North Carolina Geodetic Survey (NCGS): Positioning NC today and for the future!

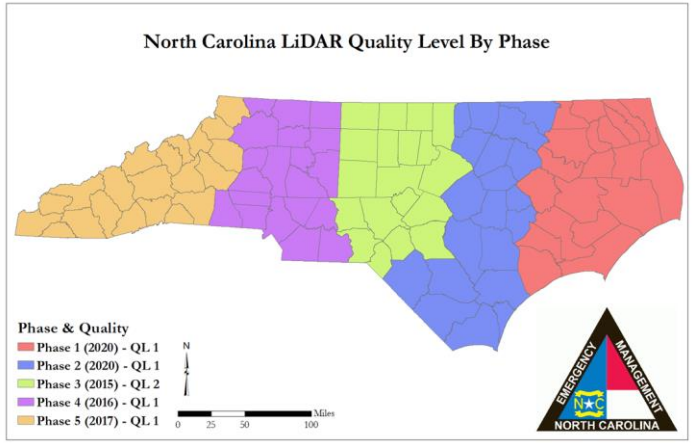
Onslow County Surveyor/Realtor Presentation

Applications Updates

- Flood Inundation Mapping and Alert Network (FIMAN)
  - Completed
- Flood Risk Information System (FRIS)
  - In progress
- Spatial Data Download (SDD)
  - In progress

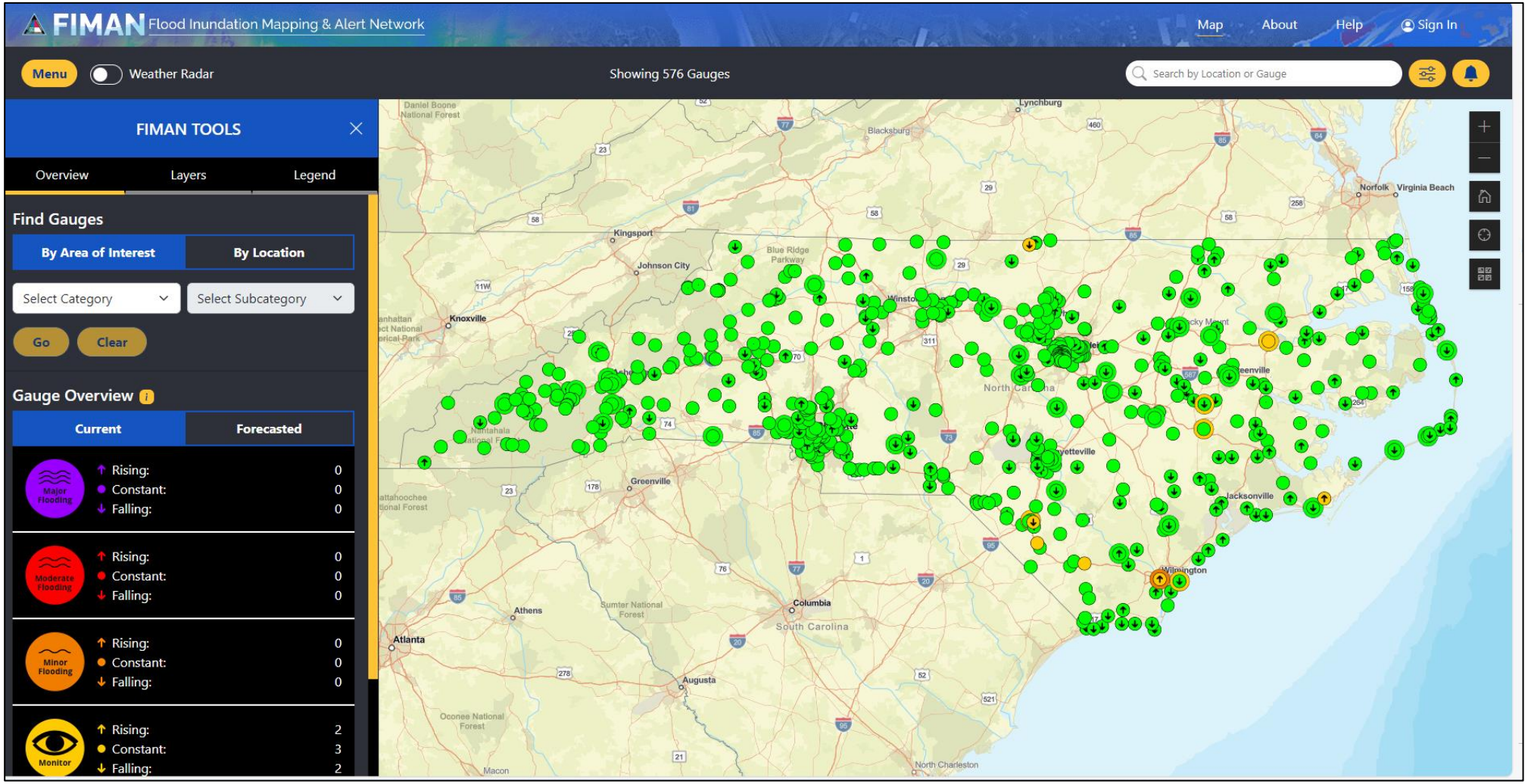
Flood Inundation Mapping and Alert Network (FIMAN)

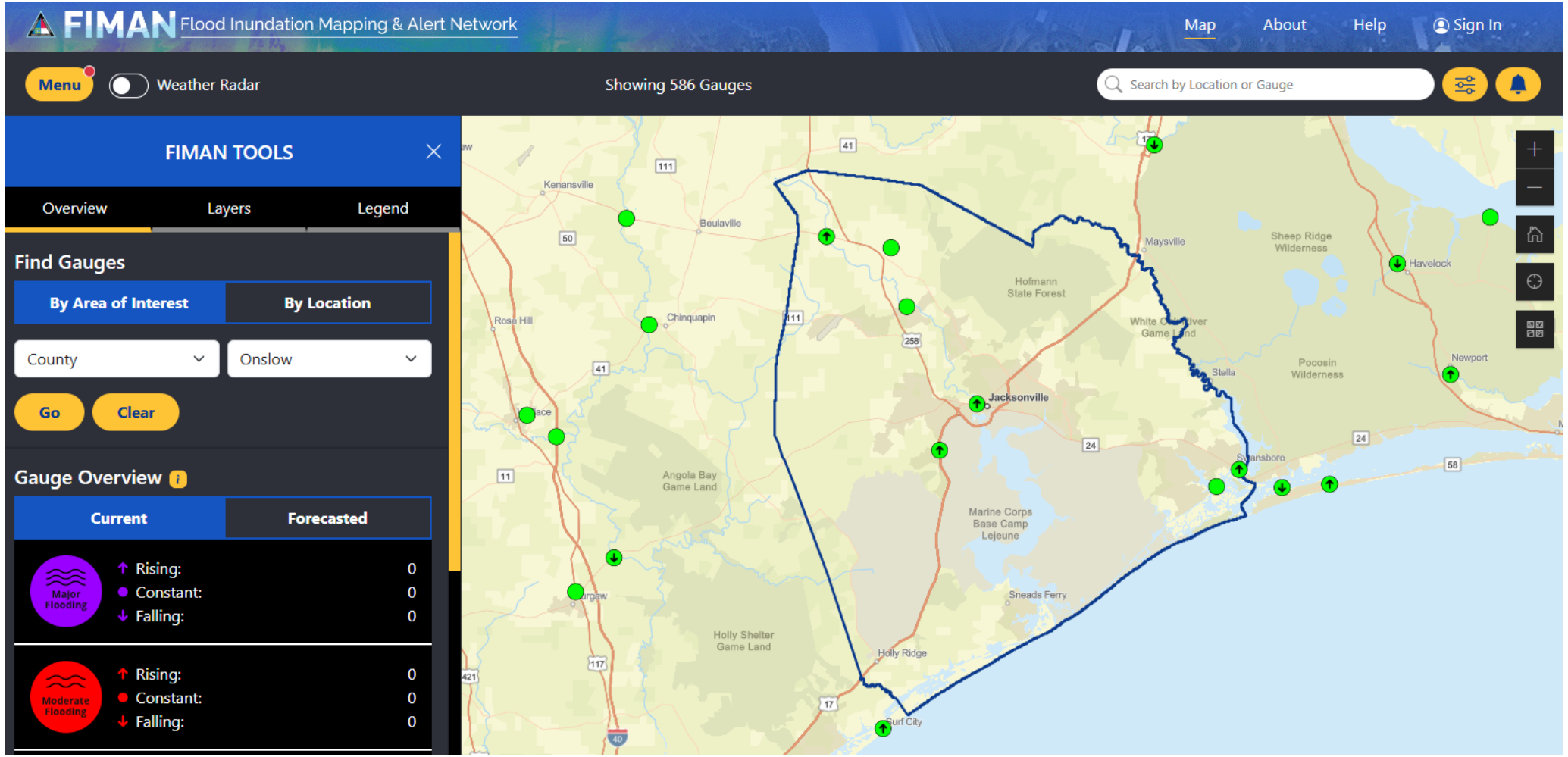
- FIMAN flood mapping solution
  - Near real-time flood inundation mapping (current and forecast)
  - Alerts
  - Leverage vast investment in data
  - Assist in risk-based decisions during and before disaster
  - Partnerships with local, state, and federal agencies and the private sector



FIMAN Real-time flood mapping solution

- Gauges
  - 652 gauges in FIMAN
  - NC Emergency Management owned water level and rain gauges (473)
- Telemetry
- Pre-made inundation libraries
- Web tool to efficiently communicate


