



NORTH CAROLINA
Department of Transportation



NCDOT – Data to Define Resilience

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Investing in Transportation Resilience: A Framework for Informed Choices
TRB Workshop, Washington DC June 17, 2022



Extreme Events

Hurricanes, prolonged flooding, increased maintenance/asset repairs

- 2018 Florence
- 2016 Matthew
- Other isolated, intense storms

2015-
Present

Federal Response

- FAST Act
- Infrastructure and Investment Jobs
- FHWA Emergency Relief Funds
- Vulnerability and Adaptation
- Resiliency considerations in long range plans
- Toolkits, training, peer exchanges (e.g., RAMCAPs Colorado procedure document)
- USACE Flood Risk Feasibility Studies on Tar Pamlico, Neuse, and Lumber River Basins

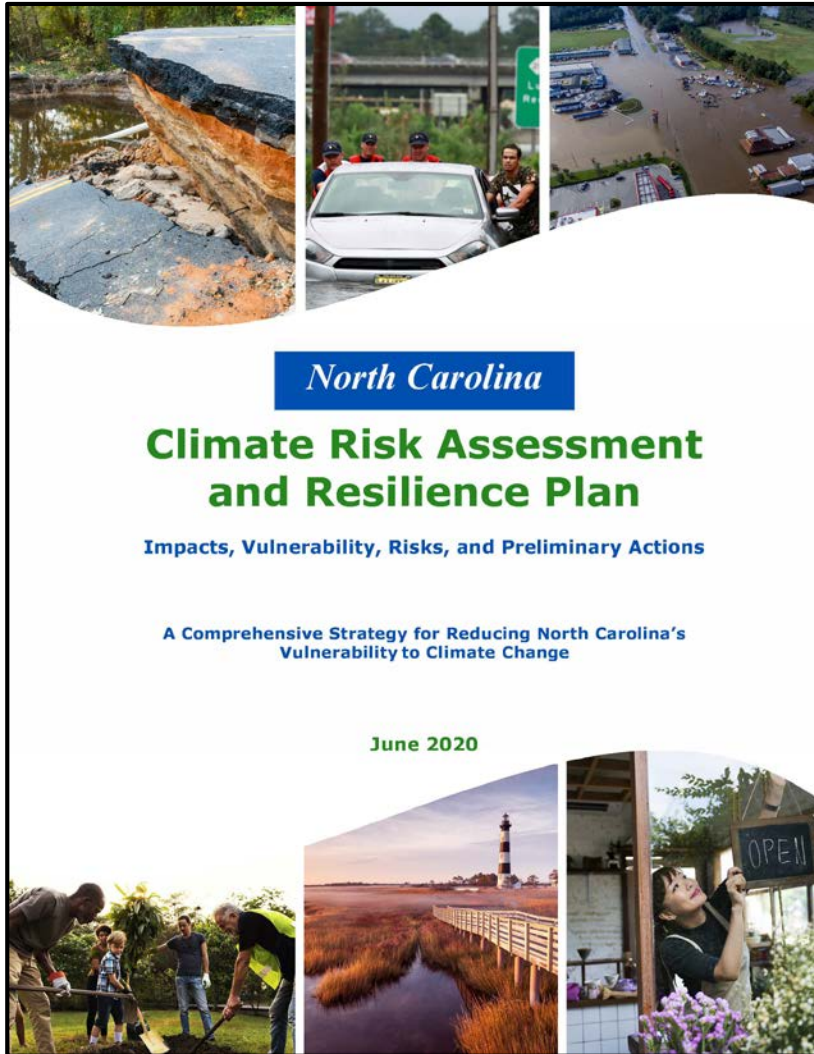
State Response







- **EO80**
- NC Climate Change Interagency Council
- ZEV Plan
- NC Climate Risk and Resiliency Plan
- NC Moves 2050
- Ongoing Research, Studies

