NCGS: Positioning NC today and for the future!

North Carolina
Geodetic Survey

Establishing and Maintaining
the Official Survey Base
in North Carolina

- North Carolina one of the two original states to receive Height Modernization funding.
- The North Carolina Geodetic Survey (NCGS) received $1.0M grant in FY01, $800K in FY02, $800K in FY03, $800K in FY04 and $800K in FY05.
- North Carolina Floodplain Mapping Program uses Height Modernization to gather elevation data to evaluate and improve the accuracy of the floodplain maps.
- Cooperative effort with the Department of Homeland Security to use the results of the GNP surveys and the CORS to cover the State with modernized Flood Insurance Maps.
- Approximately 45 CORS in the state, with plans to expand the network.
- North Carolina established Real-Time Kinematic CORS Networks in several urban areas, with plans to expand coverage.
- Several Height Modernization projects have been completed: Buncombe, Gaston, Henderson, Wake, and Watauga Counties. Height Modernization projects are currently underway in Ashe and Haywood Counties.
- Leveling connections to CORS are ongoing.
- Outreach, education, technology transfer, and software support for Height Modernization activities conducted by NOAA and NCGS through a cooperative agreement with North Carolina Agricultural and Technical State University (NCA&T).
- Current NCA&T projects include the development of a Windows interface software program for ADJUST which will be made available to the public when complete.
- NCA&T hosted two 2-day Height Modernization workshops (September 2004 and 2005) for beginners and advanced users of GPS.
- NCA&T developing a GeoSpatial Curriculum and anticipates a program offered in 2006.

National Height Modernization System

Projects in North Carolina

N
W E
S

NHMS Station

0 10 20 40 60 80 100 Miles

Education Outreach

Height Modernization Workshops is a traveling workshop designed for government agencies, professional surveyors, academic departments, school groups, and other interested parties in North Carolina.

- Workshops are tailored to each group's requirements
- PDH credit

Mapping Evacuation Routes

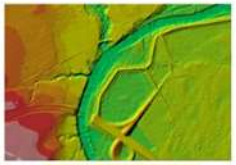
North Carolina Floodplain Mapping Program

Tidal Station Surveys

Floodplain Mapping

Jones County 2003 Mapping

LIDAR Digital Elevation Model



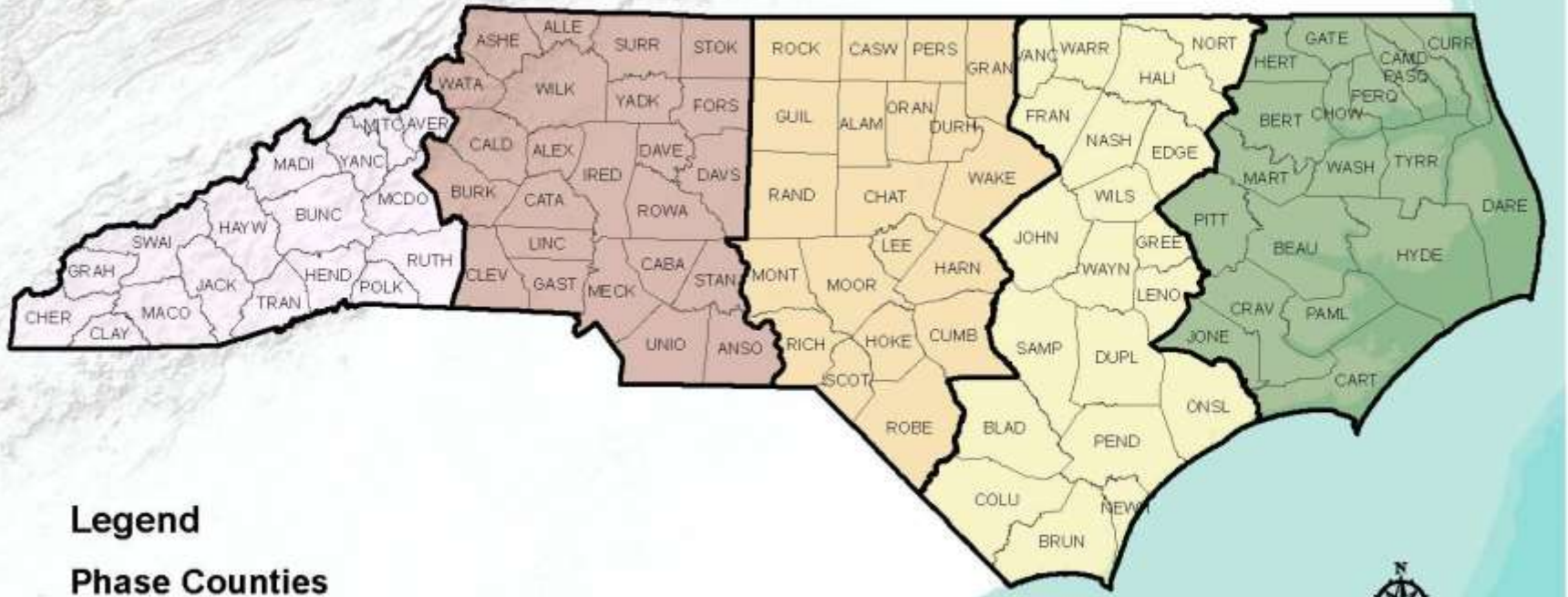
Sample Bare Earth DEM (Tarboro, NC)

Monitoring Subsidence

09-23-13

High Resolution Topographic Refresh

Proposed LiDAR-Derived Elevation Acquisition by Phase



Legend

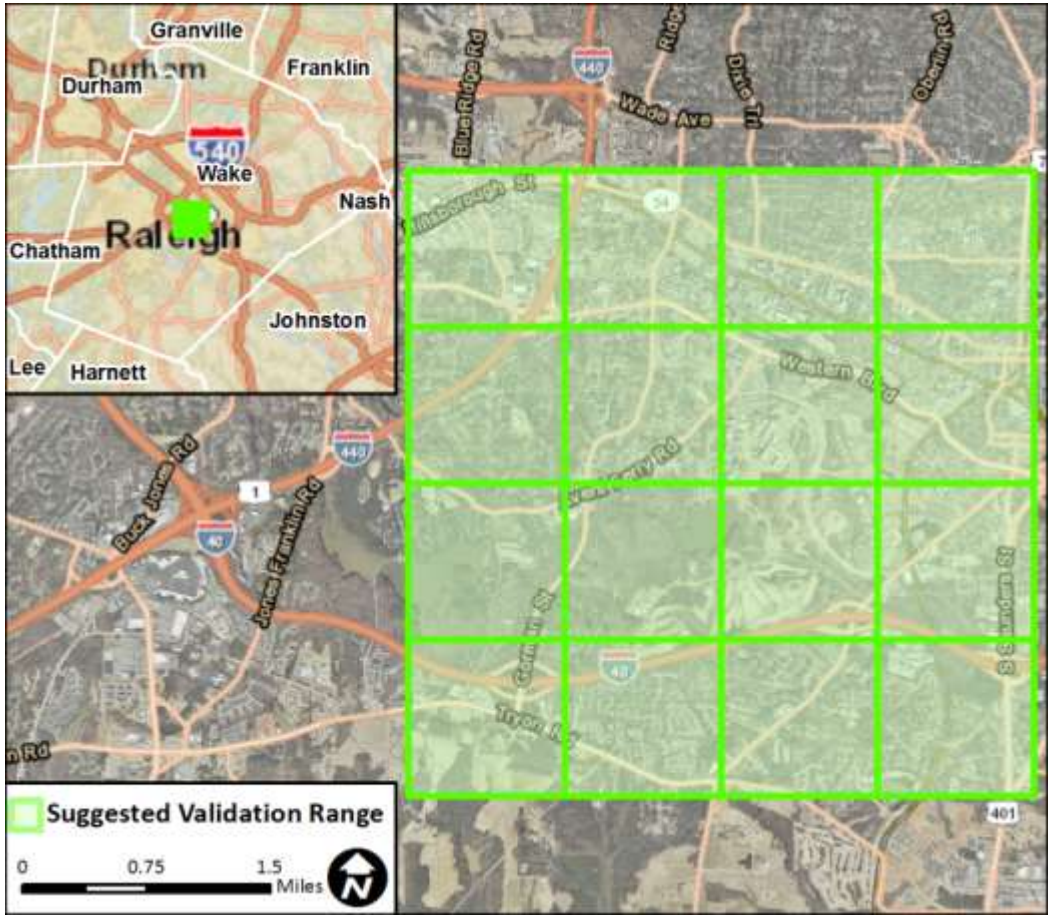
Phase Counties

- USGS/NCFMP 2014
- Phase 2 - NC 2014
- Phase 3 - 2015
- Phase 4 - 2016
- Phase 5 - 2017

Validation Range

State Specifications

- flown by each sensor to check horizontal and vertical accuracy
- gives the teams the capability of adjusting the sensors



State Specifications

Collection

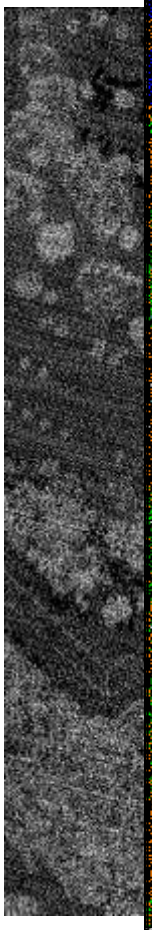
- The 2014 LiDAR data collection will meet 2 points per square meter standard with nominal post spacing of 0.7 meters