FIMAN Flood Inundation Mapping & Alert Network
Map
About
Help
Sign In
Menu
Weather Radar
Showing 576 Gauges
Search by Location or Gauge
FIMAN TOOLS
Overview
Layers
Legend
Find Gauges
By Area of Interest
By Location
Select Category
Select Subcategory
Go
Clear
Gauge Overview
Current
Forecasted
Major Flooding
Rising: 0
Constant: 0
Falling: 0
Moderate Flooding
Rising: 0
Constant: 0
Falling: 0
Minor Flooding
Rising: 0
Constant: 0
Falling: 0
Monitor
Rising: 2
Constant: 3
Falling: 2
Knoxville
Kingsport
Johnson City
Blacksburg
Lynchburg
Norfolk
Virginia Beach
Greenville
Columbia
South Carolina
Atlanta
Athens
Augusta
Wilmington
Jacksonville
North Charleston
Macon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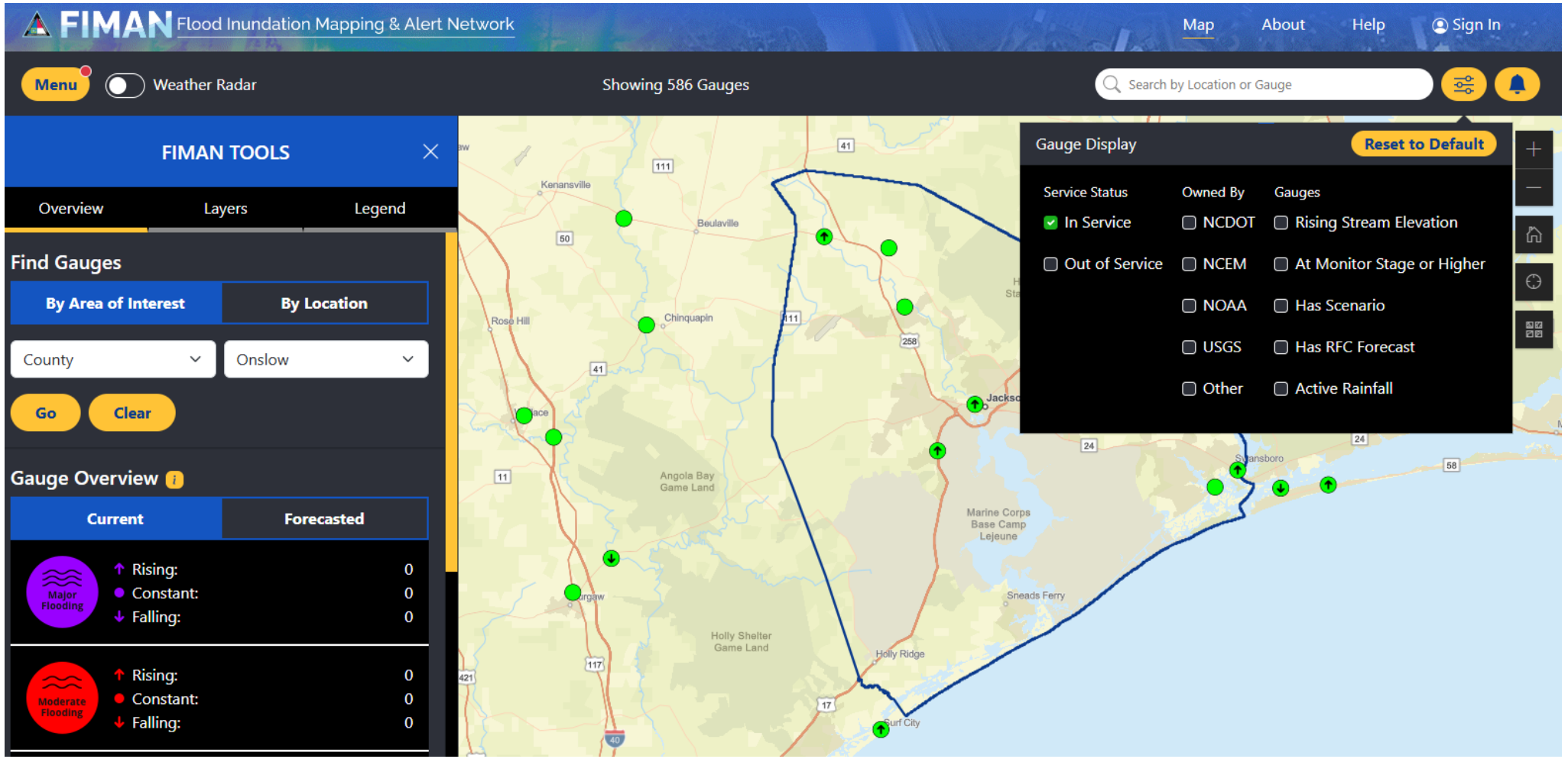
Map
About
Help
Sign In
Menu
Weather Radar
Showing 586 Gauges
Search by Location or Gauge
FIMAN TOOLS
Overview
Layers
Legend
Find Gauges
By Area of Interest
By Location
County
Onslow
Go
Clear
Gauge Overview
Current
Forecasted
Major Flooding
Rising: 0
Constant: 0
Falling: 0
Moderate Flooding
Rising: 0
Constant: 0
Falling: 0
Kenansville
Beulaville
Rose Hill
Chinquapin
Jacksonville
Maysville
Hofmann State Forest
Sheep Ridge Wilderness
Havelock
Stella
Pocosin Wilderness
Newport
Angola Bay Game Land
Marine Corps Base Camp Lejeune
Sneads Ferry
Holly Shelter Game Land
Holly Ridge
Surf City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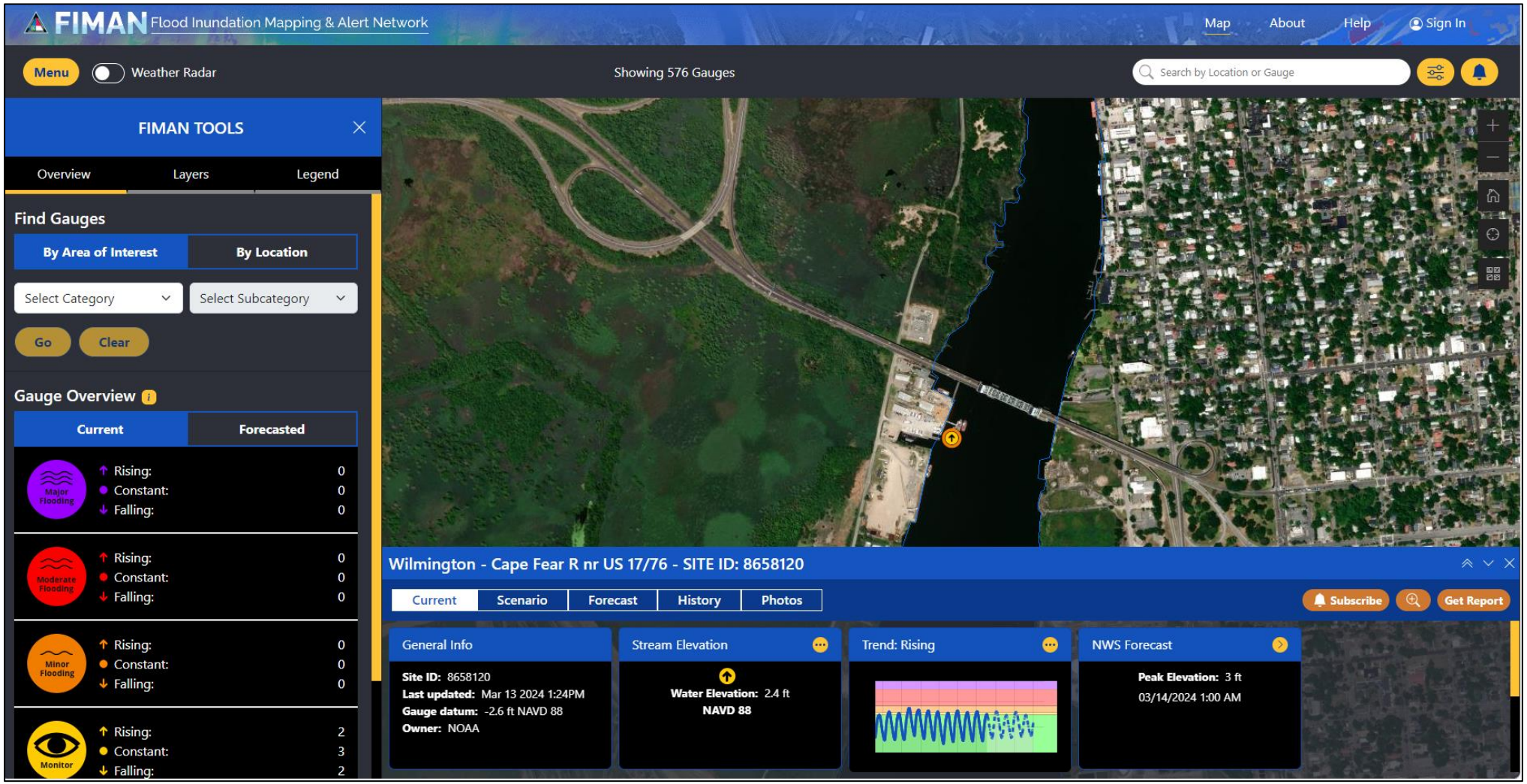
Map
About
Help
Sign In
Menu
Weather Radar
Showing 586 Gauges
Search by Location or Gauge
FIMAN TOOLS
Overview
Layers
Legend
Find Gauges
By Area of Interest
By Location
County
Onslow
Go
Clear
Gauge Overview
Current
Forecasted
Major Flooding
Rising: 0
Constant: 0
Falling: 0
Moderate Flooding
Rising: 0
Constant: 0
Falling: 0
Gauge Display
Reset to Default
Service Status
In Service
Out of Service
Owned By
NCDOT
NCEM
NOAA
USGS
Other
Gauges
Rising Stream Elevation
At Monitor Stage or Higher
Has Scenario
Has RFC Forecast
Active Rainfall
Kenansville
Beulaville
Chinquapin
Rose Hill
Angola Bay Game Land
Holly Shelter Game Land
Marine Corps Base Camp Lejeune
Sneads Ferry
Holly Ridge
Surf City
Swansboro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Map
About
Help
Sign In
Menu
Weather Radar
Showing 576 Gauges
Search by Location or Gauge
FIMAN TOOLS
Overview
Layers
Legend
Find Gauges
By Area of Interest
By Location
Select Category
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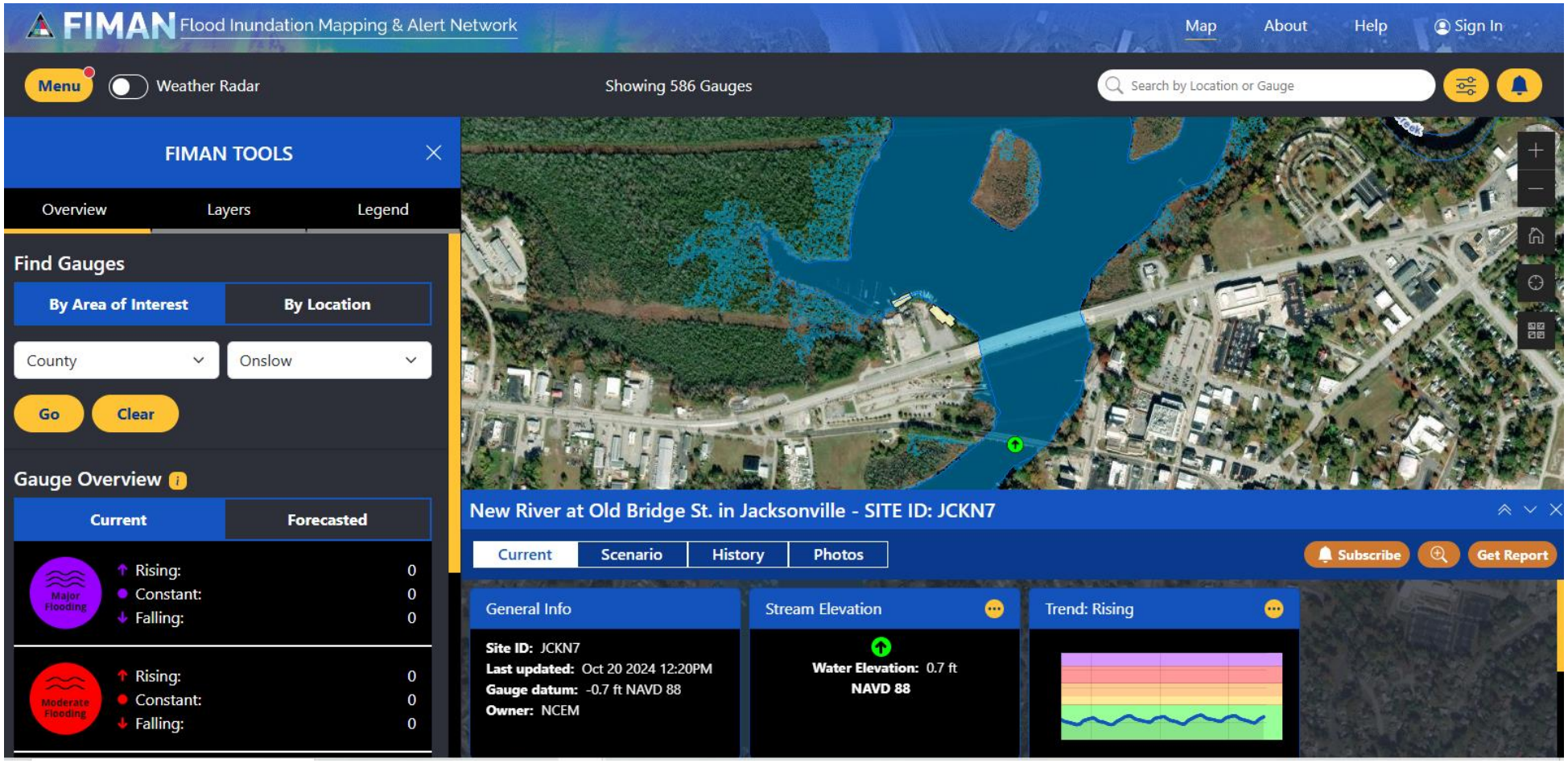
Clear
Gauge Overview
Current
Forecasted
Major Flooding
Rising: 0
Constant: 0
Falling: 0
Moderate Flooding
Rising: 0
Constant: 0
Falling: 0
Minor Flooding
Rising: 0
Constant: 0
Falling: 0
Monitor
Rising: 2
Constant: 3
Falling: 2
Wilmington - Cape Fear R nr US 17/76 - SITE ID: 8658120
Current
Scenario
Forecast
History
Photos
Subscribe
Get Report
General Info
Site ID: 8658120
Last updated: Mar 13 2024 1:24PM
Gauge datum: -2.6 ft NAVD 88
Owner: NOAA
Stream Elevation
Water Elevation: 2.4 ft
NAVD 88
Trend: Rising
NWS Forecast
Peak Elevation: 3 ft
03/14/2024 1:00 AM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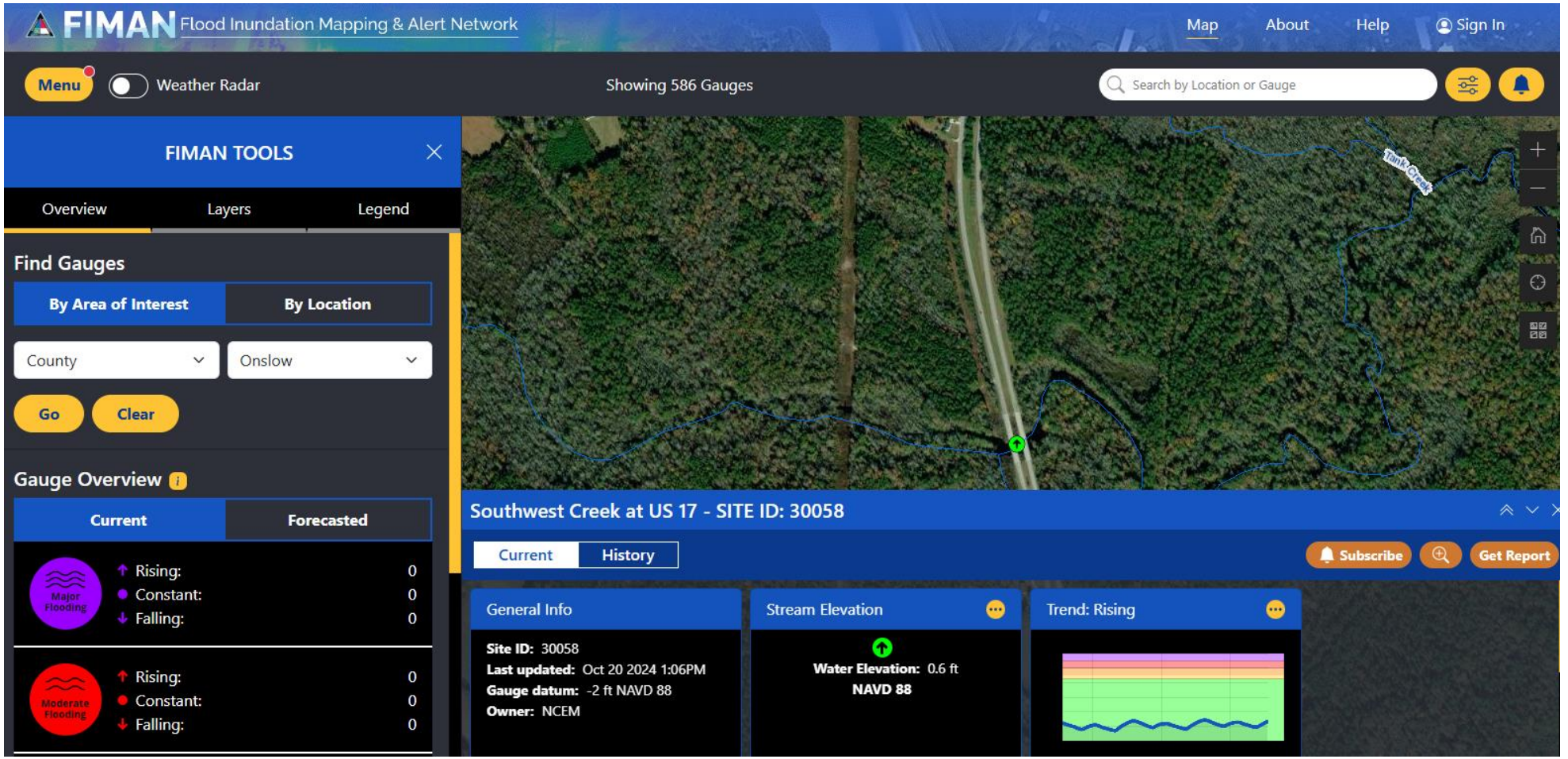
Map
About
Help
Sign In
Menu
Weather Radar
Showing 586 Gauges
Search by Location or Gauge
FIMAN TOOLS
Overview
Layers
Legend
Find Gauges
By Area of Interest
By Location
County
Onslow
Go
Clear
Gauge Overview
Current
Forecasted
Major Flooding
Rising: 0
Constant: 0
Falling: 0
Moderate Flooding
Rising: 0
Constant: 0
Falling: 0
New River at Old Bridge St. in Jacksonville - SITE ID: JCKN7
Current
Scenario
History
Photos
Subscribe
Get Report
General Info
Site ID: JCKN7
Last updated: Oct 20 2024 12:20PM
Gauge datum: -0.7 ft NAVD 88
Owner: NCEM
Stream Elevation
Water Elevation: 0.7 ft
NAVD 88
Trend: Rising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Map
About
Help
Sign In
Menu
Weather Radar
Showing 586 Gauges
Search by Location or Gauge
FIMAN TOOLS
Overview
Layers
Legend
Find Gauges
By Area of Interest
By Location
County
Onslow
Go
Clear
Gauge Overview
Current
Forecasted
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Constant: 0
Falling: 0
Moderate Flooding
Rising: 0
Constant: 0
Falling: 0
Tank Creek
Southwest Creek at US 17 - SITE ID: 30058
Current
History
Subscribe
Get Report
General Info
Site ID: 30058
Last updated: Oct 20 2024 1:06PM
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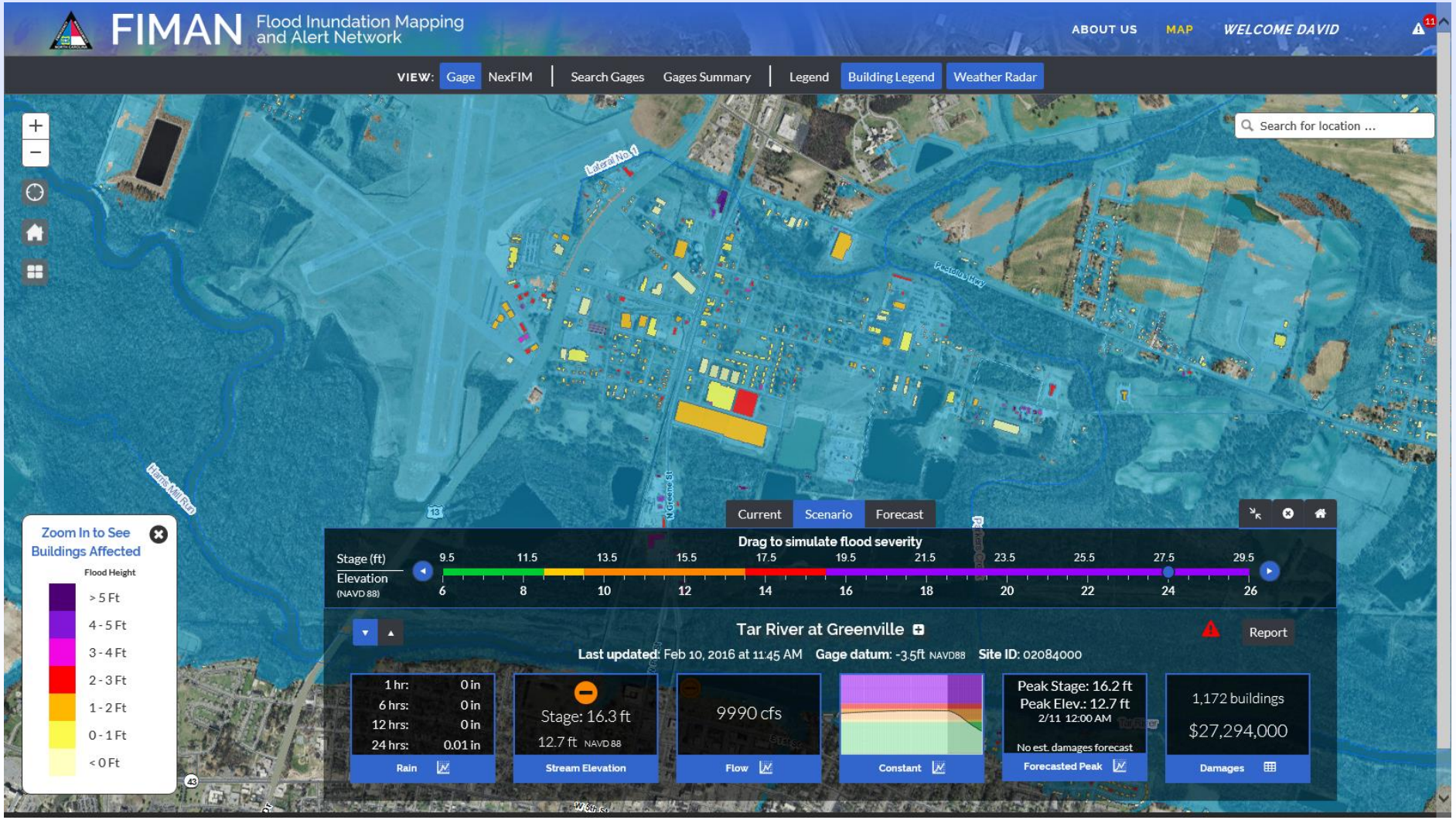
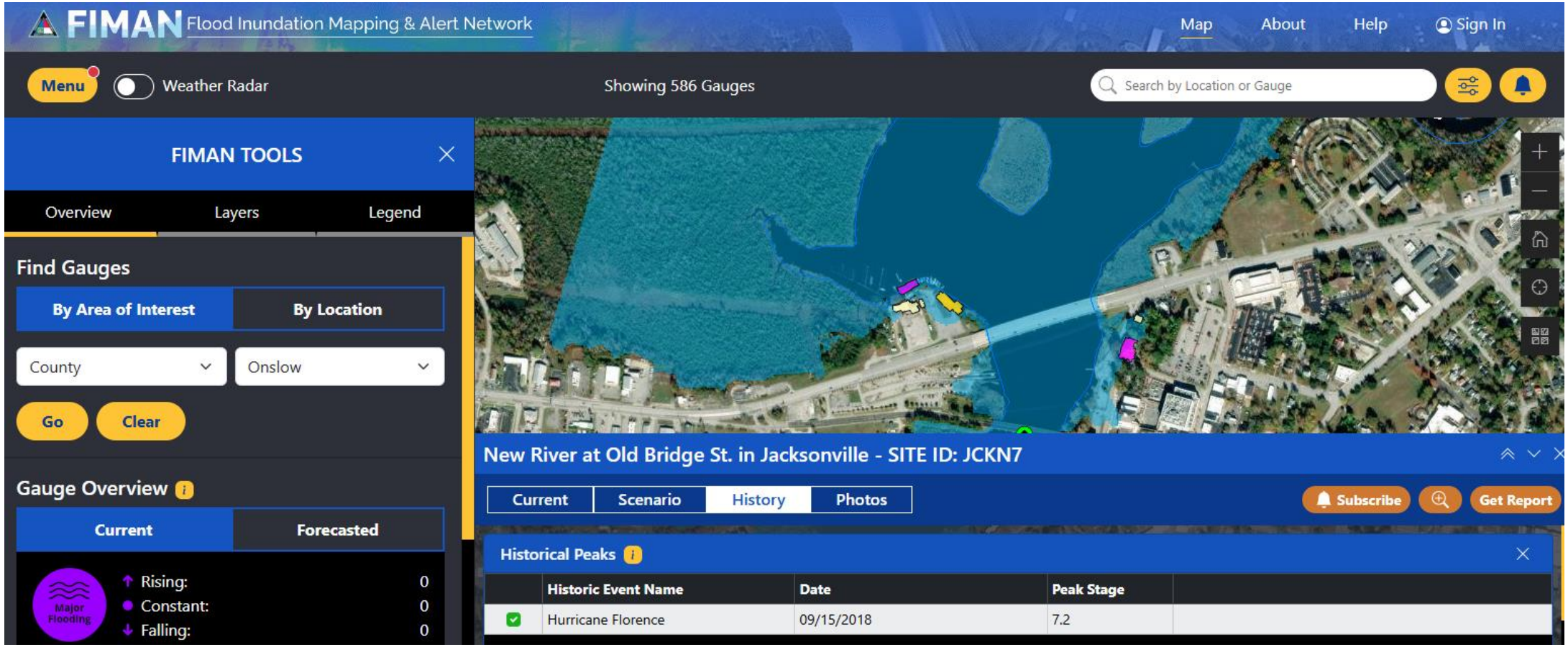
Owner: NCEM
Stream Elevation
Water Elevation: 0.6 ft
NAVD 88
Trend: Rising

