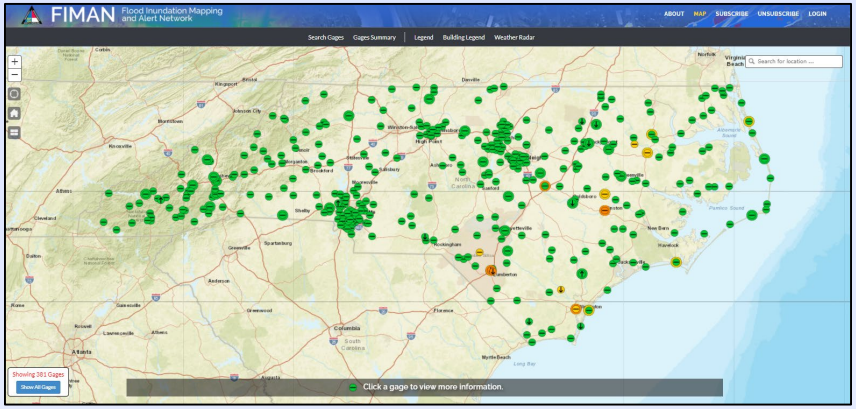


Flood Inundation Mapping and Alert Network (FIMAN)

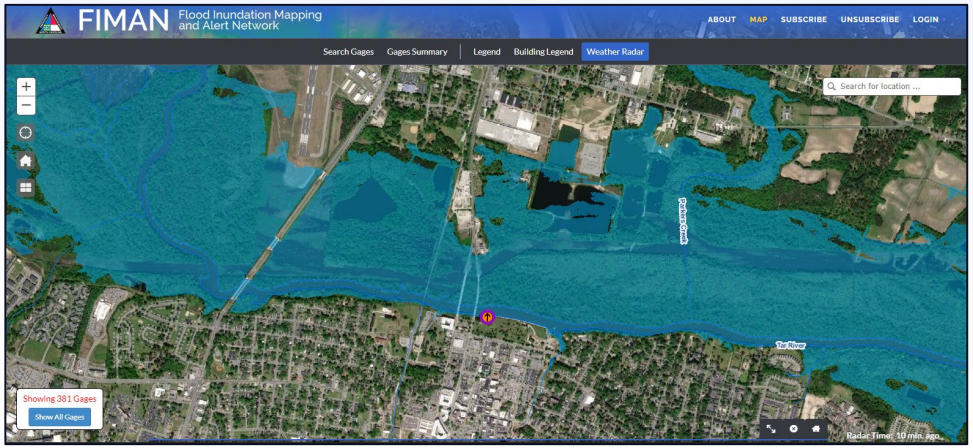
https://fiman.nc.gov/fiman/

DEPARTMENT OF PUBLIC SAFETY

North Carolina Emergency Management

FIMAN Goals

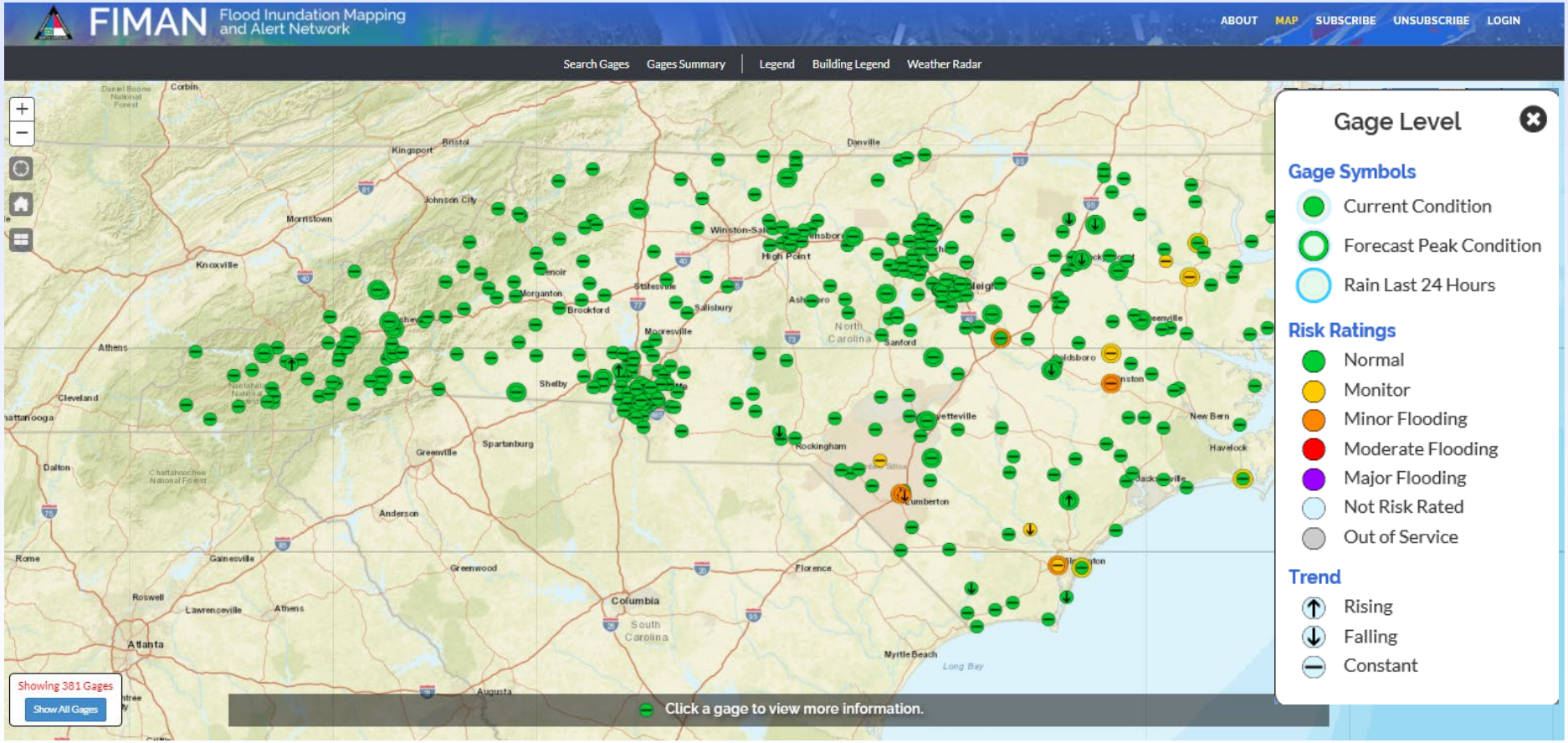
- Real-time flood inundation mapping (current and forecast)
- Alerts
- Leverage vast investment in data
- Assist in risk-based decisions during and before disaster
- Partnerships with local, state, and federal agencies