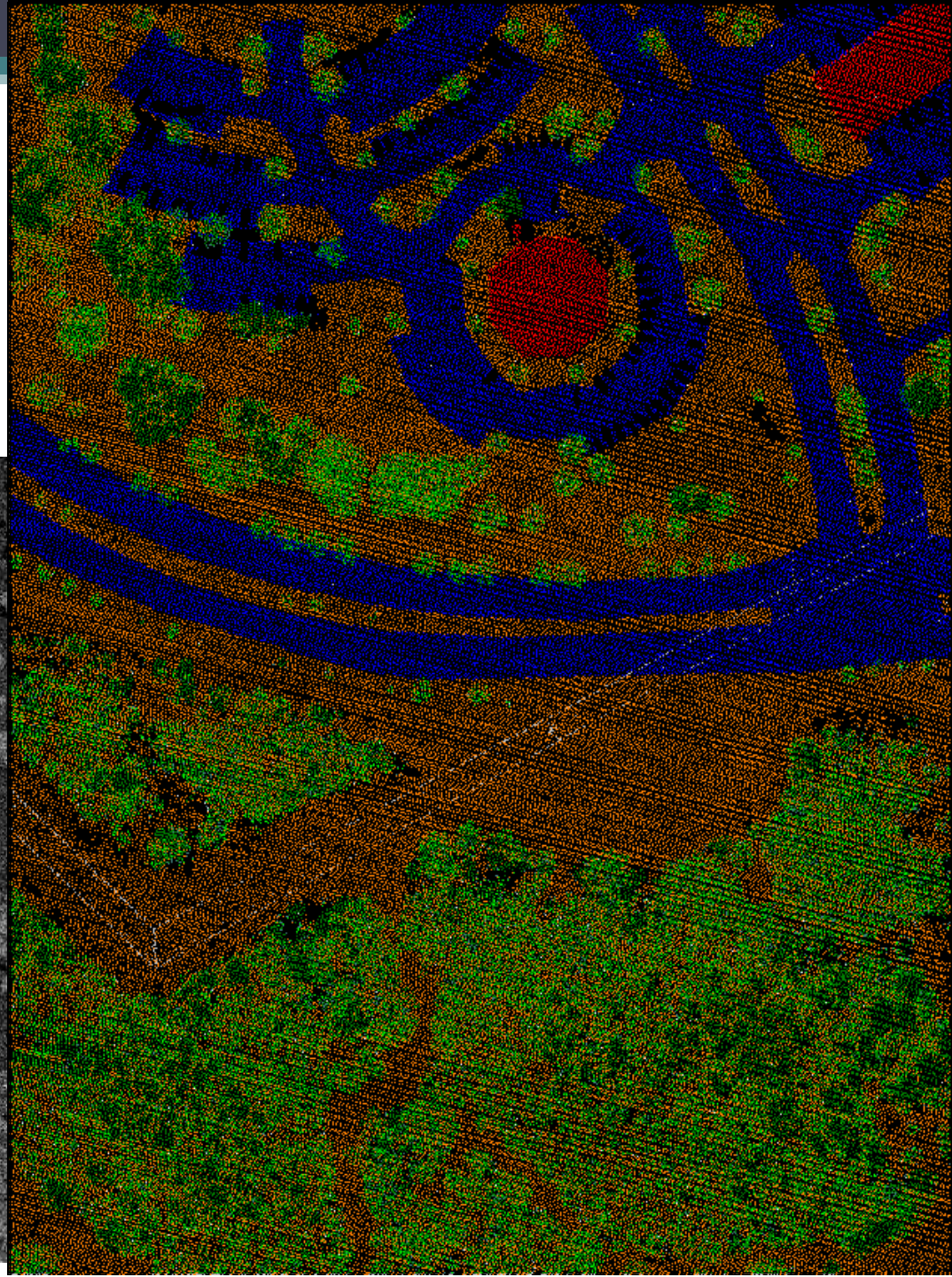
- All data will include multi-return and intensity values

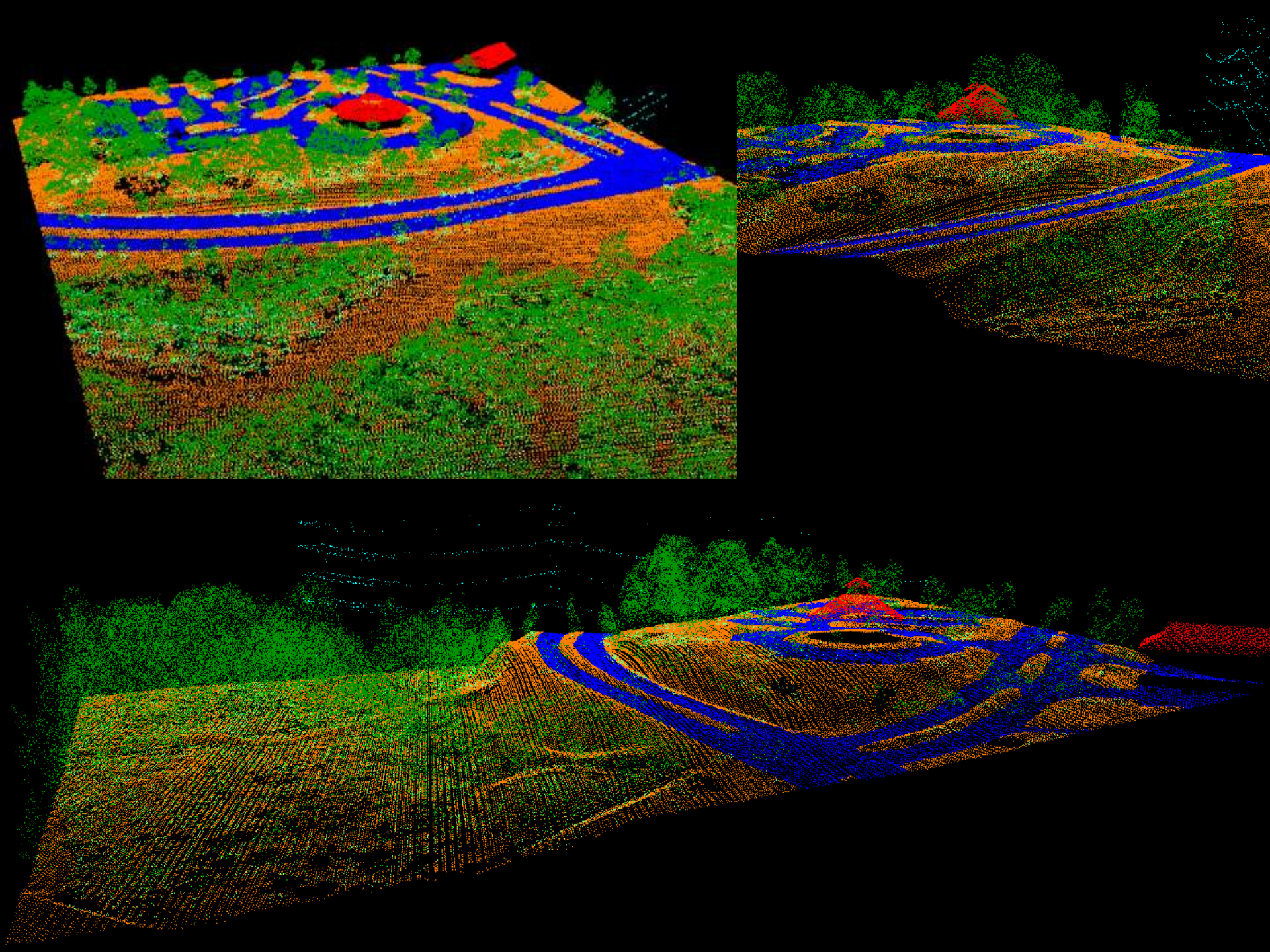
- Data collected will support a 9.25 cm RMSEz and 18.13 cm FVA based on NDEP guidelines.

LiDAR Classification

- Un-Classified Data
- Ground/Bare Earth
- Vegetation
- Buildings
- Roads/Impervious

