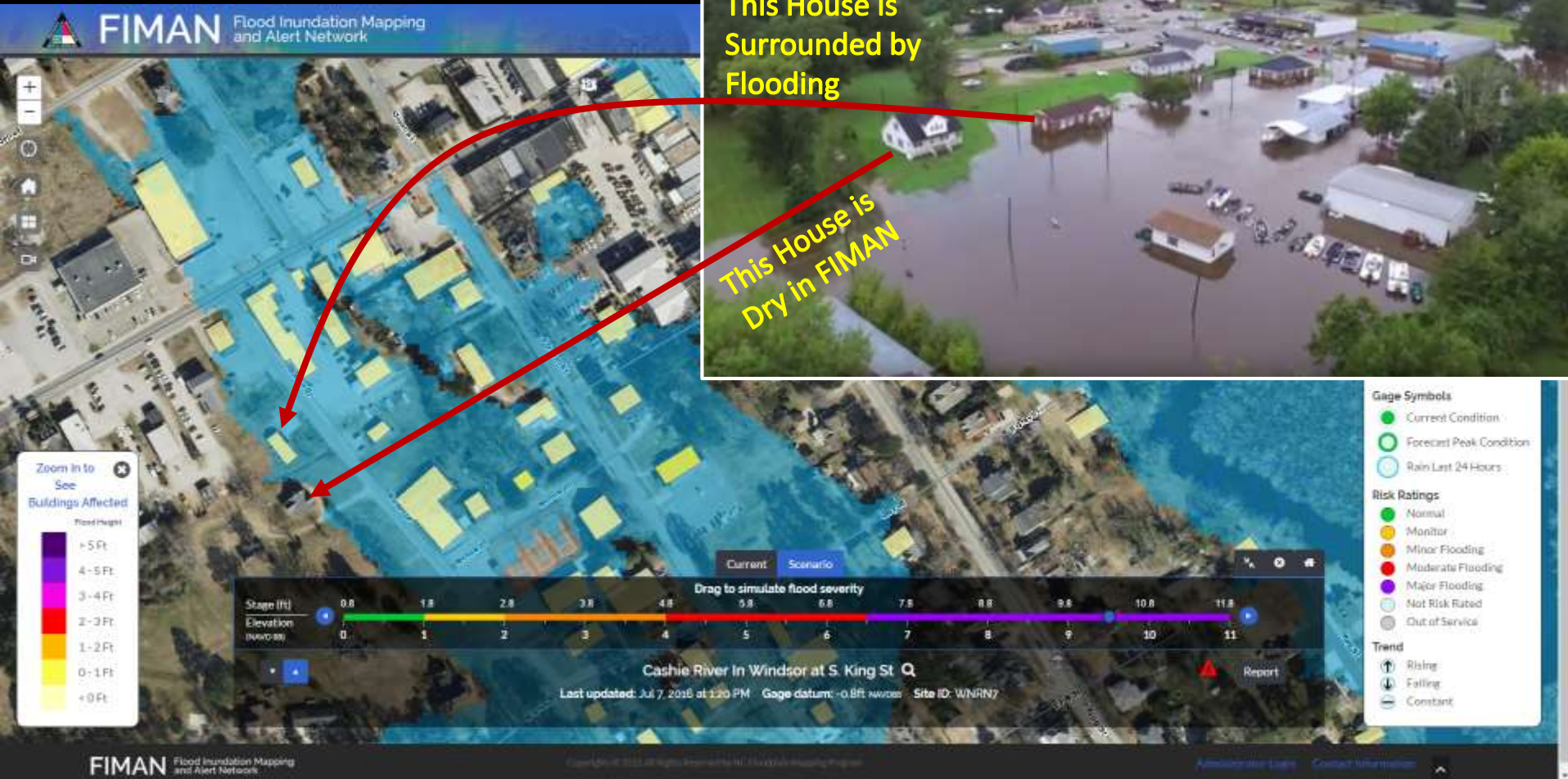


# Library Compared to HWM-Windsor Sep. 2016

## HWMWindsor – Sept 2016

### Windsor Flooding

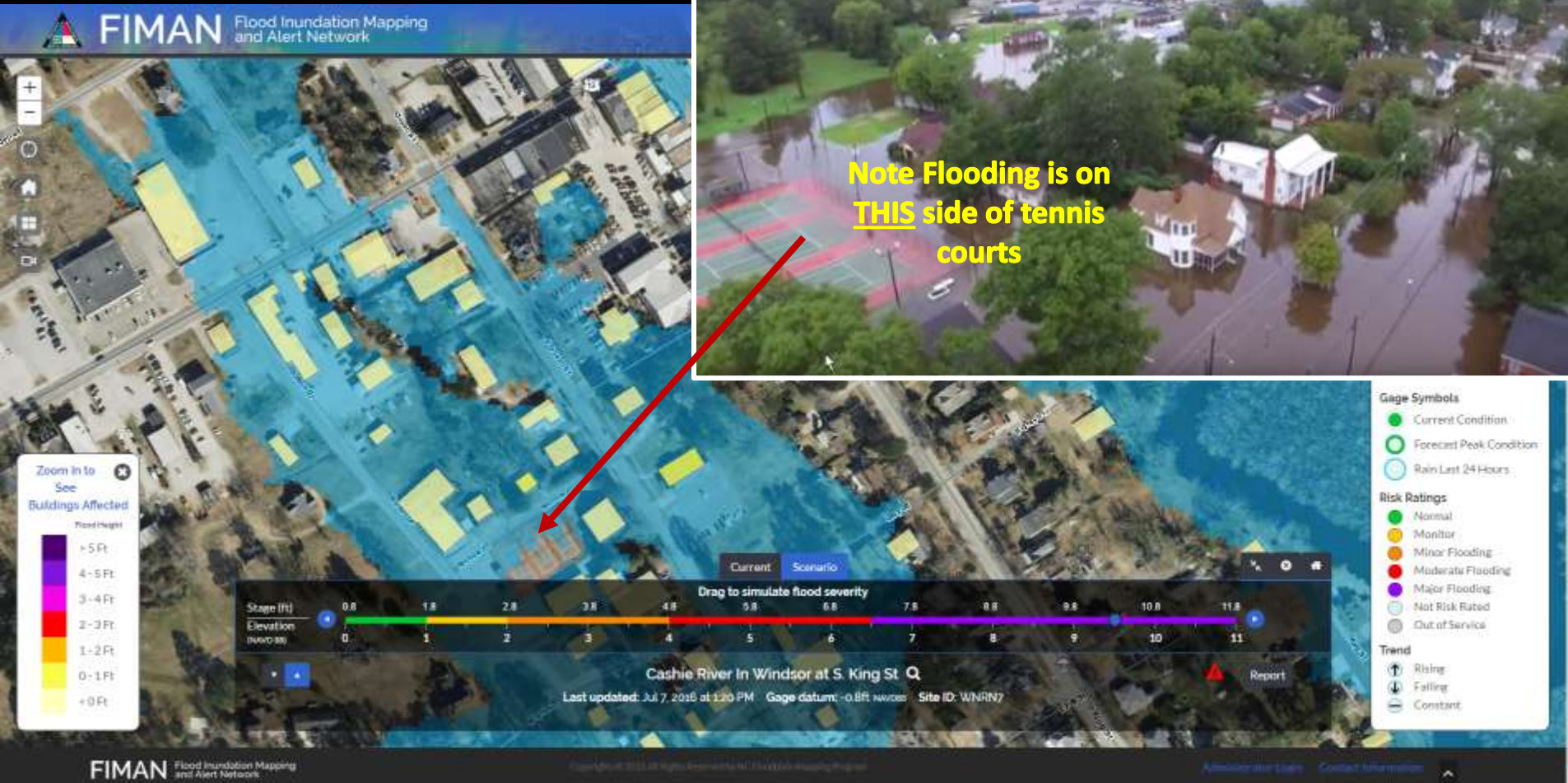
9/22/16 - Morning





# Windsor – Sept 2016

Windsor Flooding  
9/22/16 - Morning

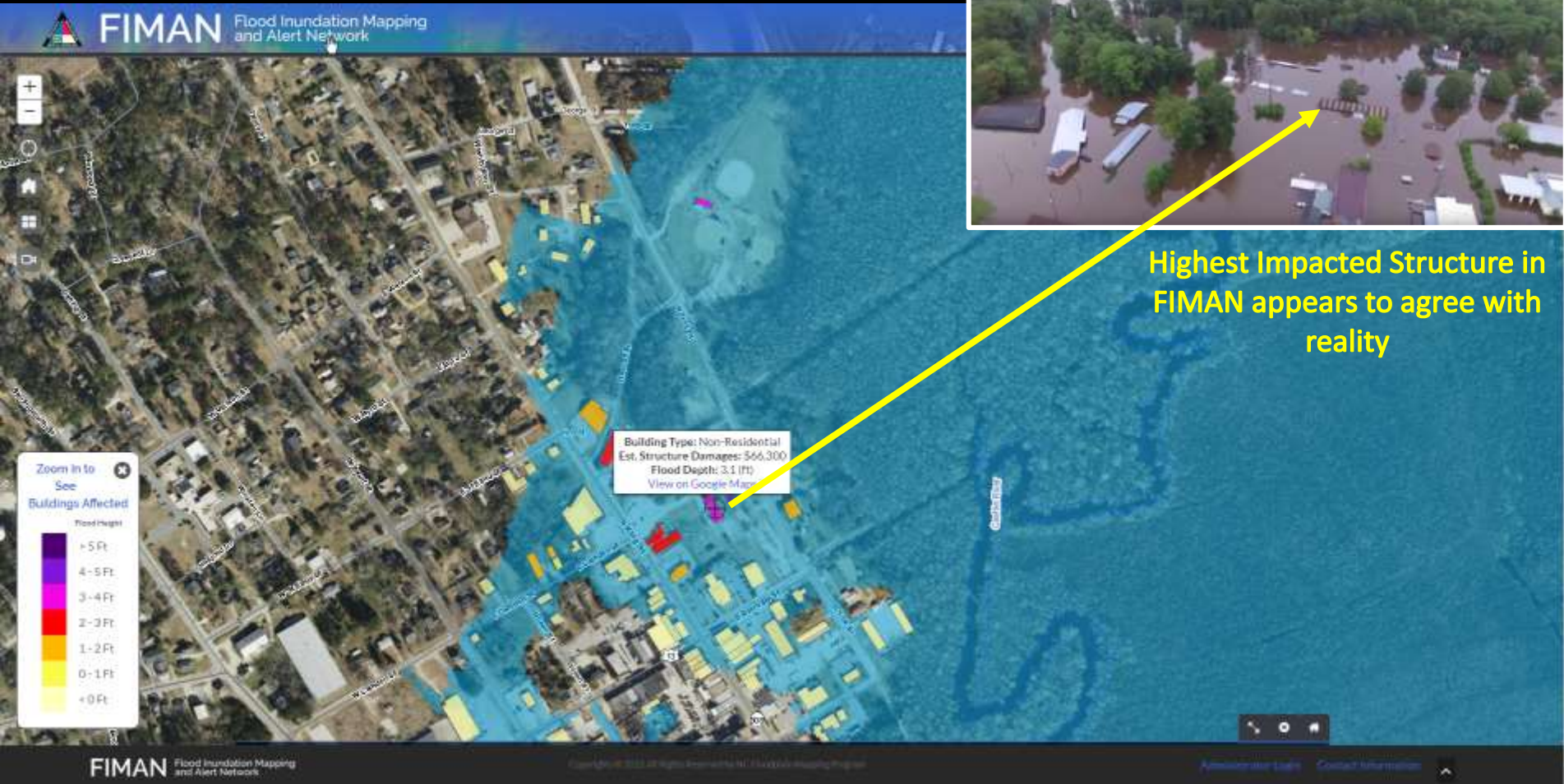




# Windsor – Sept 2016

## Windsor Flooding

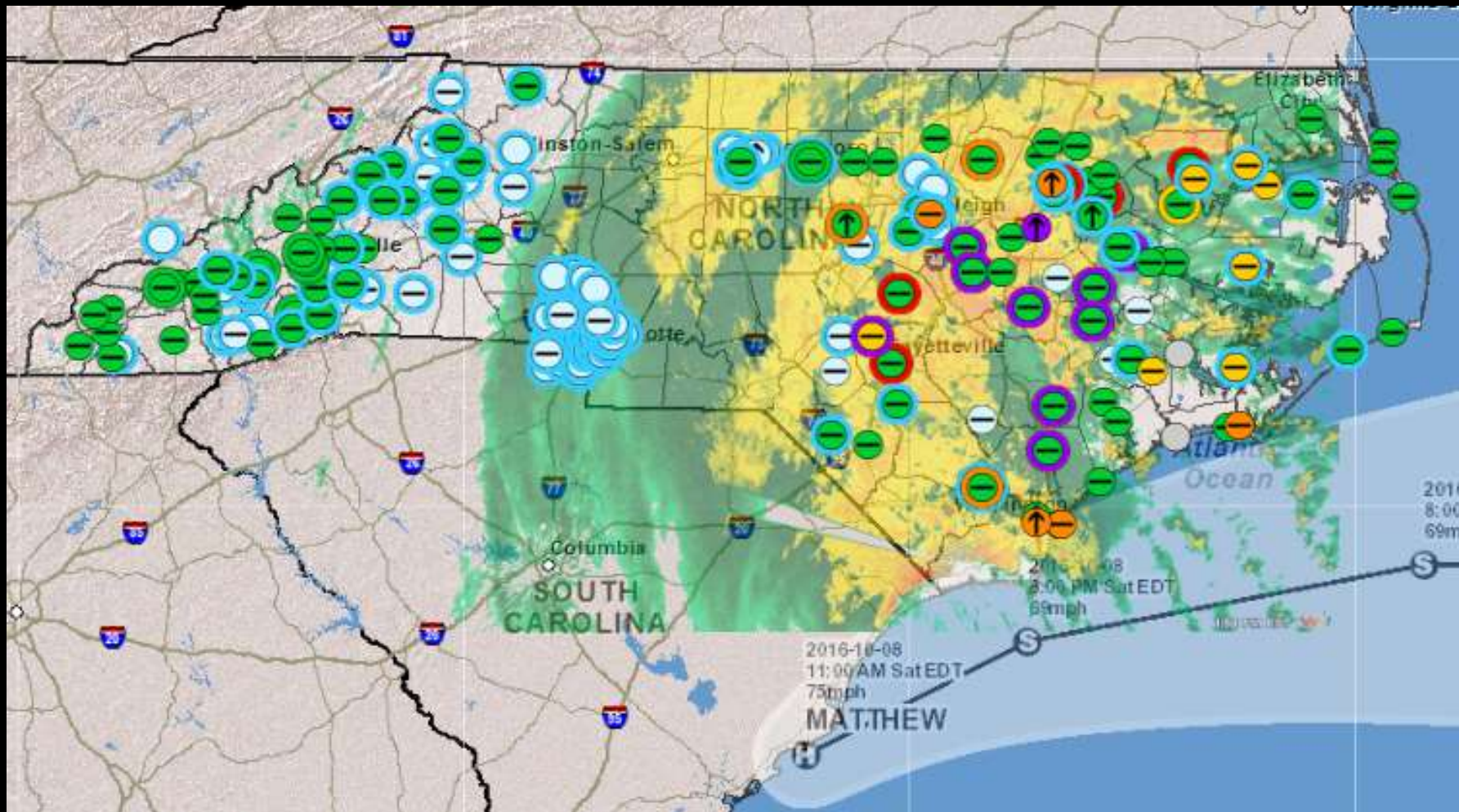
9/22/16 - Morning





# Hurricane Matthew

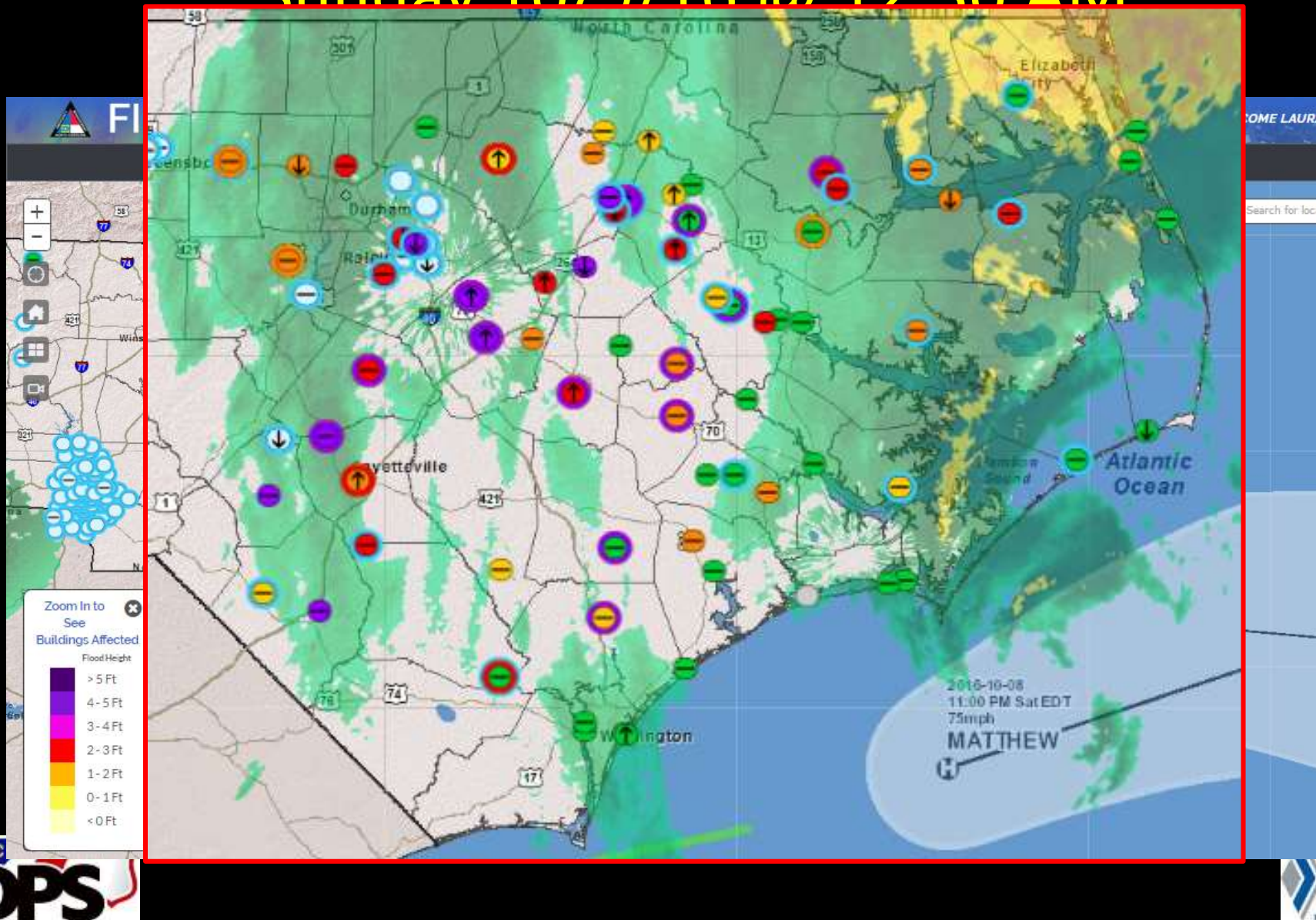
## Saturday 10/8/16 @ 2pm





# Hurricane Matthew

## Sunday 10/9/16 @ 12:30 AM





# FIMAN during Hurricane Matthew



# Library Compared to HWM- Greenville





# Library Comparison to HWM-Greenville



# Greenville – October 11, 2016

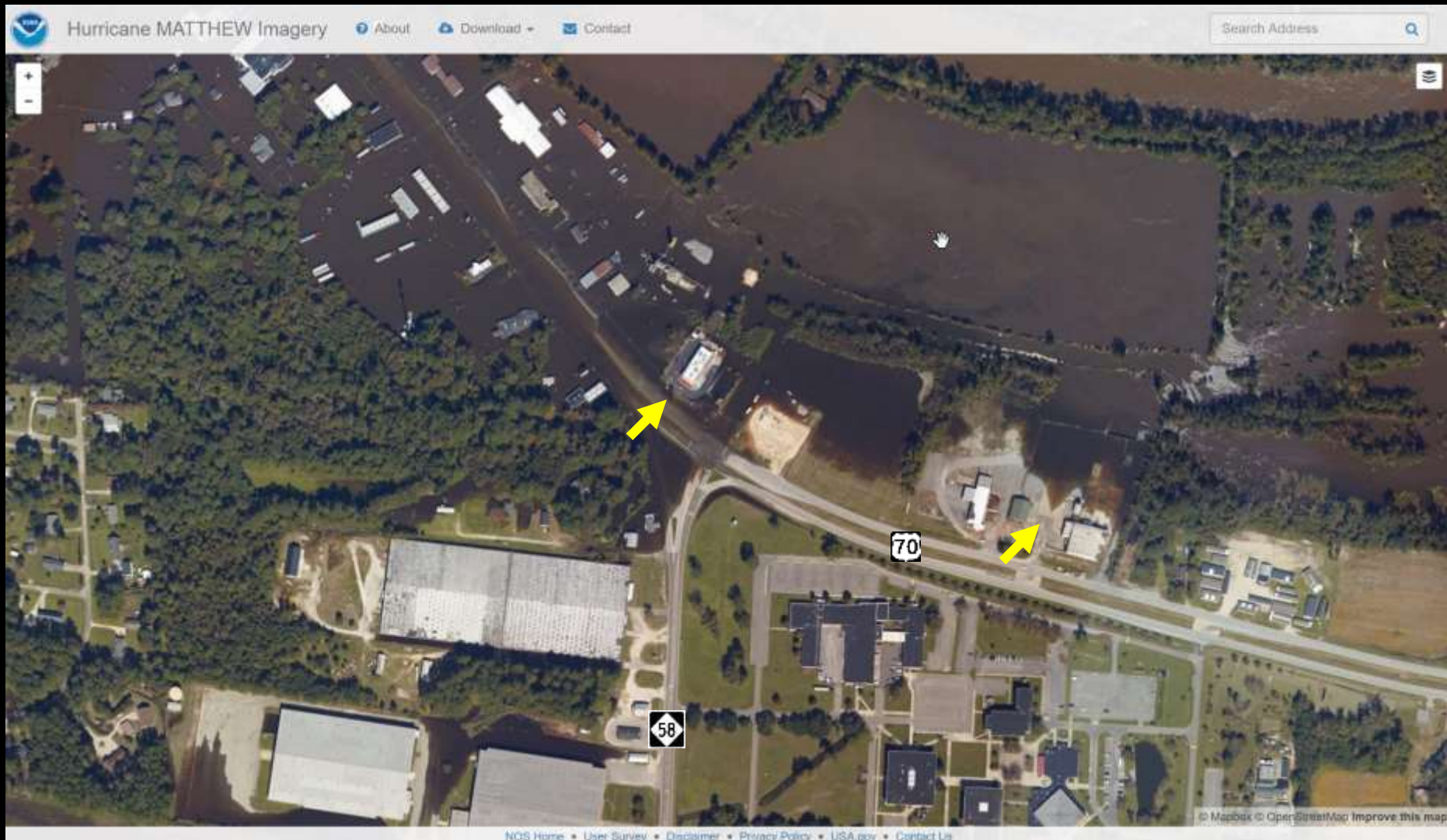




