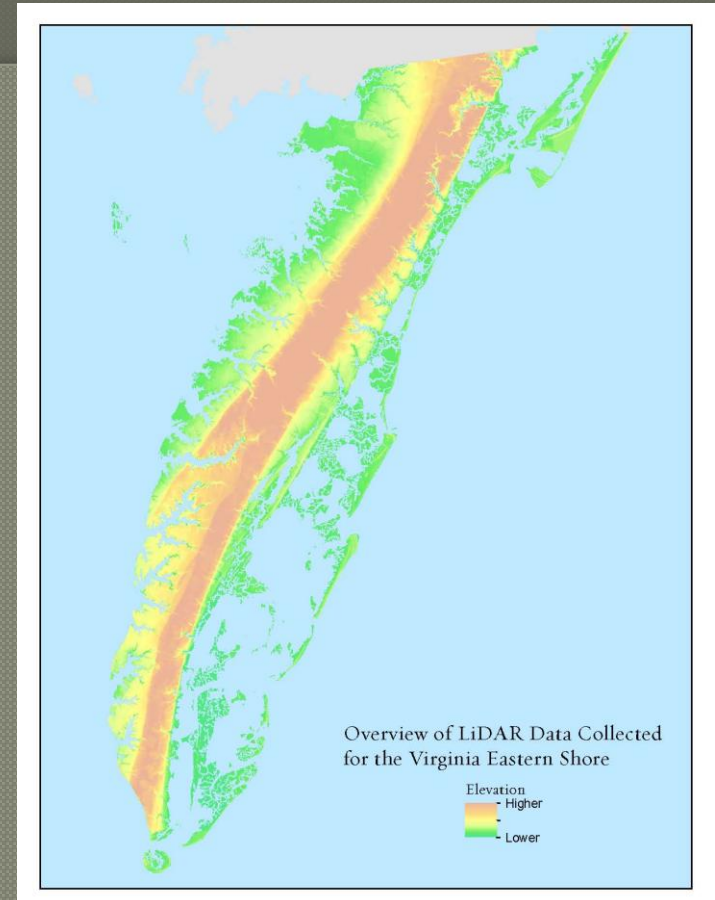
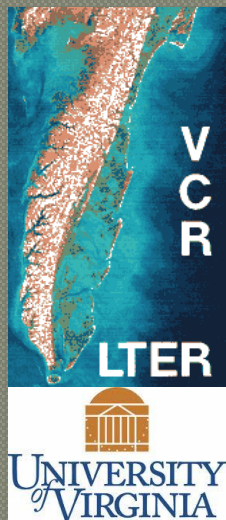


Eastern Shore of Virginia LiDAR Project



Why do we need accurate elevation data?

- ✓ To update & create flood insurance rate maps
- ✓ To revise hazard mitigation plans
- ✓ To create emergency service plans
- ✓ To develop stormwater management plans
- ✓ To document shoreline change and sea level rise
- ✓ To more safely site future development out of harm's way