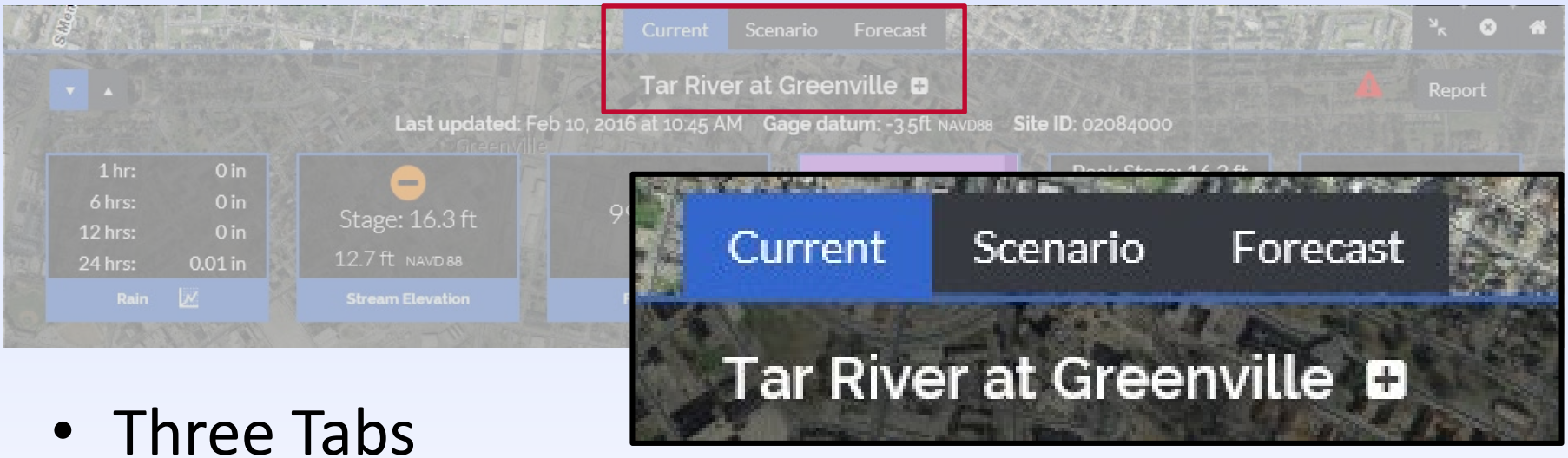
FIMAN
Real-time flood mapping solution

- Gauges
- Telemetry
- Pre-made inundation libraries
- Web tool to efficiently communicate

Home Screen / Current Severity

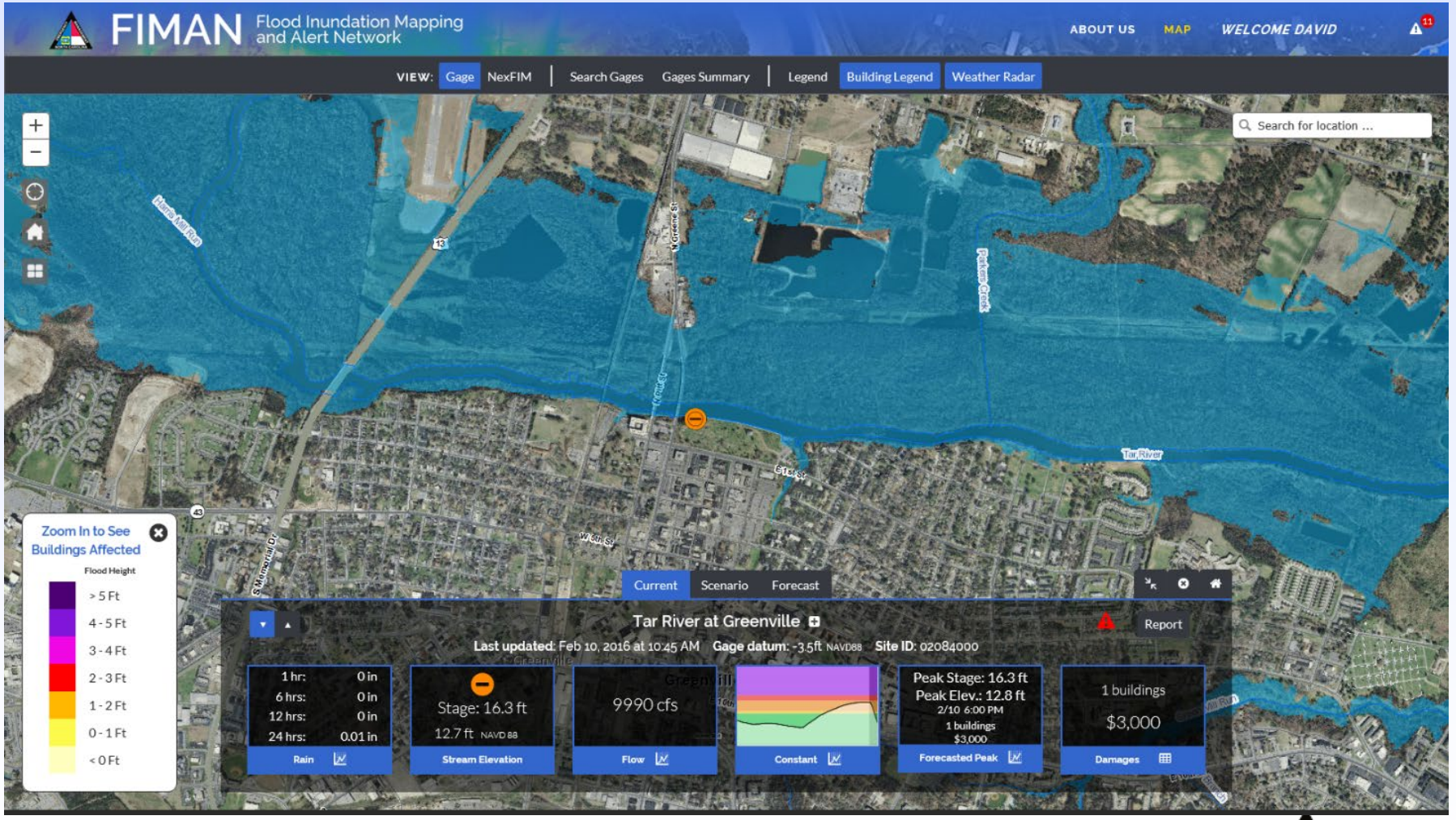


Gage View - Dashboard Concept



- Three Tabs
  - ***Current:*** Provides most recent inundation extent
  - ***Scenario:*** Planning tool for visualization and impact
  - ***Forecast:*** Shows timeline using NWS forecast data
- Info Widgets
  - Interactive for rainfall, stage, flow, forecast, impacts