# Library Comparison to HWM-Kinston

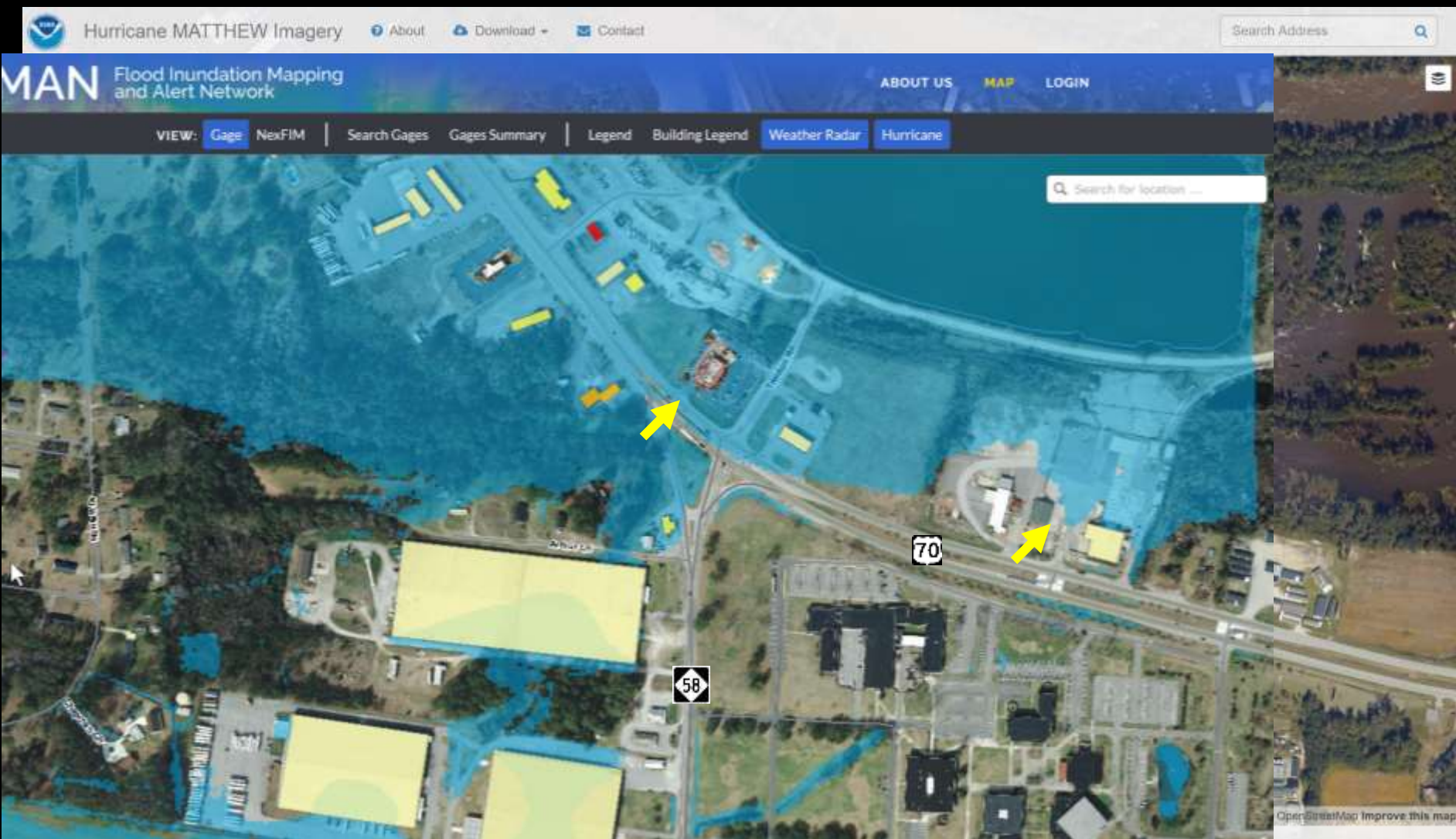


# Kinston-Hurricane Matthew

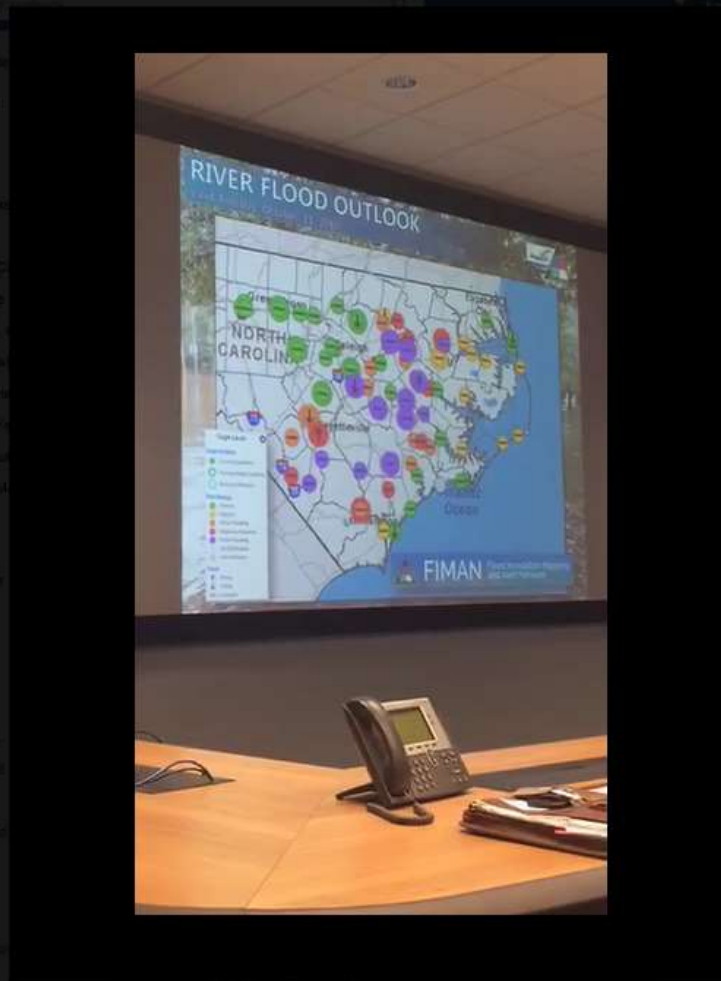




# Kinston-Hurricane Matthew



# FIMAN during Hurricane Matthew



**NC Emergency Management** was live...  
Page Liked · 2 hrs ·

**7PM Weather Outlook #MatthewNC**

1,080 Views

Like Comment Share

35 Realtime Comments ·

18 shares 8 Comments

**Debbie Armstrong Cobb** · 1:19 Thank you  
Like · 2 hrs

**Lori Gail Ennis** · 1:08 Thank you for keeping us updated  
Like · 1 · 2 hrs

**Rhonda Fields** · 0:52 Listening  
Like · 3 · 2 hrs

**Jonathan Anschutz** · 0:17 Thanks for the live stream - great situational awareness!  
Like · 1 · 2 hrs

**Laura Jane Richardson Price** · 0:03 McCory  
Like · 2 hrs

**Laura Jane Richardson Price** · 0:03 Don't agree with mccory  
Like · 2 hrs

**Laura Jane Richardson Price** · 0:03 Roy cooper!  
Like · 2 hrs

**NC Emergency Management** · 0:00 Listening and watching debate  
Like · 2 hrs

Write a comment...

**Suggested Pages** See All

**Skate For Derby**  
Megan and 4 other friends like this.  
Like



# FIMAN during Hurricane Matthew



**NC National Guard** @NCNationalGuard · 3h

Our [#AlwaysReady](#) team is working closely with our State Emergency Response partners coordinating support efforts for Hurricane [#MatthewNC](#)