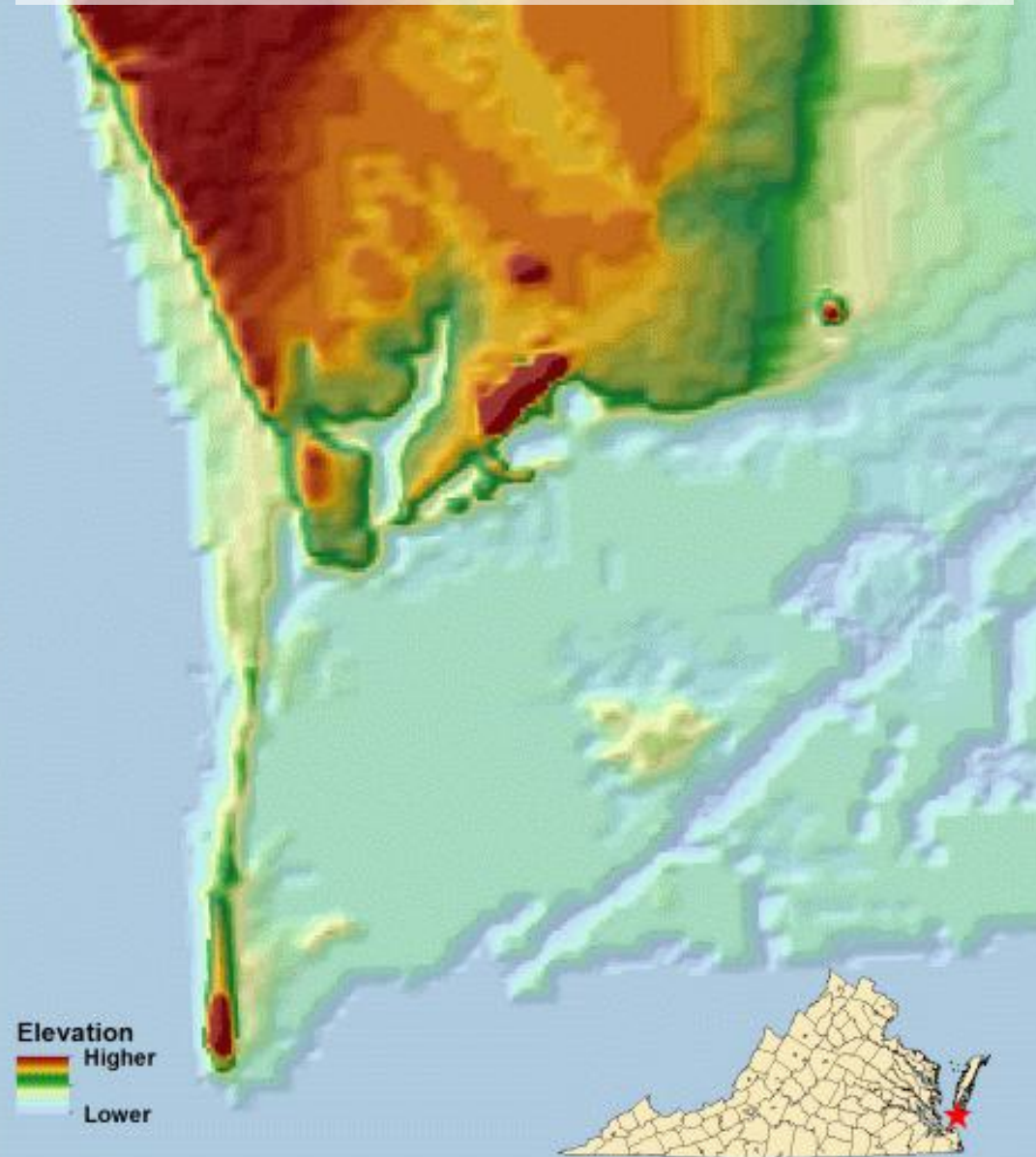


The Problem

- Existing data are too vague
- Existing data do not include buildings and vegetation