Current Inundation Level and Map



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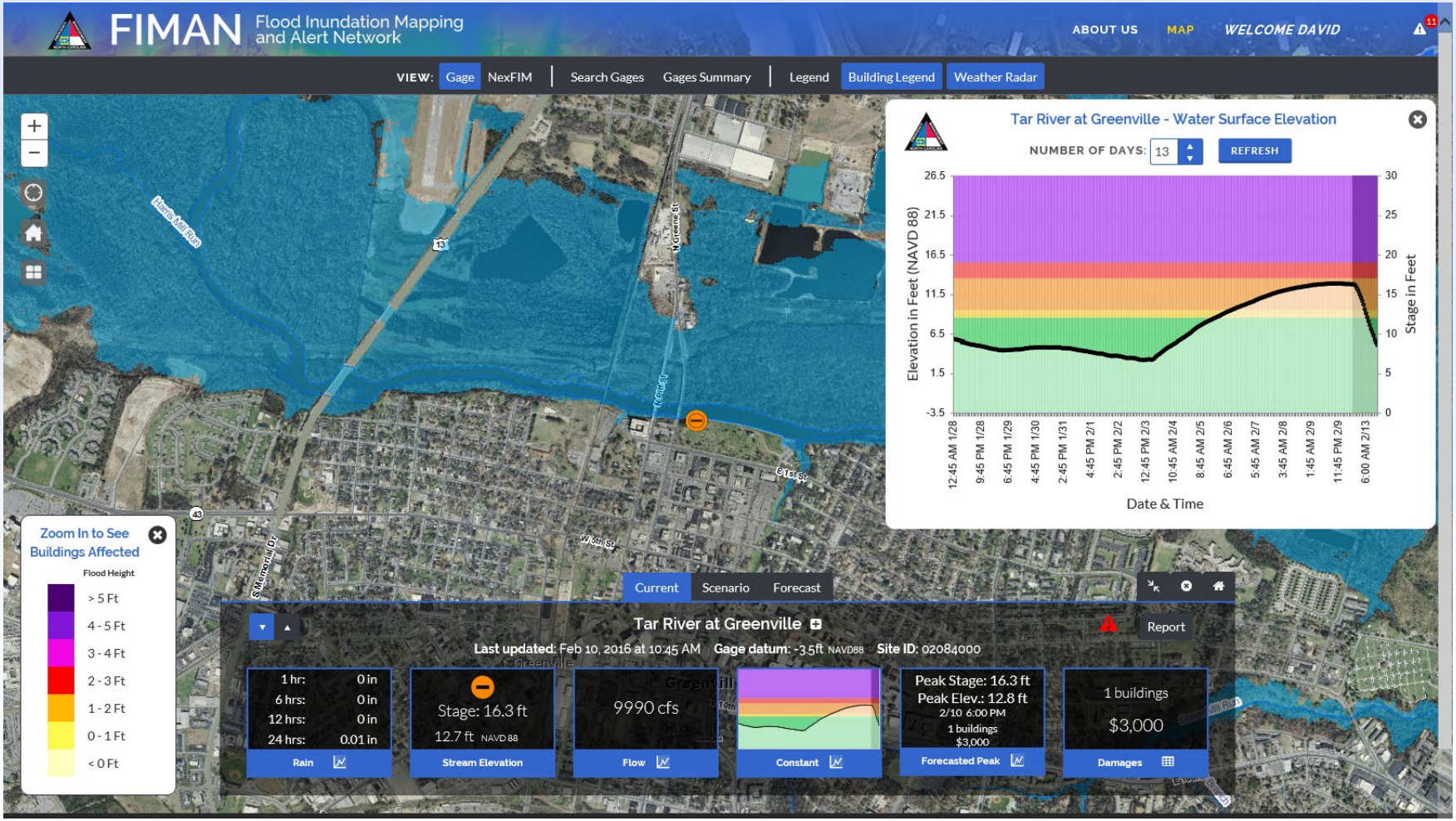
Gage Stage Charts + Forecast



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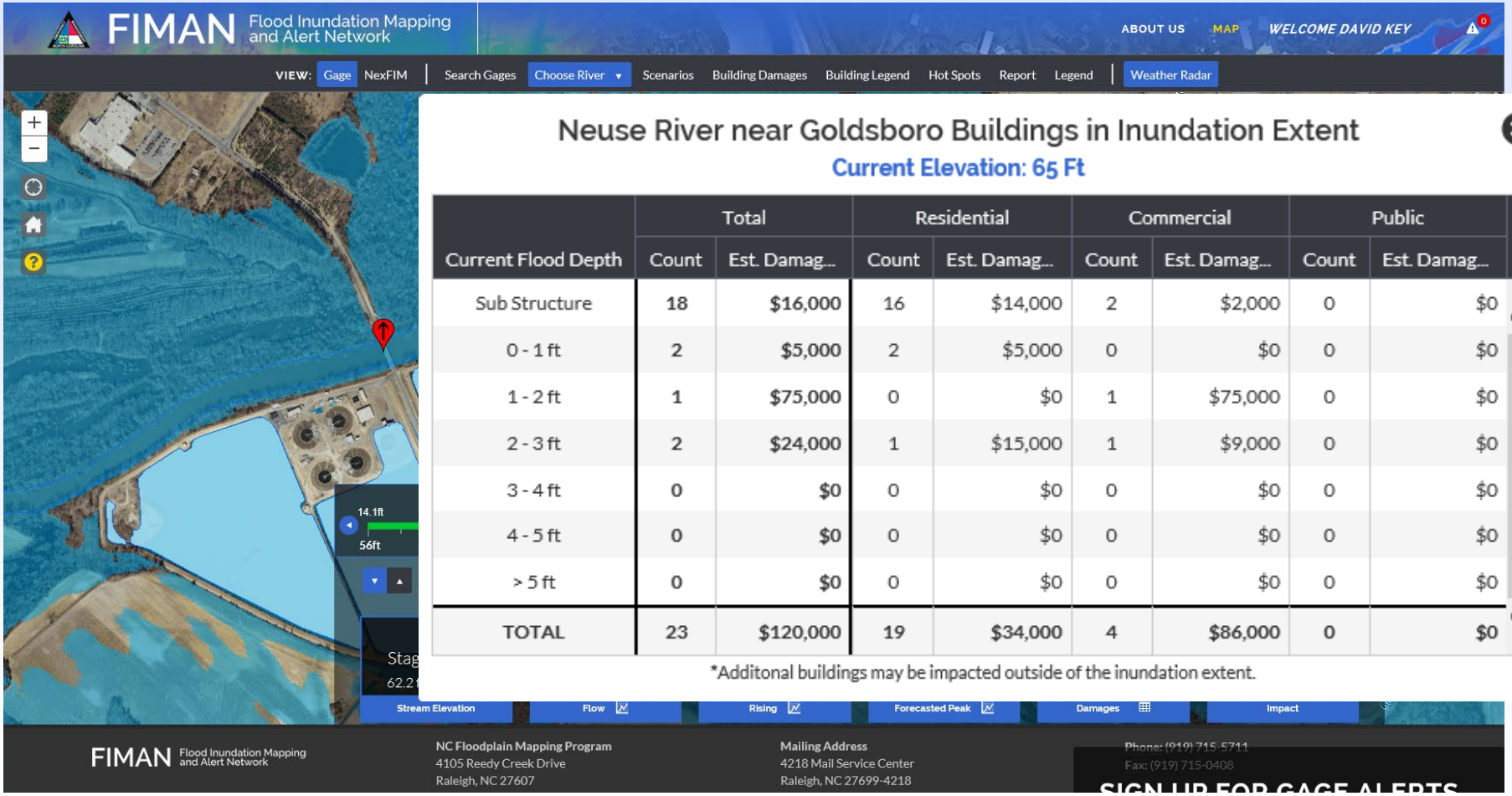
EMERGENCY MANAGEMENT NORTH CAROLINA