👤 NC Emergency Managem, NC Public Safety and NC Governor's Office



10



8



# Media and Social Media

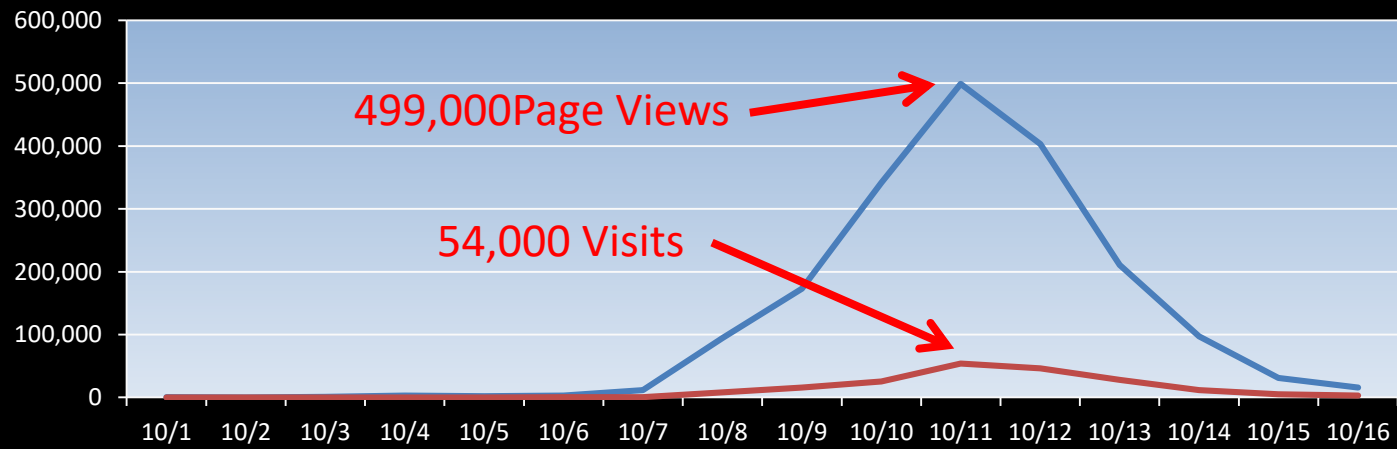
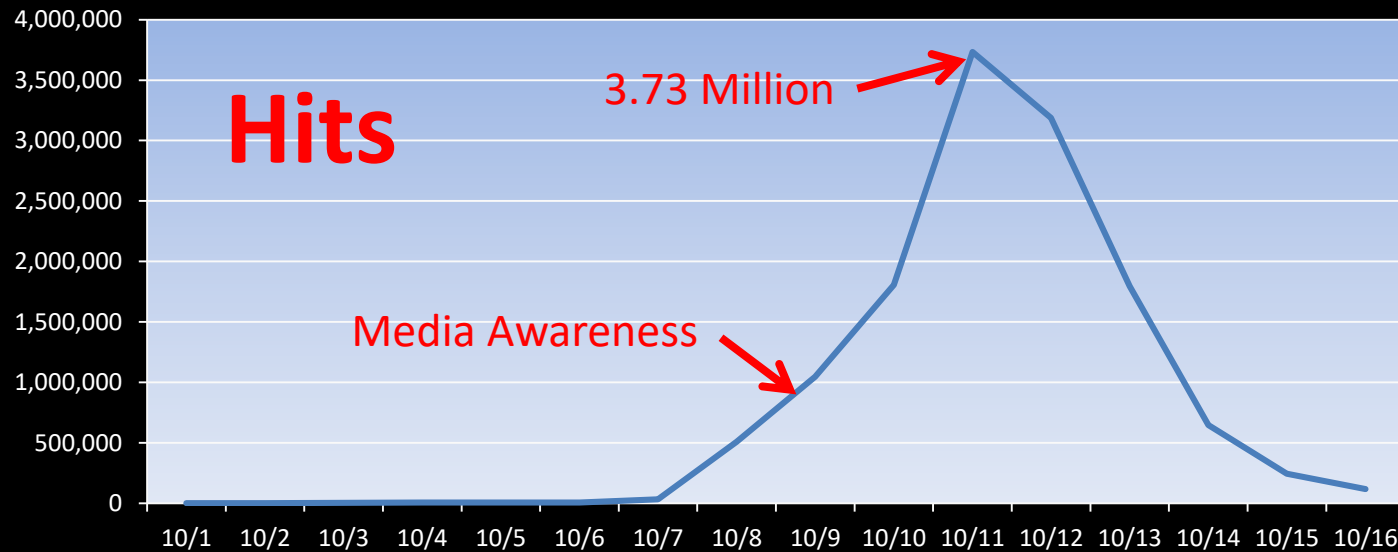
Rising Tar River water levels threaten Tarboro, Princeville



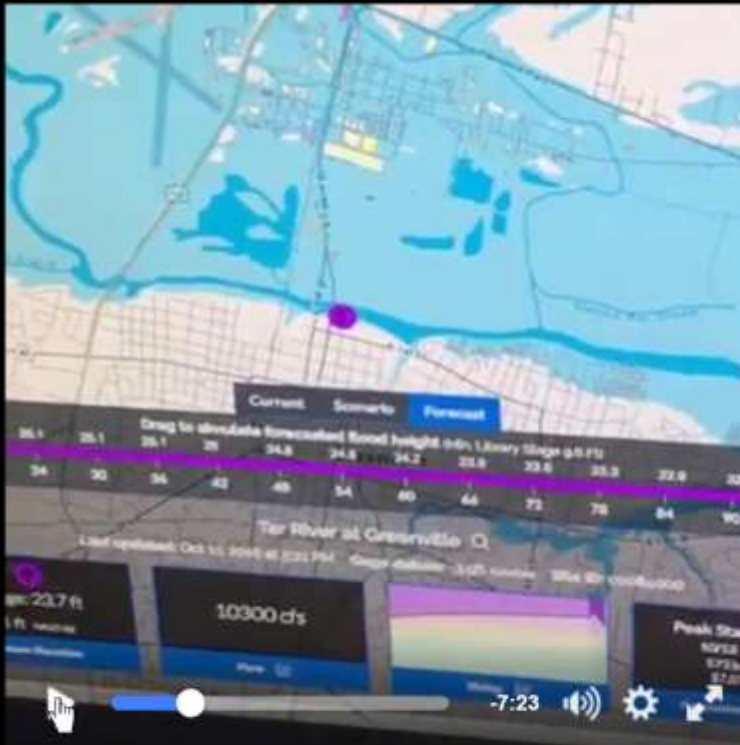
The rising water levels in the Tar River are threatening to flood Tarboro and Princeville.  
5:34 a.m. yesterday



# FIMAN Web Traffic



# Media and Social Media



Options | Share | Send | Like



WRAL TV was live.

Page Liked · October 12 ·

WRAL Nate Johnson takes a look at crest levels across the state.

7,676 Views

Like Comment Share

146

Realtime Comments

53 shares

24 Comments



Raisy Rae · 2:11 Praying

Like · 1 · October 12 at 2:45pm



Rachael Currin Skipper · 2:06 News on lower Cape Fear?

Like · 1 · October 12 at 2:33pm



Monamovingforward Marie · 2:00 264 Wilson/rocky mount?

Like · October 12 at 4:46pm



Robin Steward · 1:57 That is right

Like · October 12 at 3:50pm

Write a comment...





# Media and Social Media



SECTIONS

TRAFFIC

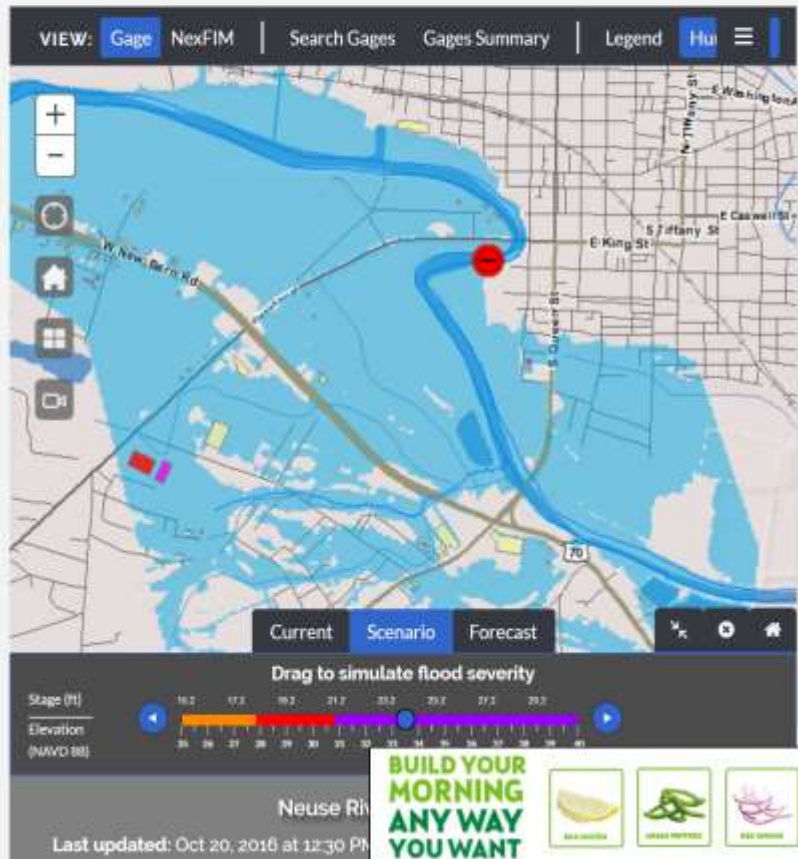
WATCH



82° Raleigh, NC  
M/Cloudy

and Alert Network as of 11:00 a.m., Tuesday, October 11, 2016. (NC FIMAN)

The Lumber River in the Lumberton area is currently running at record levels but is down from yesterday with a reading of 20.7'. The old record was 20' with flood stage at 13'. According to the NC Flood Inundation Mapping and Alert Network, 882 buildings are flooded with an estimated damage cost of \$23.9 million.



## TOP STORIES



Driver accused of slapping special needs child

Updated 50 mins ago



Woman shot in the face at Raleigh apartment complex

Updated 58 mins ago



Southbound I-95 still detoured after 3 crashes

Updated 36 mins ago



Trump says he'll honor election results - if he wins

Updated 39 mins ago

3rd person charged in murder of Fayetteville landlord

People line up for early voting in North Carolina

Updated 51 mins ago

Experts say we're in for a warmer, drier winter

Updated 1 hr 32 mins ago

Clinton, Trump don't shake hands, fling barbs instead

McCrory outlines plans for NC's hurricane

## TOP VIDEO



People line up for early voting in North Carolina

Updated 51 mins ago



Trooper comes to rescue of bald eagle



Snake slithers out of car



Brazen burglary caught on camera

MORE VIDEO ▶

BUILD YOUR MORNING ANY WAY YOU WANT



FIND A RESTAURANT

SUBWAY

At participating locations.

# Media and Social Media



Mike Moss



22h

Lots of areas continue to face river flooding - this is one example in the Goldsboro area, showing locations west and southwest of Seymour Johnson AFB where the Tar River is or will extend to as it reaches a...

[Read More](#)



Share



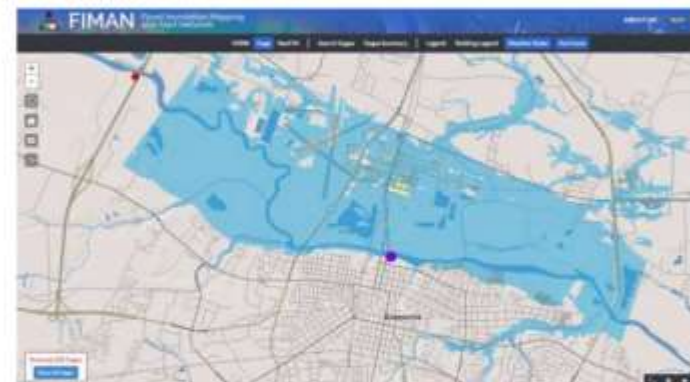
Nate Johnson



13h

This is a look at the areas expected to flood if the Tar River crests as forecast in Greenville NC later this week. This is from the new NC FIMAN system at <http://fiman.nc.gov/fiman/> — if you live in an area...