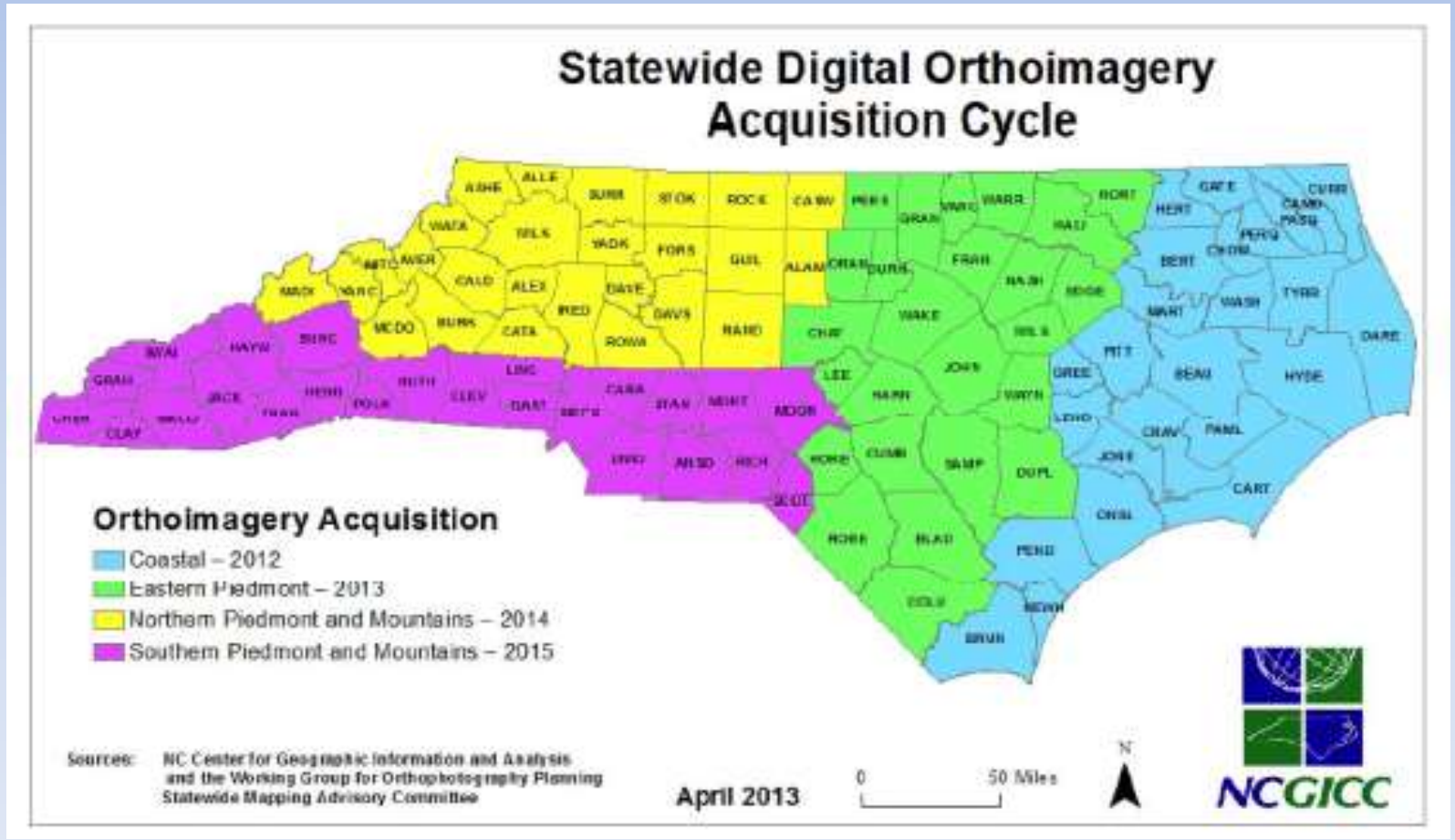


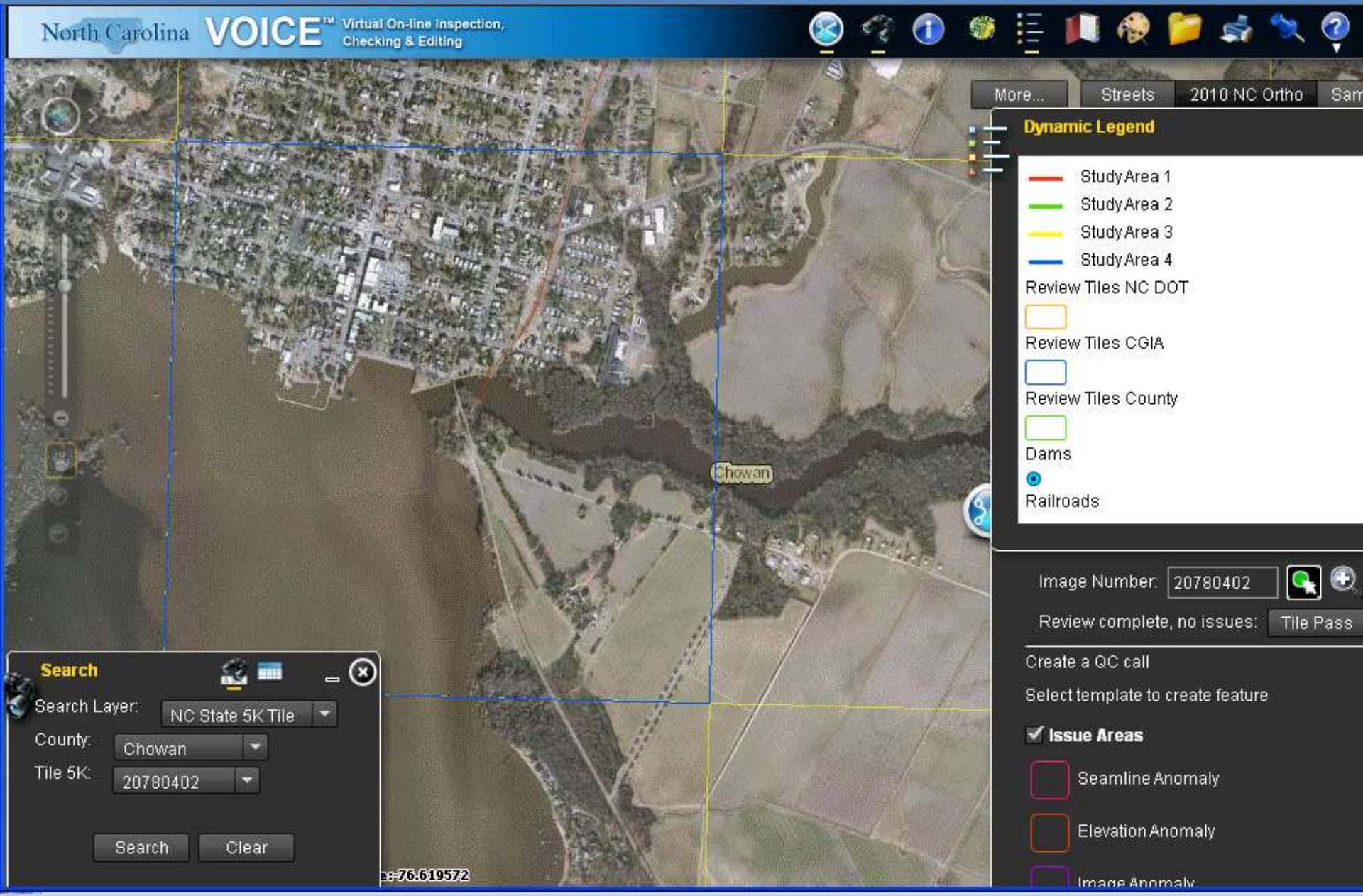




Statewide Imagery Project

North Carolina Statewide Digital Orthoimagery, Business Plan for Four-Year Acquisition and Urban Counties

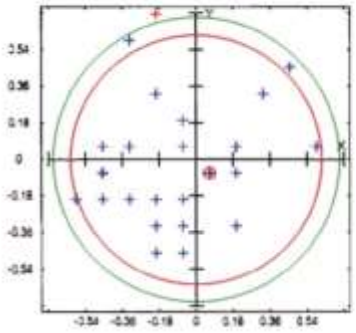



North Carolina VOICE™ Virtual On-line Inspection, Checking & Editing
More...
Streets
2010 NC Ortho
Dynamic Legend
Study Area 1
Study Area 2
Study Area 3
Study Area 4
Review Tiles NC DOT
Review Tiles CGIA
Review Tiles County
Dams
Railroads
Chowan
Image Number: 20780402
Review complete, no issues: Tile Pass
Create a QC call
Select template to create feature
Issue Areas
Seamline Anomaly
Elevation Anomaly
Search
Search Layer: NC State 5K Tile
County: Chowan
Tile 5K: 20780402
Search
Clear

Statewide Imagery Project

Quality Control Report

Circular Error

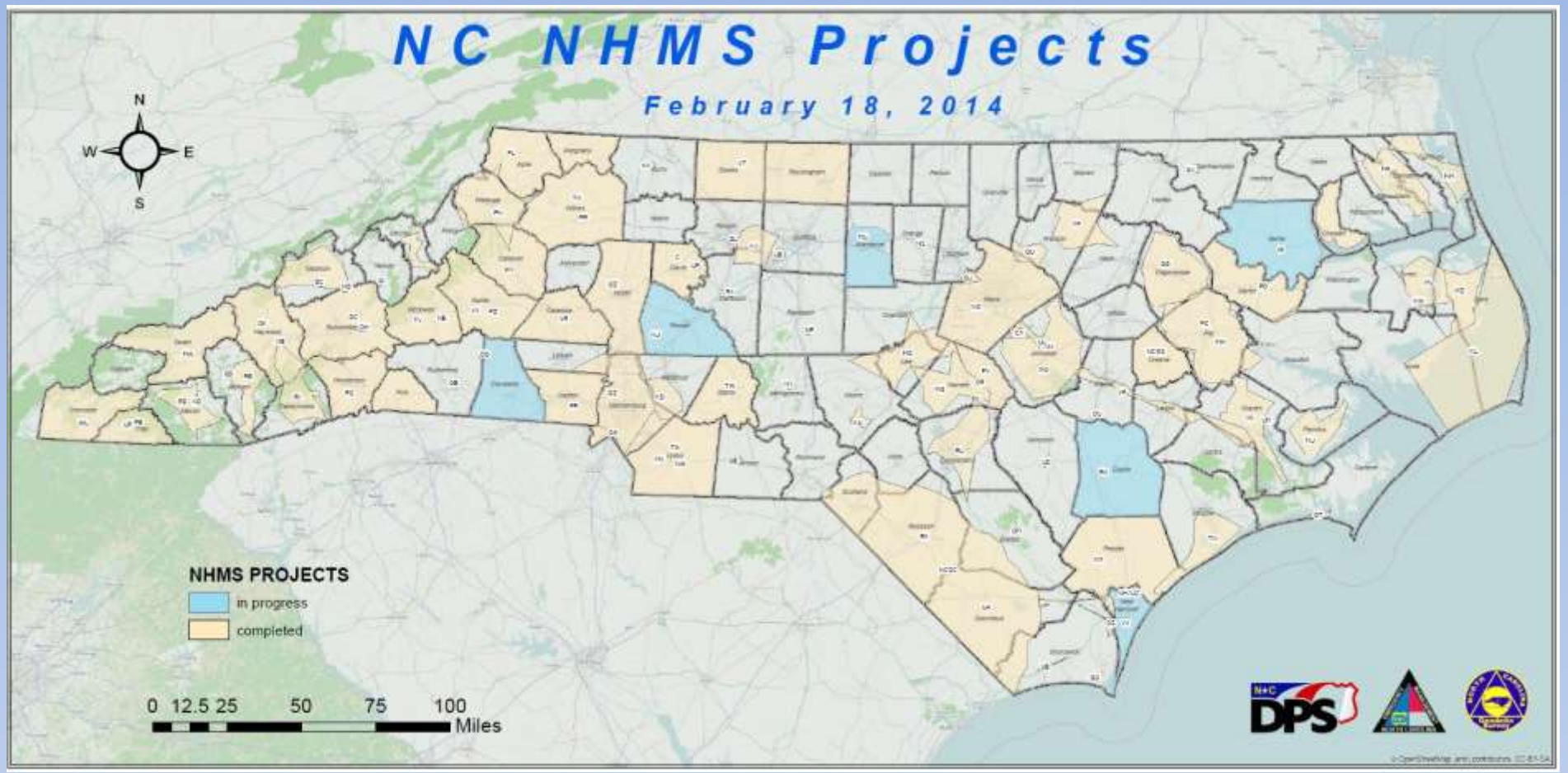


Error Statistics

Min ΔX:	-0.586
Min ΔY:	-0.456
Max ΔX:	0.586
Max ΔY:	0.716
Mean ΔX:	-0.091
Mean ΔY:	0
RmseX:	0.296
RmseY:	0.279
RmseH:	0.407
NSSDA:	0.704
No. Obs.:	30
CE 90:	0.612
CE 95:	0.698