Flood Scenario Mode



	Total		Residential		Commercial		Public	
Current Flood Depth	Count	Est. Damages	Count	Est. Damages	Count	Est. Damages	Count	Est. Damages
> 5 ft	1	$34,000	1	$34,000	0	$0	0	$0
4 - 5 ft	7	$203,000	7	$203,000	0	$0	0	$0
3 - 4 ft	16	$922,000	15	$761,000	1	$161,000	0	$0
2 - 3 ft	20	$626,000	20	$626,000	0	$0	0	$0
1 - 2 ft	14	$263,000	11	$161,000	3	$102,000	0	$0
0 - 1 ft	39	$407,000	36	$368,000	2	$37,000	1	$2,000
Sub Structure	31	$198,000	30	$197,000	1	$1,000	0	$0
TOTAL	128	$2,655,000	120	$2,352,000	7	$301,000	1	$2,000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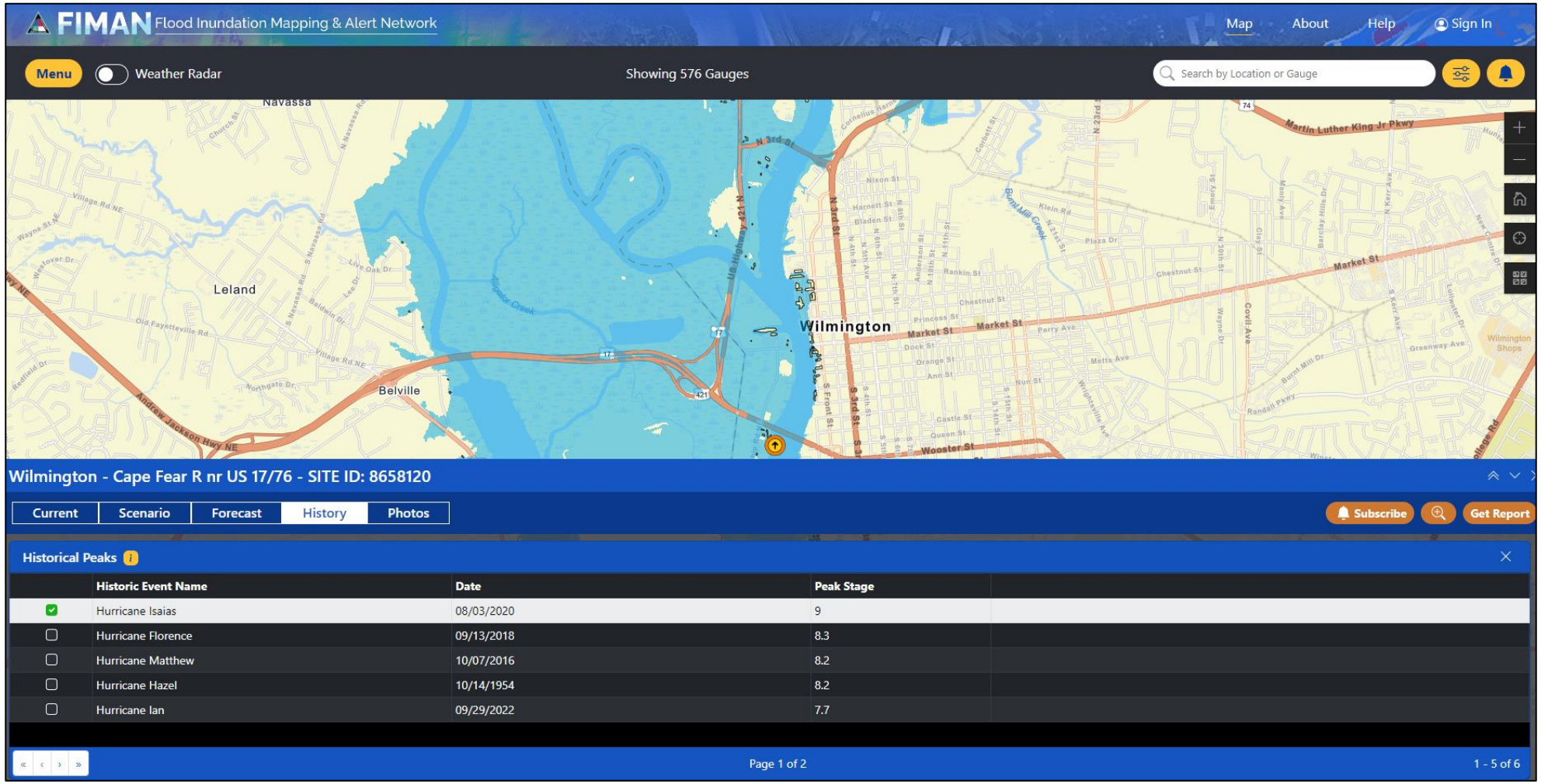
Map
About
Help
Sign In
Menu
Weather Radar
Showing 586 Gauges
Search by Location or Gauge
FIMAN TOOLS
Overview
Layers
Legend
Find Gauges
By Area of Interest
By Location
County
Onslow
Go
Clear
Gauge Overview
Current
Forecasted
Major Flooding
Rising: 0
Constant: 0
Falling: 0
New River at Old Bridge St. in Jacksonville - SITE ID: JCKN7
Current
Scenario
History
Photos
Subscribe
Get Report
Historical Peaks
Historic Event Name
Date
Peak Stage
Hurricane Florence
09/15/2018
7.2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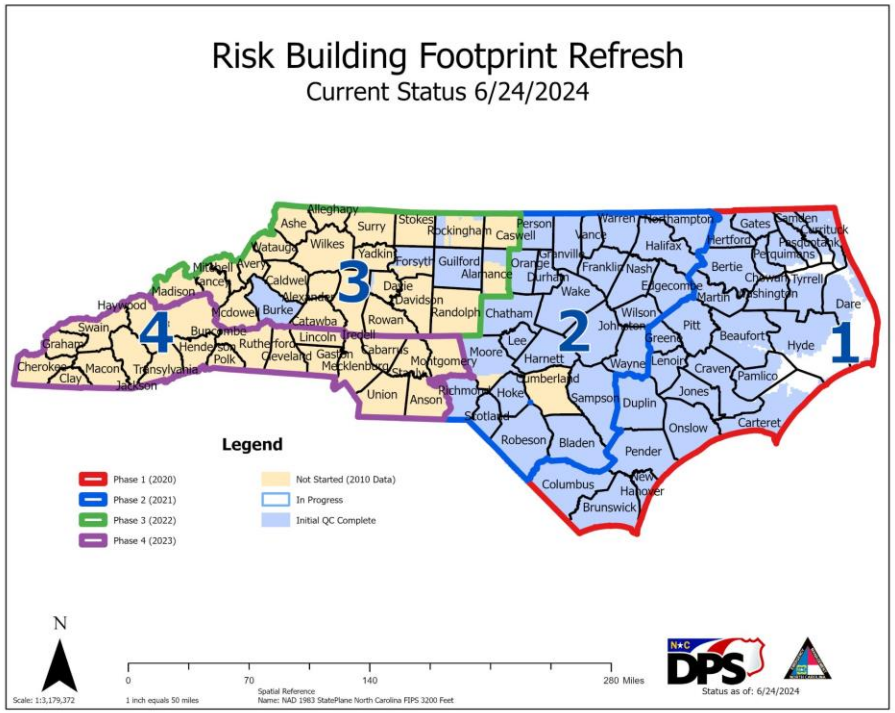
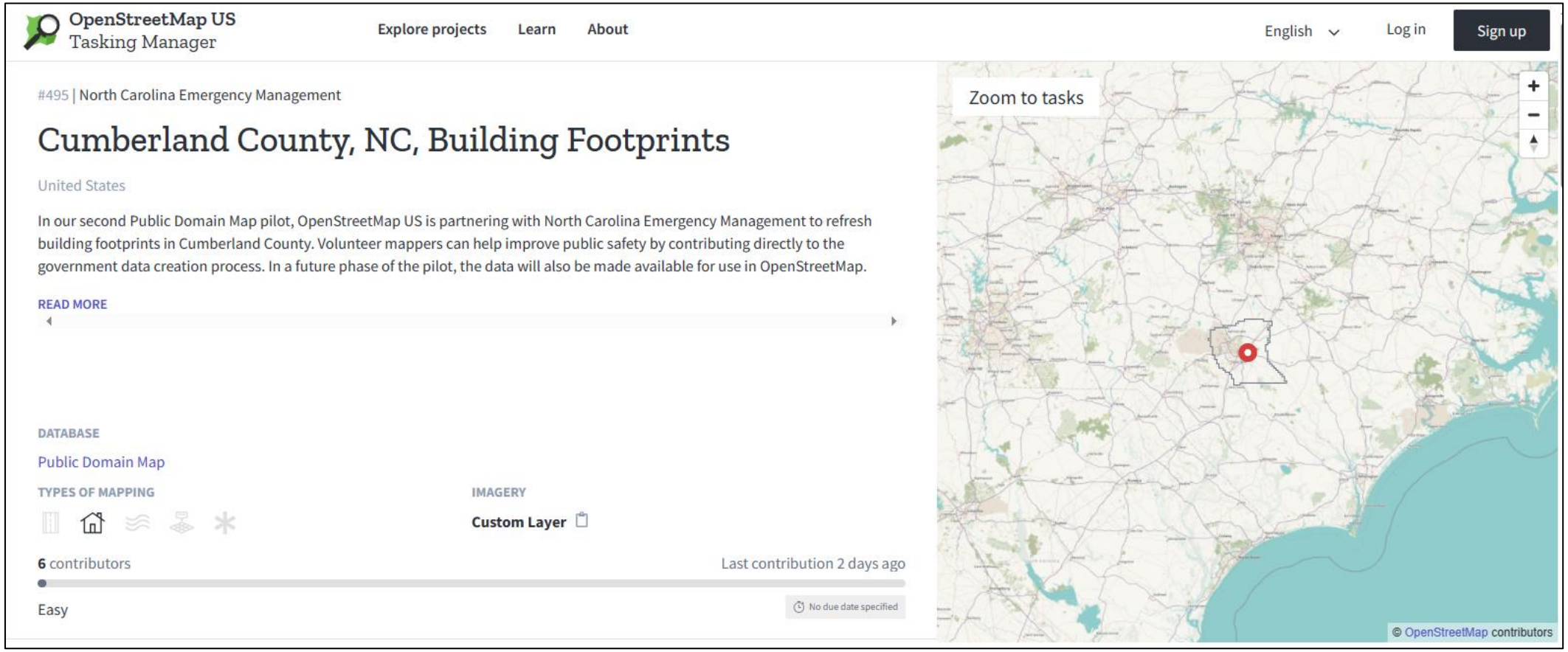
Map
About
Help
Sign In
Menu
Weather Radar
Showing 576 Gauges
Search by Location or Gauge
Navassa
Leland
Belville
Wilmington
Wilmington - Cape Fear R nr US 17/76 - SITE ID: 8658120
Current
Scenario
Forecast
History
Photos
Subscribe
Get Report
Historical Peaks
Historic Event Name
Date
Peak Stage
Hurricane Isaias
08/03/2020
9
Hurricane Florence
09/13/2018
8.3
Hurricane Matthew
10/07/2016
8.2
Hurricane Hazel
10/14/1954
8.2
Hurricane Ian
09/29/2022
7.7
Page 1 of 2
1 - 5 of 6

First Floor Elevation Collection – Mobile LiDAR

Building Footprint Update Status




OpenStreetMap US
Tasking Manager
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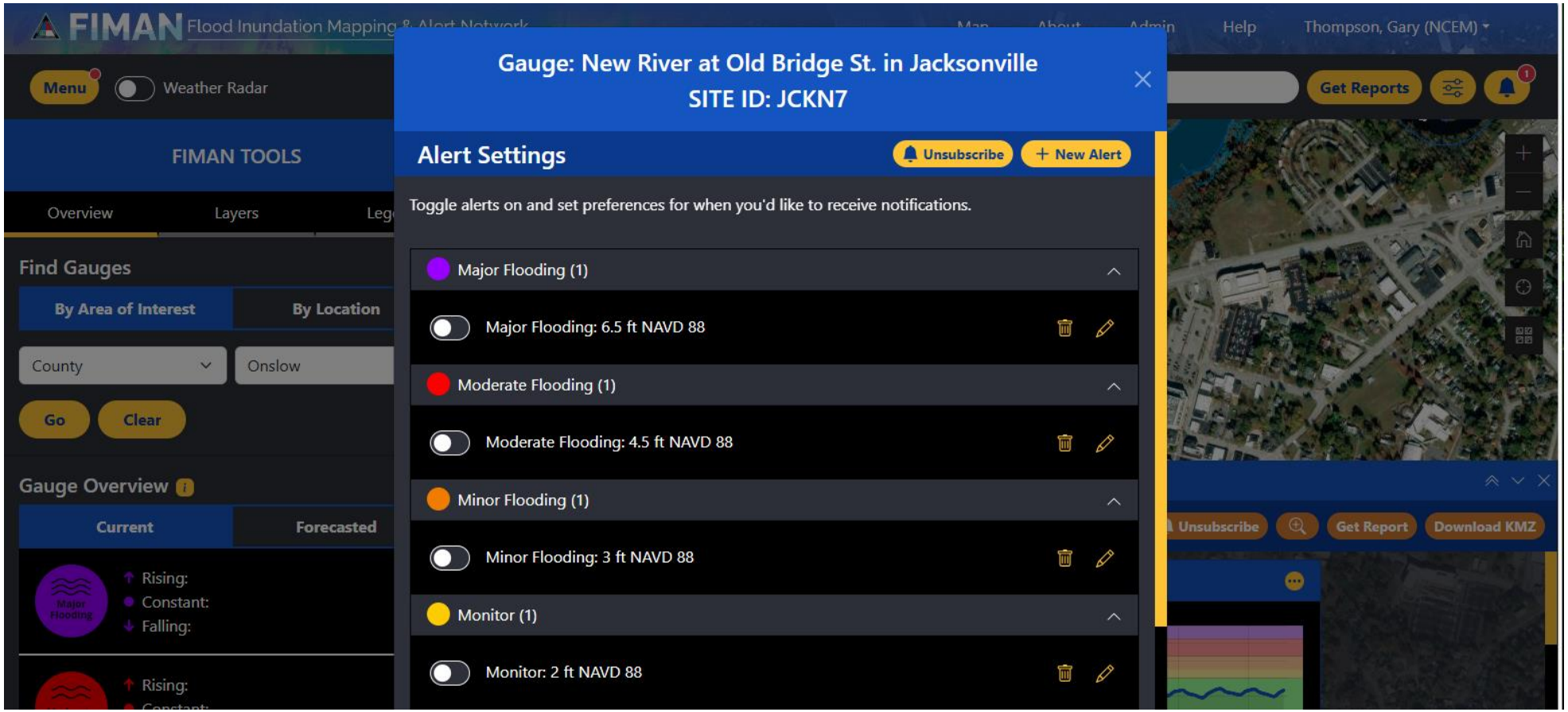
#495 | North Carolina Emergency Management
Cumberland County, NC, Building Footprints
United States
In our second Public Domain Map pilot, OpenStreetMap US is partnering with North Carolina Emergency Management to refresh building footprints in Cumberland County. Volunteer mappers can help improve public safety by contributing directly to the government data creation process. In a future phase of the pilot, the data will also be made available for use in OpenStreetMap.
READ MORE
DATABASE
Public Domain Map
TYPES OF MAPPING
IMAGERY
Custom Layer
6 contributors
Last contribution 2 days ago
Easy
No due date specified
Zoom to tasks
© OpenStreetMap contributors


FIMAN Flood Inundation Mapping & Alert Network
Map
About
Admin
Help
Thompson, Gary (NCEM)
Menu
Weather Radar
FIMAN TOOLS
Overview
Layers
Find Gauges
By Area of Interest
By Location
County
Onslow
Go
Clear
Gauge Overview
Current
Forecasted
Rising:
Constant:
Falling:
Gauge: New River at Old Bridge St. in Jacksonville
SITE ID: JCKN7
Alert Settings
Unsubscribe
+ New Alert
Toggle alerts on and set preferences for when you'd like to receive notifications.
Major Flooding (1)
Major Flooding: 6.5 ft NAVD 88
Moderate Flooding (1)
Moderate Flooding: 4.5 ft NAVD 88
Minor Flooding (1)
Minor Flooding: 3 ft NAVD 88
Monitor (1)
Monitor: 2 ft NAVD 88
Get Reports
Unsubscribe
Get Report
Download KMZ


Hurricane HELENE Imagery
About
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BLENNAHASSETT ISLAND
Blennahassett Island River Access
Island Road
Island Road
Island Road
Bellers Branch Rd
Bellers Branch Rd
Bellers Branch Rd
maptiler
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Hurricane HELENE Imagery
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Tunnel Road
US 70
Xpertech
Arby's
Azalea United Methodist Cemetery
Azalea Church
Porters Cove Rd
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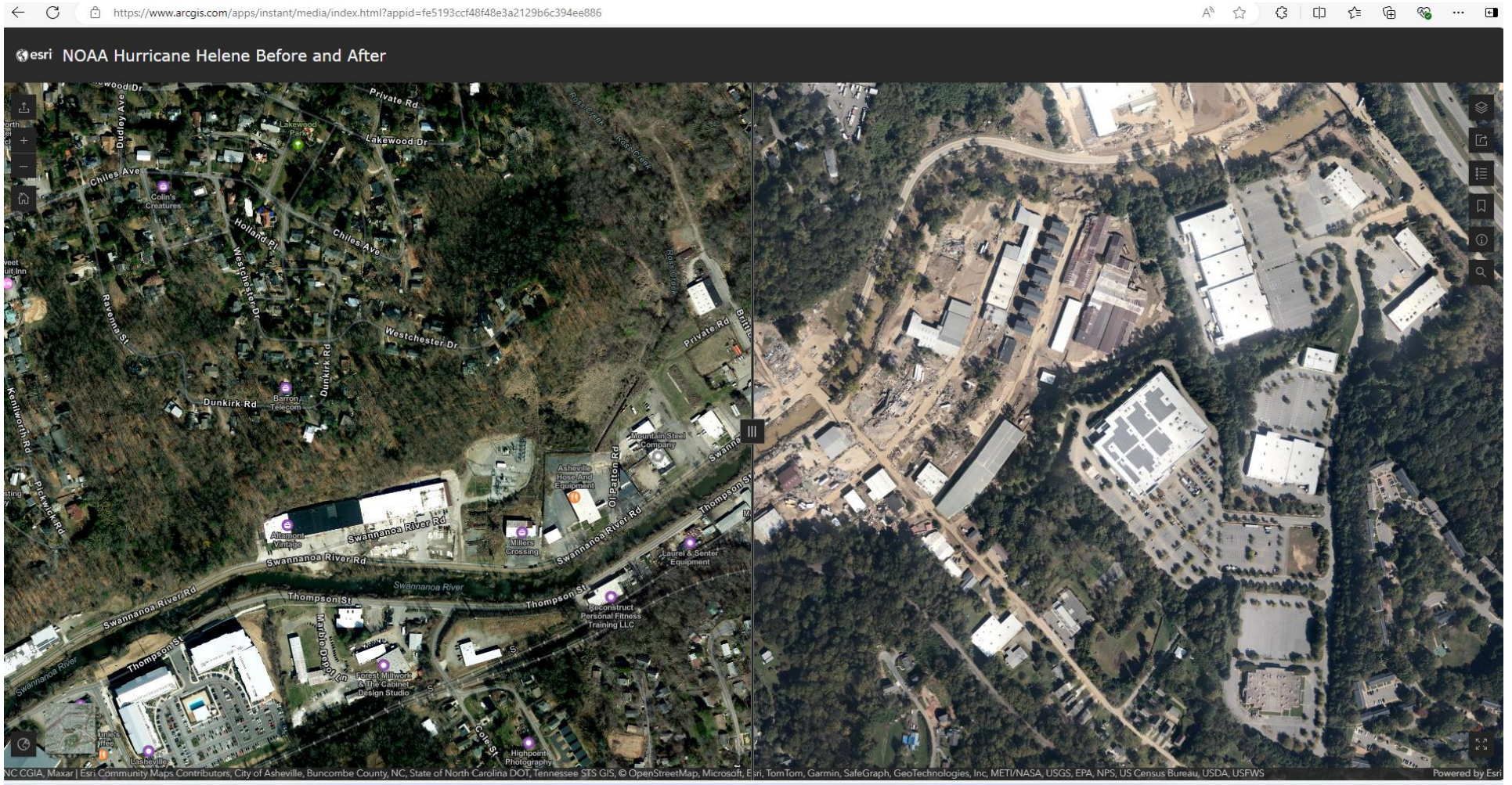