**~7 foot
vertical
accuracy**

**Example of Existing Elevation Data:
Southern Tip of VA Eastern Shore**



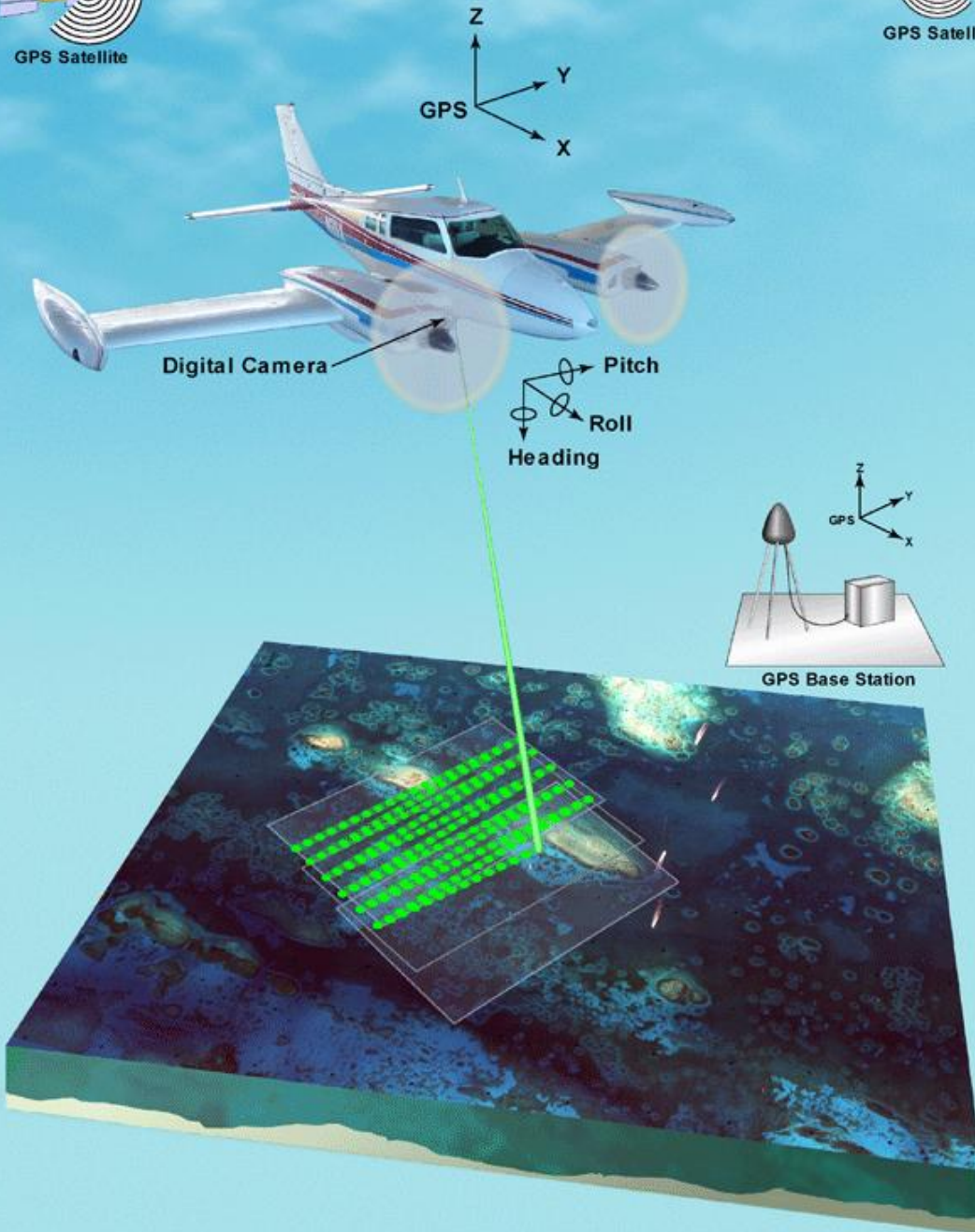
The Solution

- LiDAR: Light Detection and Ranging data
- Established method for collecting very dense and accurate elevation values