Report for Camden County
Accuracy Analyst 4/18/2013 10:32:59 AM

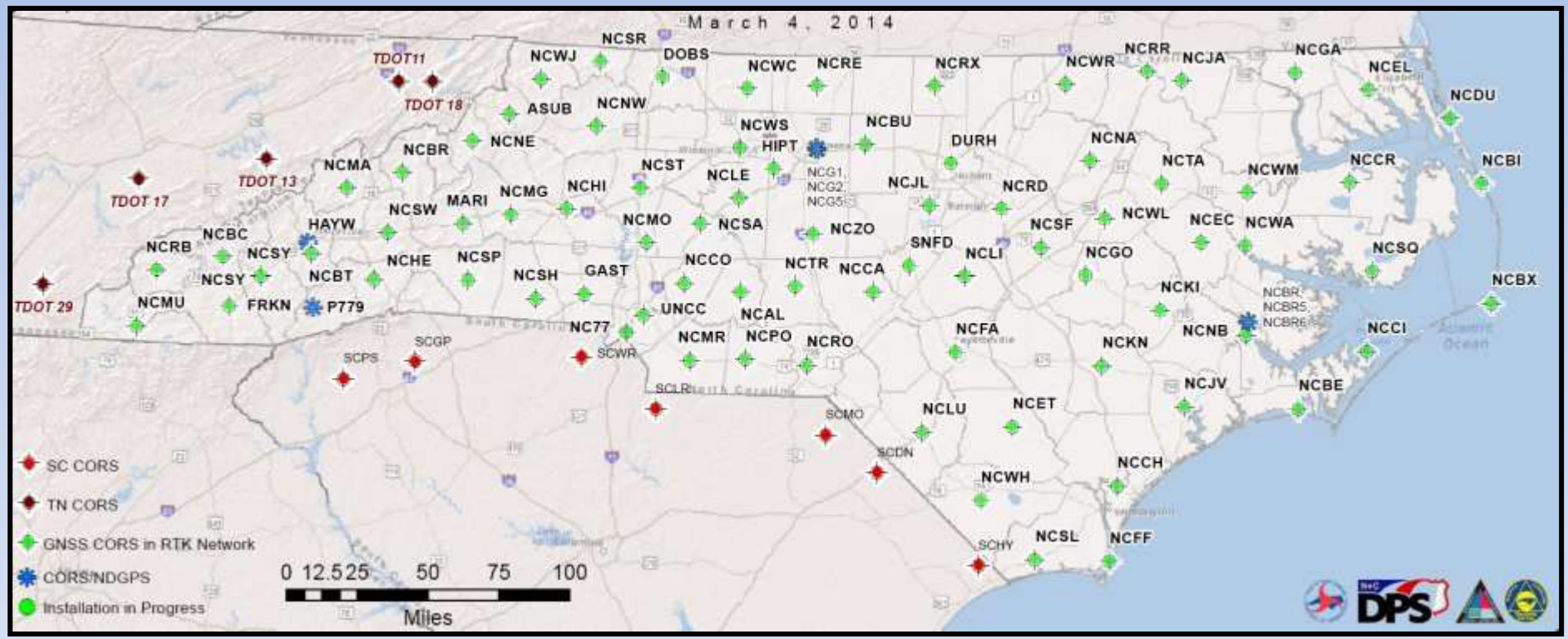
2


NC NHMS Projects
February 18, 2014
N
W
E
S
NHMS PROJECTS
in progress
completed
0 12.5 25 50 75 100
Miles
NHC
DPS

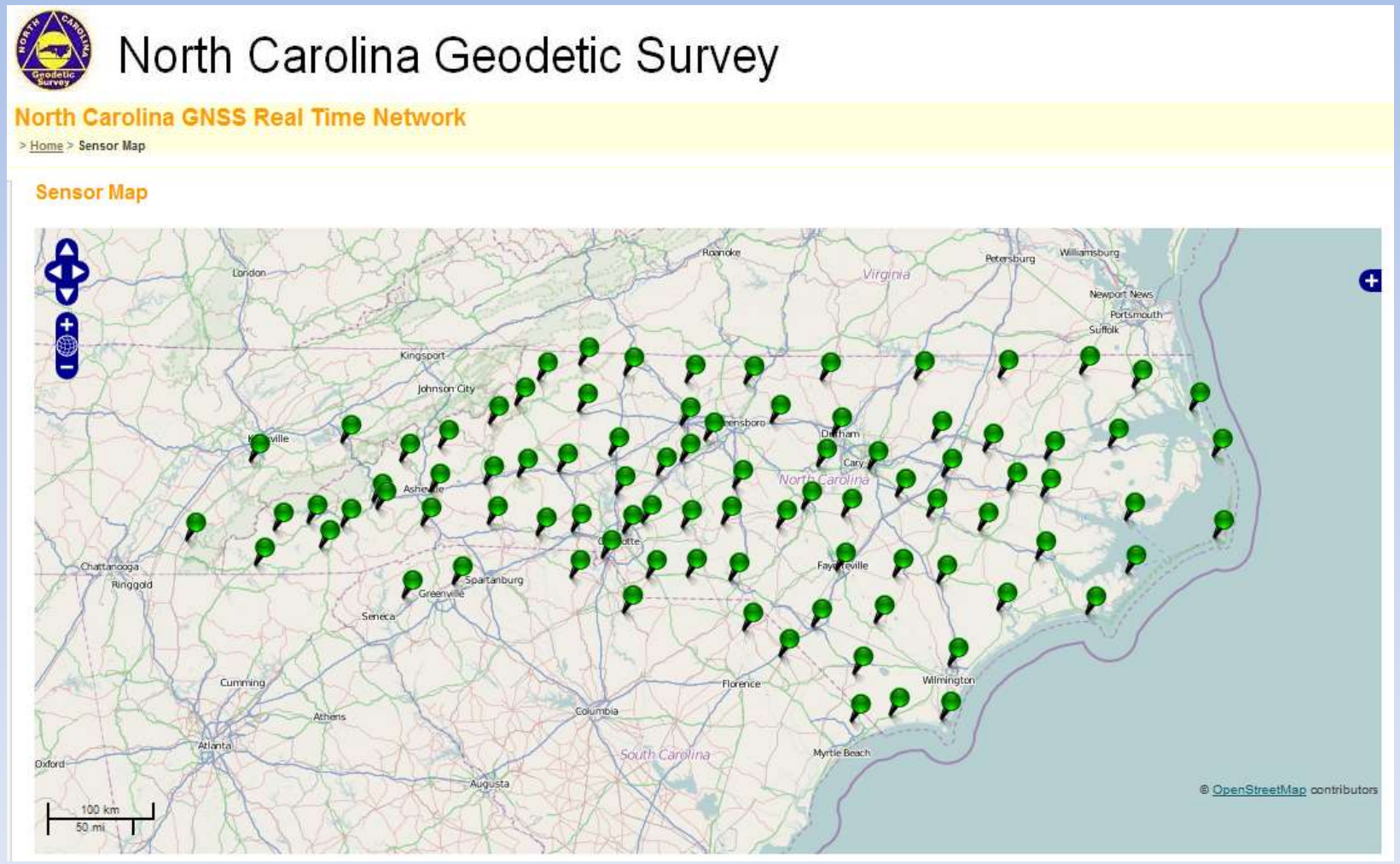
NC CORS Network

- Continuously Operating Reference Station (CORS)
  - A permanent and continuously recording Global Navigation Satellite System (GNSS) receiver, antenna (with a surveyed reference position), & support equipment
  - NC CORS Network
    - Composed of 91 CORS
      - 2 new CORS have been installed
        - Bethel (NCBT)
        - UNCC (NC49)
      - 1 decommissioned
        - Clinton (NCCL

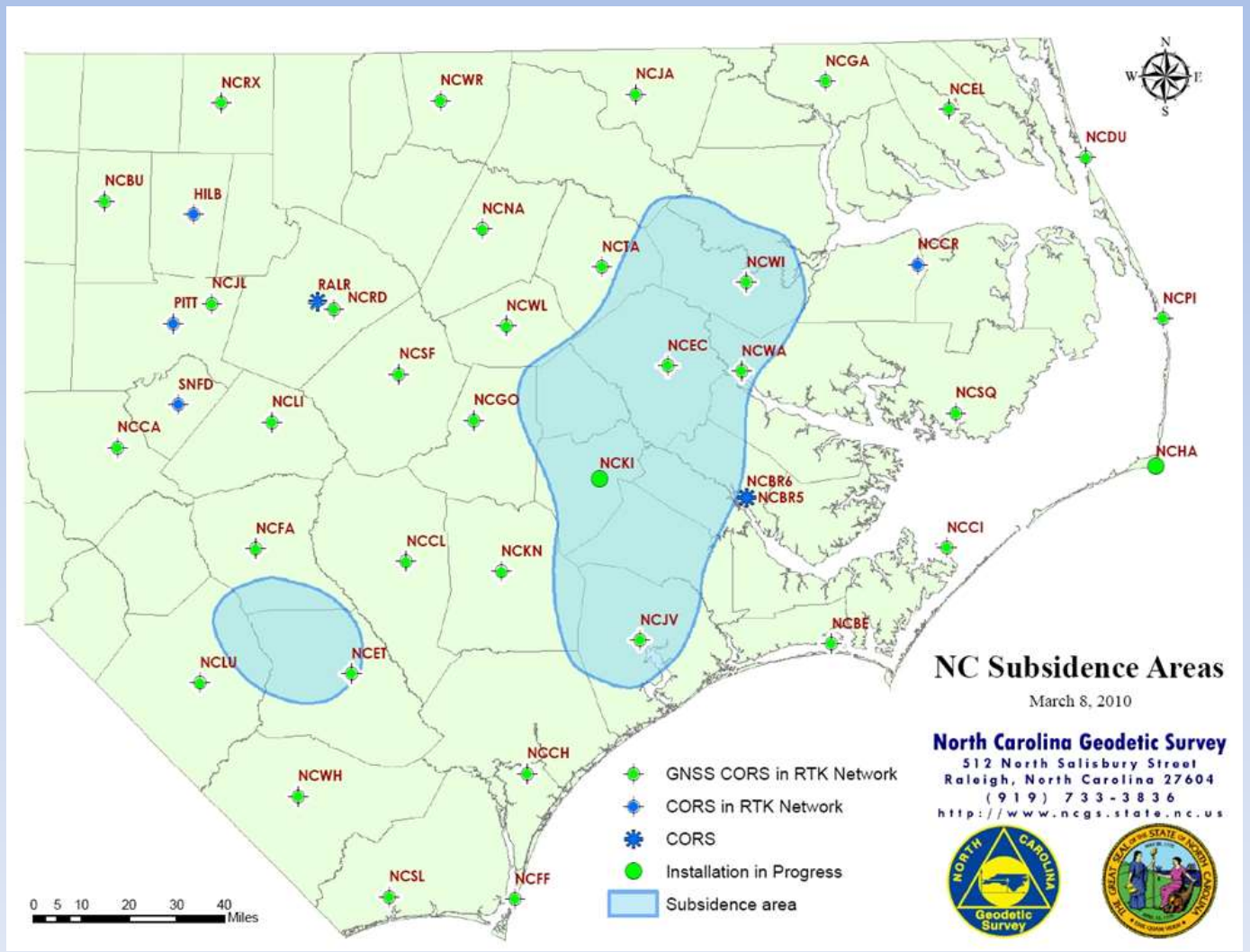
NC CORS Network



GNSS Real Time Network (RTN)