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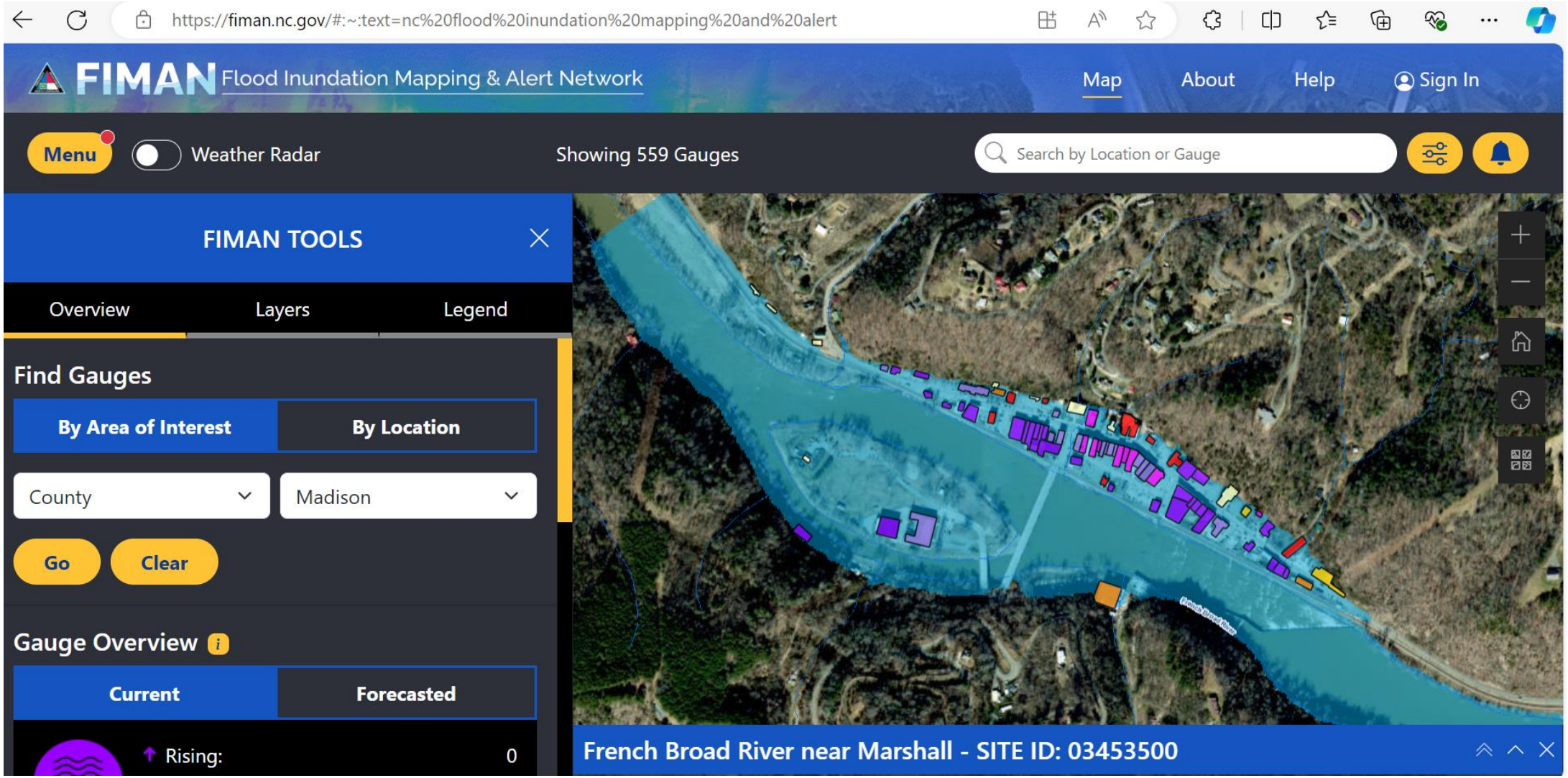
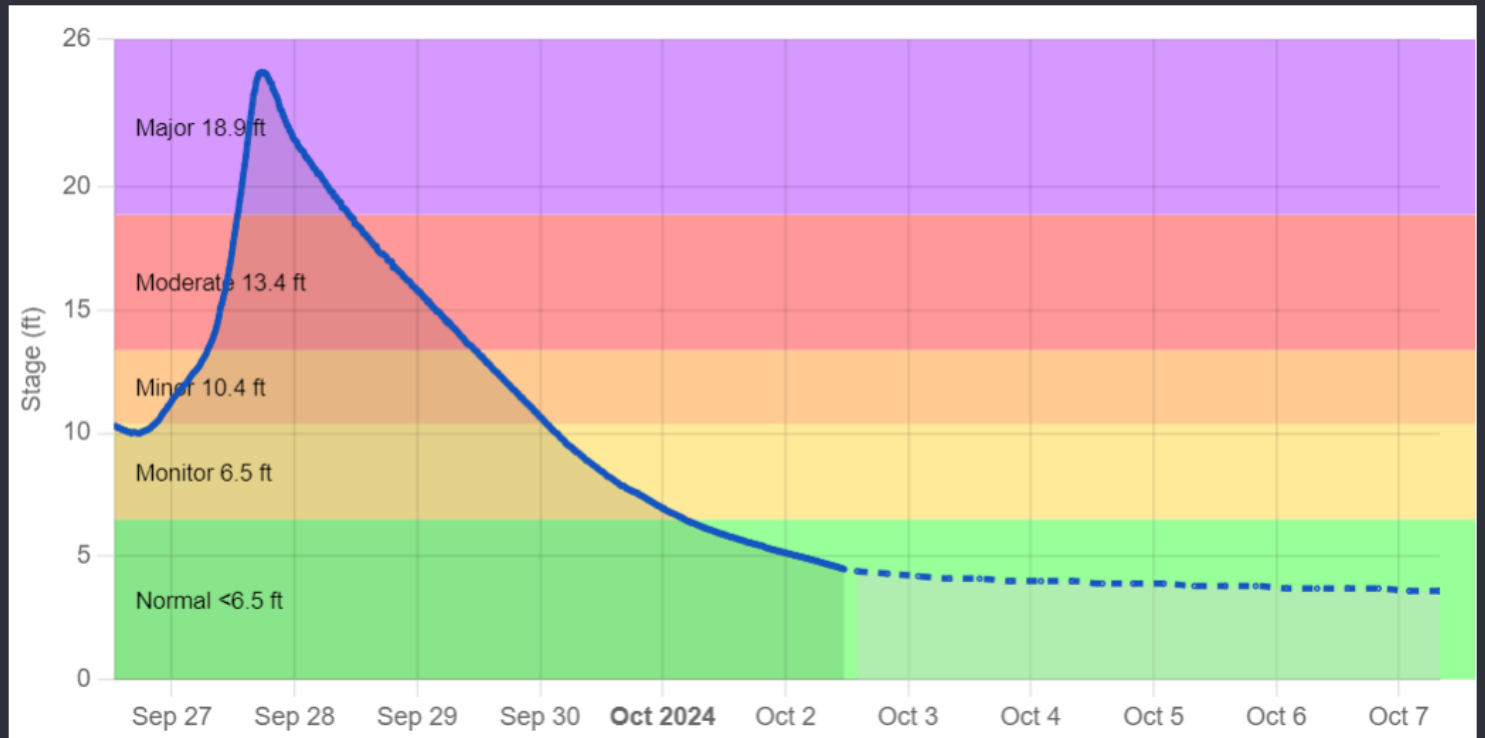


French Broad River at Asheville - Stage

Instructions



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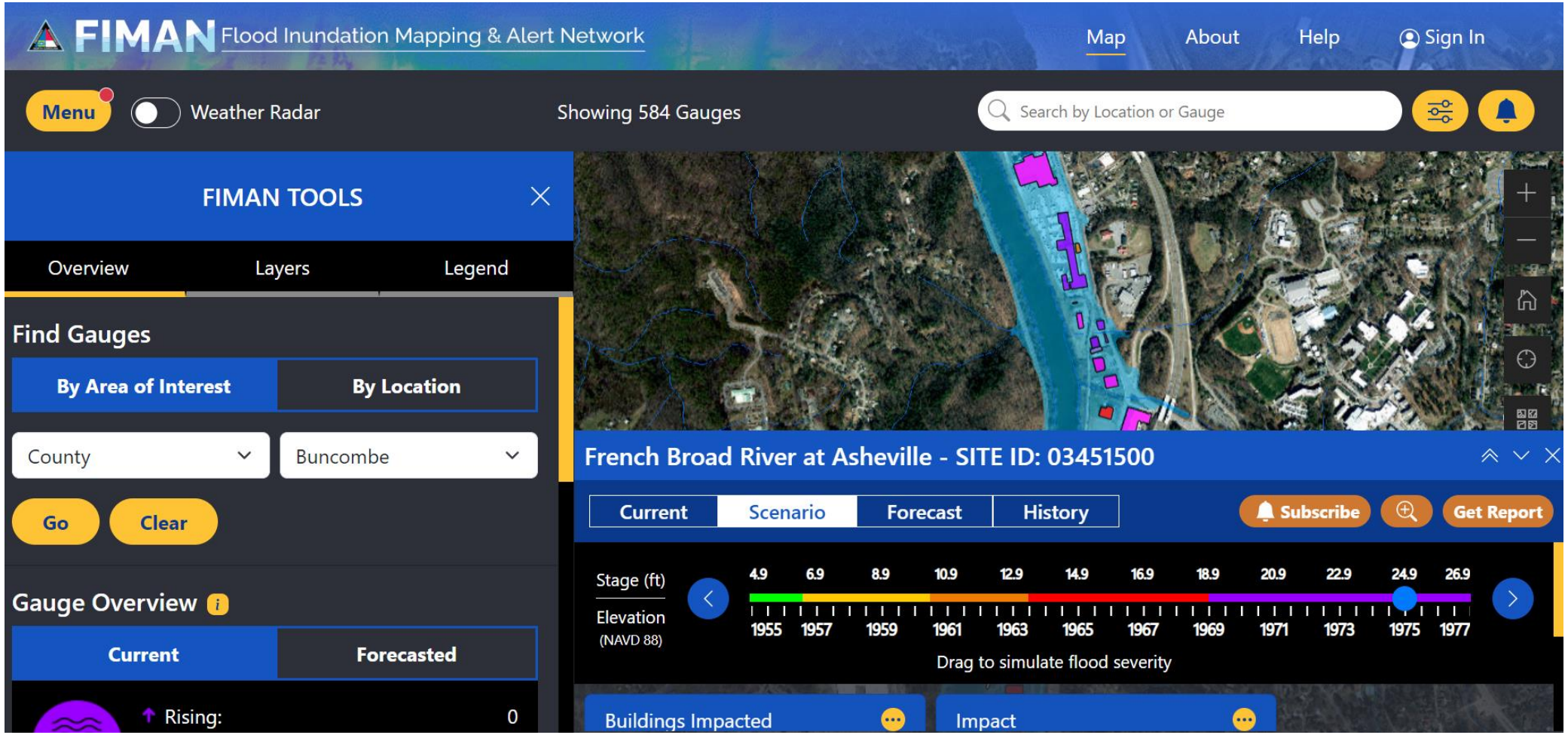
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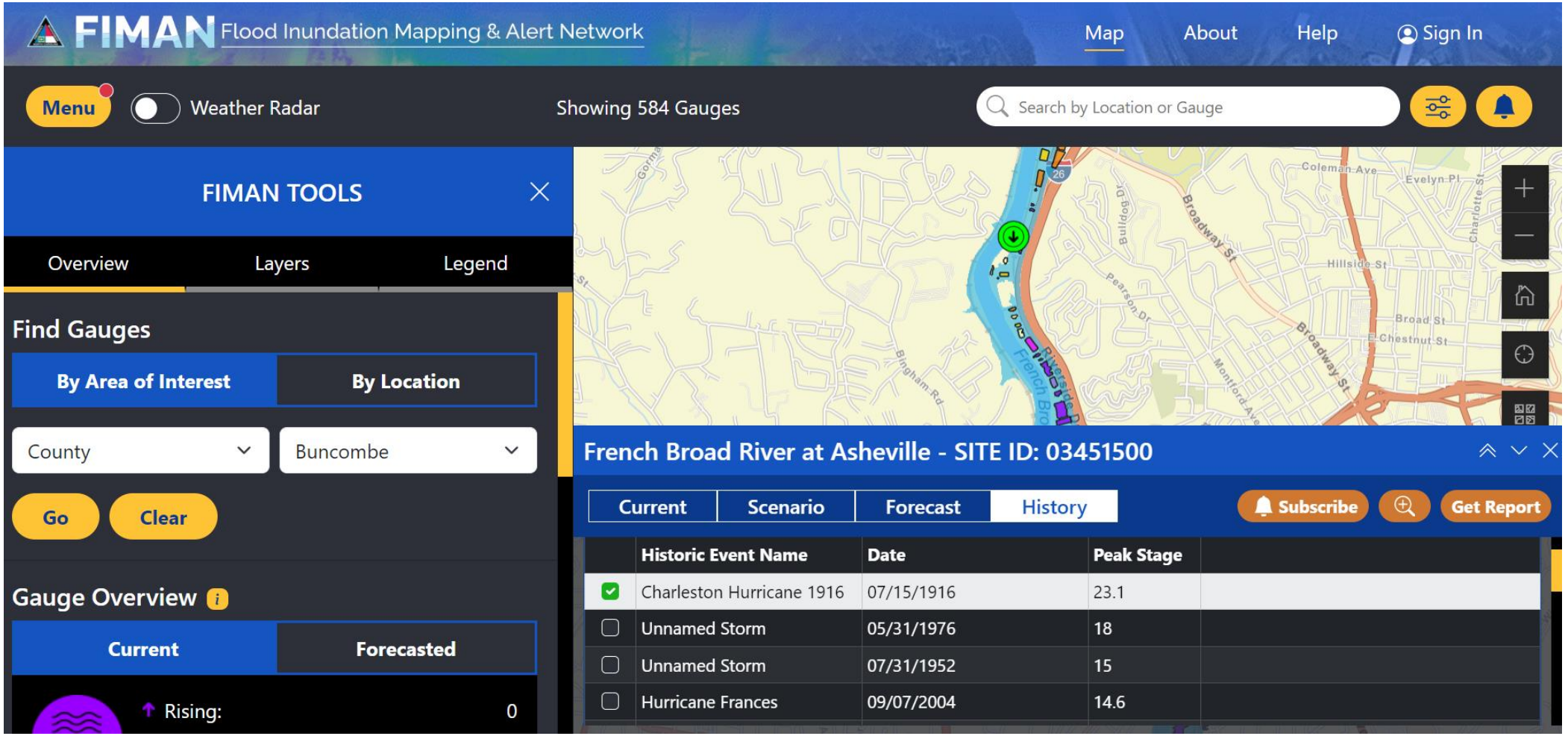
Map
About
Help
Sign In
Menu
Weather Radar
Showing 584 Gauges
Search by Location or Gauge
FIMAN TOOLS
Overview
Layers
Legend
Find Gauges
By Area of Interest
By Location
County
Buncombe
Go
Clear
Gauge Overview
Current
Forecasted
Rising:
0
French Broad River at Asheville - SITE ID: 03451500
Current
Scenario
Forecast
History
Subscribe
Get Report
Stage (ft)
Elevation
(NAVD 88)
4.9
6.9
8.9
10.9
12.9
14.9
16.9
18.9
20.9
22.9
24.9
26.9
1955
1957
1959
1961
1963
1965
1967
1969
1971
1973
1975
1977
Drag to simulate flood severity
Buildings Impacted
Impact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Map
About
Help
Sign In
Menu
Weather Radar
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FIMAN TOOLS
Overview
Layers
Legend
Find Gauges
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Buncombe
Go
Clear
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Current
Forecasted
Rising: 0
French Broad River at Asheville - SITE ID: 03451500
Current
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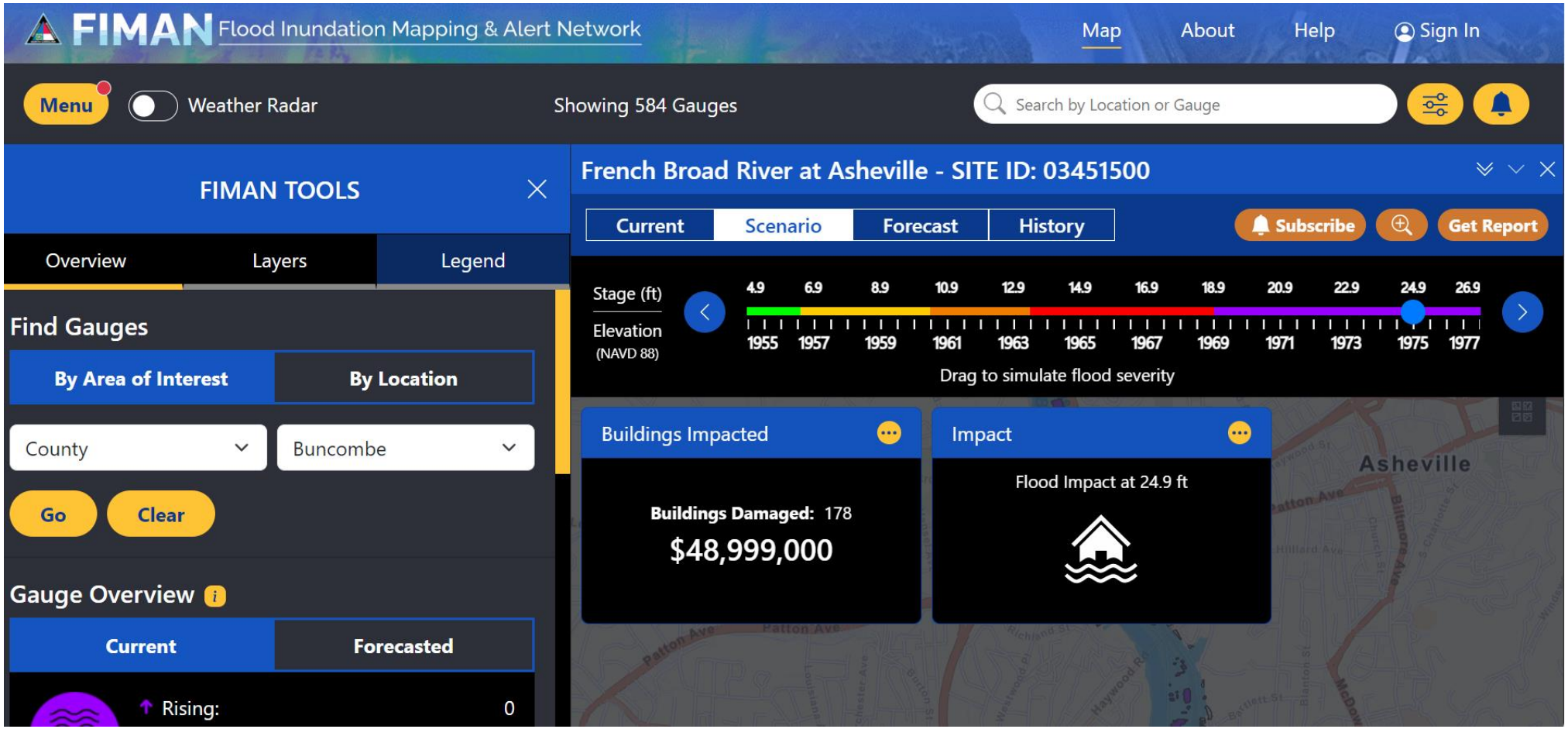
Forecast
History
Subscribe
Get Report
Historic Event Name
Date
Peak Stage
Charleston Hurricane 1916
07/15/1916
23.1
Unnamed Storm
05/31/1976
18
Unnamed Storm
07/31/1952
15
Hurricane Frances
09/07/2004
14.6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Map
About
Help
Sign In
Menu
Weather Radar
Showing 584 Gauges
Search by Location or Gauge
FIMAN TOOLS
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Layers
Legend
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Forecasted
Rising:
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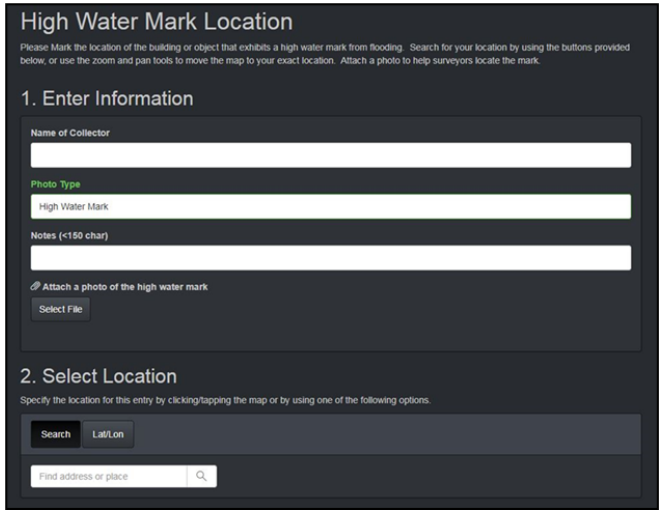
Scenario
Forecast
History
Subscribe
Get Report
Stage (ft)
Elevation
(NAVD 88)
4.9 6.9 8.9 10.9 12.9 14.9 16.9 18.9 20.9 22.9 24.9 26.9
1955 1957 1959 1961 1963 1965 1967 1969 1971 1973 1975 1977
Drag to simulate flood severity
Buildings Impacted
Buildings Damaged: 178
$48,999,000
Impact
Flood Impact at 24.9 ft
Asheville
Patton Ave

Post-Storm Geospatial Data Collection Activities

- High Water Marks
  - Coordinate collection of high water marks
    - NCDOT
    - USGS
    - USACE
    - NC Society of Surveyors
    - Local governments



High Water Mark (HWM) Photo Application

Benefits of a High Water Mark (HWM)

- Are the best resource to document a flood event
- HWM information can be used in a variety of mitigation and planning efforts
- Calibrate models
- Supports FIMAN (Flood Inundation Mapping Alert Network) and FRIS (Flood Risk Information System)
- Supports research activities
- Public safety

HWM Photo

HWM Examples


PITT

Adopt a Gauge

Adopt a Gauge

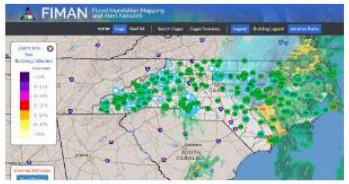
North Carolina's network of more than 500 river, stream and coastal gauges provides data that empowers flood warning for local communities and the public.

Data from these gauges drives the Flood Inundation Mapping and Alert Network (FIMAN) which is designed reduce the loss of life and flood related property damage by providing timely, detailed, and accurate flood inundation information to government officials and the public. For FIMAN to provide timely and accurate information, data from these gauges must be obtained 24 hours a day, seven days a week with no interruptions.

Gauge maintenance is critical to being able to provide continuous data to community officials and the public. North Carolina Emergency Management has created the Adopt a Gauge (AaG) program to partner with local officials to insure that gauges are operational and to notify NCEM when a gauge needs repair.