Real Time Flood Impacts



Neuse River near Goldsboro Buildings in Inundation Extent

Current Elevation: 65 Ft

Current Flood Depth	Total		Residential		Commercial		Public	
	Count	Est. Damag...	Count	Est. Damag...	Count	Est. Damag...	Count	Est. Damag...
Sub Structure	18	$16,000	16	$14,000	2	$2,000	0	$0
0 - 1 ft	2	$5,000	2	$5,000	0	$0	0	$0
1 - 2 ft	1	$75,000	0	$0	1	$75,000	0	$0
2 - 3 ft	2	$24,000	1	$15,000	1	$9,000	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
TOTAL	23	$120,000	19	$34,000	4	$86,000	0	$0

*Additonal buildings may be impacted outside of the inundation extent.

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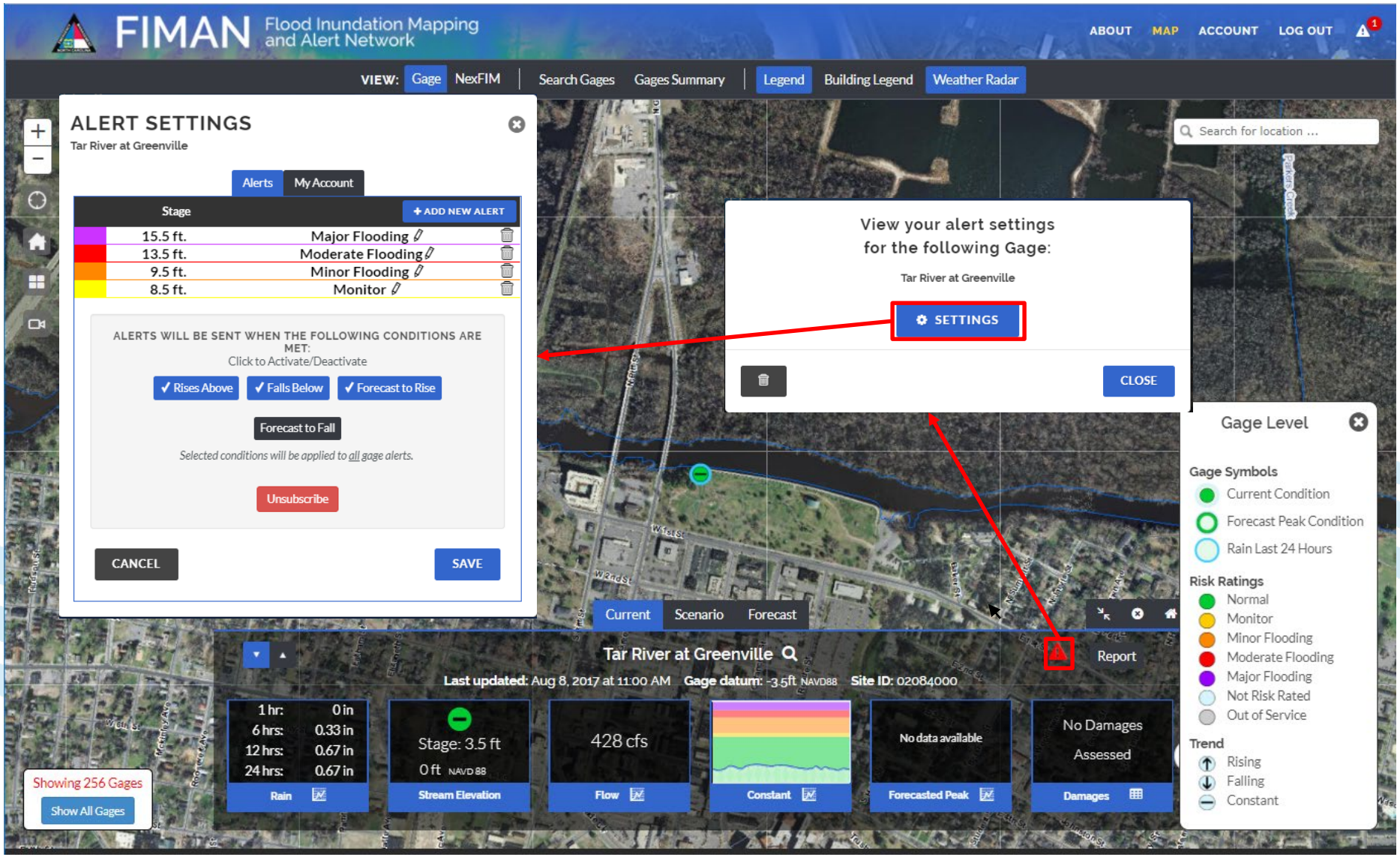
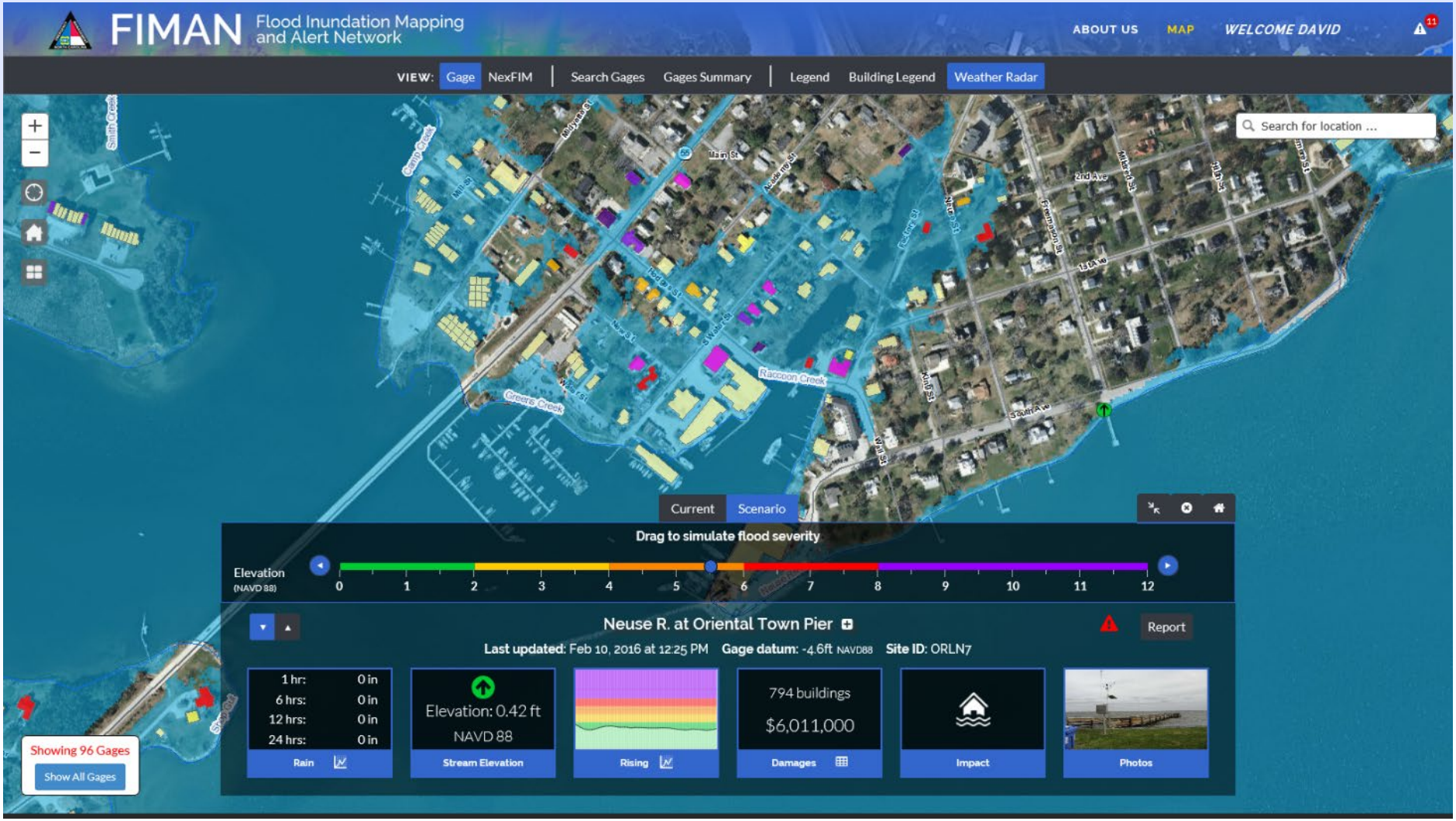
First Floor Elevation Collection – Mobile LiDAR