- Like radar but uses light pulses instead of radio waves

~6 inch vertical accuracy

**Example of LiDAR:
Southern Tip of VA Eastern Shore**





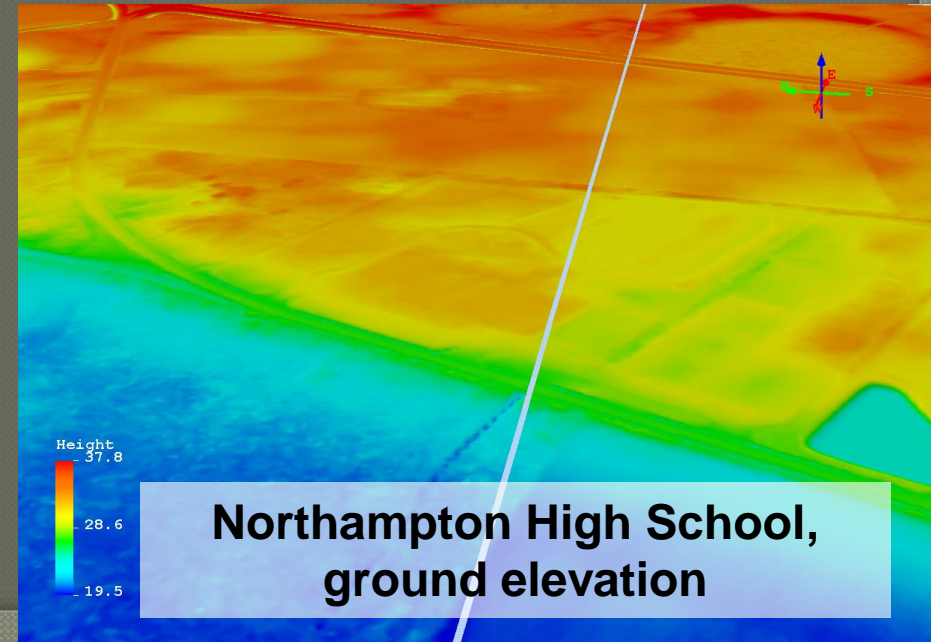
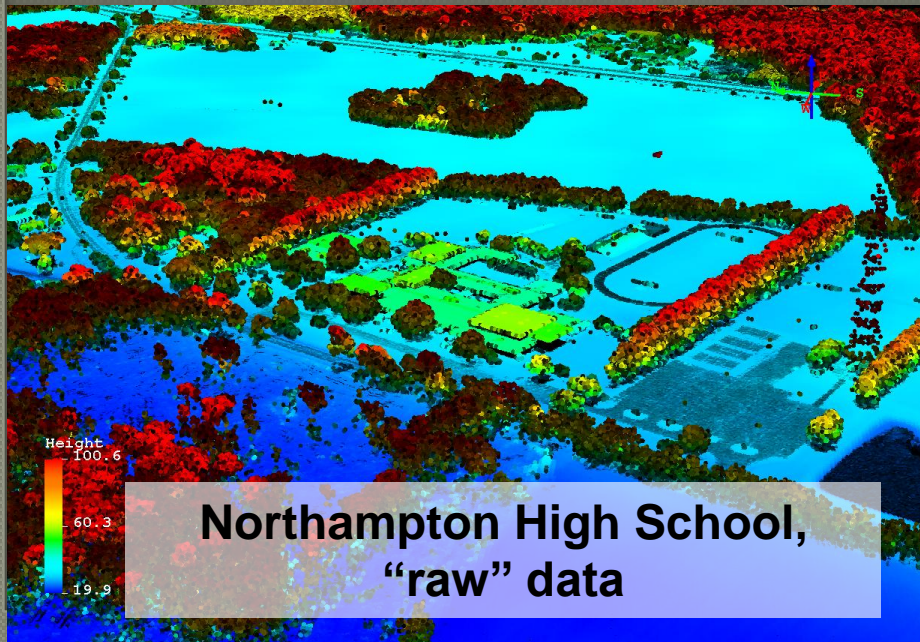
LiDAR