[Read More](#)



Share



Nate Johnson



13h

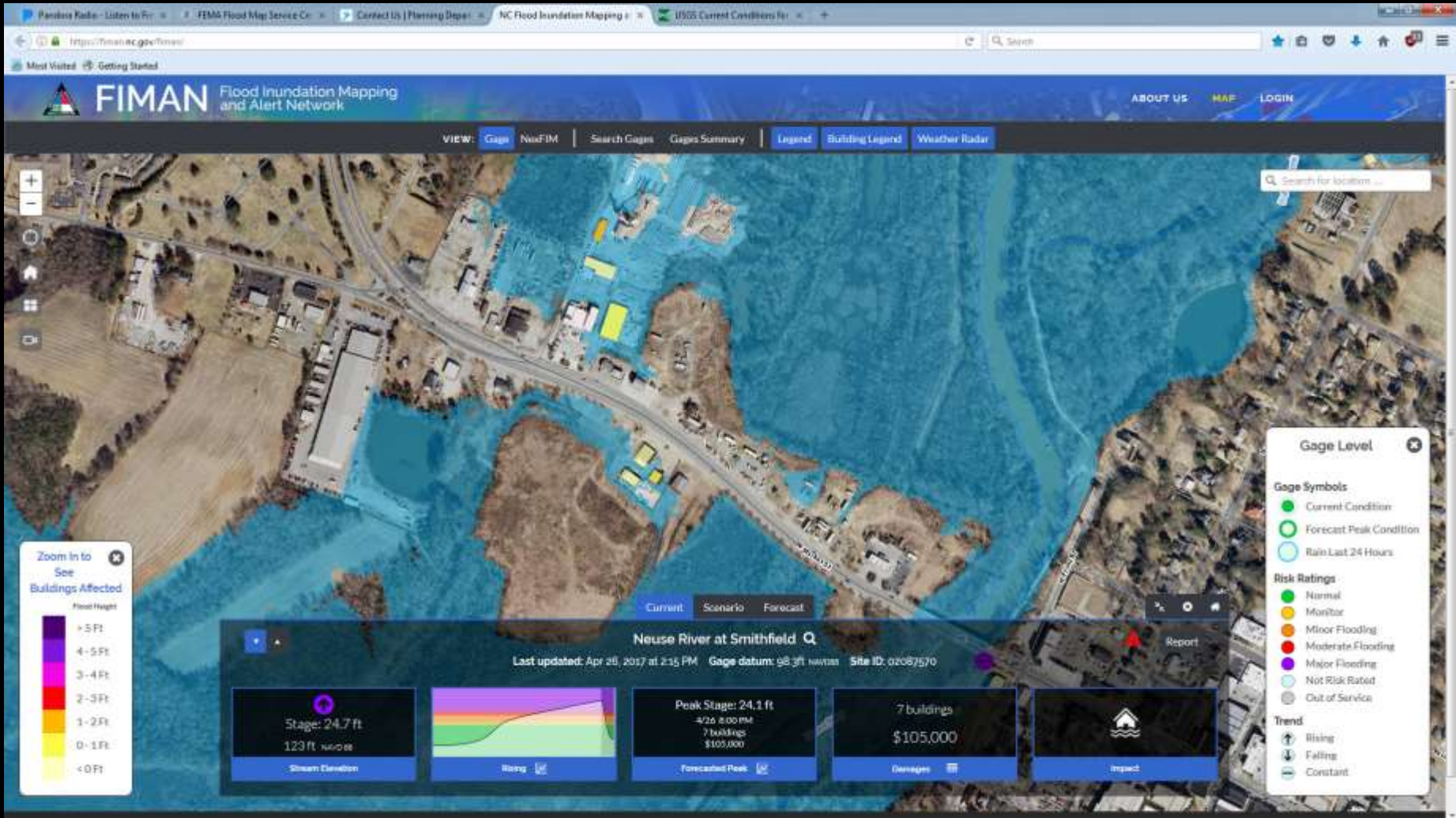
Good news for Fayetteville. Assuming no dams fail and there is no additional rain (and certainly none is in the forecast), the Cape Fear will dip below flood