Submit a gauge report

The Adopt a Gauge program allows a county or local government, nonprofit or civic group to adopt gauges in their community and serve as eyes on the ground for those gauges. Adopt A Gauge partners regularly check the status of their assigned gauge sites, reporting problems (debris buildup, damage, theft) or simply reporting that the gauge is in good condition. While we have online monitoring tools, having eyes in the field can aid in assessing any issues with a gauge.



Visual checks of the gauge site:

- Check to see if there has been any damage or vandalism to the external parts of the gauge (solar panel, antenna, conduits and cabling). Photos can be provided for each site for reference, if needed. Photos are also available in FIMAN for many sites.
- See that the gauge is still an upright position i.e. has not been hit by a vehicle.
- Remove any brush, vines and trees that are within 10 feet of the gauge

Adopt a Gauge - Reporting

Enter observations from your gauge site visits here.

* Indicates required field

First Name *

Last Name

Phone Number *

Email Address *

Date of Inspection *

mm/dd/yyyy

County *

- Select -

Name of Gauge *

Is the gauge in good operating condition? *

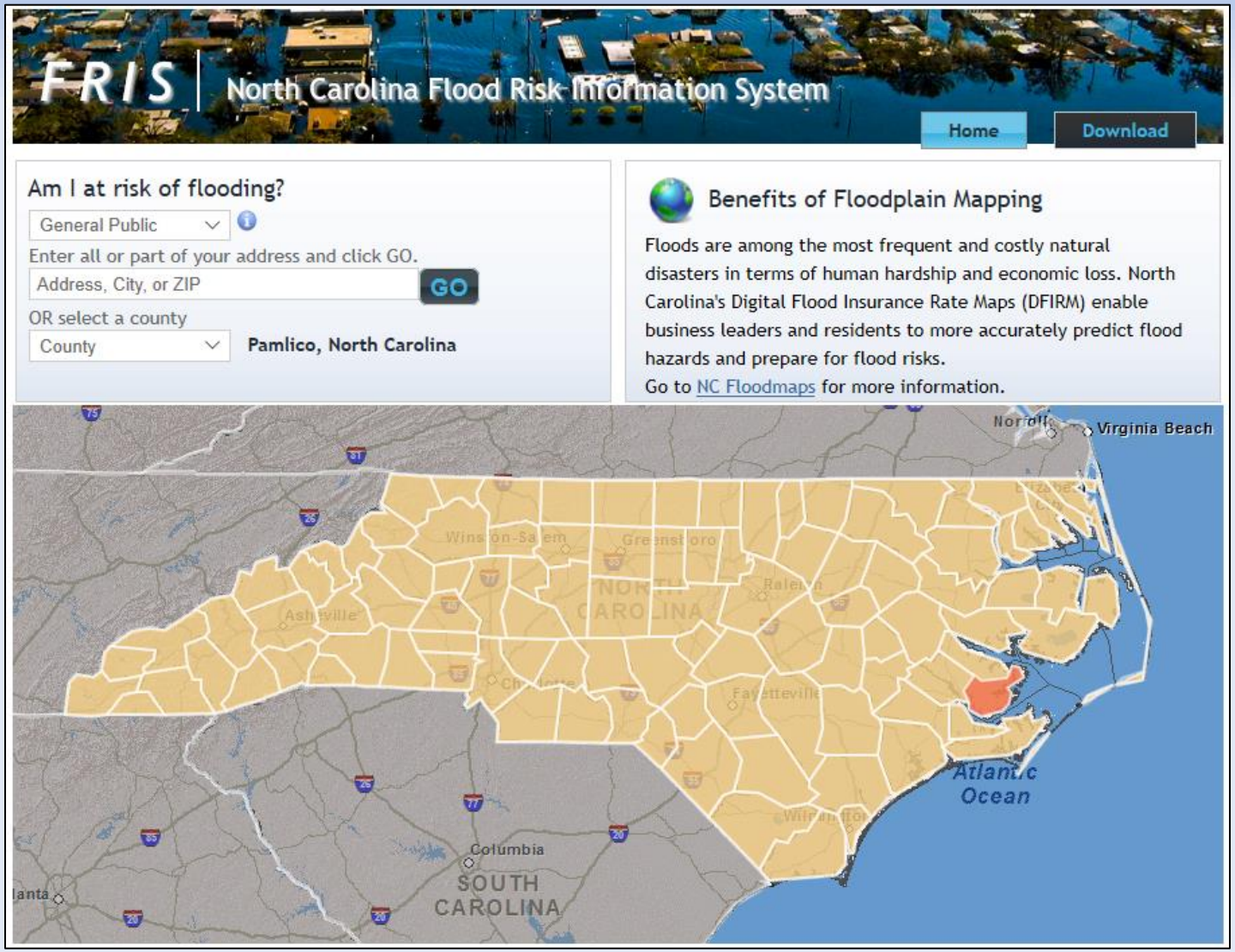
- Yes
- No

Submit

Sevenmile Swamp at SR18094 Gauge

Before

After



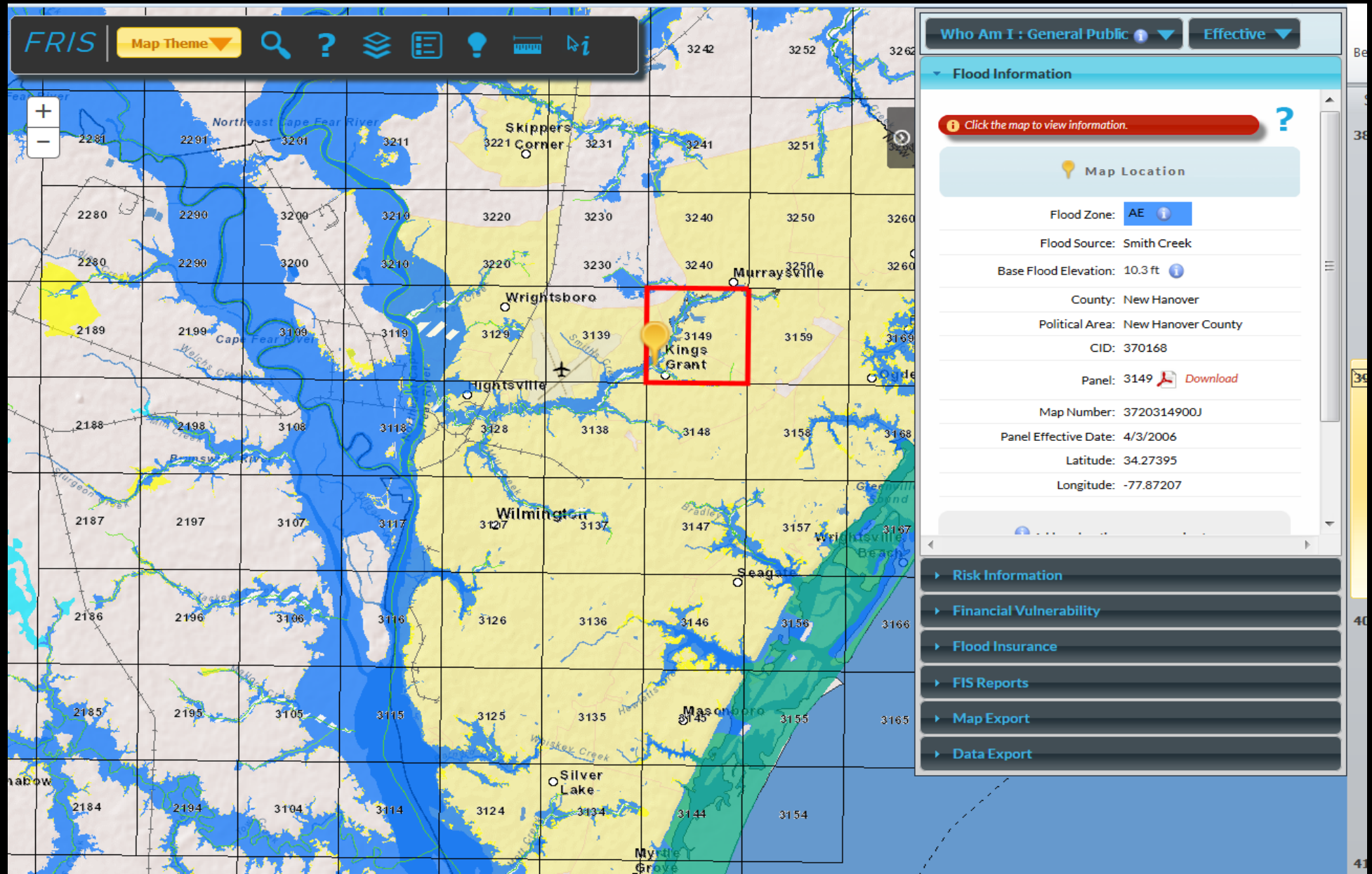
N★C DPS DEPARTMENT OF PUBLIC SAFETY

EMERGENCY MANAGEMENT EMAP Accredited ACCREDITATION PROGRAM

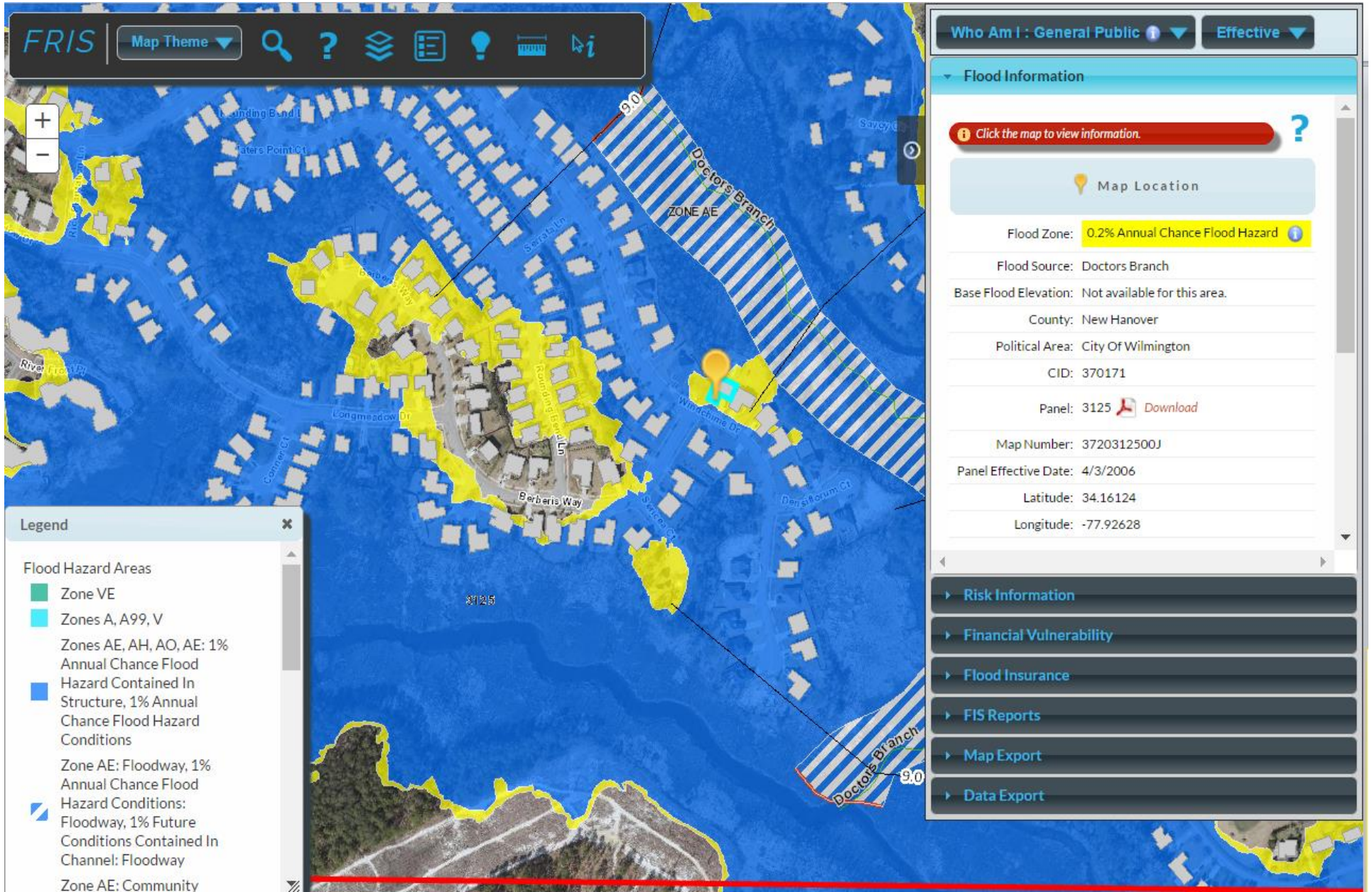
North Carolina Emergency Management

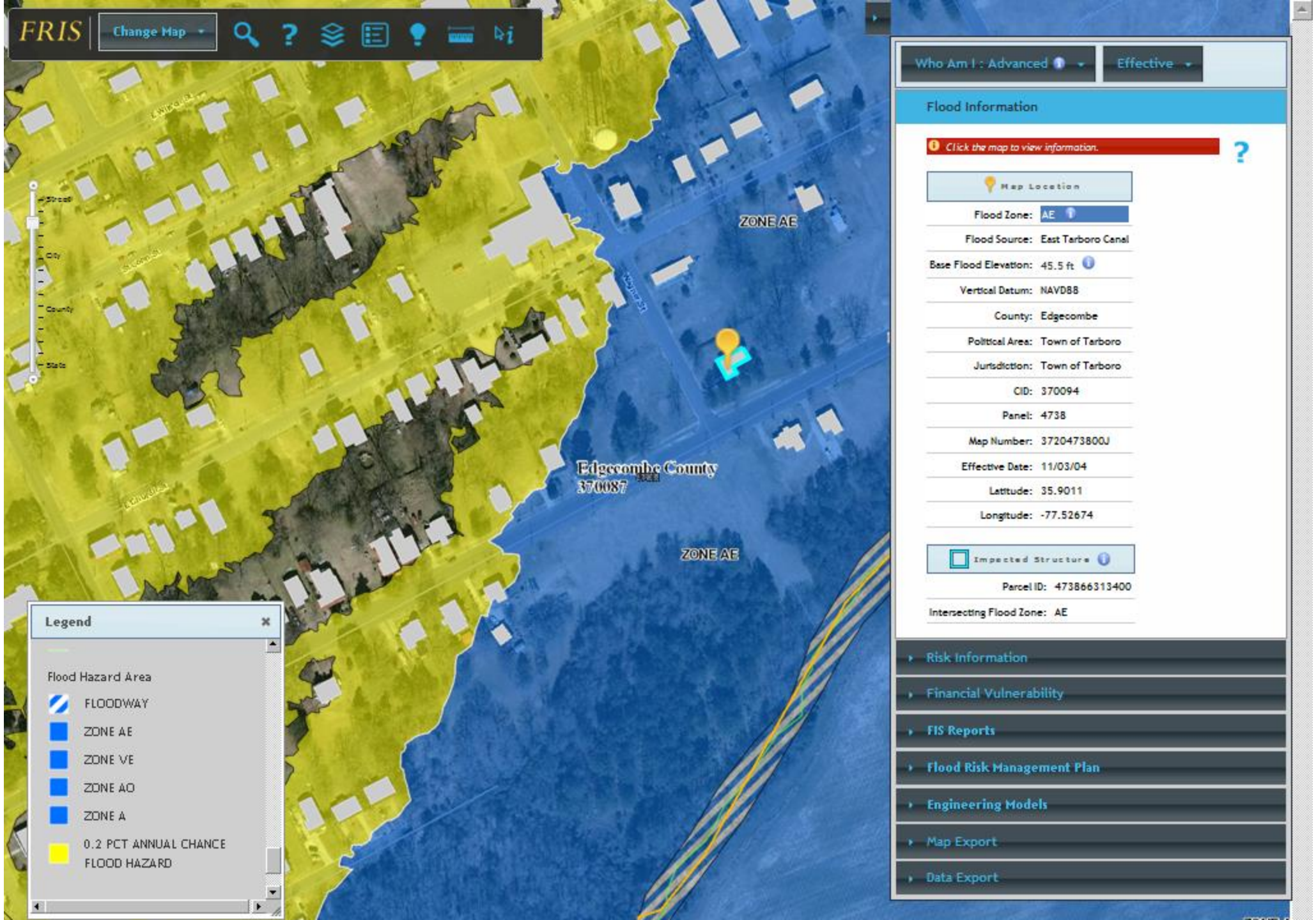
EMERGENCY MANAGEMENT N★C NORTH CAROLINA

FRIS Display

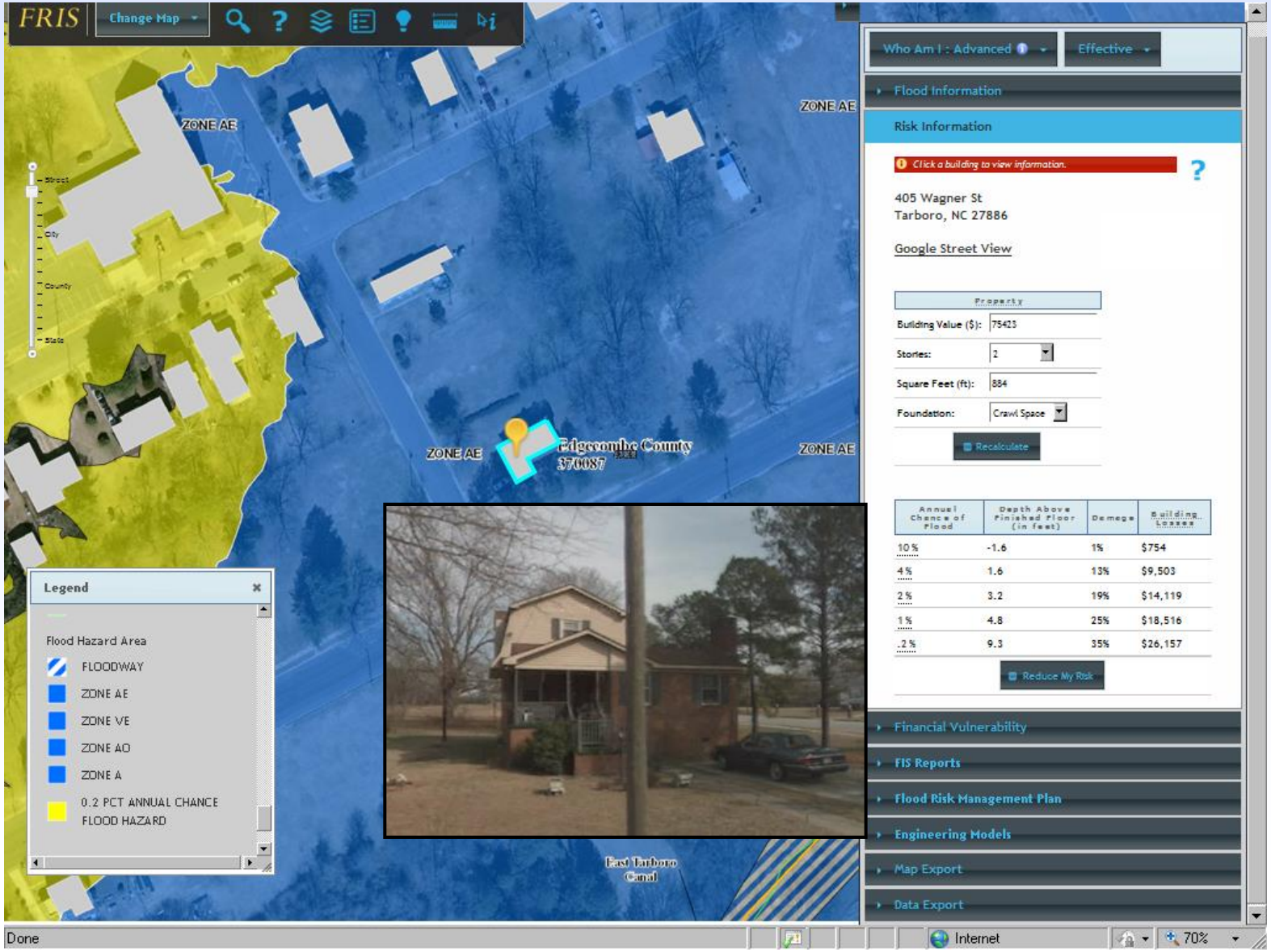


FRIS DFIRM Map Symbology

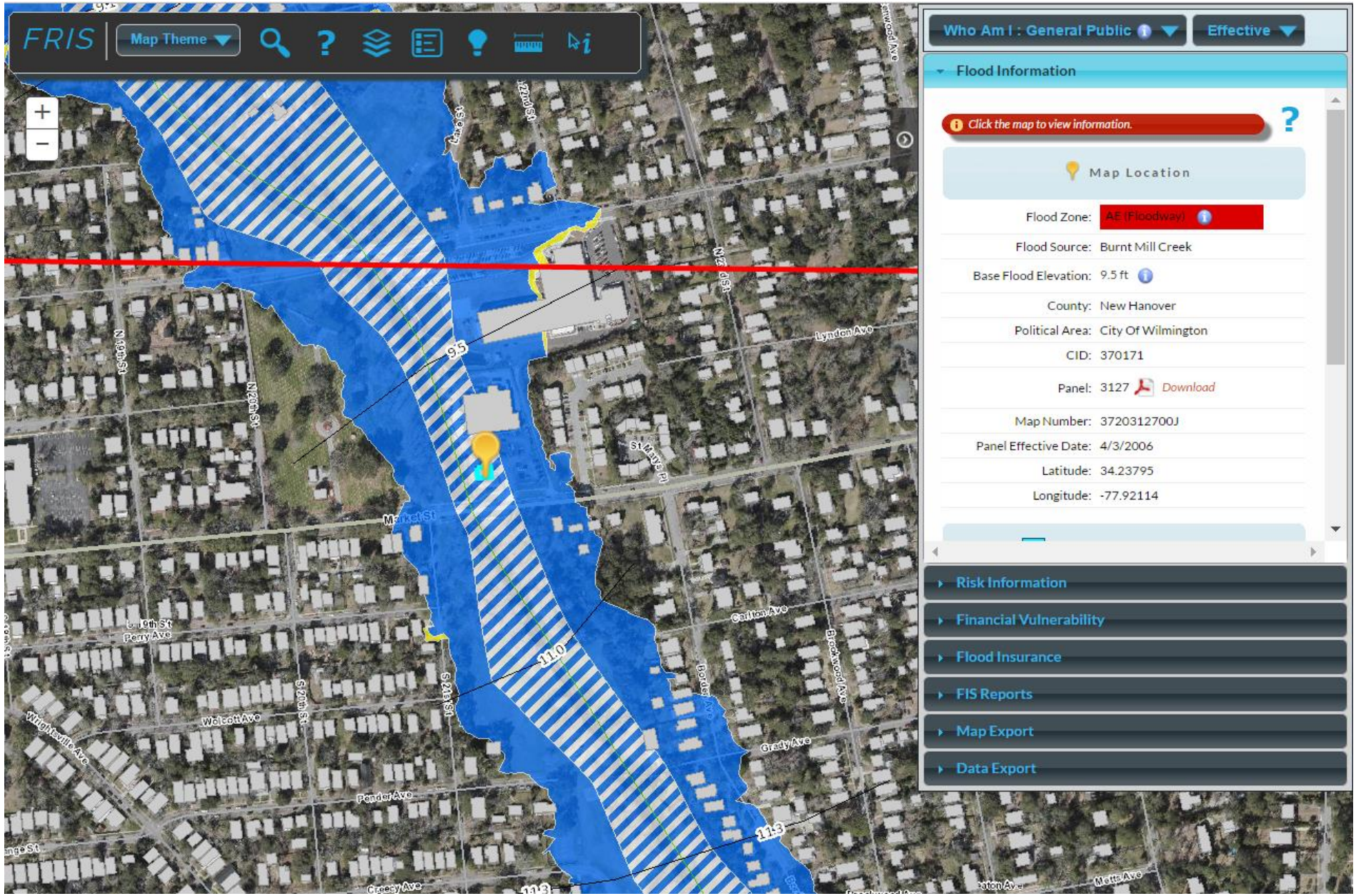



FRIS
Change Map
ZONE AE
Edgecombe County
370087
ZONE AE
Who Am I : Advanced
Effective
Flood Information
Click the map to view information.
Map Location
Flood Zone: AE
Flood Source: East Tarboro Canal
Base Flood Elevation: 45.5 ft
Vertical Datum: NAVD88
County: Edgecombe
Political Area: Town of Tarboro
Jurisdiction: Town of Tarboro
CID: 370094
Panel: 4738
Map Number: 3720473800J
Effective Date: 11/03/04
Latitude: 35.9011
Longitude: -77.52674
Impacted Structure
Parcel ID: 473866313400
Intersecting Flood Zone: AE
Risk Information
Financial Vulnerability
FIS Reports
Flood Risk Management Plan
Engineering Models
Map Export
Data Export
Legend
Flood Hazard Area
FLOODWAY
ZONE AE
ZONE VE
ZONE AO
ZONE A
0.2 PCT ANNUAL CHANCE FLOOD HAZARD