Monitoring Subsidence



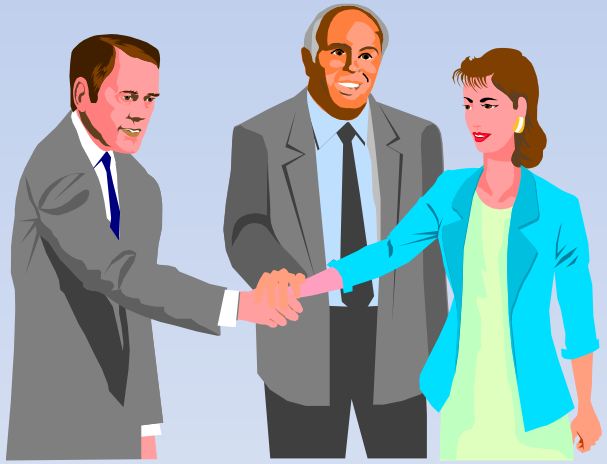
Stream Gage Surveys

USGS Stream Gage

GPS and traditional leveling will be use to connect stream gages to NAVD88

Education Outreach

Height Modernization Workshops: is a traveling workshop designed for government agencies, professional surveyors, academic departments, school groups, and other interested parties in North Carolina.



- Workshops are tailored to each group's respective needs
- PDH credit
  - Height Modernization Workshops
  - OPUS Projects

Future projects

- Statewide collection of gravity data to support GRAV-D
  - Airborne and terrestrial
- NC UAS test range
  - UAS forum
- Web page and database upgrade

GRAV-D


GRAV-D
National Geodetic Survey
NGS Home
About NGS
Data & Imagery
Tools
Surveys
Science & Education
Search
GRAV-D Quick Links
Home
Science Fundamentals
News Archive
Data Products
Publications
Meetings/Workshops
Informational Materials
Contact Us
Geoid Slope Validation Survey of 2011
Kinematic GPS Challenge
Download the GRAV-D Project Plan (.PDF):
Gravity for the Redefinition of the American Vertical Datum (GRAV-D)
GRAV-D is a proposal by the National Geodetic Survey to re-define the vertical datum of the US by 2021.
The gravity-based vertical datum resulting from this project will be accurate at the 2 cm level for much of the country. The proposal is official policy for NGS and is included in the NGS 10 year plan. The project is currently underway and actively collecting gravity data across the United States and its holdings. Why is the Vertical Datum important?
The GRAV-D project consists of three major campaigns:
1. A high-resolution "snapshot" of gravity in the US:
This is a predominantly airborne campaign, to be accomplished around 2017 and at a cost of ~$ Million dollars. The highest priority targets are: Alaska, Puerto Rico and the Virgin Islands, the Gulf Coast, the Great Lakes, and Hawaii (some portions of which have already been completed). The coastline of the continental US and the American island holdings are also of high priority.
2. A low-resolution "movie" of gravity changes:
This is primarily a terrestrial campaign and will mostly encompass episodic re-visits of absolute gravity sites, attempting to monitor geographically dependent changes to gravity over time. This will allow time dependent geoid modeling and thus time dependent orthometric height monitoring through GNSS technology.
3. Regional partnership surveys:
NGS seeks to collaborate with local (governmental, commercial, and academic) partners throughout the GRAV-D project. Partners that are willing to support airborne or terrestrial surveys or to monitor local variations in the gravity field are a critical component of GRAV-D. Please contact us if your organization is interested in collaboration.