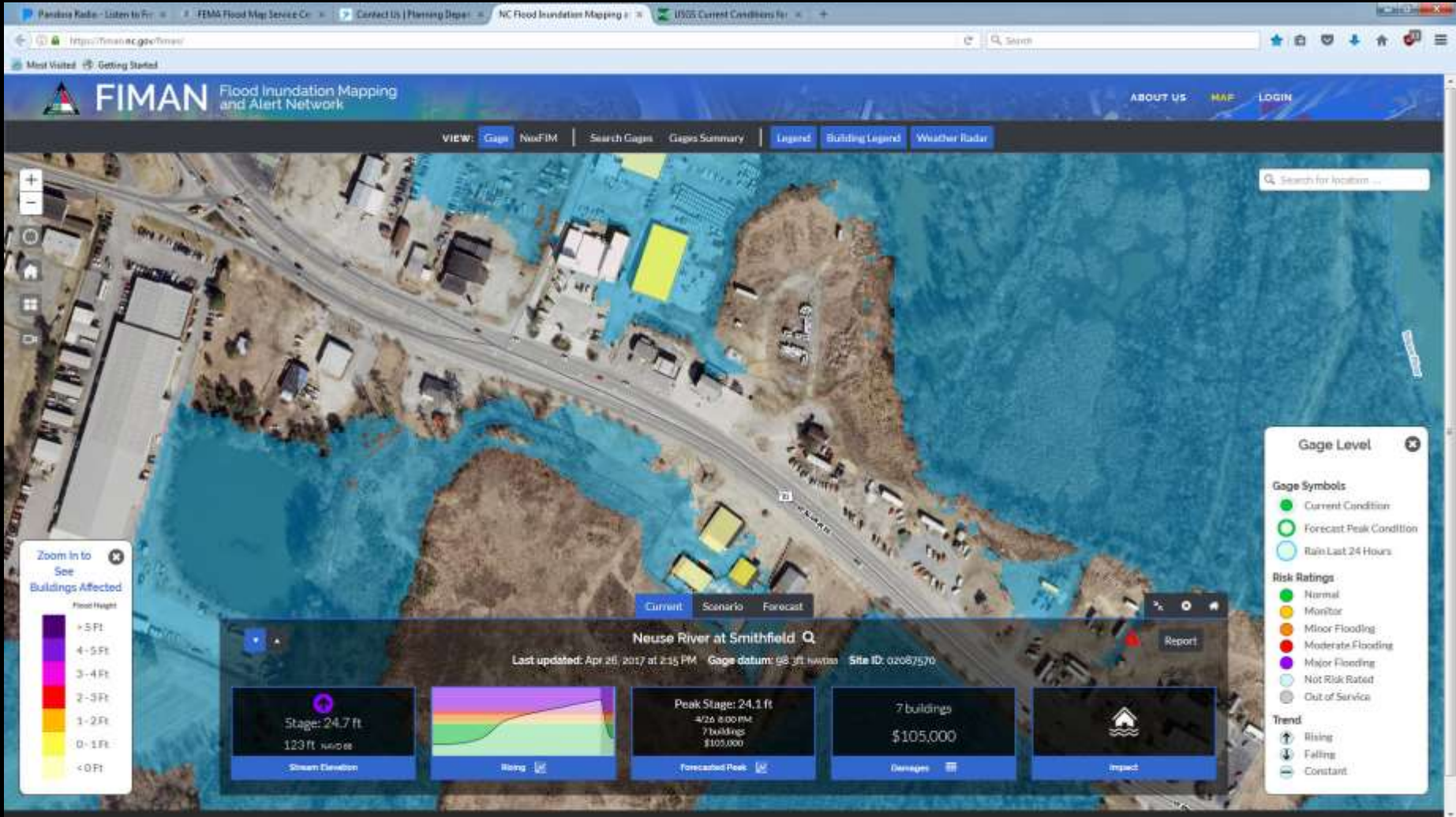
# April 2017 FIMAN Flooding

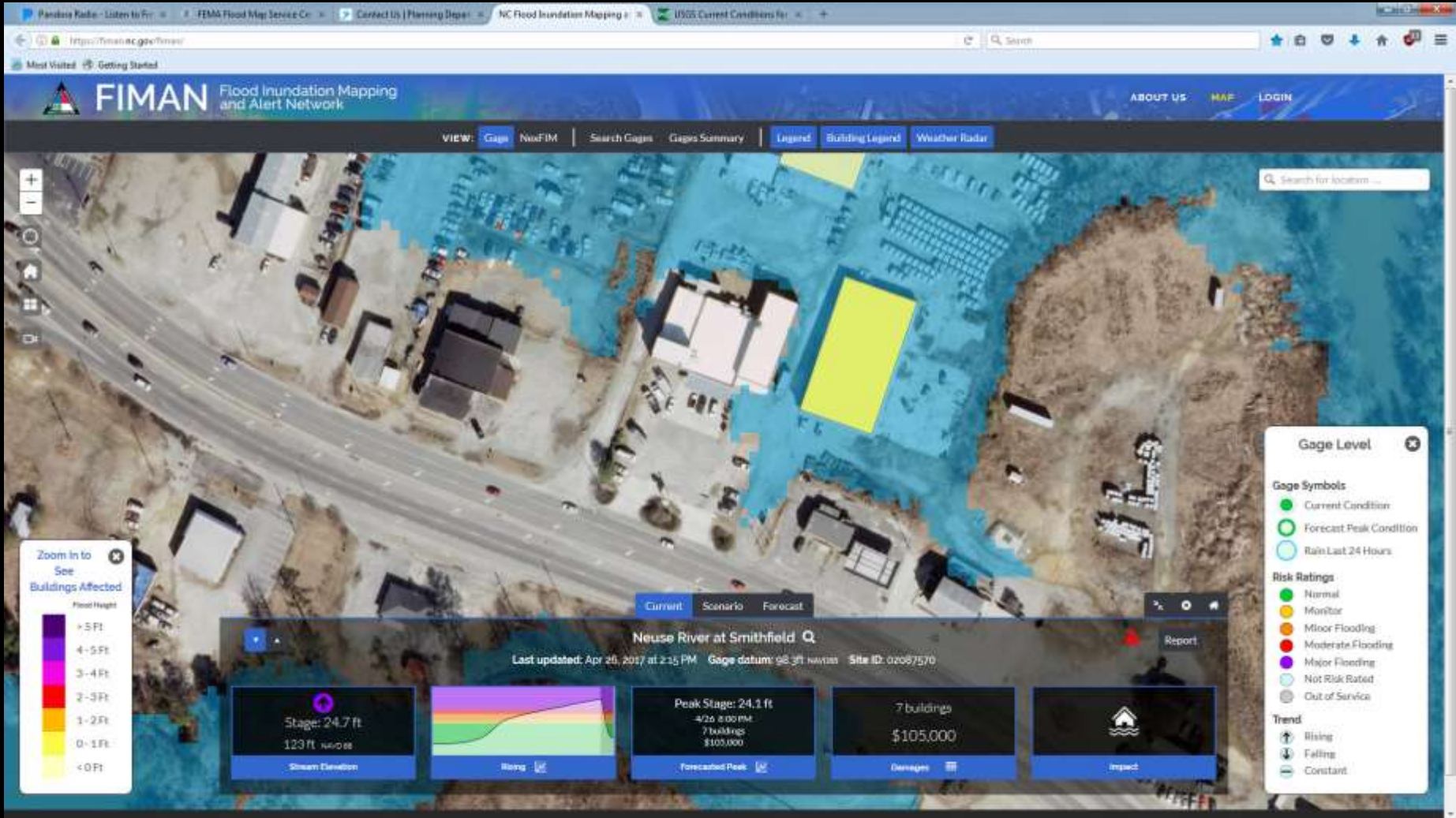
Smithfield, NC





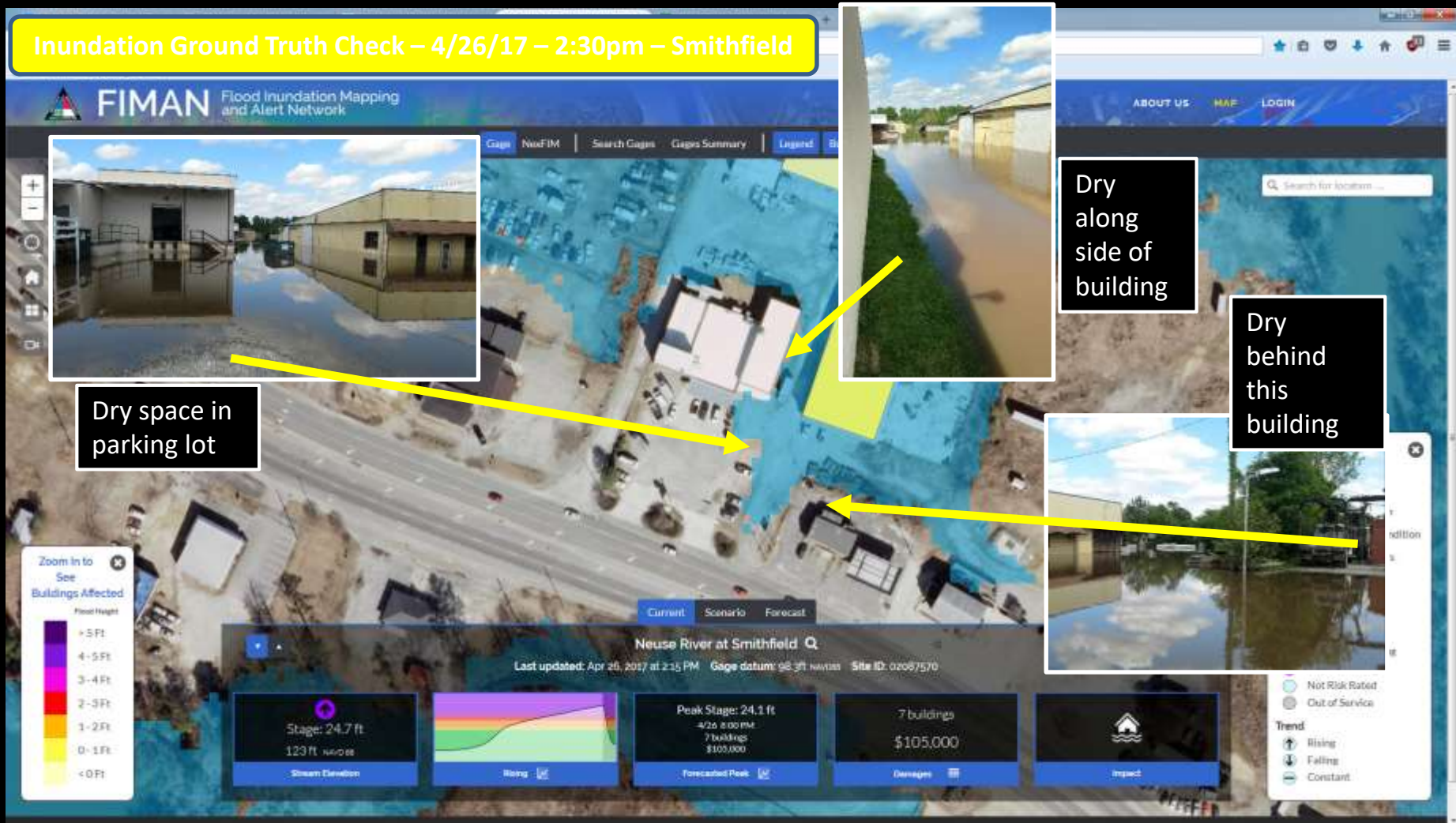




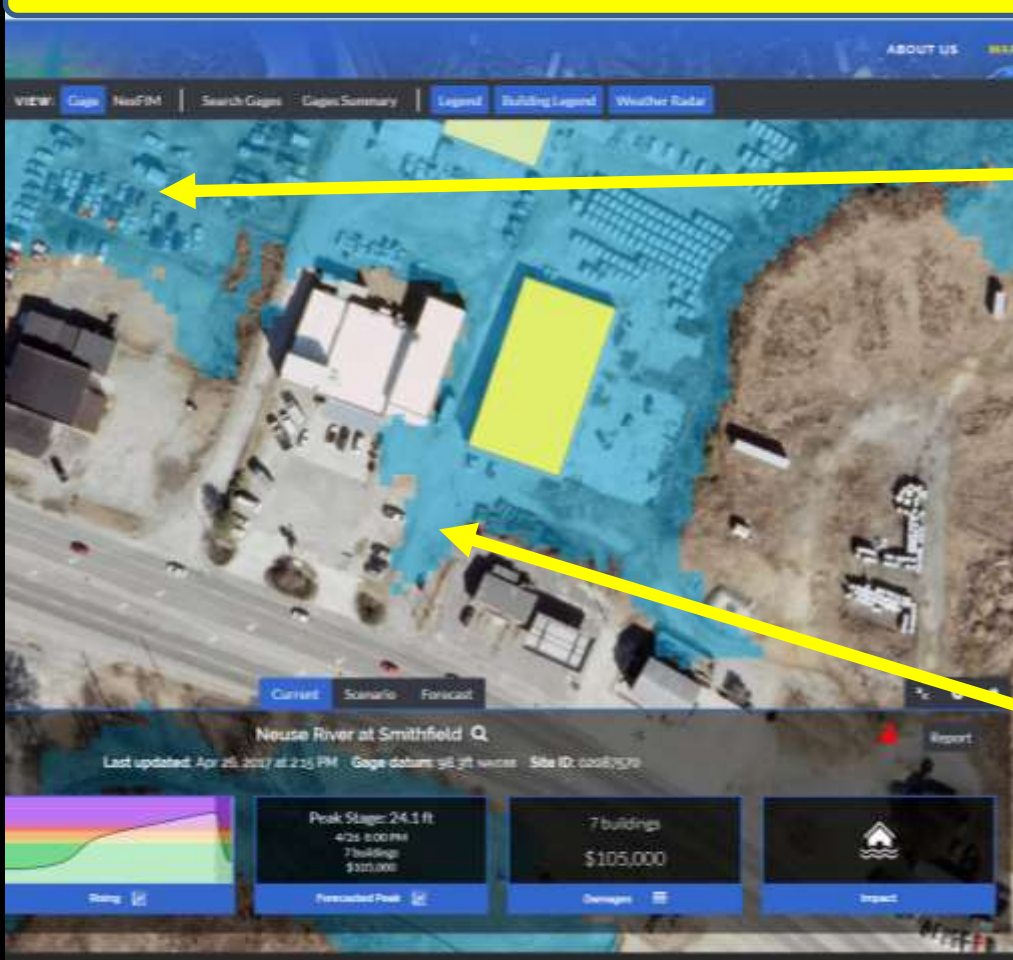




## Inundation Ground Truth Check – 4/26/17 – 2:30pm – Smithfield



## Inundation Ground Truth Check – 4/26/17 – 2:30pm – Smithfield



Auto Salvage Yard



Driveway



# April 2017 FIMAN Flooding

Rocky Mount, NC





VIEW: [Gage](#) [NedFIM](#) [Search Gages](#) [Gages Summary](#) [Legend](#) [Building Legend](#) [Weather Radar](#)

Search for location...

Zoom In to See Buildings Affected



### Gage Level

#### Gage Symbols

- Current Condition
- Forecast Peak Condition
- Rain Last 24 Hours

#### Risk Ratings

- Normal
- Monitor
- Minor Flooding
- Moderate Flooding
- Major Flooding
- Not Risk Rated
- Out of Service

#### Trend

- Rising
- Falling
- Constant

Current Scenario Forecast

Tar River at 97 at Rocky Mount

Last updated: Apr 27, 2017 at 2:00 PM Gage datum: 52.8 ft NAVD83 Site ID: 02082585

1 hr: 0 in  
6 hrs: 0 in  
12 hrs: 0 in  
24 hrs: 0 in

Rain

Stage: 24.8 ft  
77.6 ft NAVD83

Stream Elevation

9950 cfs

Flow



Constant

Peak Stage: 24.4 ft  
4/27 8:00 PM  
12 buildings  
\$29,000

Forecasted Peak

13 buildings  
\$38,000

Damages





Search for location...

Zoom In to See Buildings Affected



Gage Level

Gage Symbols

- Current Condition
- Forecast Peak Condition
- Rain Last 24 Hours

Risk Ratings

- Normal
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Trend

- Rising
- Falling
- Constant

Current Scenario Forecast

Tar River at 97 at Rocky Mount

Last updated: Apr 27, 2017 at 2:00 PM Gage datum: 52.8 ft NAVD83 Site ID: 02082985