Real Time Alerts



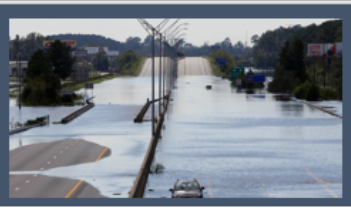
Flood Scenario Mode

Coastal Libraries



FIMAN-T

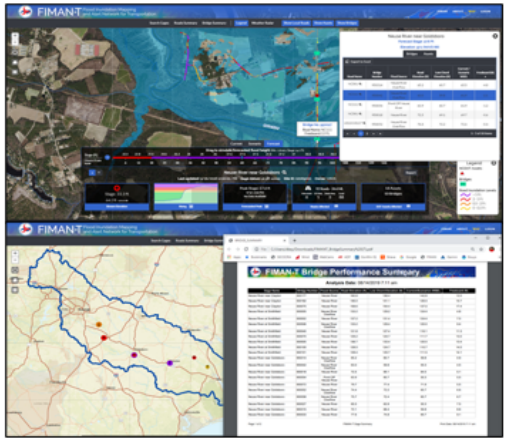
Flood Inundation Mapping and Alert Network for Transportation (FIMAN-T)



OVERVIEW OF INNOVATION

Building on the emergency response successes of North Carolina's Flood Inundation Mapping and Alert Network (FIMAN), NCDOT and NCEM have partnered to develop FIMAN for Transportation (FIMAN-T). FIMAN-T is a web-based tool that provides NCDOT officials and emergency management stakeholders with real-time and forecasted flood inundation depths along roadways, bridges, and other NCDOT assets in support of risk-based decision-making during flood events. The goal of FIMAN-T is to provide visualization and metrics for roadway inundation, bridge hydraulic performance (freeboard, overtopping, etc.) and identify potentially impacted NCDOT assets. This will enhance NCDOT's responsiveness during flooding events by generating data and reports for use in disaster response and planning.

FIMAN-T leverages real time riverine and coastal gauge measurements, 3D inundation mapping coupled with LIDAR-derived roadway elevation layers to accurately estimate flooding depths over roadways for both current and forecasted conditions. The application features an interactive dashboard allowing users to navigate between current conditions, modeled scenarios, and forecasted conditions where available. The dashboard also features different "info-widgets" that provide detailed information including stream elevation, an interactive stage hydrograph, and forecasted peak.



BENEFITS

- NCDOT personnel and stakeholders are provided real-time and forecasted roadway inundation depths and summaries for hundreds of miles.
- FIMAN-T provides real-time and forecasted bridge hydraulic performance such as freeboard, pressure flow and overtopping conditions.
- Real-time reports are generated for Emergency Operations Center Briefings.

FIND OUT MORE . . .