GRAV-D Google Map
National Geodetic Survey
NGS Home
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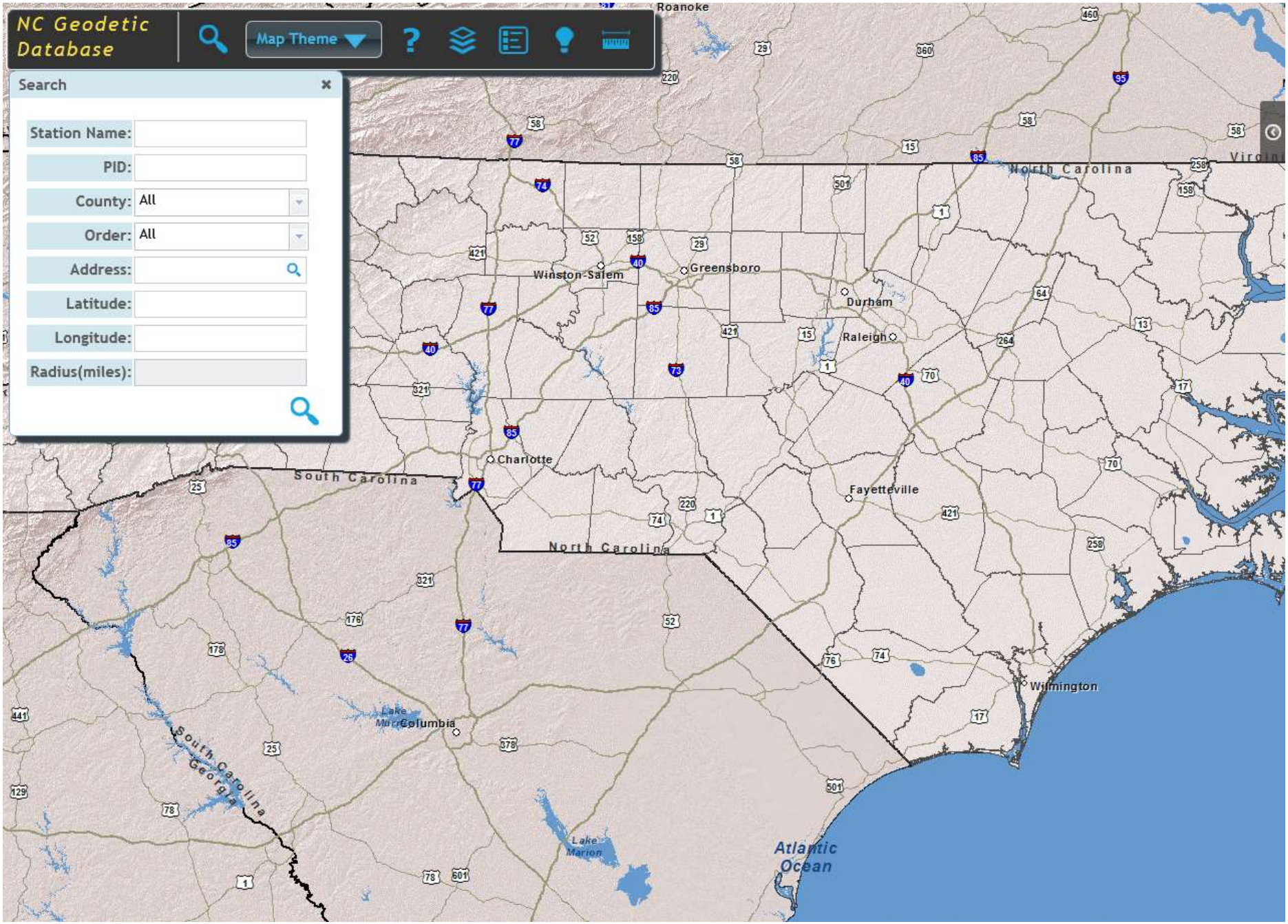
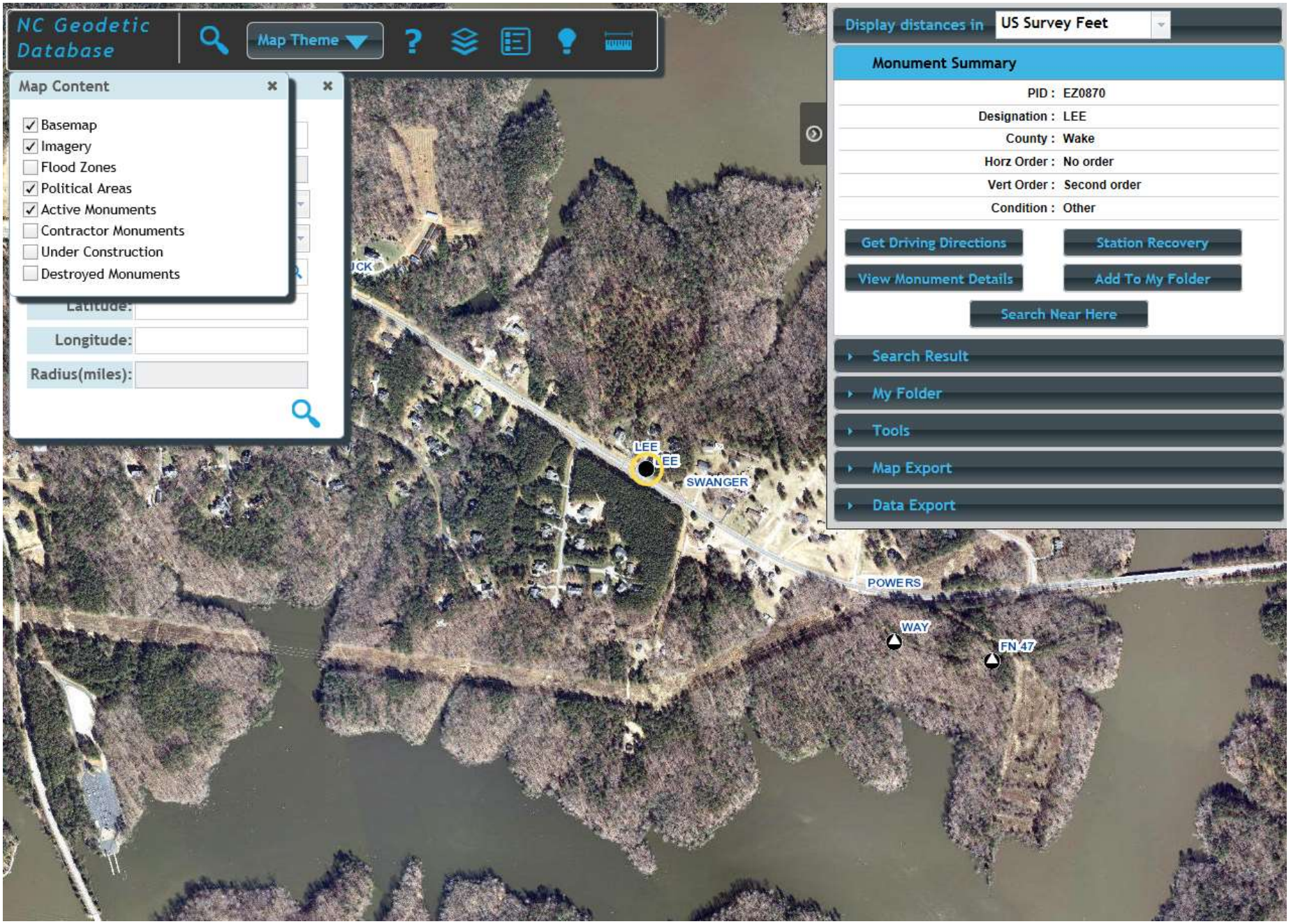
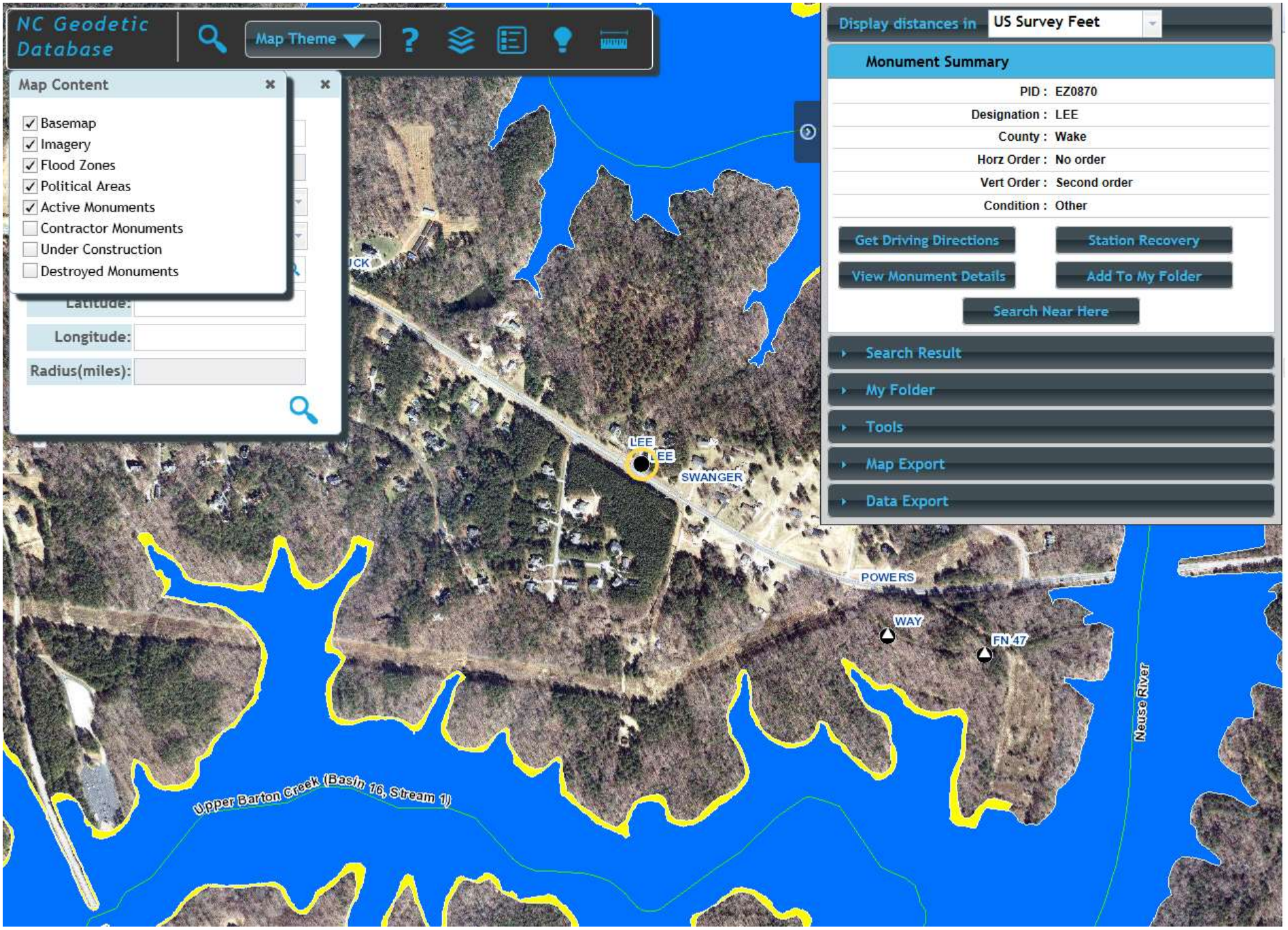
Data & Imagery
Tools
Surveys
Science & Education
Search
GRAV-D Quick Links
Home
Science Fundamentals
News Archive
Data Products
Publications
Meetings/Workshops
Informational Materials
Contact Us
Geoid Slope Validation Survey of 2011
Kinematic GPS Challenge
Download the GRAV-D Project Plan (.PDF):
GRAV-D Data Products
Products will be posted as they are completed.
Available information may include: airborne and terrestrial survey information, gravity data, and gravity-based geoids or datums. Please click the block of interest to view general information and a red tint will appear if data is available.
IMPORTANT NOTICE
As of December 5, 2012 a new version (v1.1) of the GRAV-D General User Manual is available with data downloads. This version supersedes v1 of the manual and fixes minor errors in the previous version. Most important is a corrected typo for the GRS-80 first eccentricity squared value reported on page 20 of the document.
Map Key
Green: Available data and metadata
Blue: Data being processed
Orange: Data collection underway
White: Planned for data collection
41.8077,-101.5137
Map
Satellite
United States
Mexico


NC Geodetic Database
Map Theme
Search
Station Name:
PID:
County: All
Order: All
Address:
Latitude:
Longitude:
Radius(miles):
Roanoke
North Carolina
Winston-Salem
Greensboro
Durham
Raleigh
Charlotte
South Carolina
Fayetteville
North Carolina
Wilmington
Lake Murray
Columbia
South Carolina
Georgia
Lake Marion
Atlantic Ocean


NC Geodetic Database
Map Theme
Map Content
Basemap
Imagery
Flood Zones
Political Areas
Active Monuments
Contractor Monuments
Under Construction
Destroyed Monuments
Latitude:
Longitude:
Radius(miles):
Display distances in
US Survey Feet
Monument Summary
PID : EZ0870
Designation : LEE
County : Wake
Horz Order : No order
Vert Order : Second order
Condition : Other
Get Driving Directions
Station Recovery
View Monument Details
Add To My Folder
Search Near Here
Search Result
My Folder
Tools
Map Export
Data Export
LEE
SWANGER
POWERS
WAY
FN 47


NC Geodetic Database
Map Theme
Map Content
Basemap
Imagery
Flood Zones
Political Areas
Active Monuments
Contractor Monuments
Under Construction
Destroyed Monuments
Latitude:
Longitude:
Radius(miles):
Display distances in
US Survey Feet
Monument Summary
PID : EZ0870
Designation : LEE
County : Wake
Horz Order : No order
Vert Order : Second order
Condition : Other
Get Driving Directions
Station Recovery
View Monument Details
Add To My Folder
Search Near Here
Search Result
My Folder
Tools
Map Export
Data Export
LEE
SWANGER
POWERS
WAY
FN 47
Neuse River
Upper Barton Creek (Basin 16, Stream 1)

FRIS | North Carolina Flood Risk Information System

This site is under development and is still draft. Do not quote or cite data. Site subject to disruptions for updates and revisions.

Download

Am I at risk of flooding?

Who am I? General Public

Enter all or part of your address and click GO.