Last
Decade

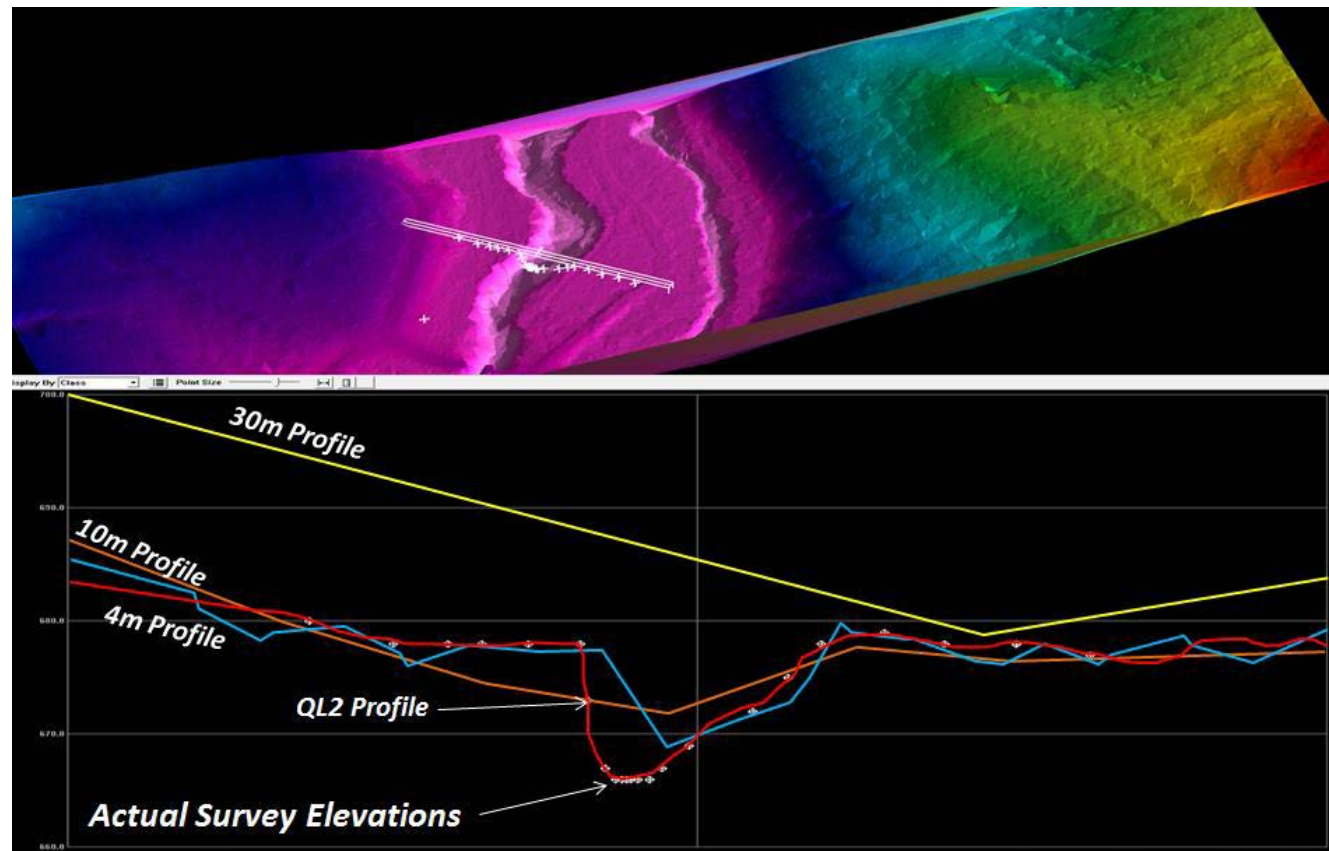
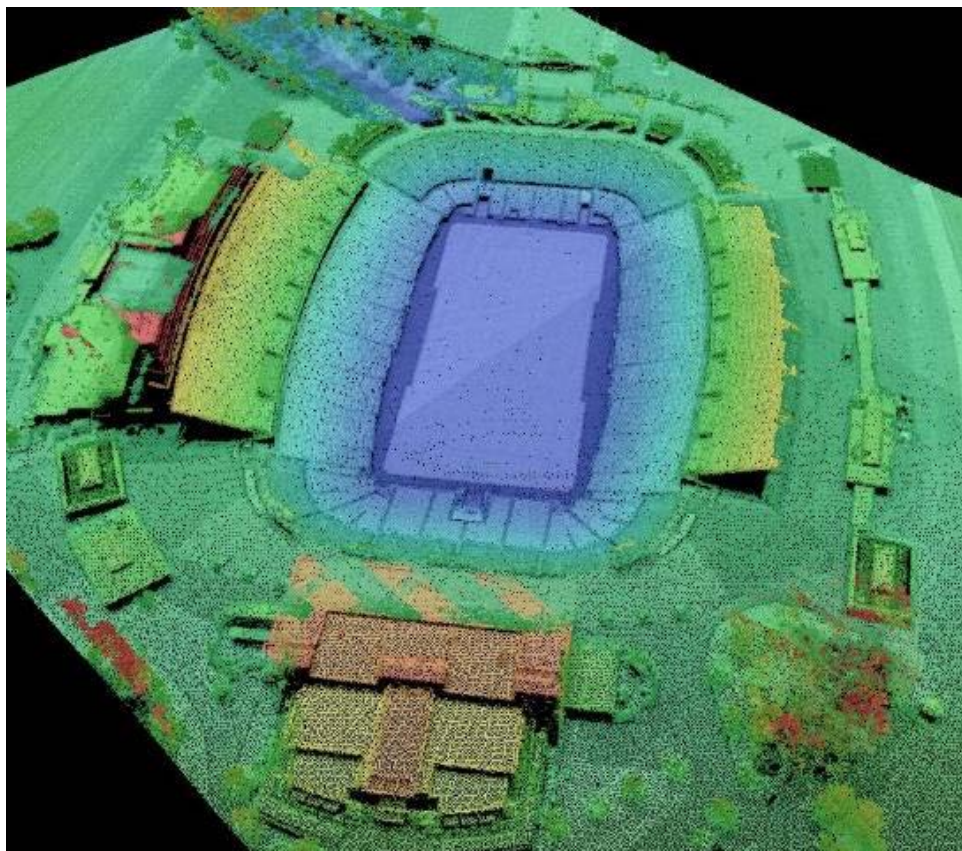
2018-
Present