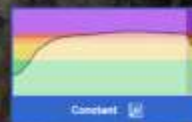


Stage: 24.8 ft  
77.6 ft NAVD83

Stream Elevation

9950 cfs

Flow



Constant

Peak Stage: 24.4 ft  
4/27 8:00 PM  
12 buildings  
\$29,000

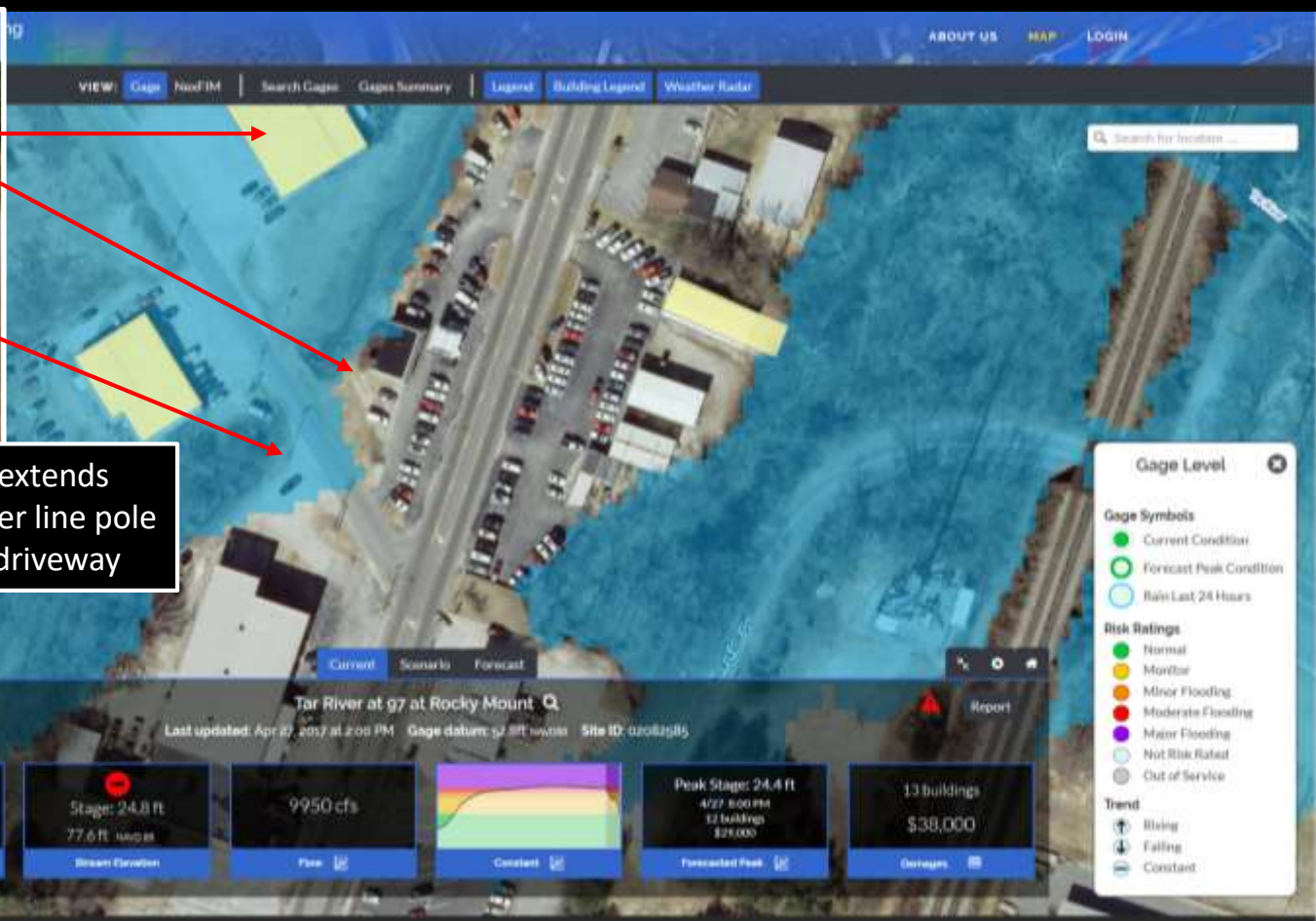
Forecasted Peak

13 buildings  
\$38,000

Damages



Flooding extends past power line pole and into driveway







VIEW: [Gage](#) [NoeFIM](#) [Search Gages](#) [Gages Summary](#) [Legend](#) [Building Legend](#)



Zoom In to See Buildings Affected



- Report
- Moderate Flooding
  - Major Flooding
  - Not Risk Rated
  - Out of Service
- Trend
- Rising
  - Falling
  - Constant



# April 2017 FIMAN Flooding

Greenville, NC





VIEW: [Gage](#) [NexFIM](#)

Tar River at Greenville – 4/30/17: 5pm



Note: Flooding under three structures as FIMAN shows. Water extends into cul de sac which matches FIMAN inundation

Zoom In to  
See  
Buildings Affected

[Current](#) [Scenario](#) [Forecast](#)

Tar River at Greenville

Last updated: Apr 30, 2017 at 6:00 PM Gage datum: -3.5 ft NAVD88 Site ID: 02084000

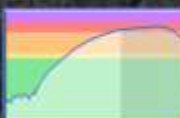
Time	Stage
1 hr:	0 in
6 hrs:	0 in
12 hrs:	0 in
24 hrs:	0 in

[Rain](#)☒

Stage: 17.5 ft  
13.9 ft NAVD88

[Stream Elevation](#)

23300 cfs

[Flow](#)☒[Constant](#)☒

Peak Stage: 18 ft  
5/3 2:00 AM  
4 buildings  
\$12,000

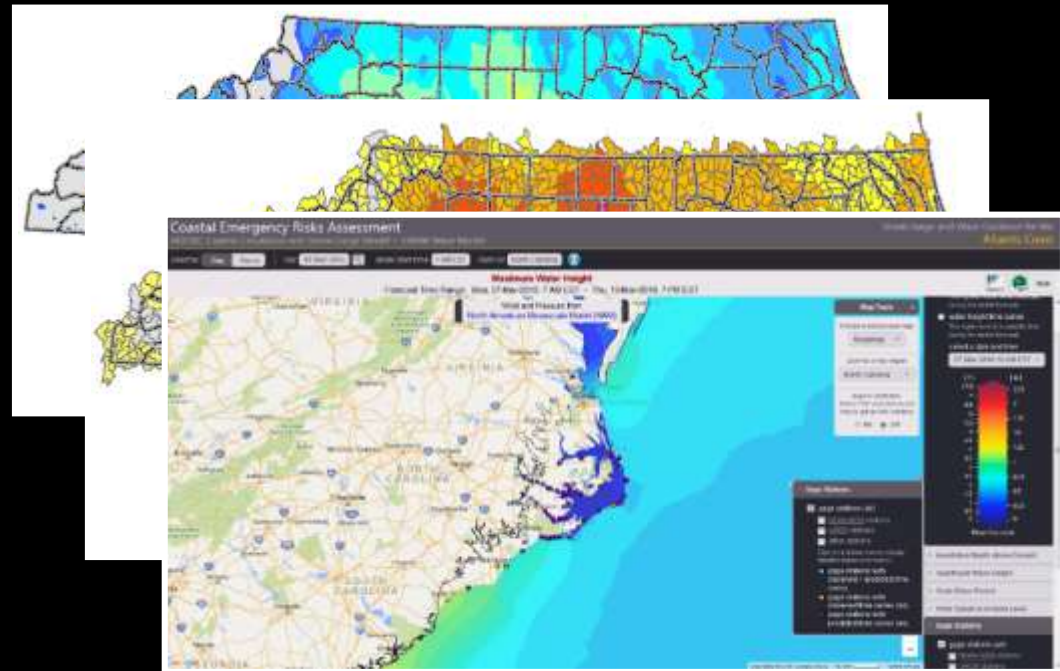
[Forecasted Peak](#)☒

2 buildings  
\$8,000

[Damages](#)☒

# INVESTING IN THE FUTURE OF FIMAN:

Where we are going!