FIMAN: https://fiman.nc.gov/

FIMAN-T: NCAFPM March 2020 Webinar Slides

NCDOT Hydraulics - Hurricane Action Plan
(MS Sharepoint access granted by request)

NCDOT Hydraulics Unit

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Asst. State Hydraulics Engineer
919-707-6700

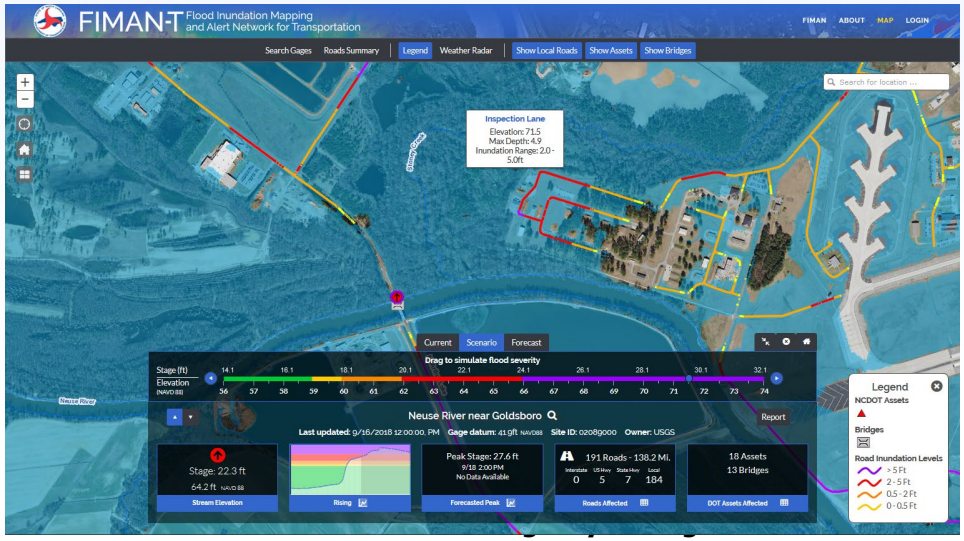
mslauffer@ncdot.gov

Keywords: Flood Warning, Emergency Response, Situational Awareness, Roadway Flooding, Inundation Mapping

FIMAN-T: Current, Forecast and Scenario Road Impacts

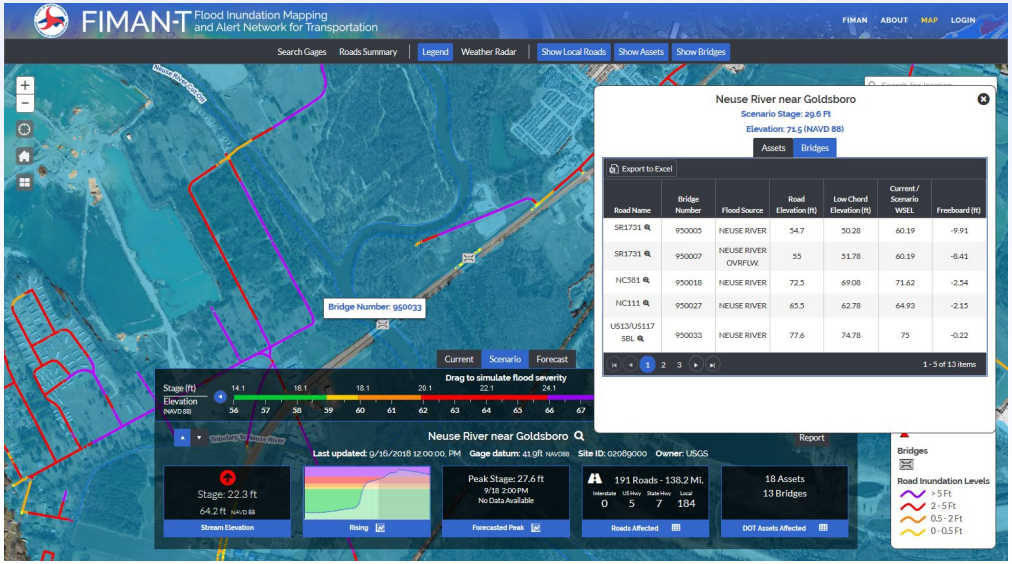
FIMAN-T displays impacts to roads, bridges, and assets in 3 ways:

- Current: Using gage readings every 15 minutes, the web application displays real-time flooding extents and impacts.
- Scenario: Allows users to show impacts at various flood levels for scenario planning.
- Forecast: Based on the NWS forecasted hydrograph, FIMAN-T allows impacts to be visualized at the predicted peak flooding.

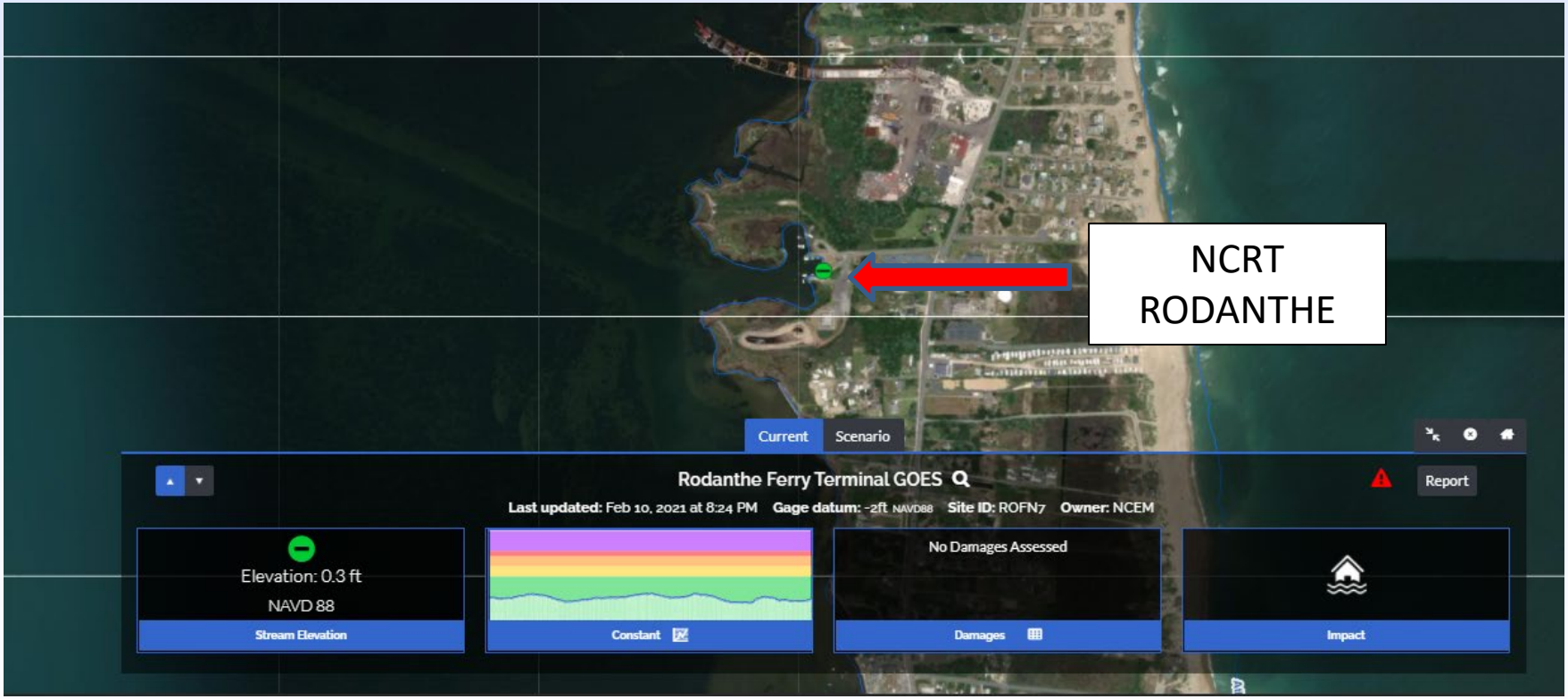


FIMAN-T: Additional Functionality

- Displays information about bridge and asset impacts.
- Displays tables for roads, bridges, and assets that are sortable by many additional attributes including Road Type, Maximum Water Depth, Bridge Freeboard, etc.
- Automatically generates aggregated reports displaying miles of roads inundated.
- Easily exports data to KML files for use in Google Earth.