NC Climate RARP

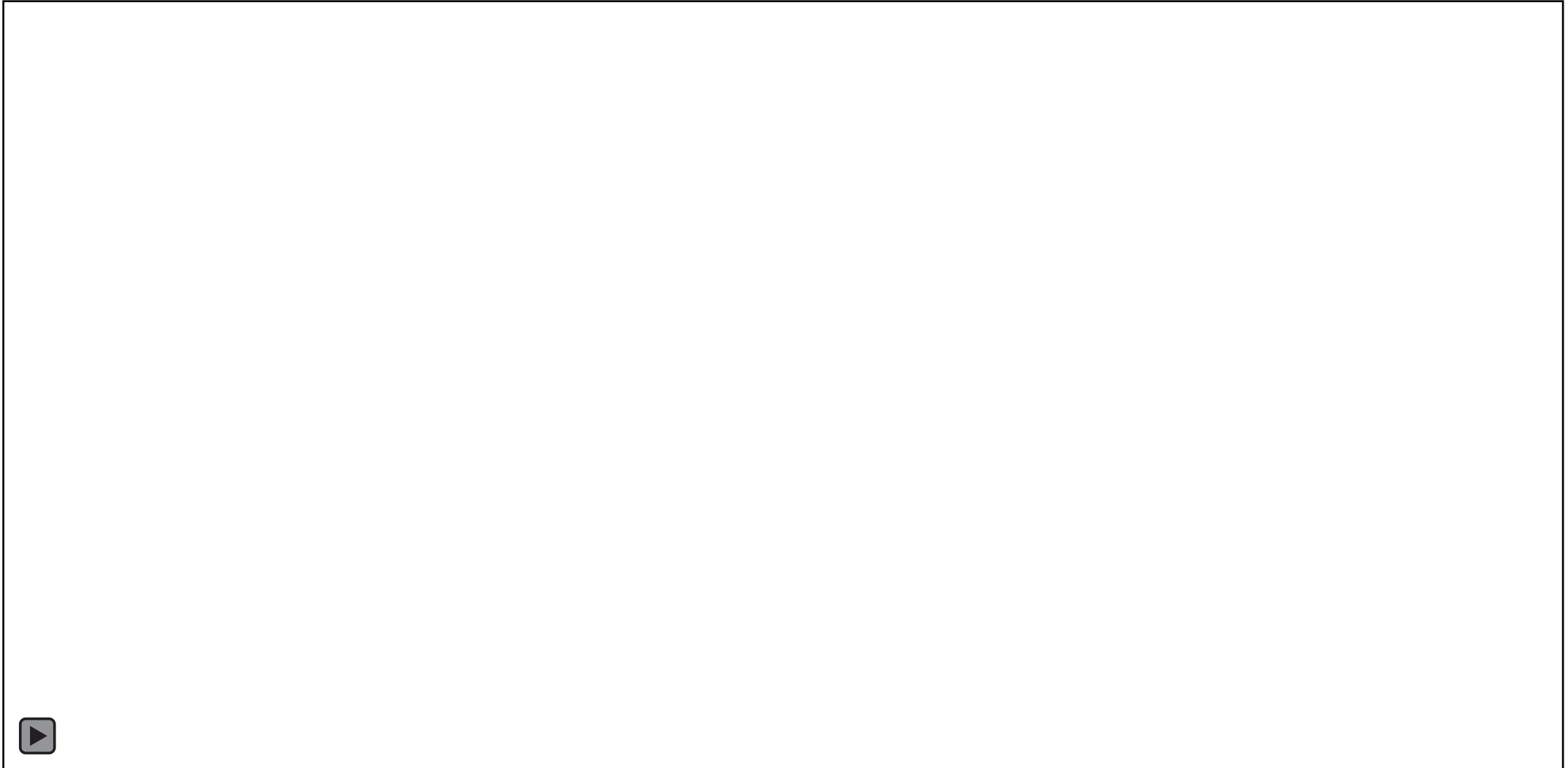


<p>Virtually Certain Sea Level will continue to rise</p> 	<p>Very Likely Summer Heat Index Values will increase</p> 	<p>Likely Annual Total precipitation will increase</p> 
<p>Likely Hurricane intensity will increase</p> 	<p>Likely Severe droughts will become more intense</p> 	<p>Likely Increase in precipitation will lead to an increase in inland flooding</p> 
<p>Virtually Certain= 99-100% probability of outcome Very Likely= 90-100% probability of outcome Likely= 66-100% probability of outcome About as Likely as Not = 33-66% probability of outcome Unlikely= 0-33% probability of outcome Very Unlikely= 0-10% probability of outcome Exceptionally Unlikely= 0-1% probability of outcome</p>		