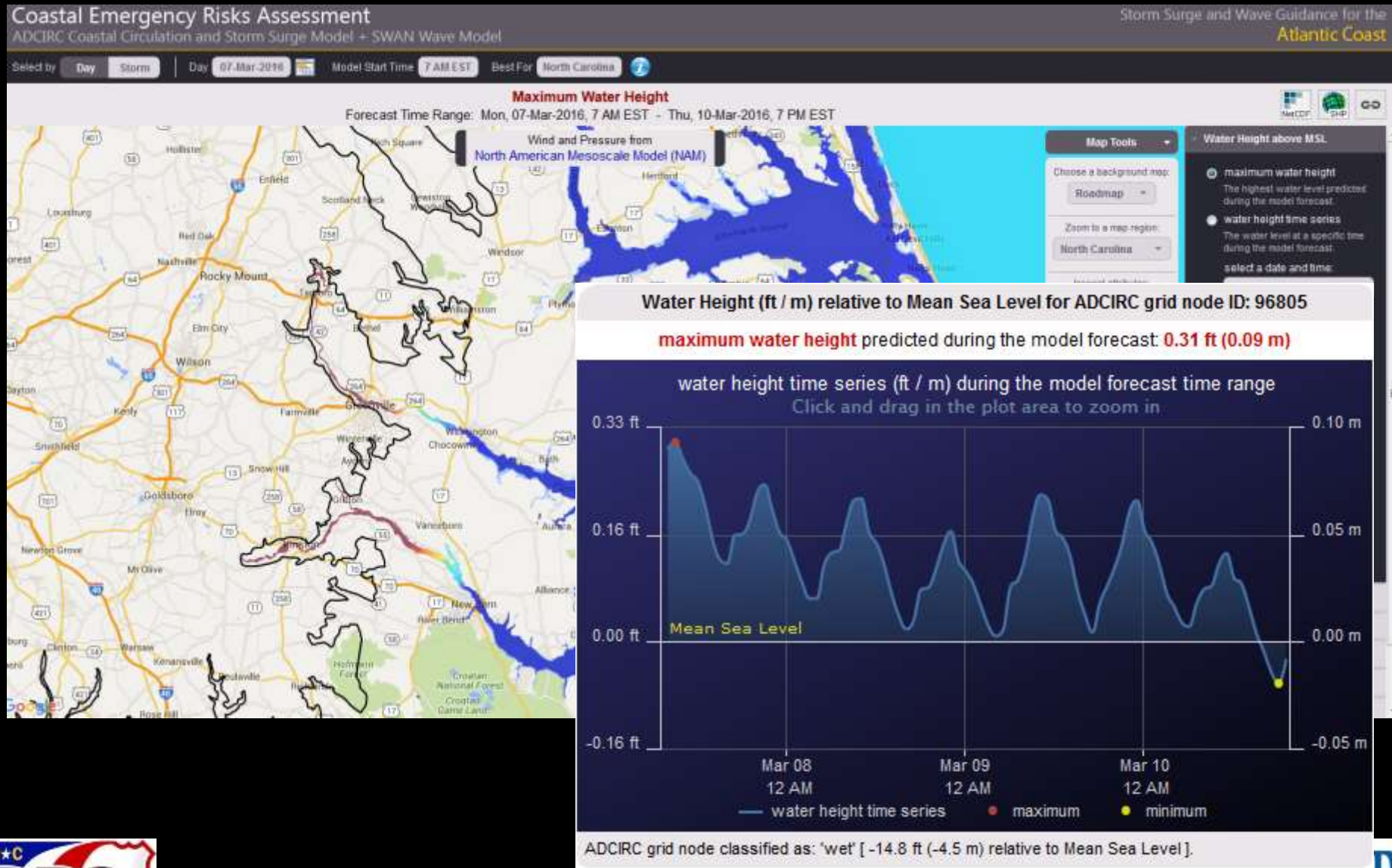
# Leverage Existing Data Sources

## Coastal Emergency Risks Assessment

ADCIRC Coastal Circulation and Storm Surge Model + SWAN Wave Model

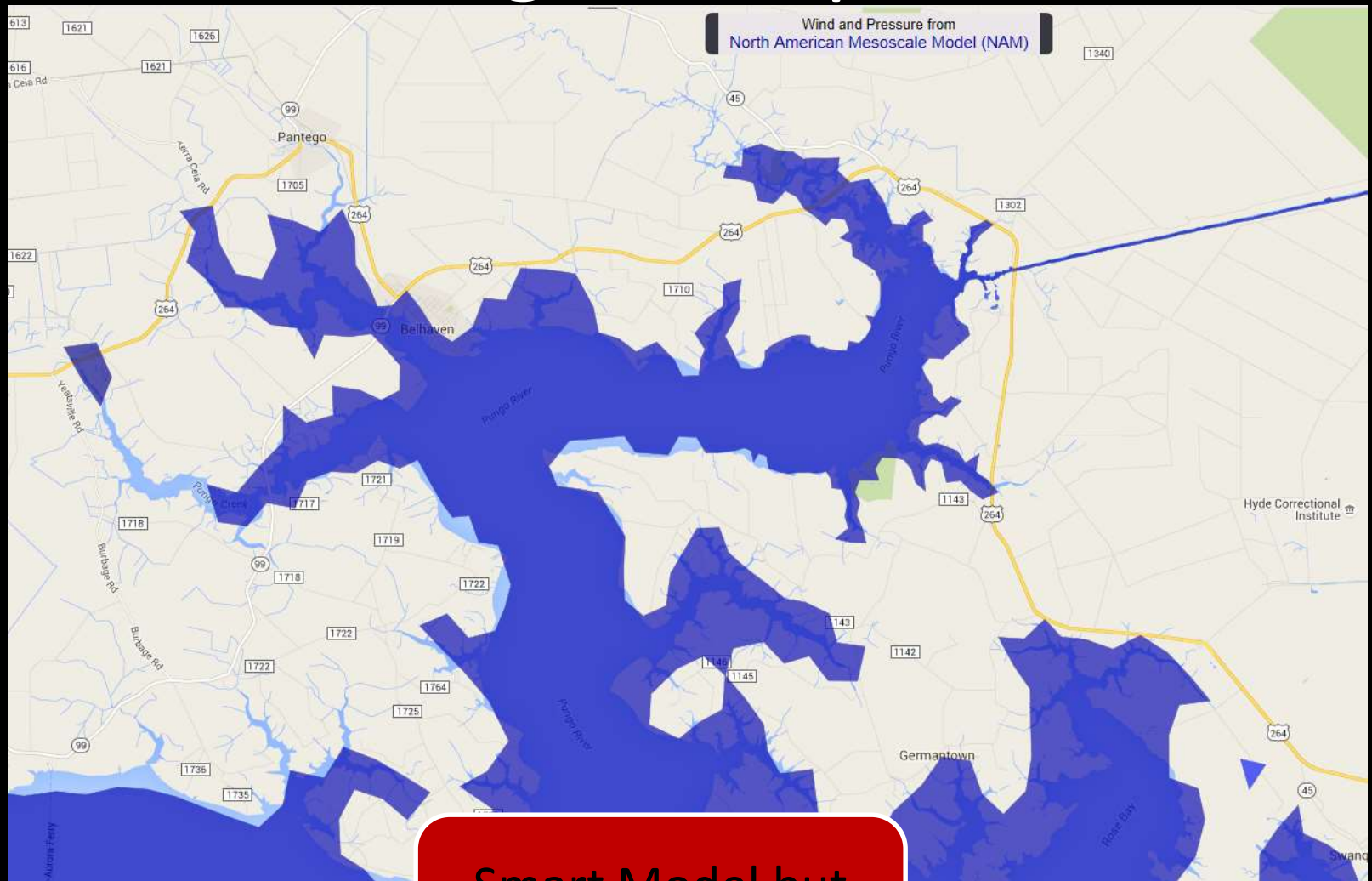


# Seamless Realtime Coastal Inundation

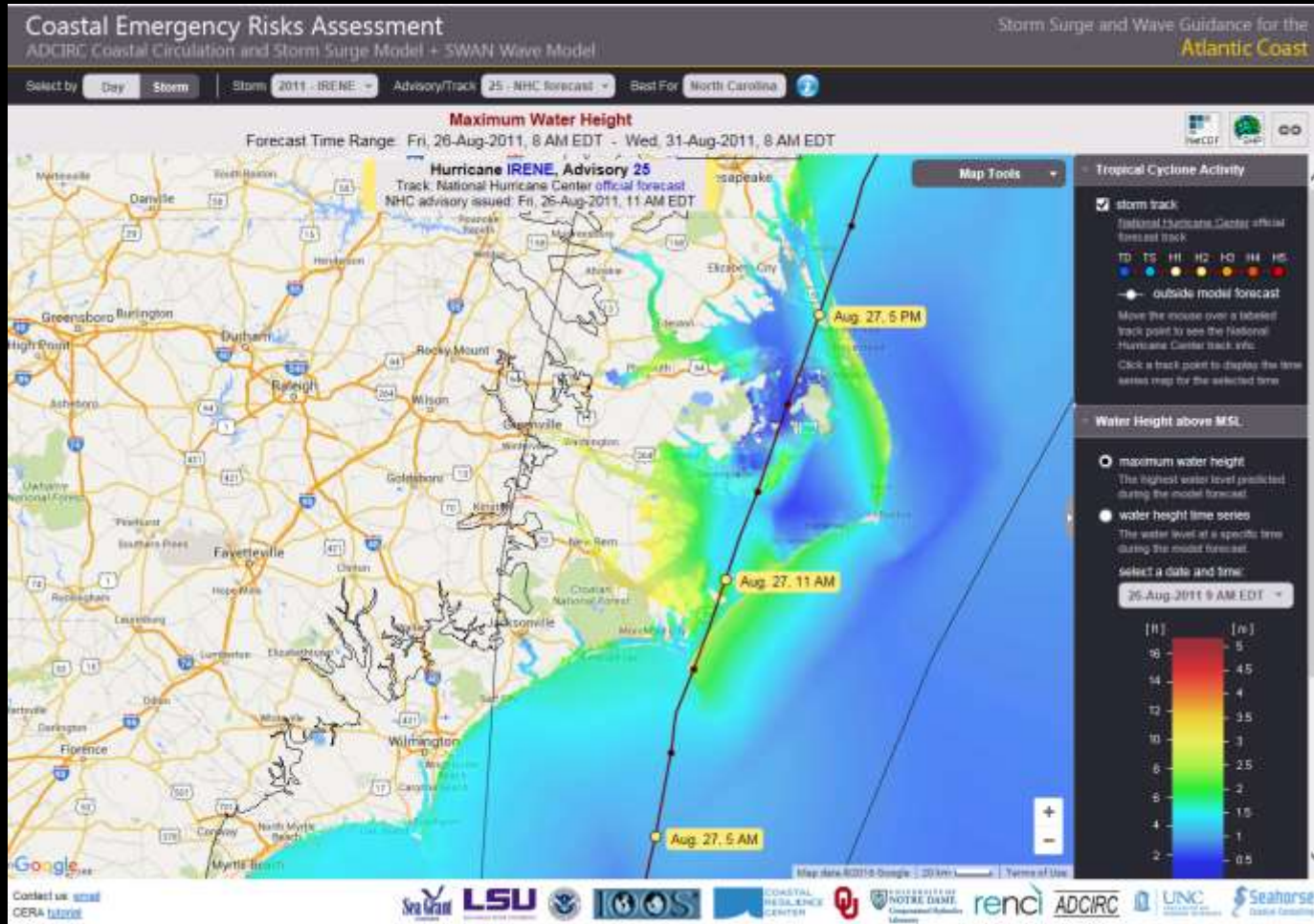




# Real Time Surge + Map Refinement

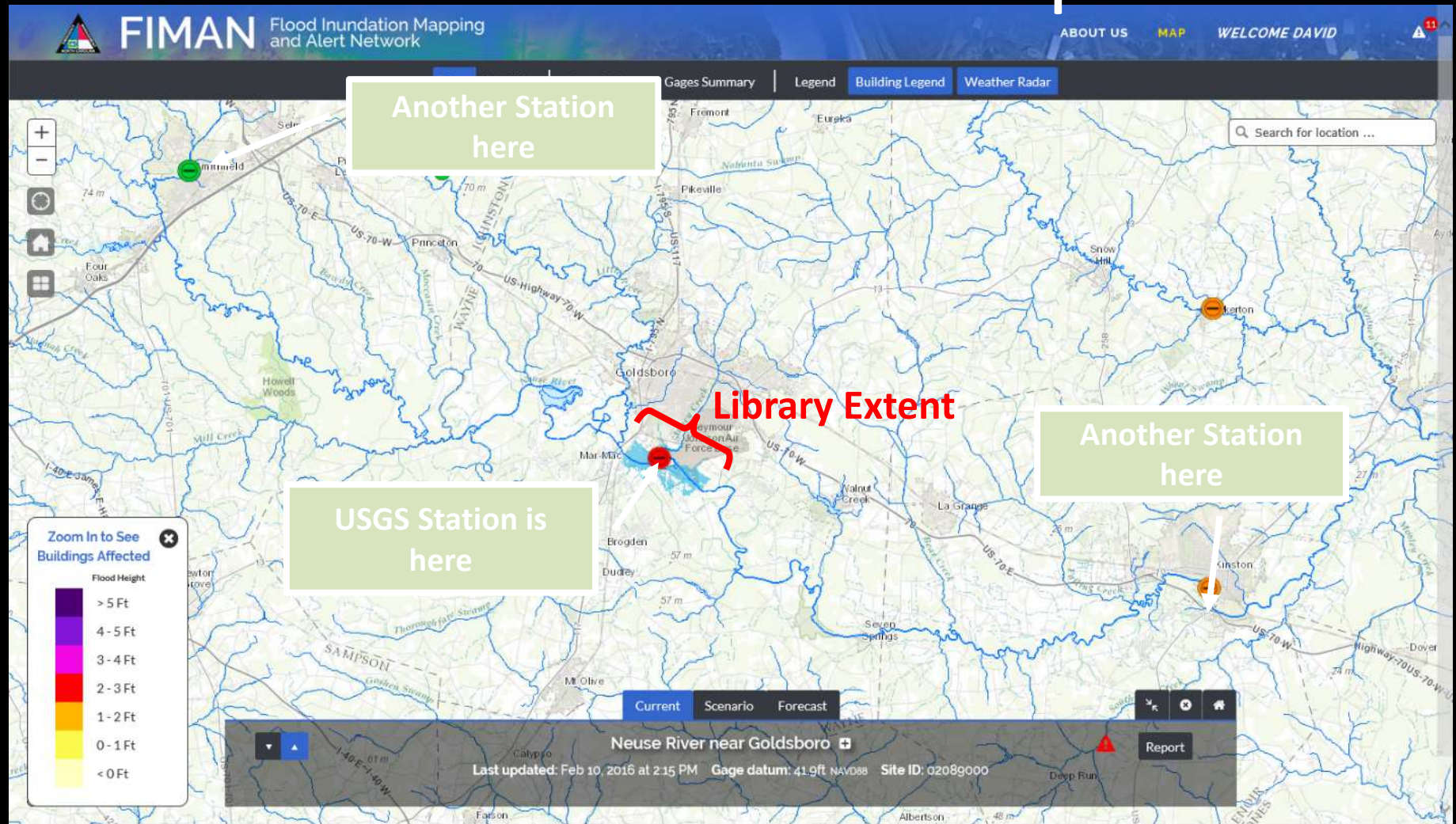


# Coastal Emergency Risks Assessment (CERA)-2011 Irene





# Where Libraries Come up Short



# The Solution

- For a given “river system” (main stem and tribs)
- The P.A.C. raster data set, **coupled** with:
  - Real time stage information at each gage
  - Stage/Return period look up tables
  - Stream distance (database)
  - Drainage area (database)
  - Model cross sections – critical (database)
  - Built Environment (buildings, roads, bridges)
- Reach based – Seamless Mapping Connecting USGS Stations
  - Pre-processed datasets
  - On the fly processing



# Datasets Used

Exclusive use of the USGS Gages, FLOOD Geodatabase, and Percent Annual Chance