Address, City, or ZIP GO

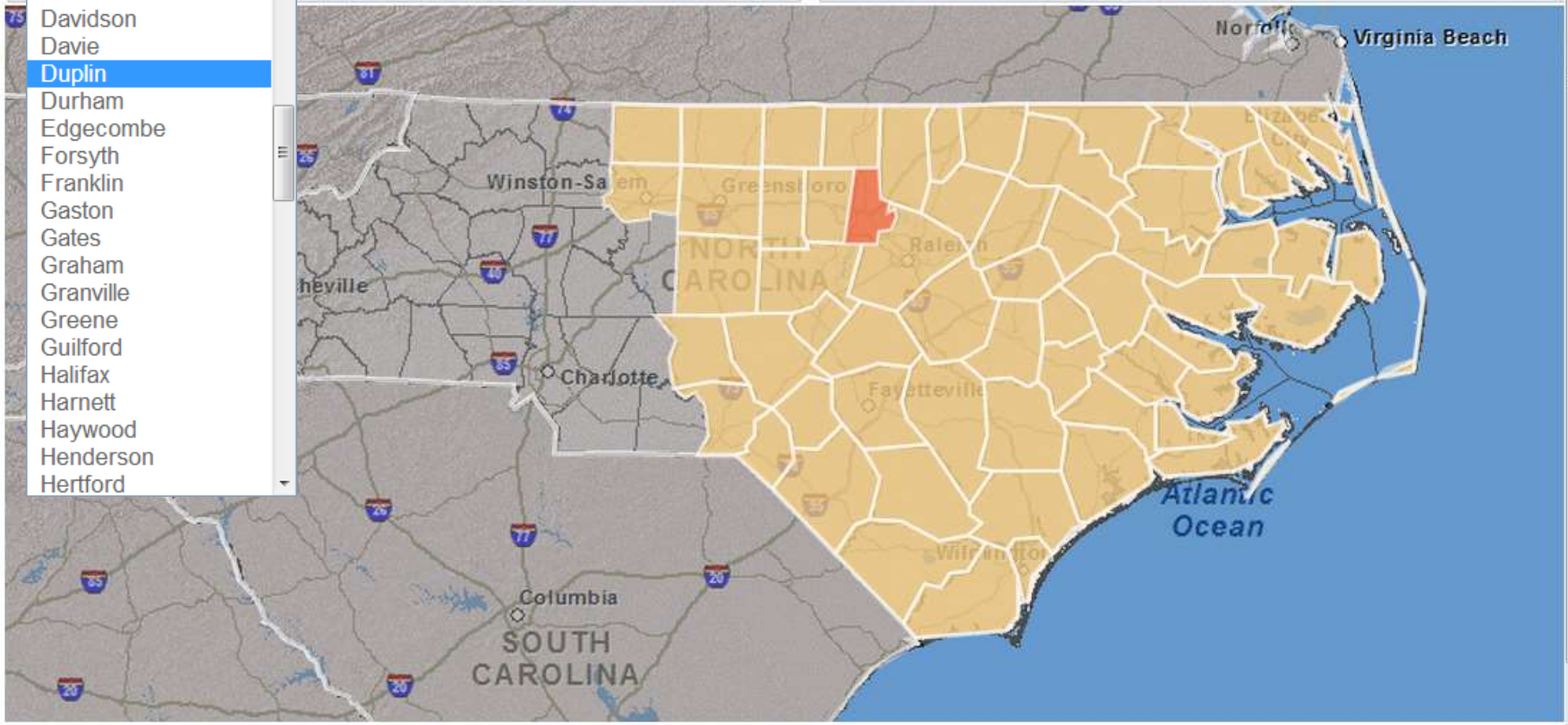
County Durham, North Carolina

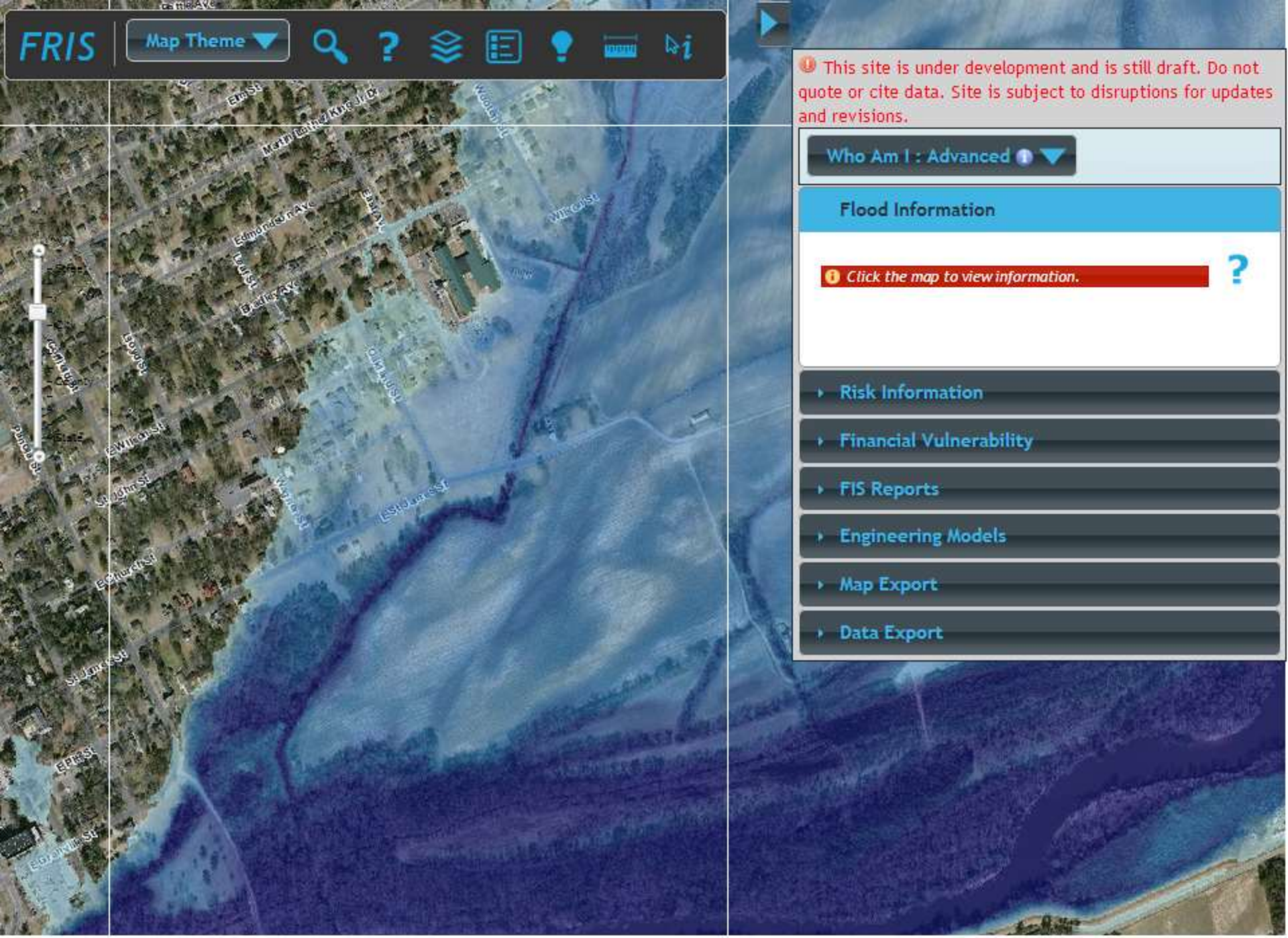
Currituck
Dare
Davidson
Davie
Duplin
Durham
Edgecombe
Forsyth
Franklin
Gaston
Gates
Graham
Granville
Greene
Guilford
Halifax
Harnett
Haywood
Henderson
Hertford

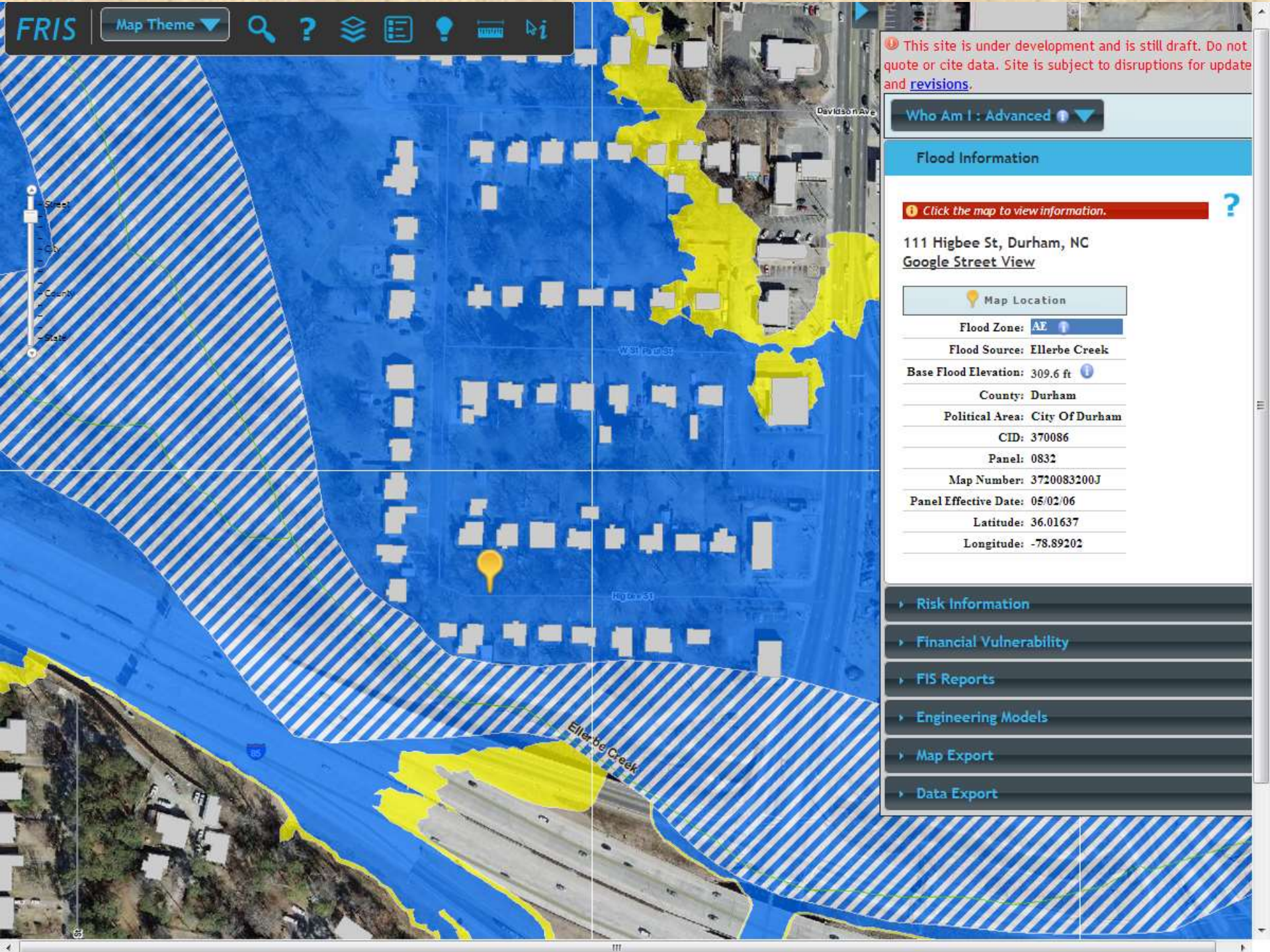
Benefits of Floodplain Mapping

Floods are among the most frequent and costly natural disasters in terms of human hardship and economic loss. North Carolina's Digital Flood Insurance Rate Maps (DFIRM) enable business leaders and residents to more accurately predict flood hazards and prepare for flood risks.

Go to NC Floodmaps for more information.