LiDAR



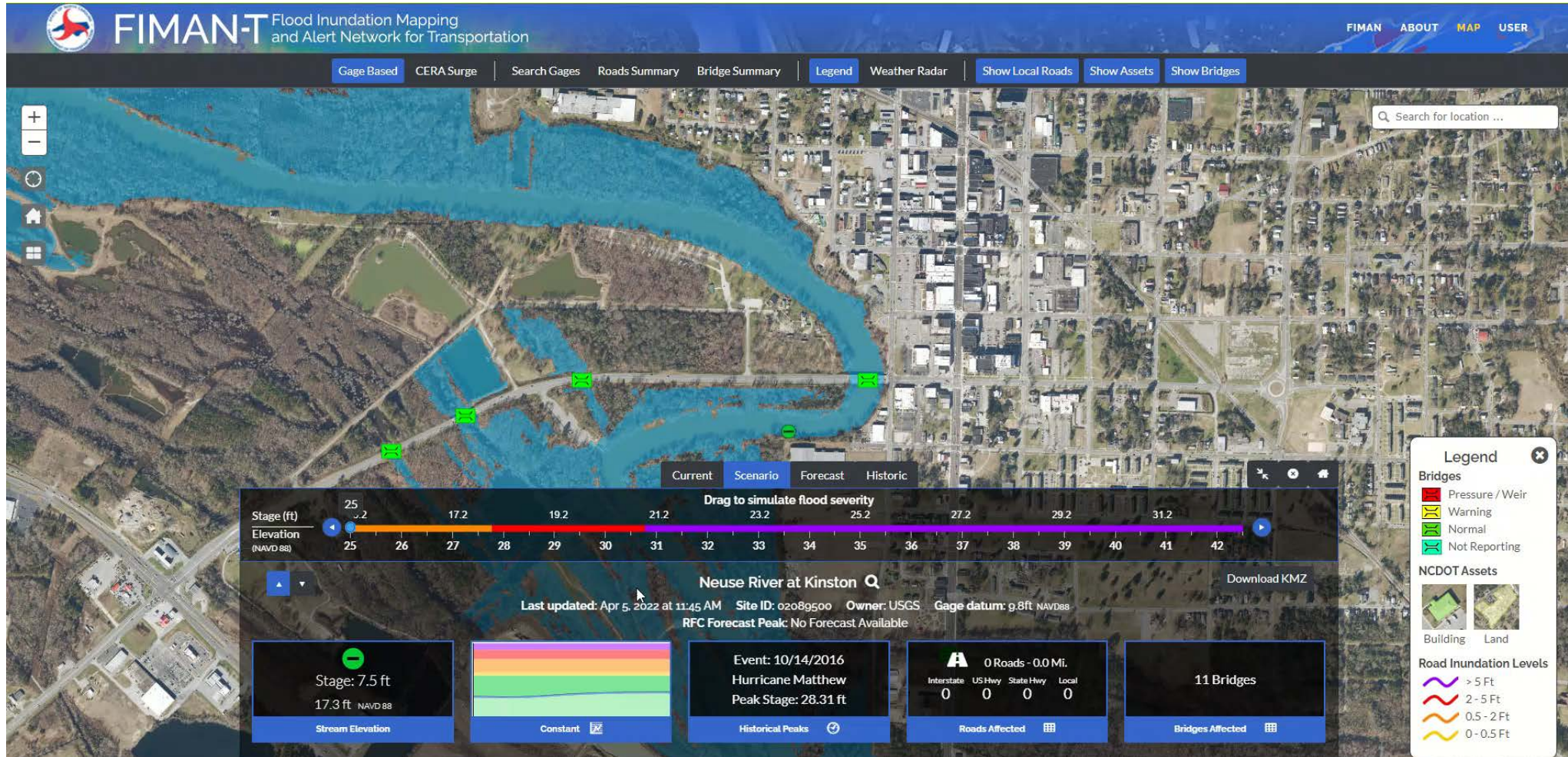
RIT – Roadway Inundation Tool



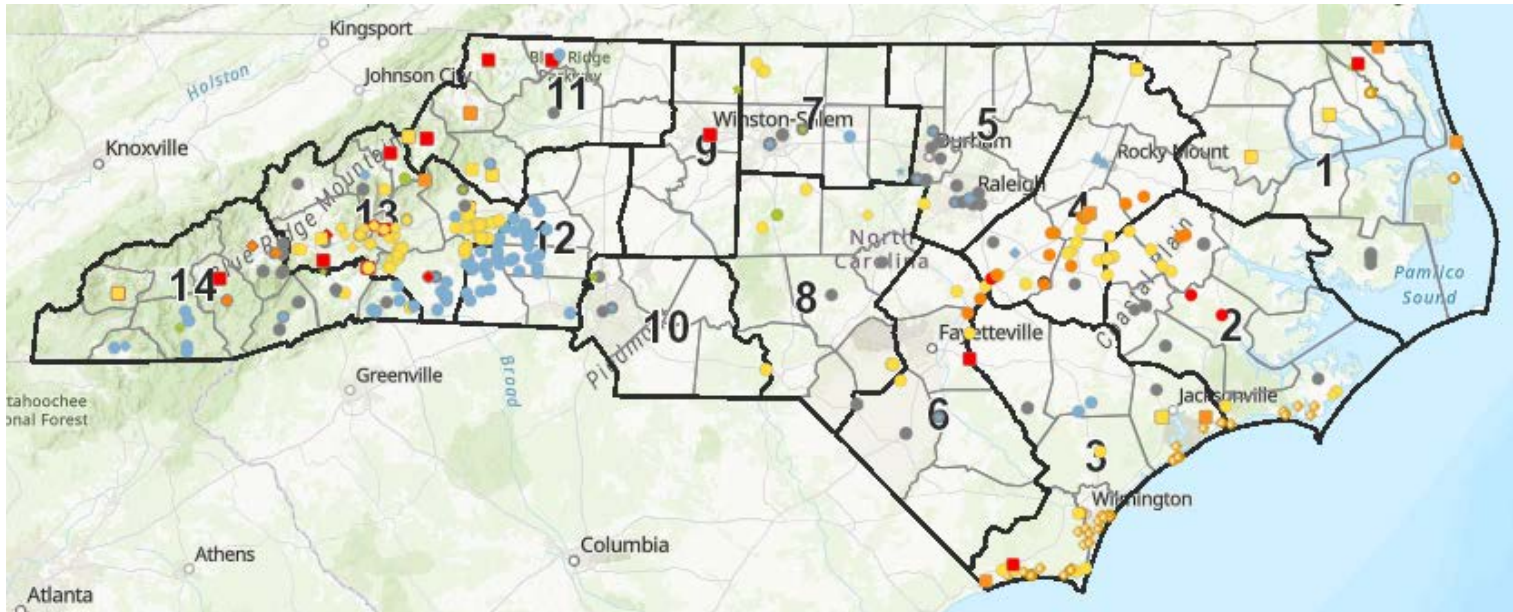
CRIS – Coastal Roadway Inundation Simulator



FIMAN-T & FIMAN-T Surge



BridgeWatch



[External] BridgeWatch - Device Alert

N
 NCBridgeWatch@ncdot.bridgewatch.us
 To Smith, Charles R

You forwarded this message on 2/24/2022 7:14 AM.
 If there are problems with how this message is displayed, click h

CAUTION: External email. Do not click links or open attachments

Structure Overtopping bridges: 780045 (In Rockingham)

[NCEM Structure Overtopping](#)

Bridge: [780045](#)

County: Rockingham

Road: SR2282

Stream: DAN RIVER

Lat\Long: 36.485,-79.763

Gage: 30020

Time: 2022-02-24 06:16:01 UTC


Event Value: 49.02

Threshold Exceeded: 45.4

Confirmation:Yes

(USGS Alert) USGS Structure
 Overtopping Br [990040](#) (Yancey)@
 NC197 & CANE RIVER Lat\long:
 35.830,-82.318 Time: 2021-12-03
 15:30:00.0 17.77 > 17.06

Landslides and Slope Stability



Landslides in Western North Carolina

Explore current and historical information about landslides across the region, and access resources to help you plan for and build resilience to landslide hazards.

Home
Data Tour Guide
Learn More
Downloads
About

Reducing Landslide Risk

What can you do to reduce landslide risk?