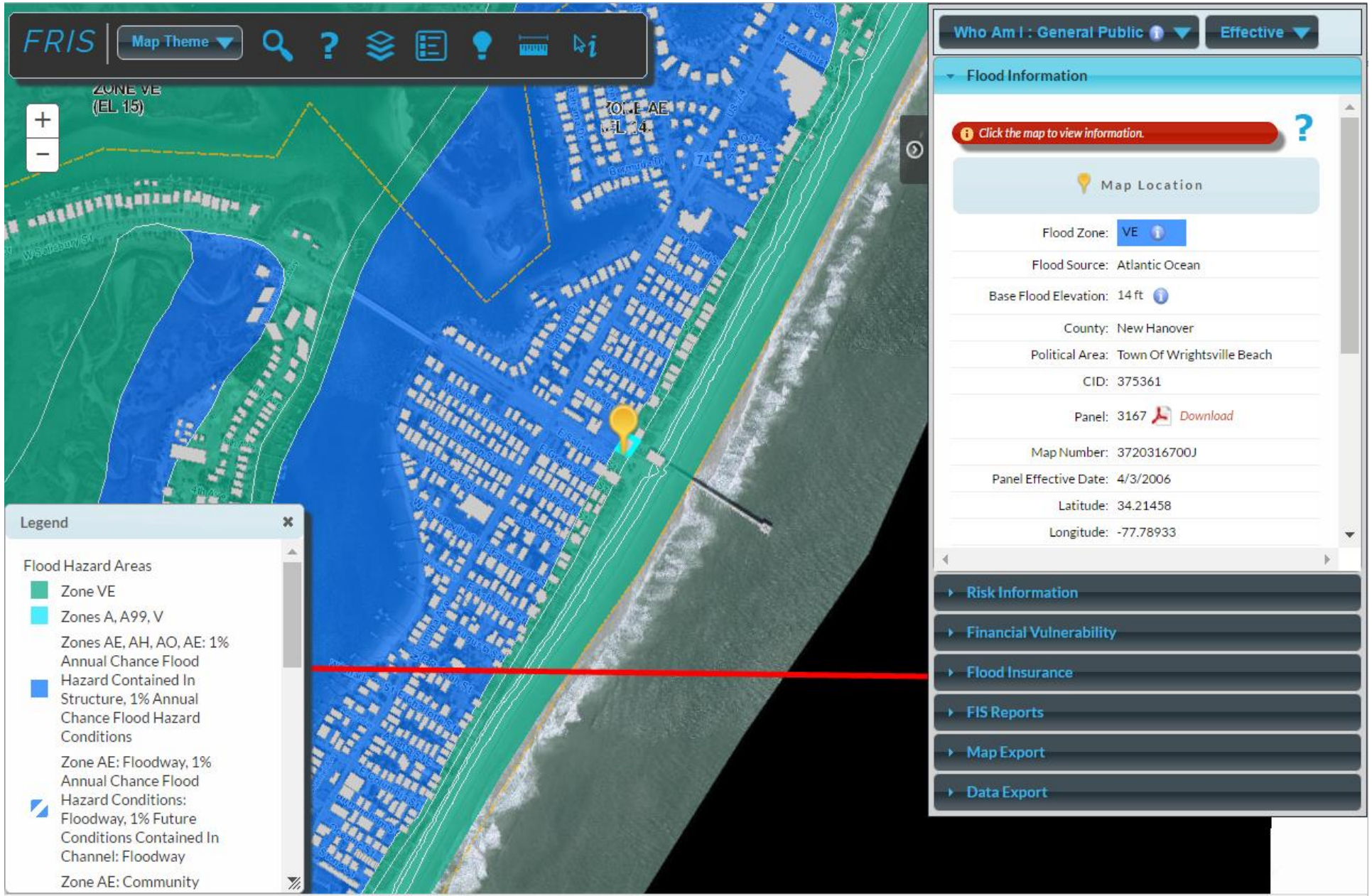
FRIS DFIRM Map Symbology



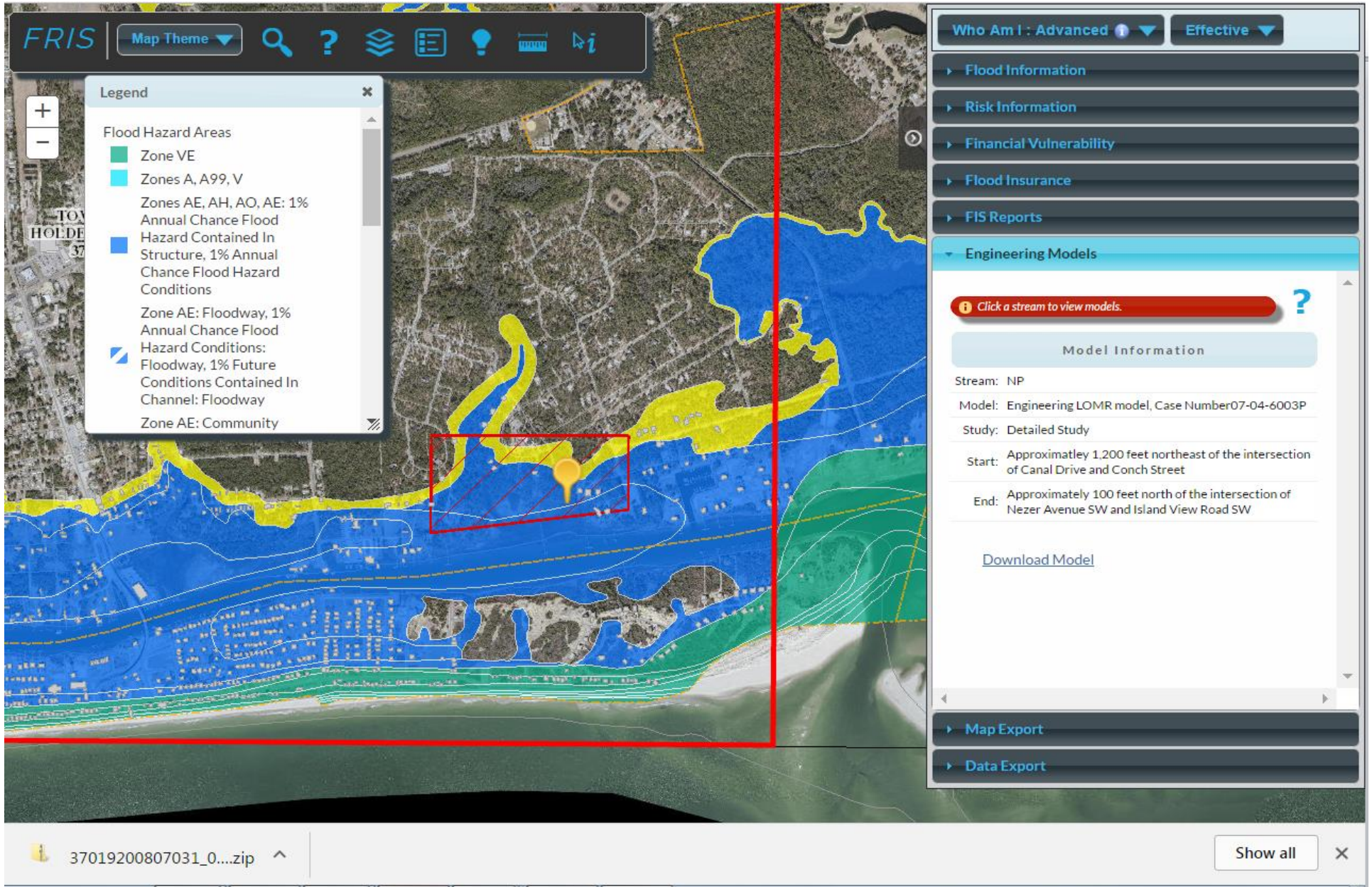
FRIS DFIRM Map Symbology



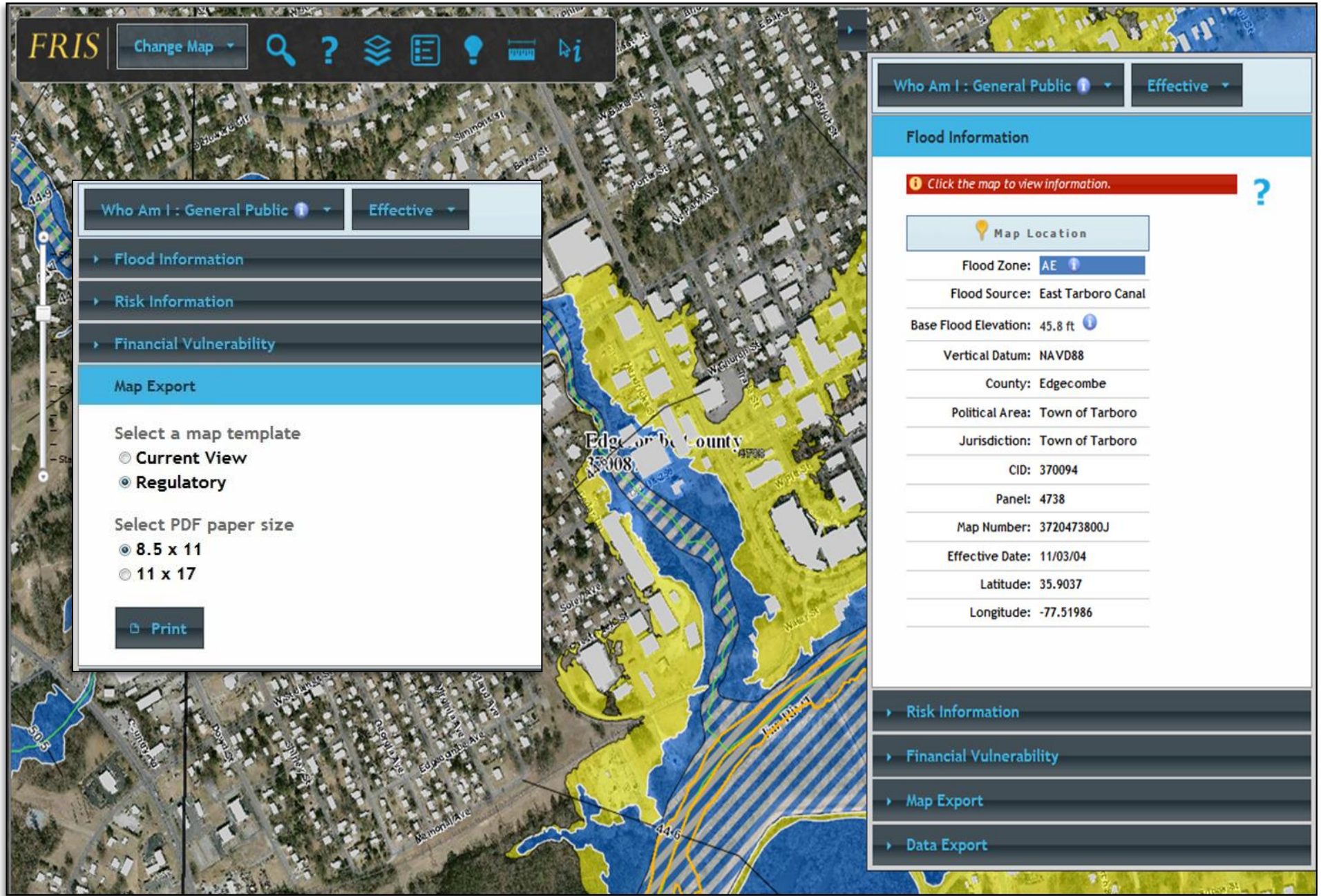
FRIS FIRM Map Symbology - Coastal



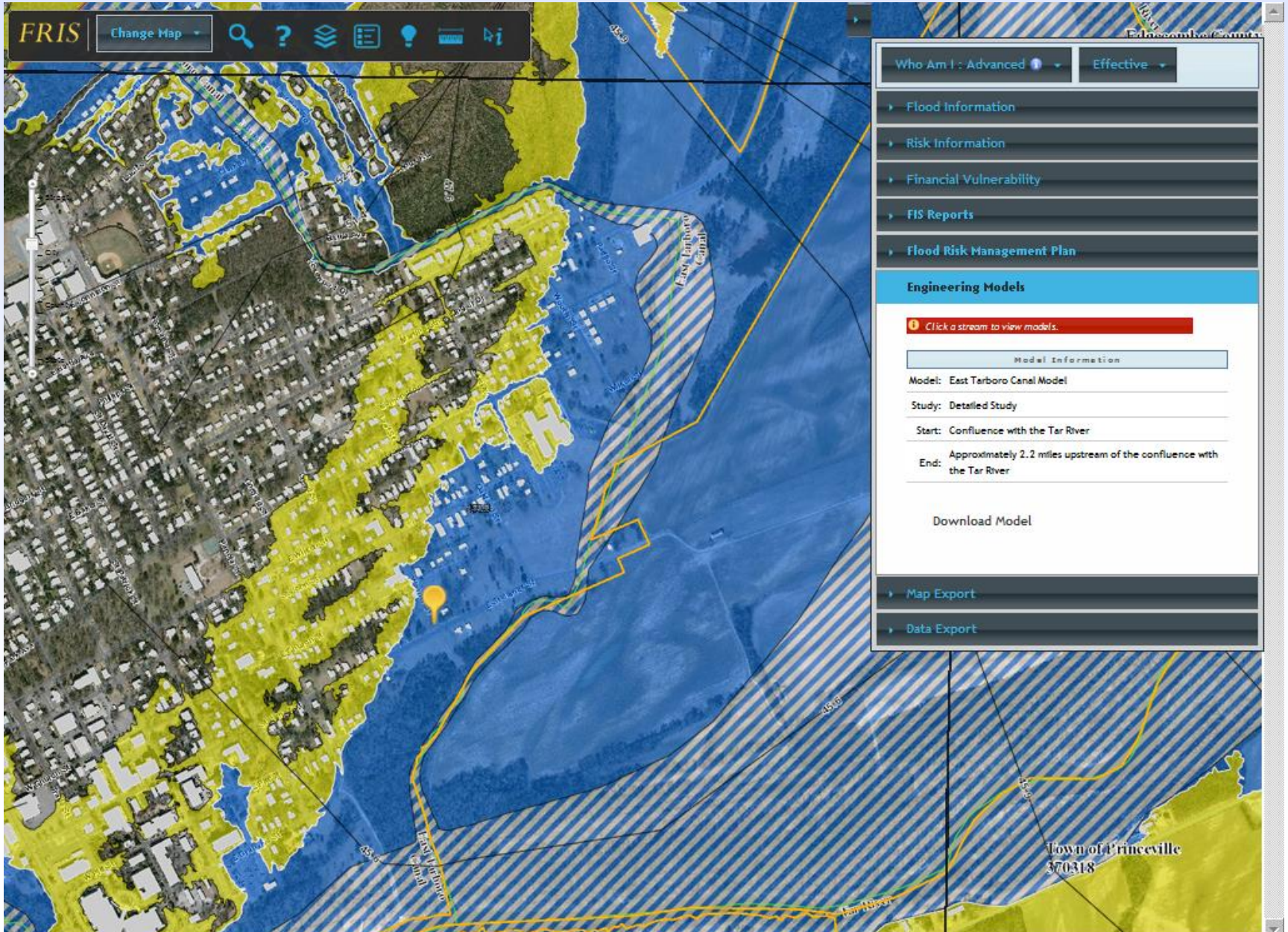
FRIS Engineering Models

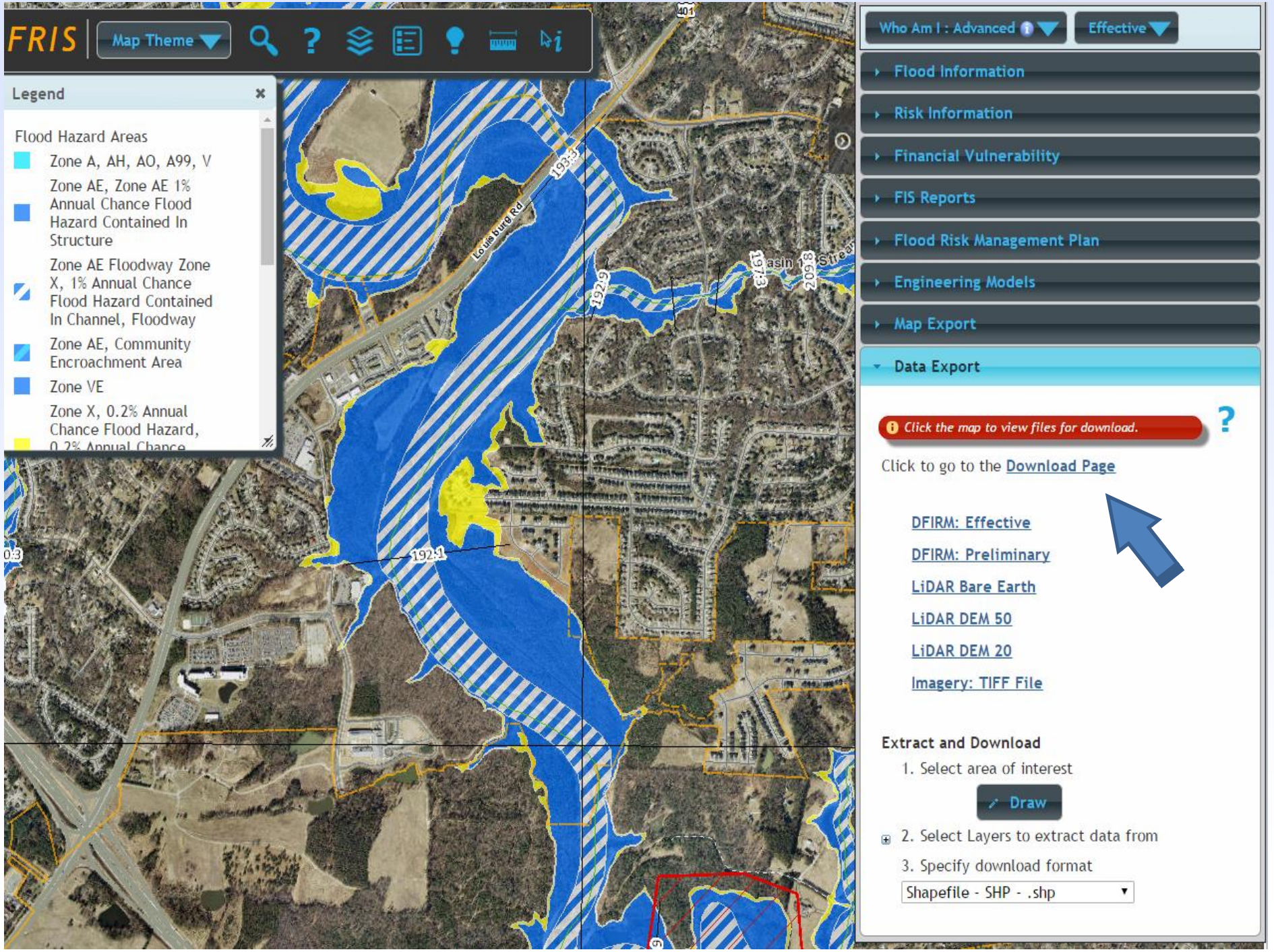


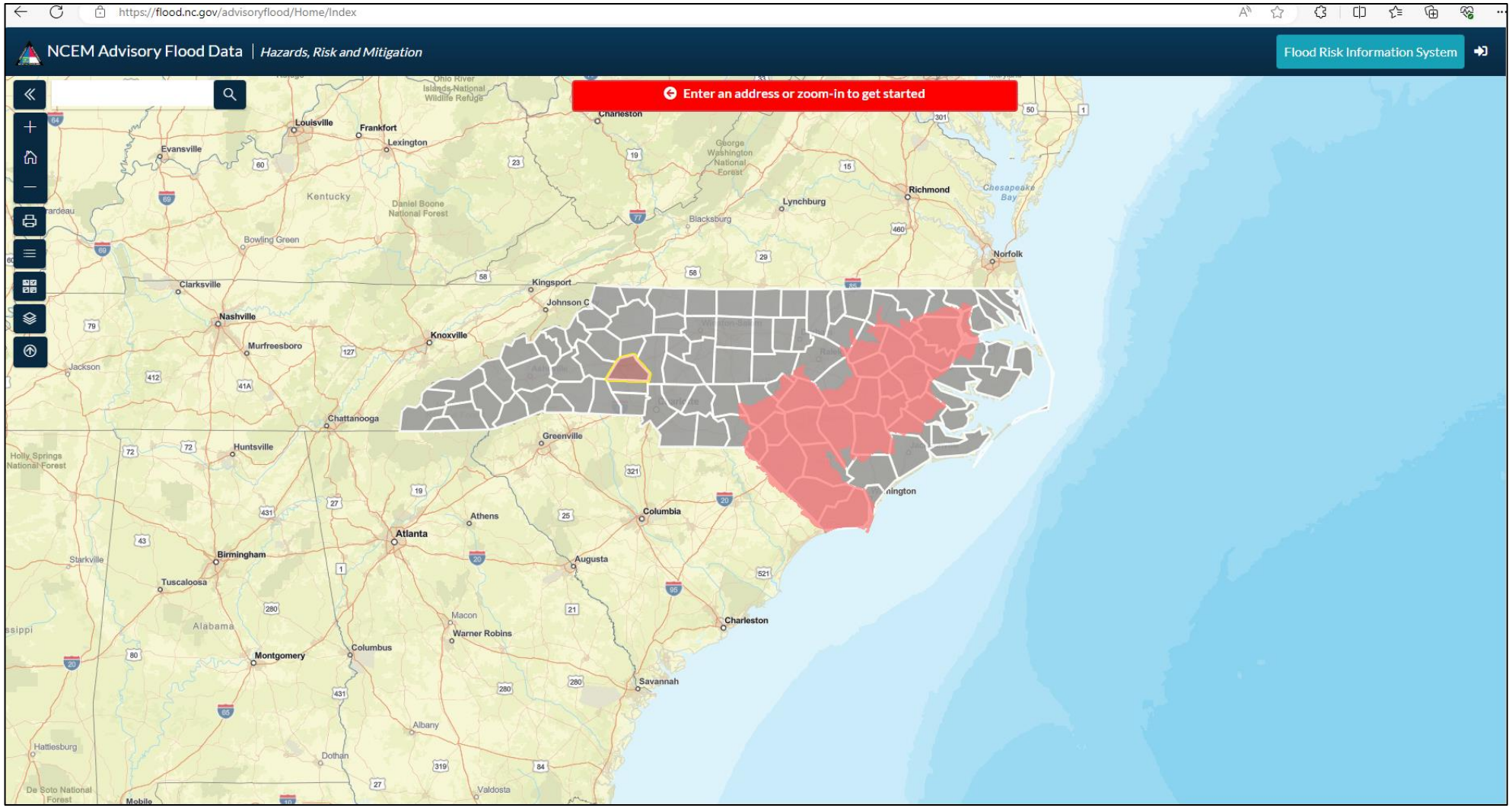
FRIS Display View/Print/Map Export

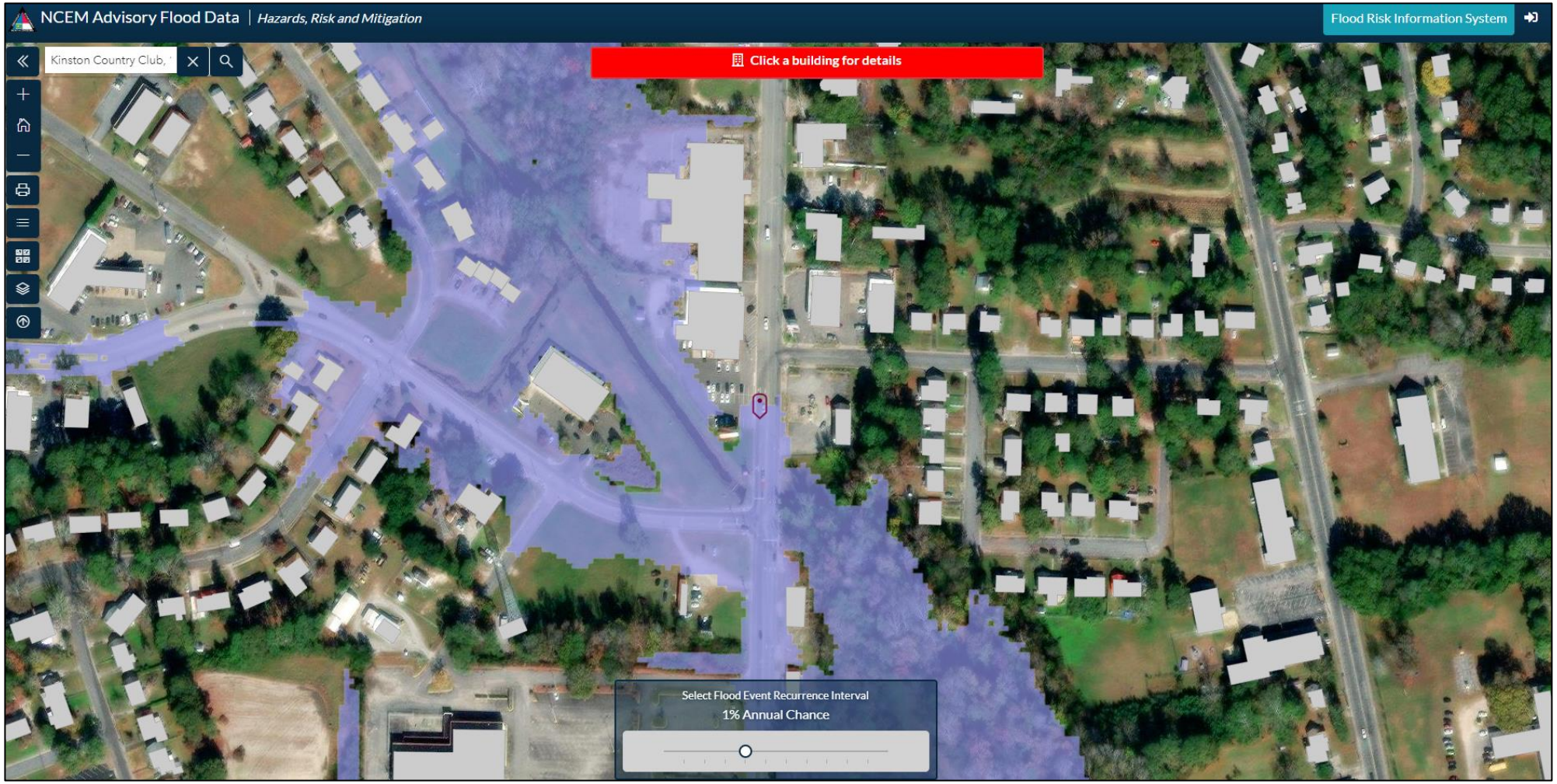


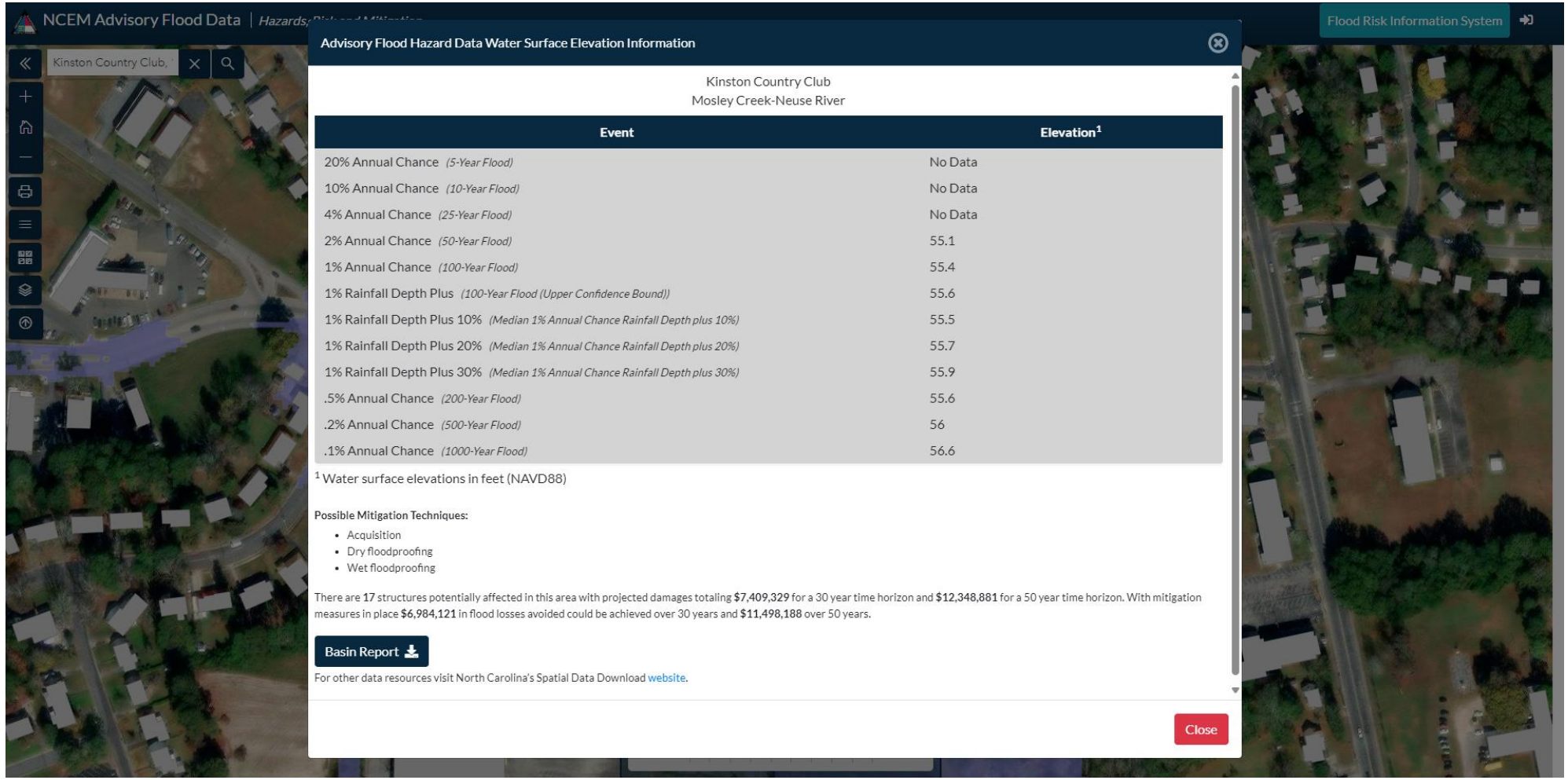
FRIS DFIRM Map Symbology




FRIS
Map Theme
Legend
Flood Hazard Areas
Zone A, AH, AO, A99, V
Zone AE, Zone AE 1% Annual Chance Flood Hazard Contained In Structure
Zone AE Floodway Zone X, 1% Annual Chance Flood Hazard Contained In Channel, Floodway
Zone AE, Community Encroachment Area
Zone VE
Zone X, 0.2% Annual Chance Flood Hazard,
Louis Burg Rd
193:5
192:9
192:1
Who Am I : Advanced
Effective
Flood Information
Risk Information
Financial Vulnerability
FIS Reports
Flood Risk Management Plan
Engineering Models
Map Export
Data Export
Click the map to view files for download.
Click to go to the Download Page
DFIRM: Effective
DFIRM: Preliminary
LiDAR Bare Earth
LiDAR DEM 50
LiDAR DEM 20
Imagery: TIFF File
Extract and Download
1. Select area of interest
Draw
2. Select Layers to extract data from
3. Specify download format
Shapefile - SHP - .shp


https://flood.nc.gov/advisoryflood/Home/Index
NCEM Advisory Flood Data | Hazards, Risk and Mitigation
Flood Risk Information System
Enter an address or zoom-in to get started
Louisville
Frankfort
Lexington
Evansville
Kentucky
Bowling Green
Clarksville
Nashville
Murfreesboro
Knoxville
Kingsport
Johnson C
Chattanooga
Huntsville
Greenville
Athens
Atlanta
Columbia
Birmingham
Augusta
Tuscaloosa
Alabama
Macon
Warner Robins
Montgomery
Columbus
Charleston
Savannah
Albany