FRIS
Map Theme
This site is under development and is still draft. Do not quote or cite data. Site is subject to disruptions for updates and revisions.
Who Am I : Advanced
Flood Information
Click the map to view information.
Risk Information
Financial Vulnerability
FIS Reports
Engineering Models
Map Export
Data Export



This site is under development and is still draft. Do not quote or cite data. Site is subject to disruptions for update and revisions.

Who Am I : Advanced

Flood Information

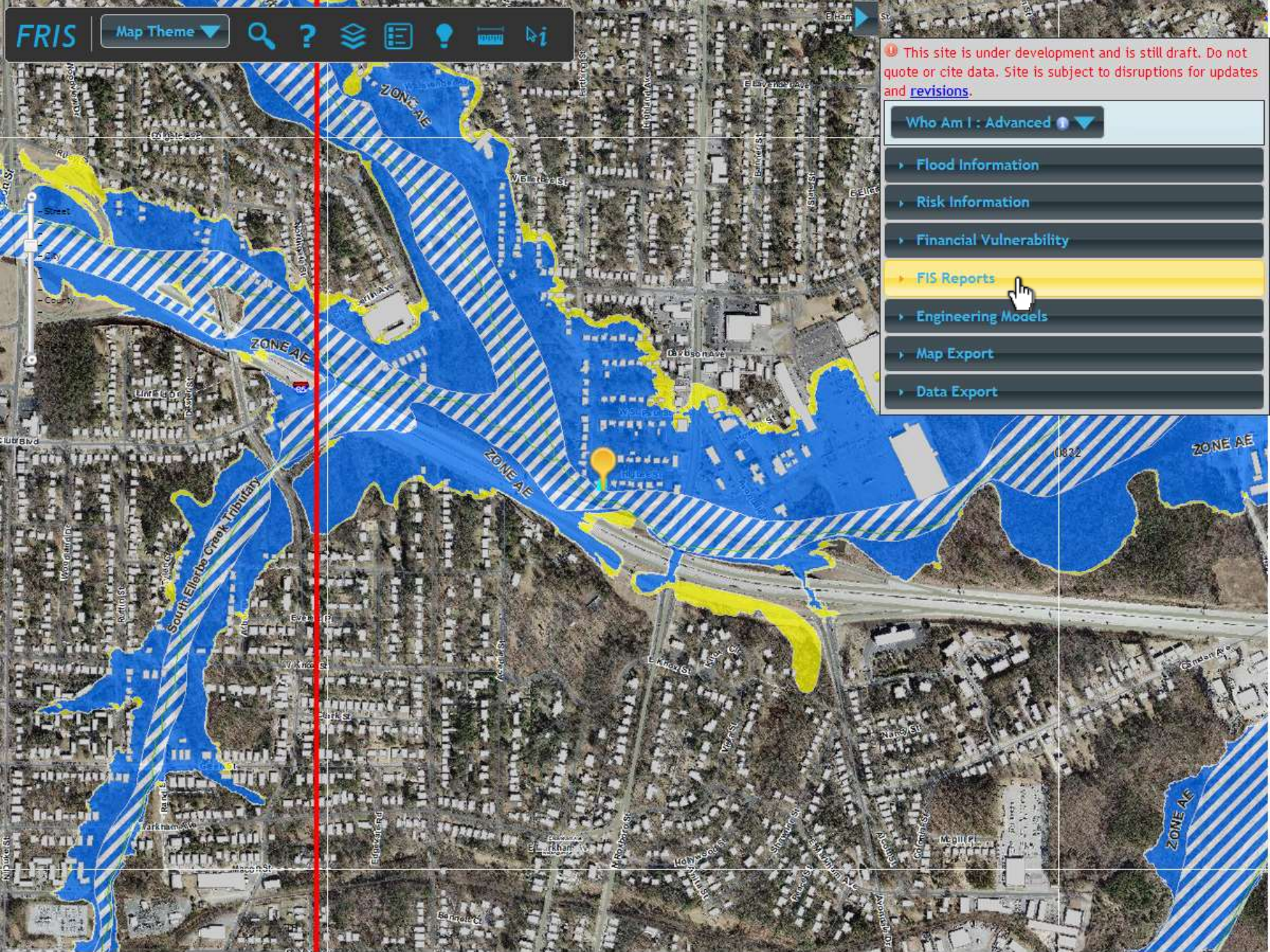
Click the map to view information.

111 Higbee St, Durham, NC
Google Street View

Map Location

Flood Zone:	AE
Flood Source:	Ellerbe Creek
Base Flood Elevation:	309.6 ft
County:	Durham
Political Area:	City Of Durham
CID:	370086
Panel:	0832
Map Number:	3720083200J
Panel Effective Date:	05/02/06
Latitude:	36.01637
Longitude:	-78.89202

- Risk Information
- Financial Vulnerability
- FIS Reports
- Engineering Models
- Map Export
- Data Export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Engineering Models
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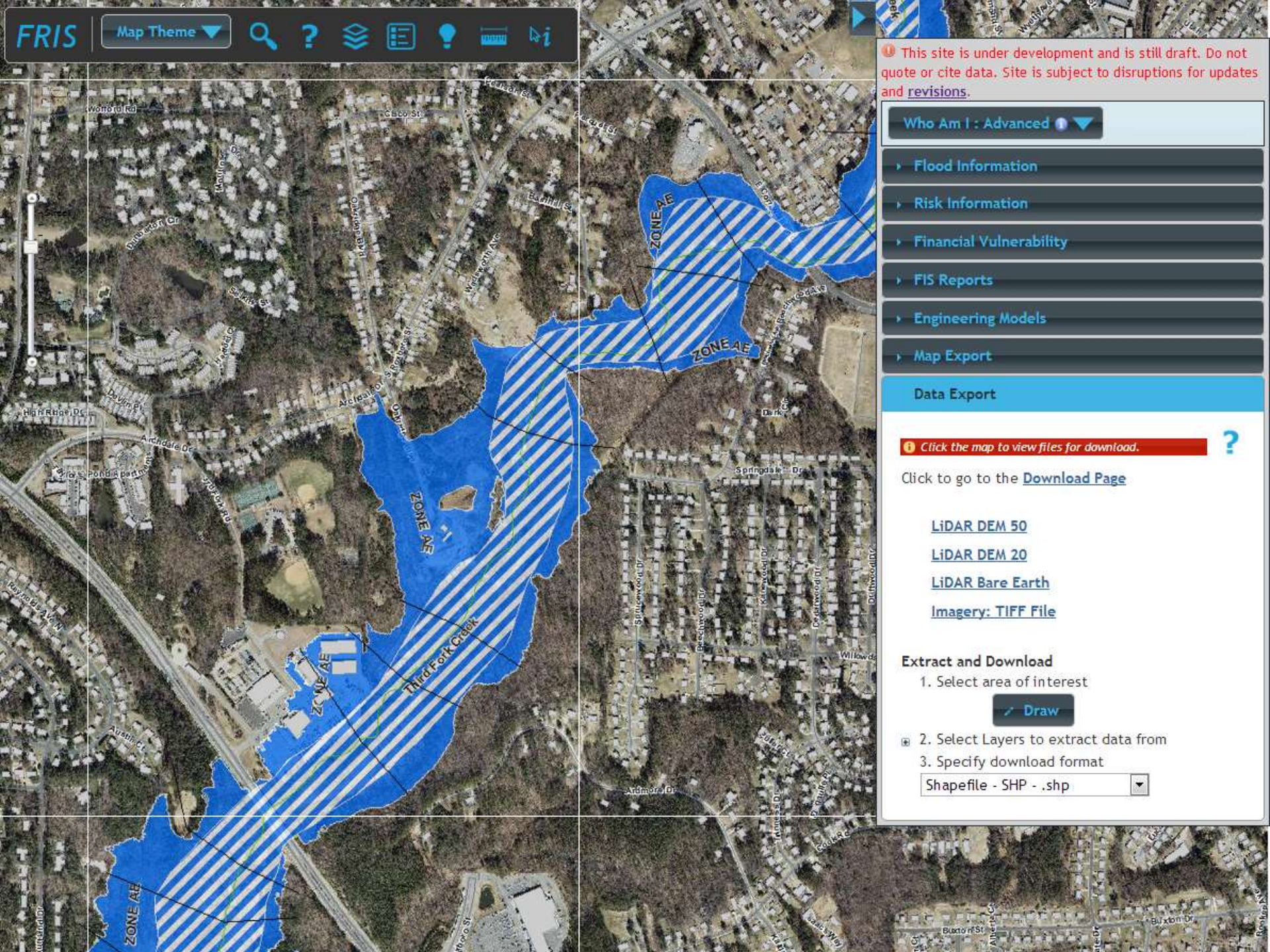
Data Export
ZONE AE
South Ellerbe Creek Tributary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Financial Vulnerability
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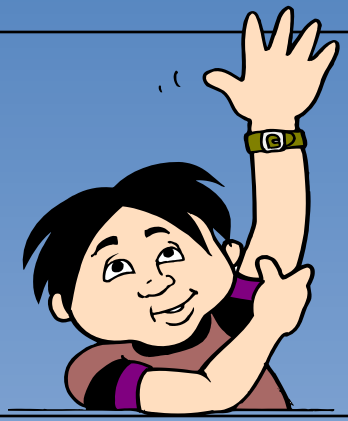
Engineering Models
Map Export
Data Export
Click the map to view files for download.
Click to go to the Download Page
LiDAR DEM 50
LiDAR DEM 20
LiDAR Bare Earth
Imagery: TIFF File
Extract and Download
1. Select area of interest
Draw
2. Select Layers to extract data from
3. Specify download format
Shapefile - SHP - .shp
ZONE AE
Third Fork Creek


Don't Let Your Feet Get Wet!

Bodie Island Baseline

Questions?

Gary W. Thompson, PLS
Office: 919-733-3836
Direct: 919-948-7844
Email: gary.thompson@ncdps.gov



Mailing address:	**Building (shipping) address:**
Gary W. Thompson, PLS NC Geodetic Survey 4298 Mail Service Center Raleigh, NC 27699-4298	Gary W. Thompson, PLS NC Geodetic Survey Bowers Building NC National Guard complex 4105 Reedy Creek Rd Raleigh, NC 27607

EMERGENCY MANAGEMENT
NORTH CAROLINA