Explore Data in a Map Viewer

Interact with landslide data in an online map viewer

Data Tour Guide

Learn about the data

Learn More

Learn about landslide hazards, historical events, and more

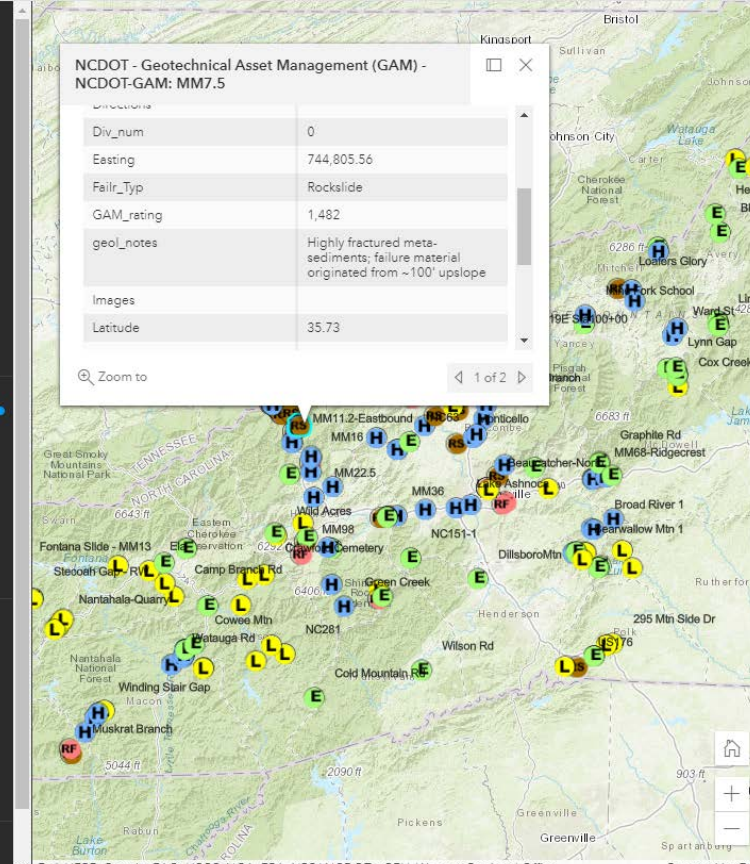
North Carolina Geological Survey
Asheville Regional Office

- +
- Layers
- Tables
- Basemap
- Charts
- Legend
- Bookmarks
- Save
- New map
- Open map
- Map properties
- Hide interface
- Share map
- Create app
- Print
- Information

NCDOT - Geotechnical Asset Management (GAM) - NCDOT-GAM: MM7.5

Div_num	0
Easting	744,805.56
Fail_Typ	Rockslide
GAM_rating	1,482
geol_notes	Highly fractured meta-sediments; failure material originated from ~100' upslope
Images	
Latitude	35.73

Zoom to



NCDOT - Geotechnical Asset Management (GAM) - NCDOT-GAM

Properties

Use the selector above to switch between layers in the map.

Information

Symbology

Show in map legend

NCDOT - Geotechnical Asset Management (GAM) - NCDOT-GAM

Fail_Typ

- E Embankment
- H Historic
- L Landslide
- RF Rockfall
- RS Rockslide
- <all other values>

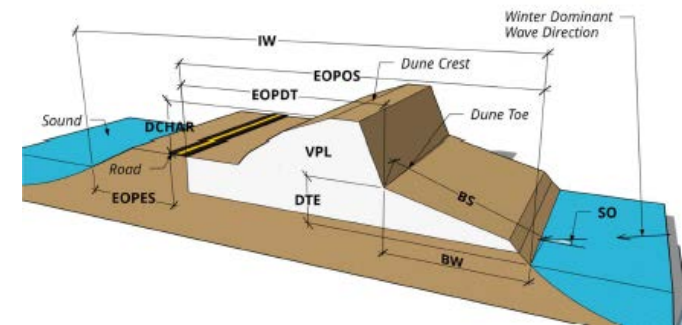
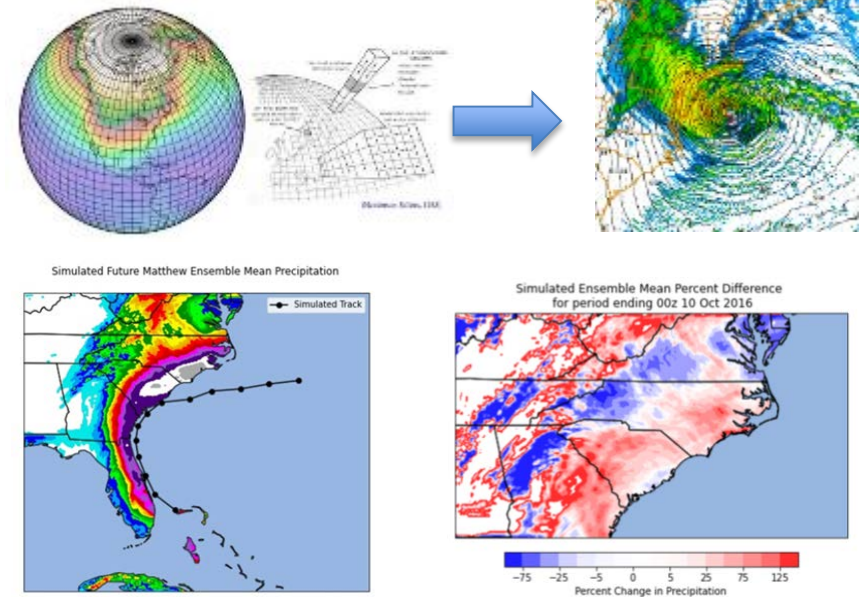
[Edit layer style](#)