Dothan
Valdosta
Hattiesburg
Mobile
Richmond
Lynchburg
Blacksburg
Norfolk
Chesapeake Bay


NCEM Advisory Flood Data | Hazards, Risk and Mitigation
Flood Risk Information System
Kinston Country Club,
Click a building for details
Select Flood Event Recurrence Interval
1% Annual Chance



Advisory Flood Hazard Data Water Surface Elevation Information

Kinston Country Club
Mosley Creek-Neuse River

Event	Elevation[1]
20% Annual Chance *(5-Year Flood)*	No Data
10% Annual Chance *(10-Year Flood)*	No Data
4% Annual Chance *(25-Year Flood)*	No Data
2% Annual Chance *(50-Year Flood)*	55.1
1% Annual Chance *(100-Year Flood)*	55.4
1% Rainfall Depth Plus *(100-Year Flood (Upper Confidence Bound))*	55.6
1% Rainfall Depth Plus 10% *(Median 1% Annual Chance Rainfall Depth plus 10%)*	55.5
1% Rainfall Depth Plus 20% *(Median 1% Annual Chance Rainfall Depth plus 20%)*	55.7
1% Rainfall Depth Plus 30% *(Median 1% Annual Chance Rainfall Depth plus 30%)*	55.9
.5% Annual Chance *(200-Year Flood)*	55.6
.2% Annual Chance *(500-Year Flood)*	56
.1% Annual Chance *(1000-Year Flood)*	56.6

[1] Water surface elevations in feet (NAVD88)

Possible Mitigation Techniques:

- Acquisition
- Dry floodproofing
- Wet floodproofing

There are **17** structures potentially affected in this area with projected damages totaling **$7,409,329** for a 30 year time horizon and **$12,348,881** for a 50 year time horizon. With mitigation measures in place **$6,984,121** in flood losses avoided could be achieved over 30 years and **$11,498,188** over 50 years.

Basin Report

For other data resources visit North Carolina's Spatial Data Download website.

Close

SPATIAL Data Download

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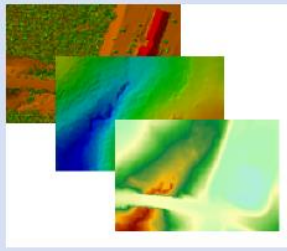
Hazards

Information provided with Floodplain Mapping.