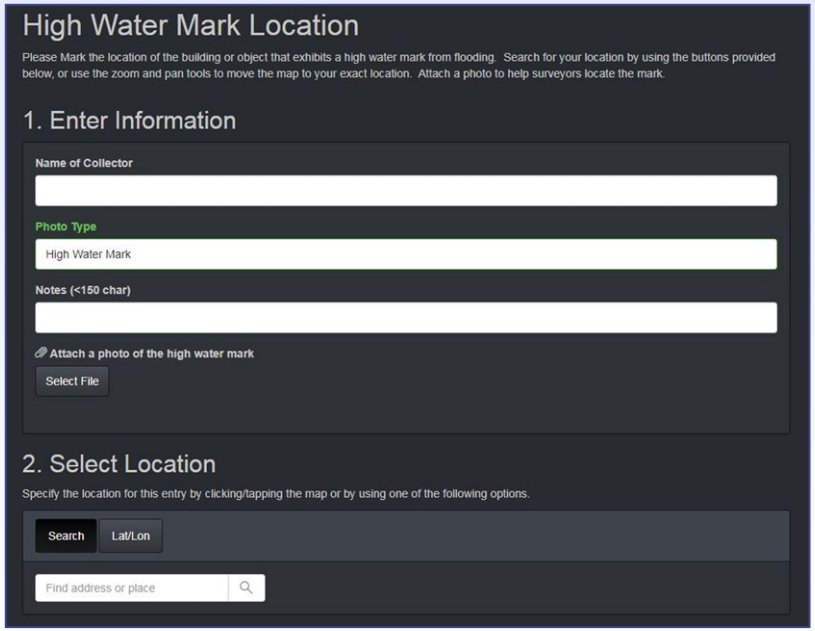


Coastal Gauge

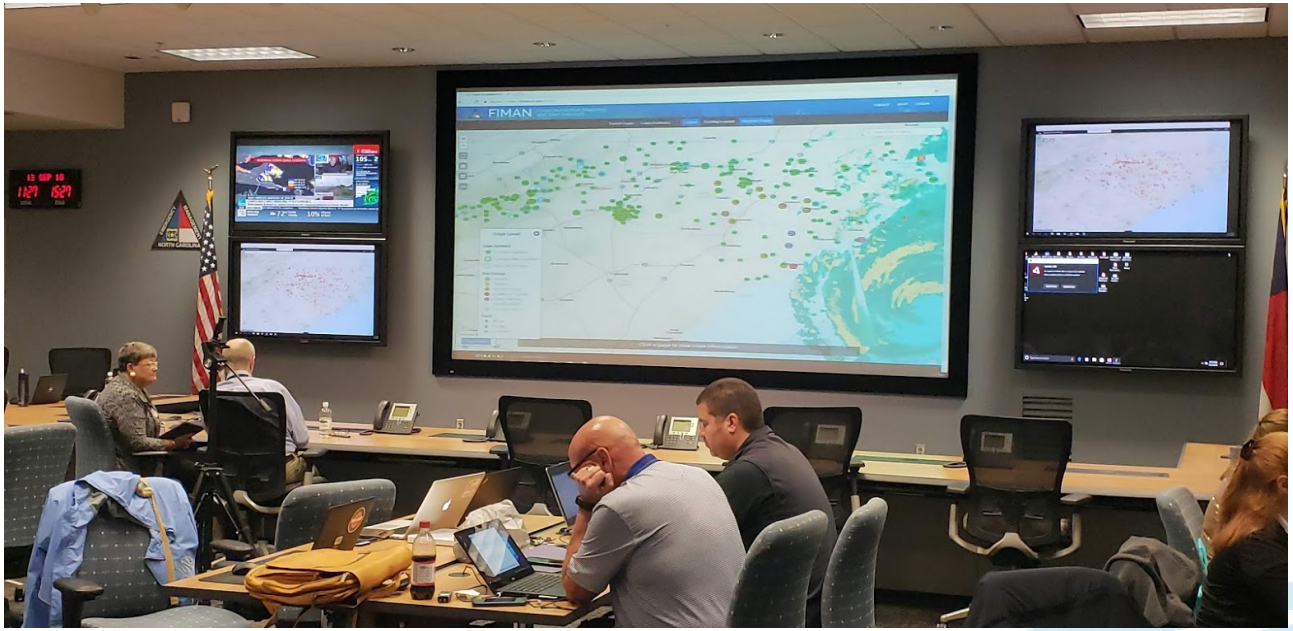


Comparing LiDAR based flood mapping to surveyed edge of water

High Water Mark (HWM) Photo Application

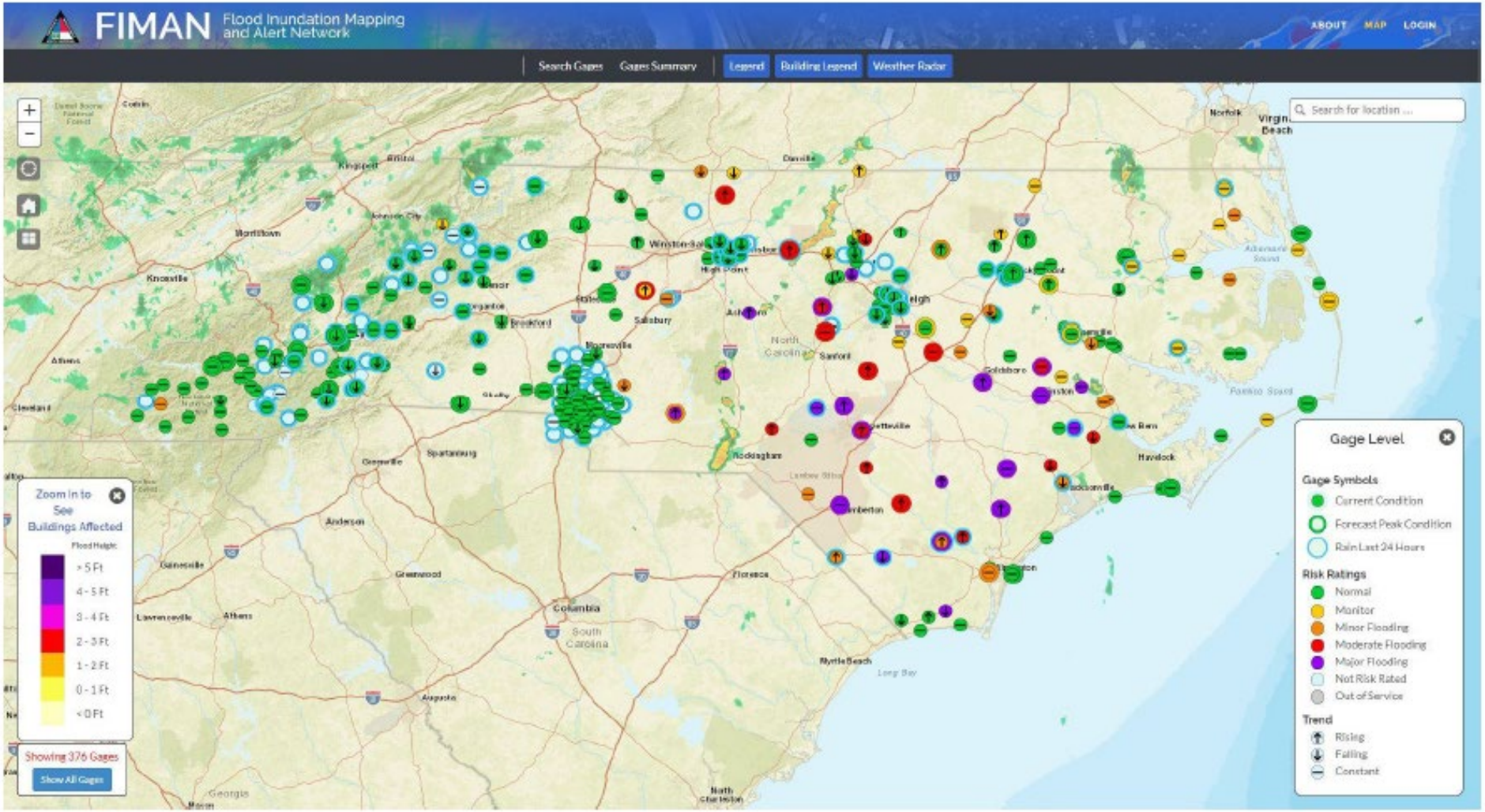


Vital Component of EOC Operations