Appearance

Esri, HERE, Garmin, FAO, USGS, NGA, EPA, NPS | NCDOT - GEU, Western Regional Office
Powered by Esri

RESEARCH

- NC Future Precipitation for Resilient Design
- IDF Rainfall Update – Atlas-14, Volume 13
- NCSU Flood Abatement Studies and predicting roadway washouts– Resilient Routes
- NCHRP 51-10 – Practices for Integrated Flood Prediction and Response Systems
- NCHRP – Climate Change for Hydrologic and Coastal Design (NCHRP 15-61/20-44(23))
- Multiple Outer Banks Coastal Monitoring



DATA Availability & Access



A

Advancing

T

Transportation through

L

Linkages

A

Automation and

S

Screening



SEARCH TOOL

Search or download data related to project development



SCREENING TOOL

Screen projects for effects and create screening reports



WORKBENCH

Manage and upload project data and deliverables, track project progress, and report on activities



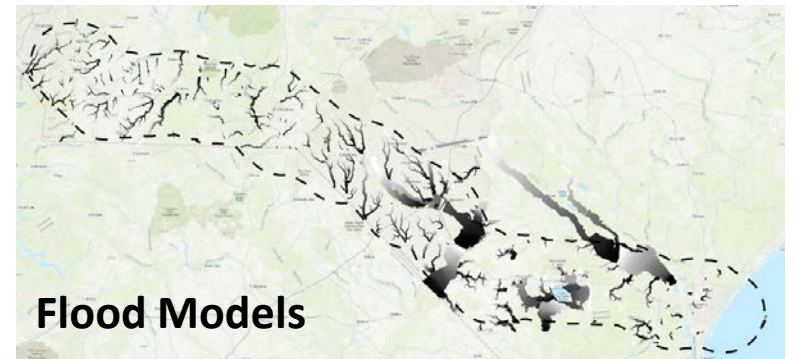
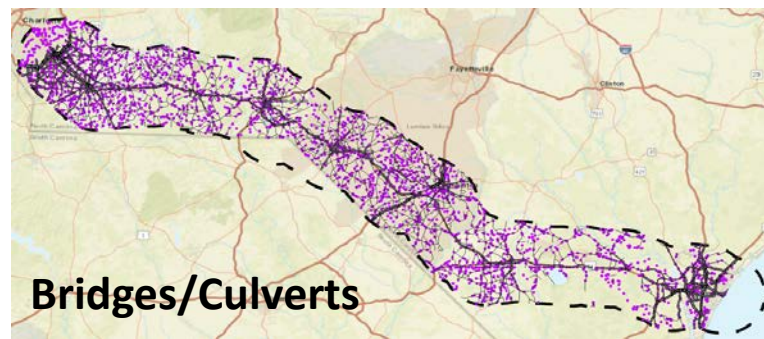
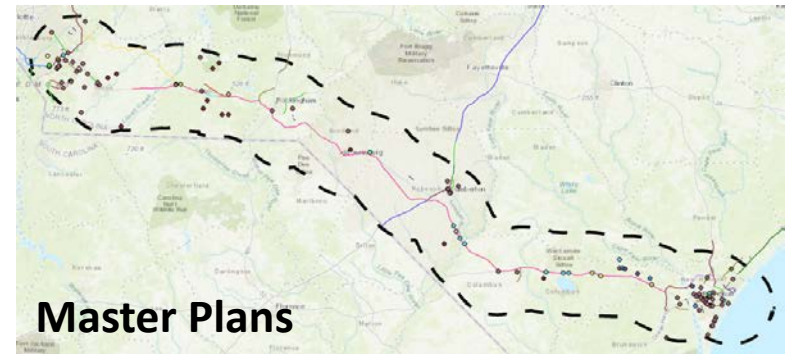
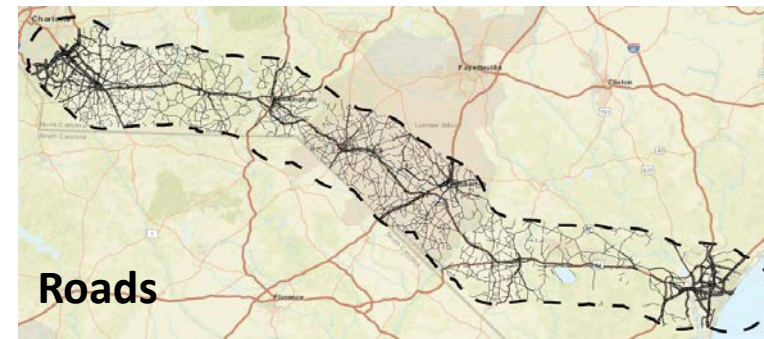
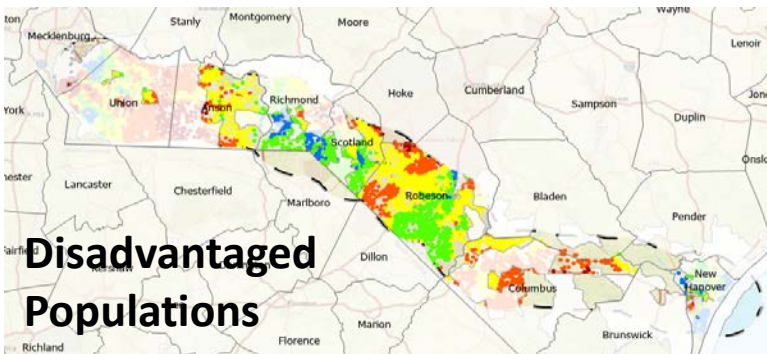
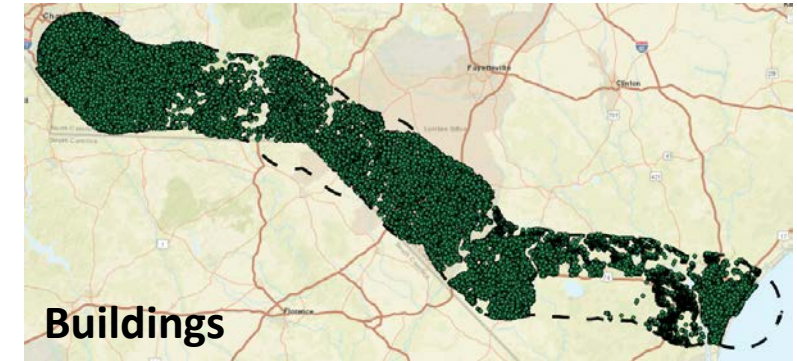
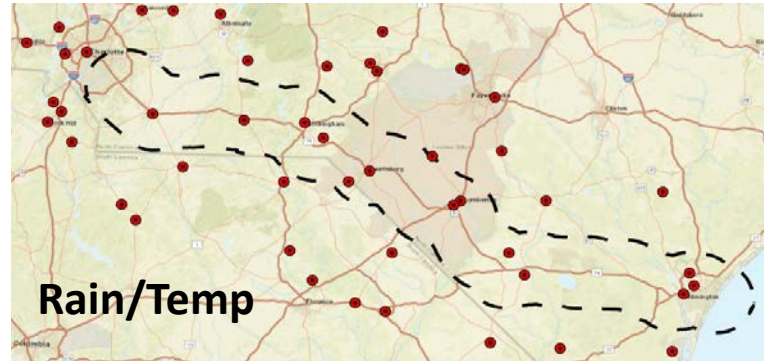
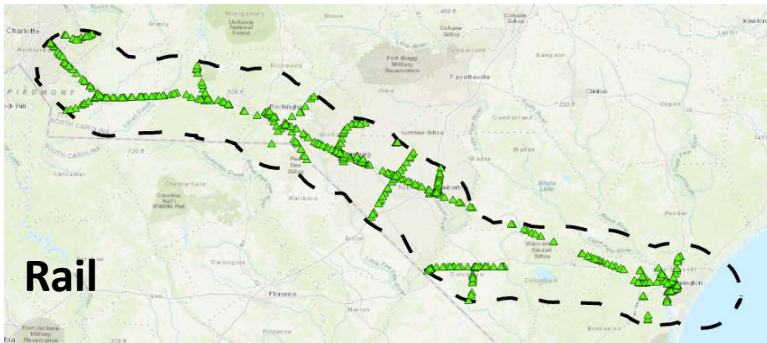
APP MANAGEMENT TOOL

.....
Configuration
tools
in the hands
of DOT
Business

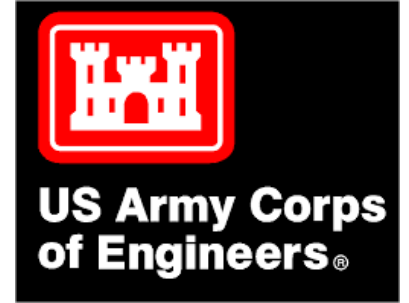
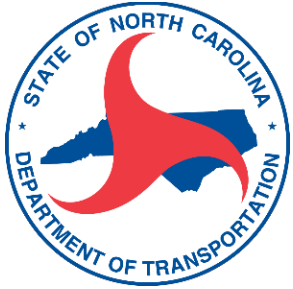
ATKINS

Member of the SNC-Lavalin Group

VULNERABILITY ASSESSMENTS



Partnerships



FEMA