Elevation Data

- Quality Level 1 & 2 LiDAR (2014-2017)
- Legacy LiDAR (2001-2005)
- Digital Elevation Models
- DEM Mosaics by County 3.125, 5, 10, 20 and 50 foot cell size

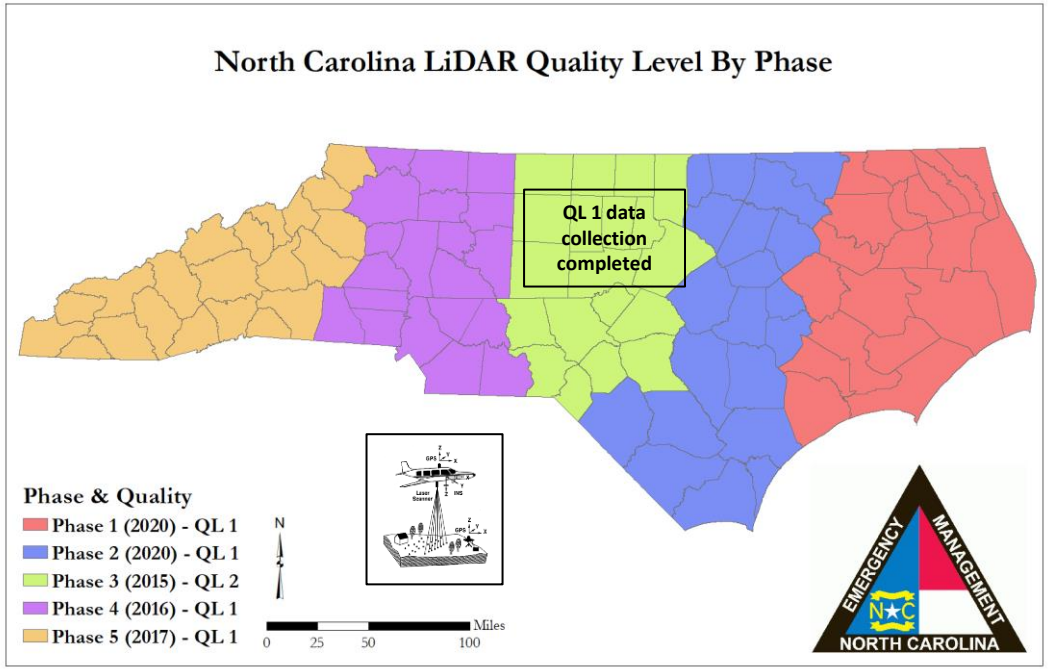
Building Footprints

2010 Statewide Building Footprint Polygons by county

2020 Coastal Building Footprint Polygons by county

2021 Eastern Piedmont Building Footprint Polygons by county

NC Light Detection and Ranging (LiDAR) Elevation Data

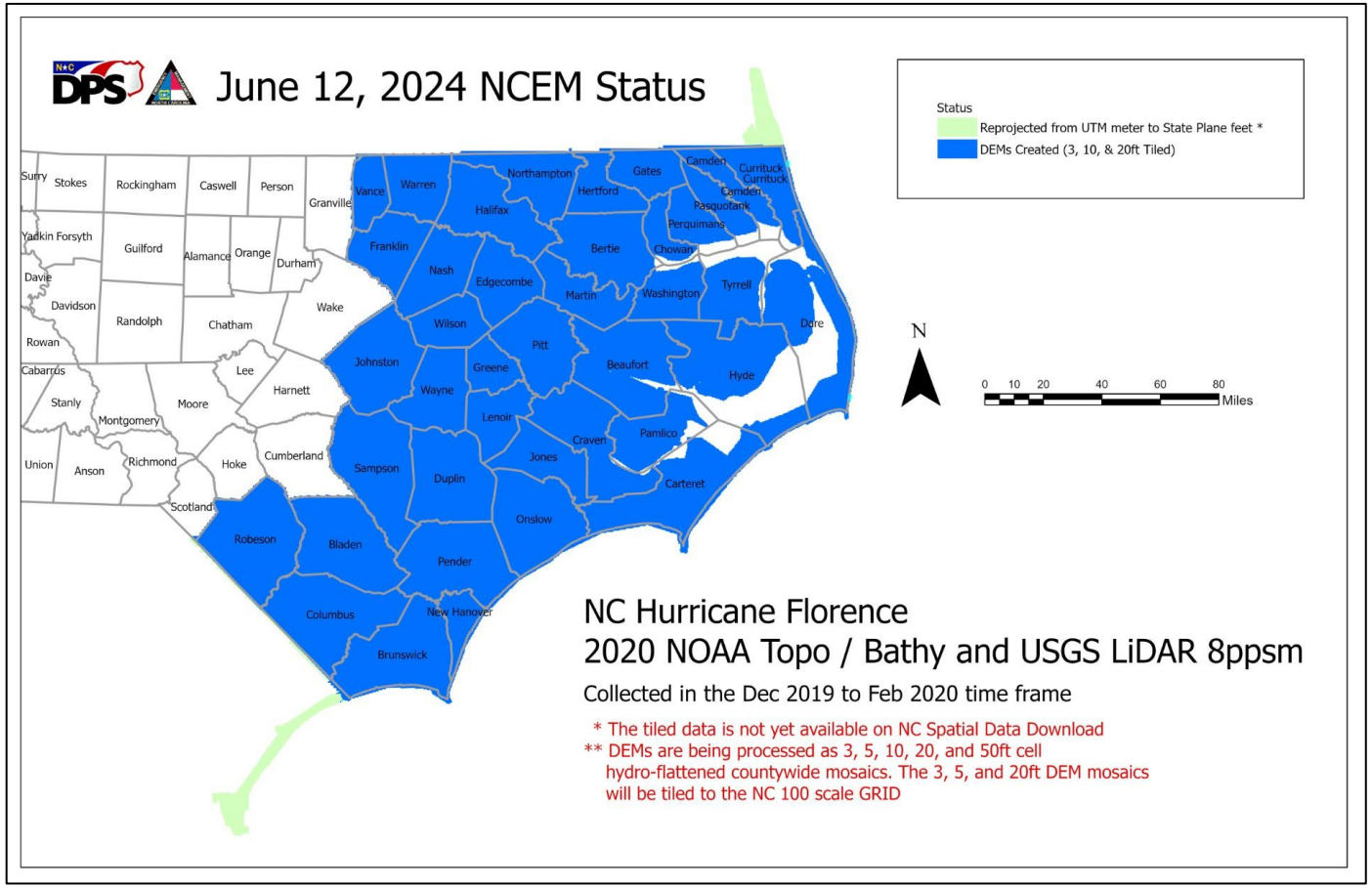


QL = Quality Level

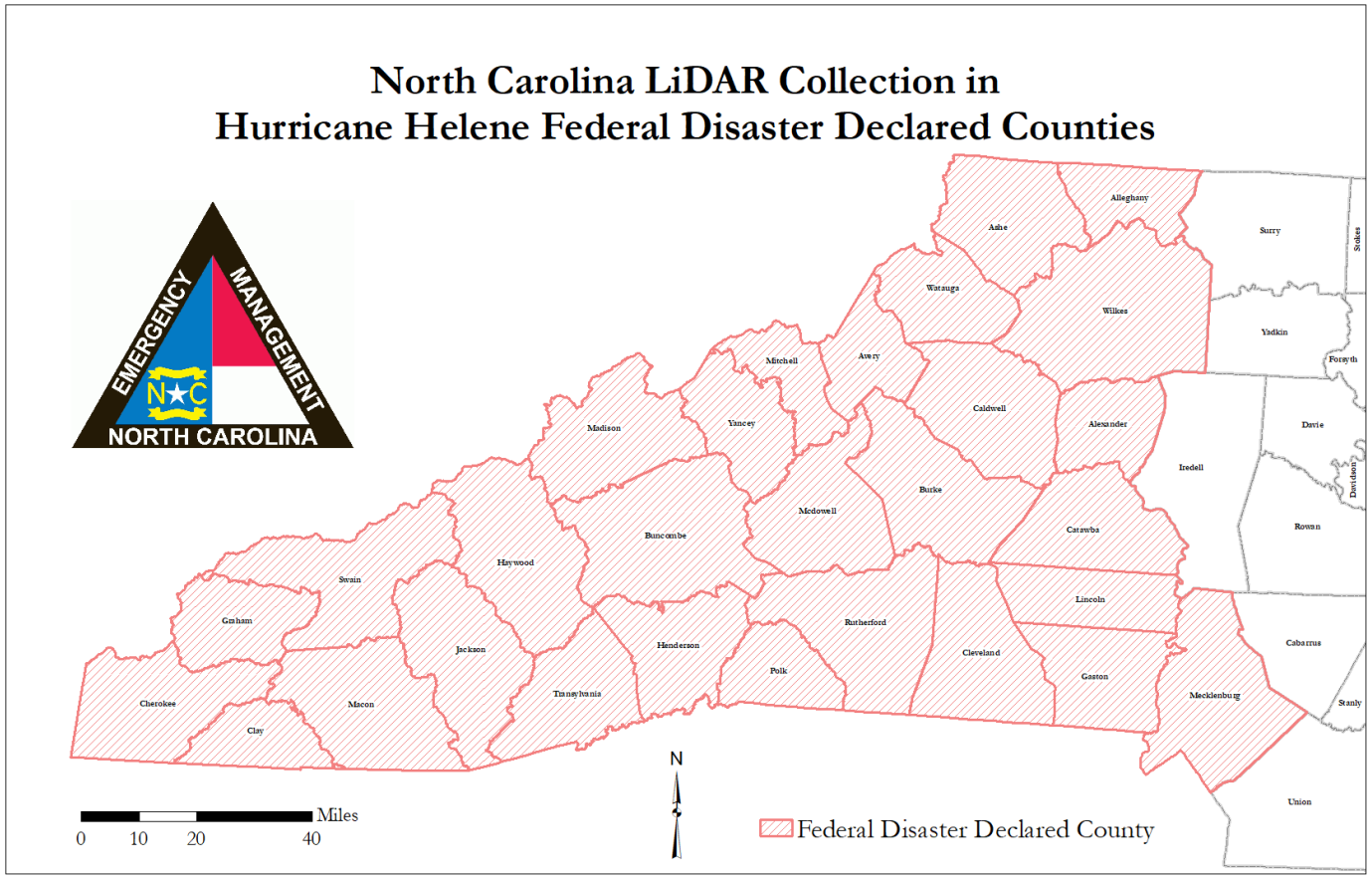
NAD83(2011), NAVD88, and US Survey Foot will be used to collect new LiDAR data in Phases 3, 4, 5

The new datums and the International Foot will be used when we start the 4th phase of statewide LiDAR data collection

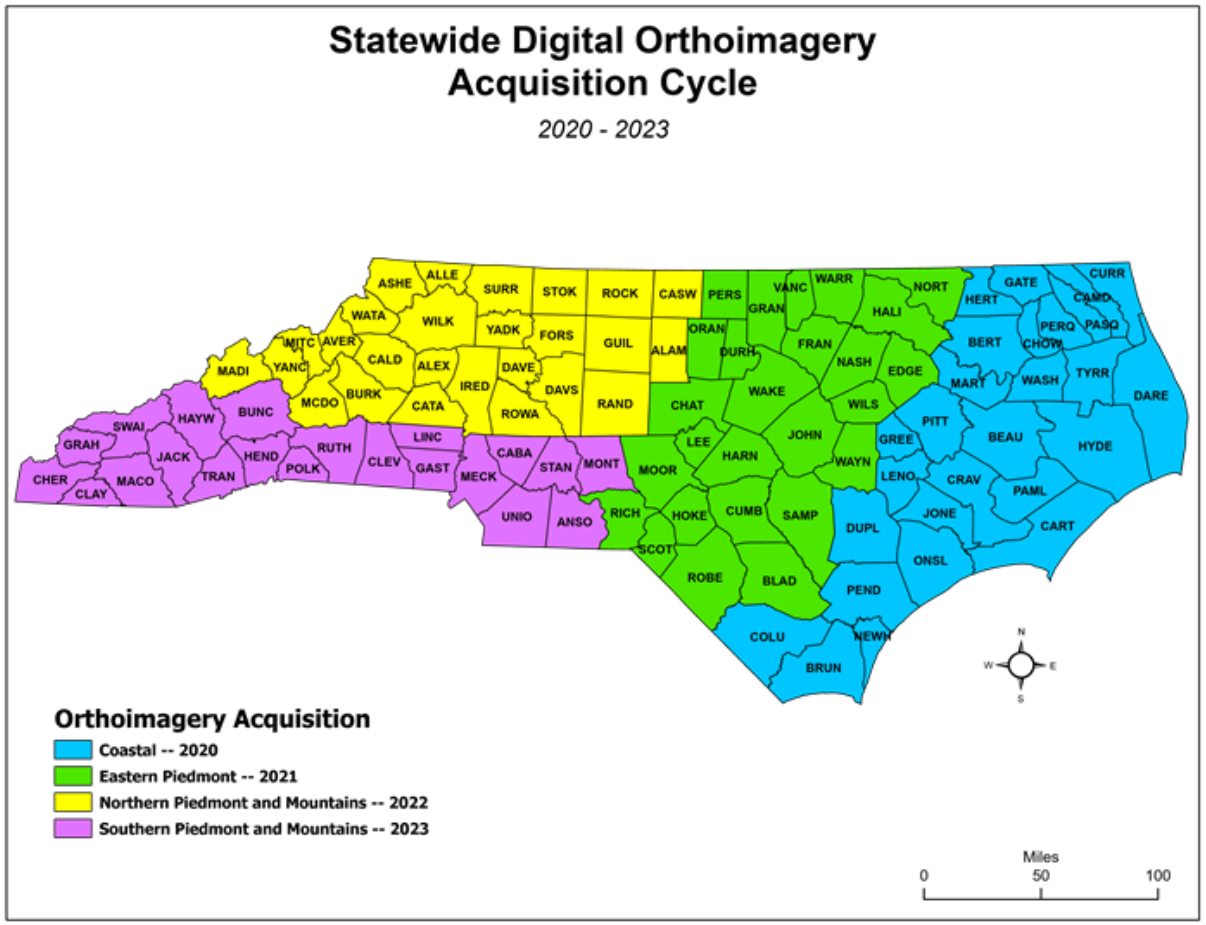
NC Light Detection and Ranging (LiDAR) Elevation Data



NC Light Detection and Ranging (LiDAR) Elevation Data 2025



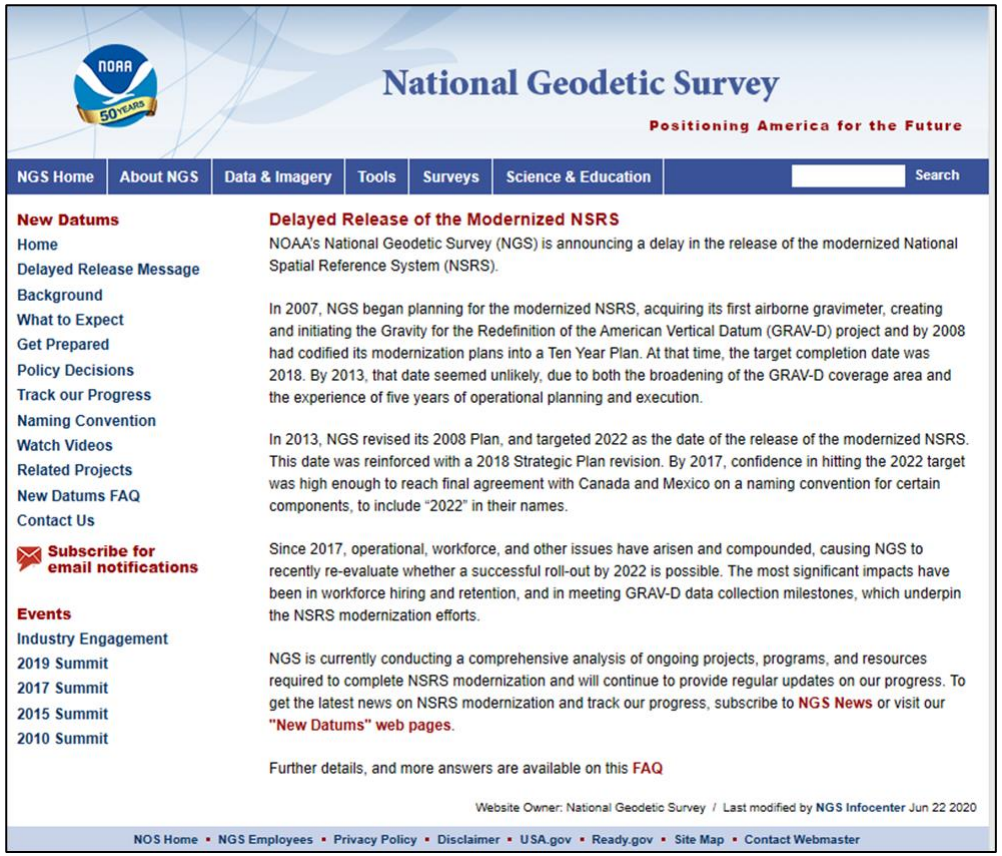
Statewide Imagery



NAD83(2011), NAVD88, and US Survey Foot will be used to collect new imagery in 2028.

The new datums and the International Foot will be used when we start imagery data collection in 2028 in the Coastal project area.

New Datums are Coming in Spring 2026



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Background
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2017 Summit
2015 Summit
2010 Summit

Delayed Release of the Modernized NSRS

NOAA's National Geodetic Survey (NGS) is announcing a delay in the release of the modernized National Spatial Reference System (NSRS).

In 2007, NGS began planning for the modernized NSRS, acquiring its first airborne gravimeter, creating and initiating the Gravity for the Redefinition of the American Vertical Datum (GRAV-D) project and by 2008 had codified its modernization plans into a Ten Year Plan. At that time, the target completion date was 2018. By 2013, that date seemed unlikely, due to both the broadening of the GRAV-D coverage area and the experience of five years of operational planning and execution.

In 2013, NGS revised its 2008 Plan, and targeted 2022 as the date of the release of the modernized NSRS. This date was reinforced with a 2018 Strategic Plan revision. By 2017, confidence in hitting the 2022 target was high enough to reach final agreement with Canada and Mexico on a naming convention for certain components, to include "2022" in their names.

Since 2017, operational, workforce, and other issues have arisen and compounded, causing NGS to recently re-evaluate whether a successful roll-out by 2022 is possible. The most significant impacts have been in workforce hiring and retention, and in meeting GRAV-D data collection milestones, which underpin the NSRS modernization efforts.

NGS is currently conducting a comprehensive analysis of ongoing projects, programs, and resources required to complete NSRS modernization and will continue to provide regular updates on our progress. To get the latest news on NSRS modernization and track our progress, subscribe to NGS News or visit our "New Datums" web pages.

Further details, and more answers are available on this FAQ

Website Owner: National Geodetic Survey / Last modified by NGS Infocenter Jun 22 2020

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geodesy.noaa.gov

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2021 Summit
2019 Summit
2017 Summit
2015 Summit
2010 Summit

Get Prepared

1. Transform Data

Tools will be available to transform your coordinates from historic datums (NAVD 88, NAD 83, etc.) to coordinates in the modernized NSRS at the first reference epoch of the modernized NSRS (2020.00) using **NGS Coordinate Conversion and Transformation Tool (NCAT)**.

NOTE: Depending on your accuracy requirements, consider saving original observation files and/or plan for re-observations.

2. Record Metadata

Knowing the datums and epochs for your geospatial files will simplify your datum transformations, so require complete metadata in all surveying and mapping contracts.

3. Perform GPS on Bench Marks Operations

Obtain accurate NAD 83 ellipsoid heights on NAVD 88 bench marks to improve the transformation tool for the new geopotential ("vertical") datum.

4. Review State Plane Coordinate System of 2022 (SPCS2022) requirements

SPCS2022 policy and procedures documents and forms give the requirements for developing SPCS2022. The procedures and forms include contact information and instructions for requesting and proposing SPCS2022 zones.

5. Prepare to update legislation, as needed

The National Society of Professional Surveyors (**NSPS**), the American Association of Geodetic Surveying (**AAGS**), and NGS created **template legislation** to aid states in transitioning their legislation to new wording. Contact NSPS, AAGS, your state affiliate, or your local chapter for more information. Examples of new state legislation are available for **download**. The map below shows the status of legislation for the State Plane Coordinate Systems of 1983 and 1927 for all U.S. states and territories.

What about state plane coordinates?

NGS will likely define State Plane Coordinates (SPCs) through the same projections and zones associated with NAD 83. See our **FAQ** to learn more.

SPCs are converted from meters using the conversion factor as defined by the individual states who have requested that NGS publish SPCs in feet. The two conversion factors are:

The International Foot
1 inch = 2.54 centimeters

The U.S. Survey Foot
1 meter = 39.37 inches

HB814

Questions?

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NC Geodetic Survey Chief
200 Park Offices Drive
Durham, NC 27713

Main office: 919-733-3836
Direct line: 919-948-7844

gary.thompson@ncdps.gov

- https://storms.ngs.noaa.gov/storms/helene/index.html#5/31.9/-82.19
- https://disasterresponse.maps.arcgis.com/apps/instant/media/index.html?appid=fe5193ccf48f48e3a2129b6c394ee886