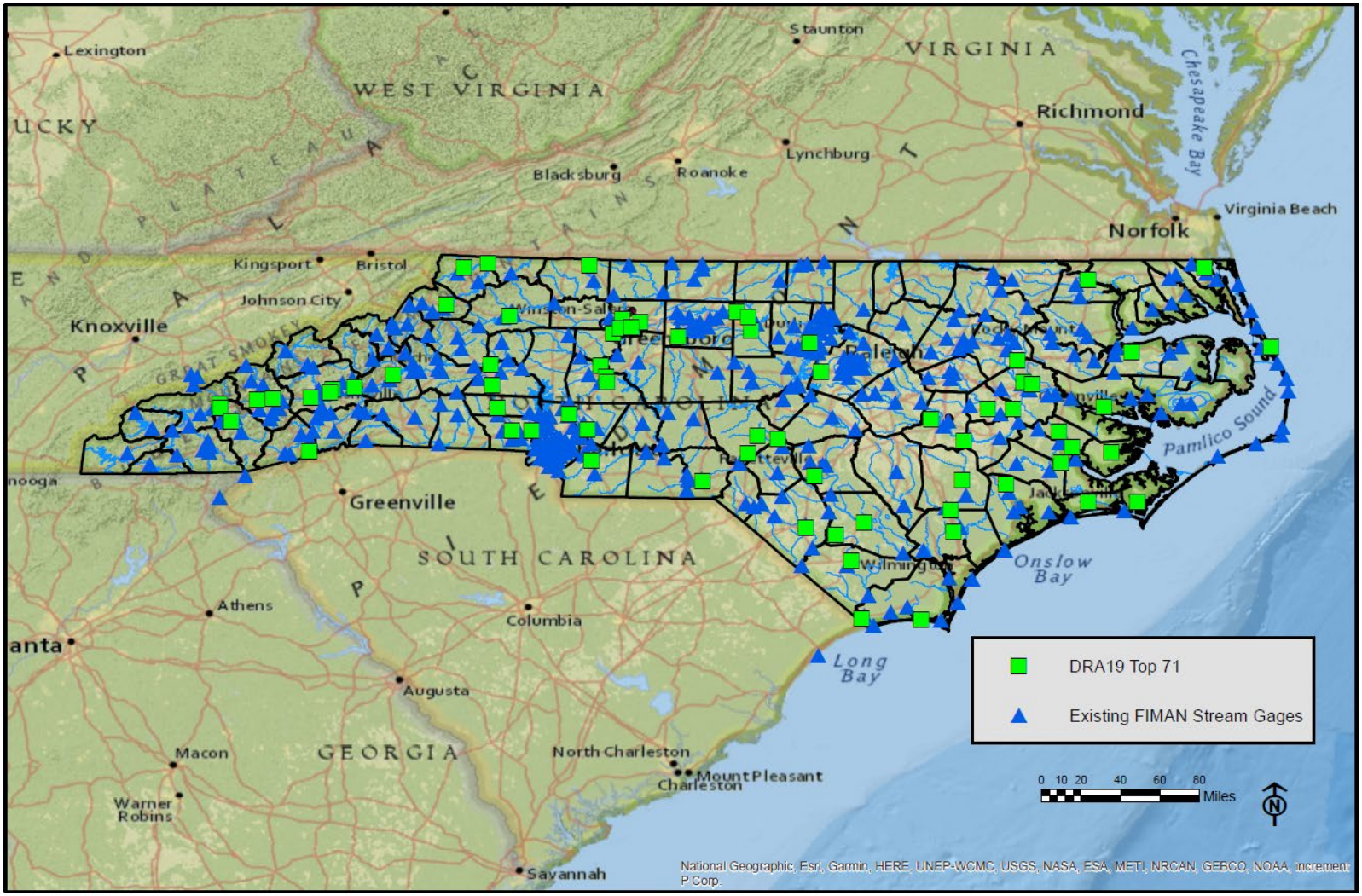
9/17/18

FIMAN Current and Forecast Conditions - Hurricane Florence - 9/17/2018 4:31 PM



New Stream Gauges

Existing and Proposed Riverine/Coastal Gages
NC Disaster Recovery Act of 2019



Questions?

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