- Typically collected from planes
- Uses more than 70,000 light pulses per second to derive elevations of features on the ground
- Includes elevation of built environment, vegetation and bare earth

LiDAR Data Comes in Two Forms

A “Point Cloud” - the raw LiDAR point measurements that includes buildings and vegetation

A Digital Elevation Model (DEM) that is a grid of ground elevation with no buildings or vegetation



LiDAR for VA's Eastern Shore

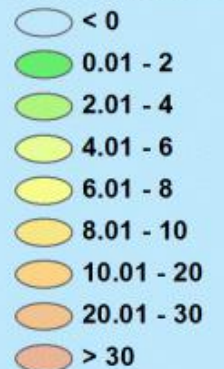
Funded by the Nature Conservancy, VA Coast Reserve Long-Term Ecological Research Project, and U.S. Geological Survey and collected in 2010.

The Nature Conservancy 
Protecting nature. Preserving life.™



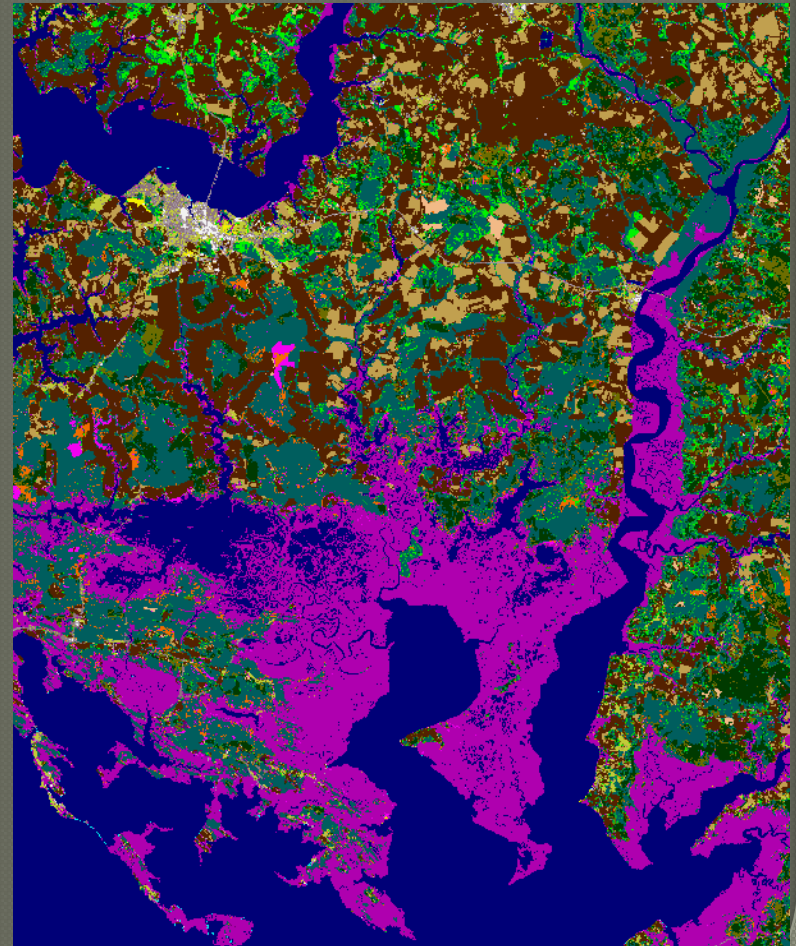
GS
ing world

Elevation in Feet

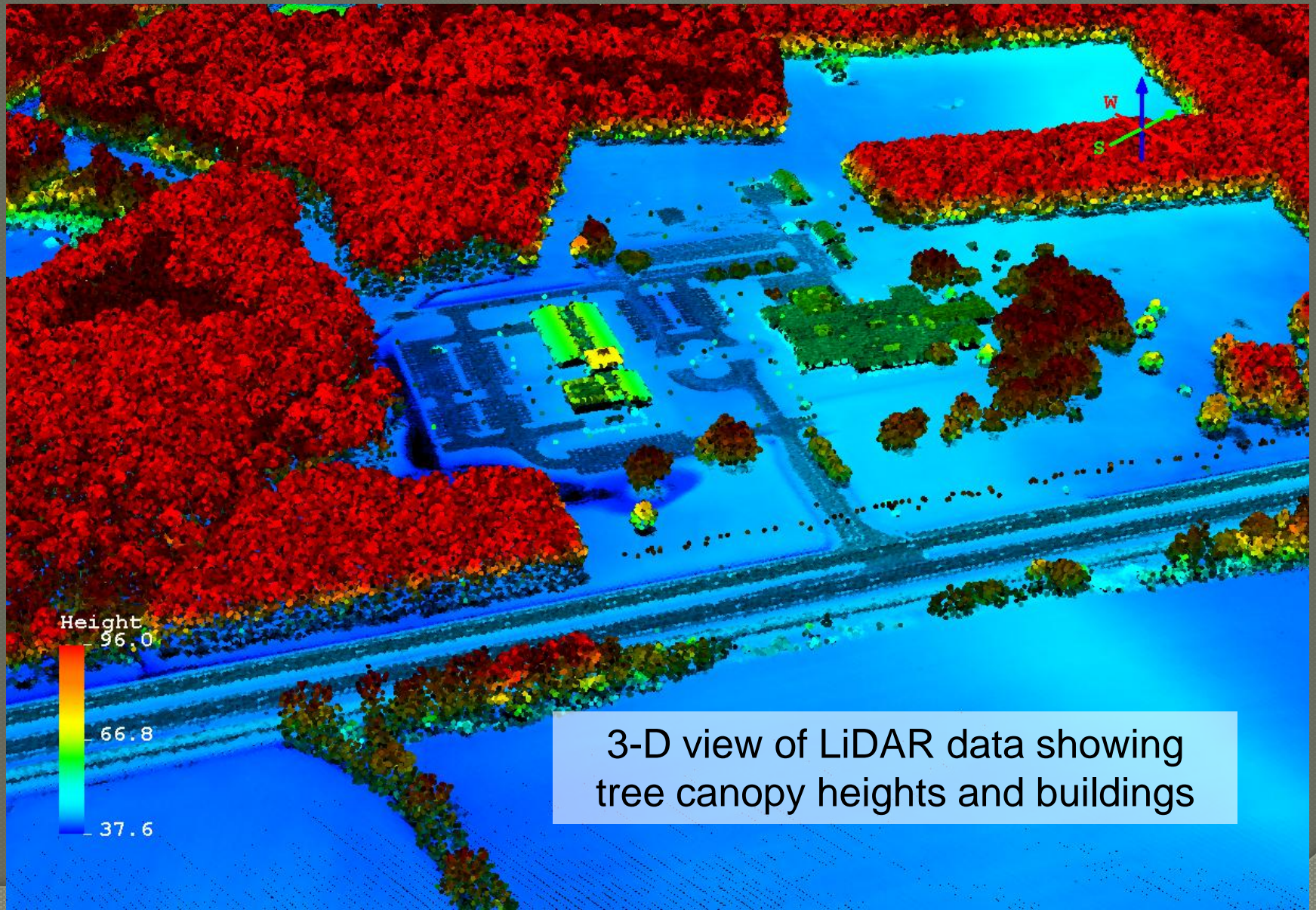


LiDAR Applications

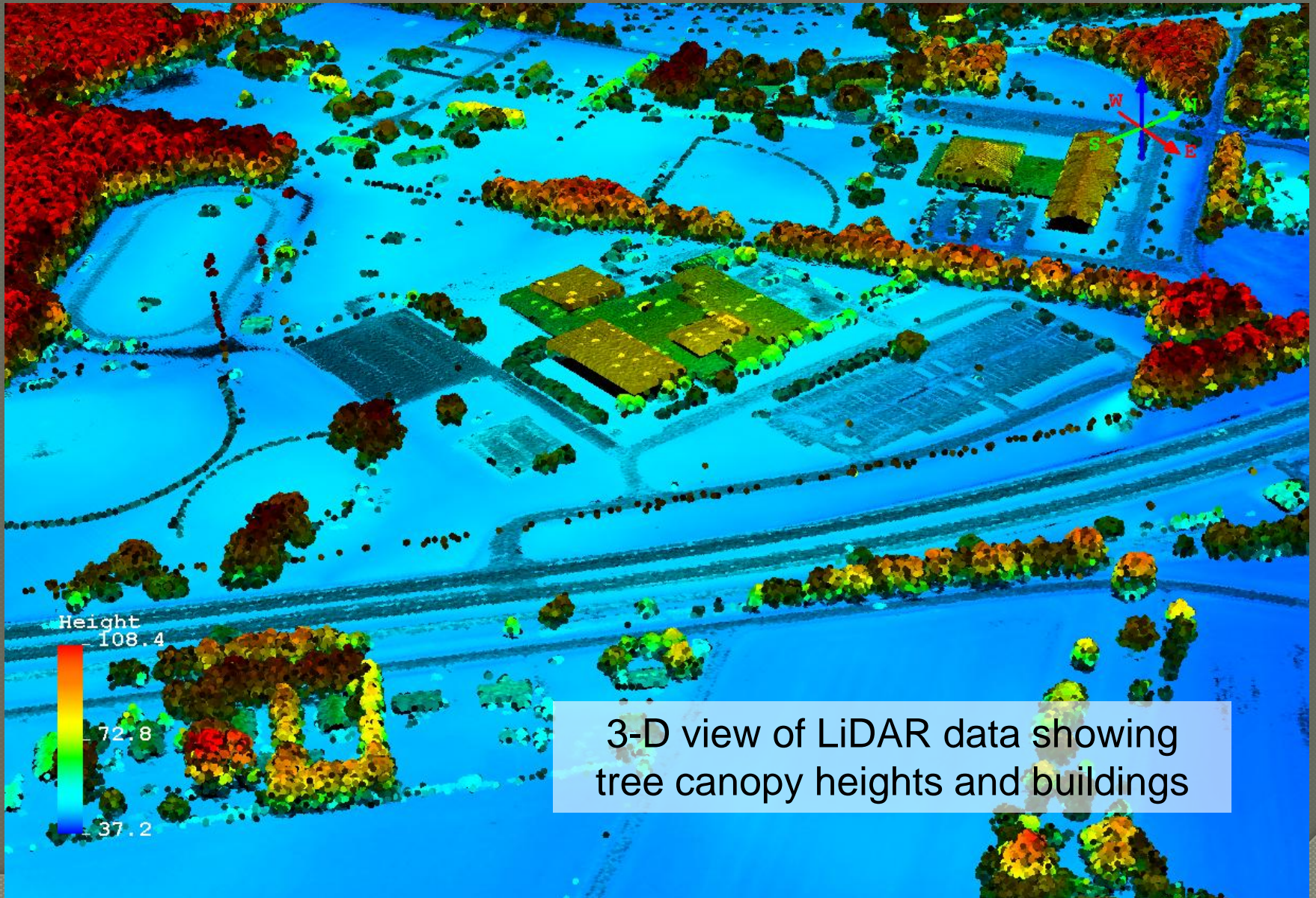
- Visualize flooding and storm surge
- Identify structures at risk
- Map shorelines, marshes, and floodplains accurately
- Classify vegetation
- Stormwater management
- Many others...



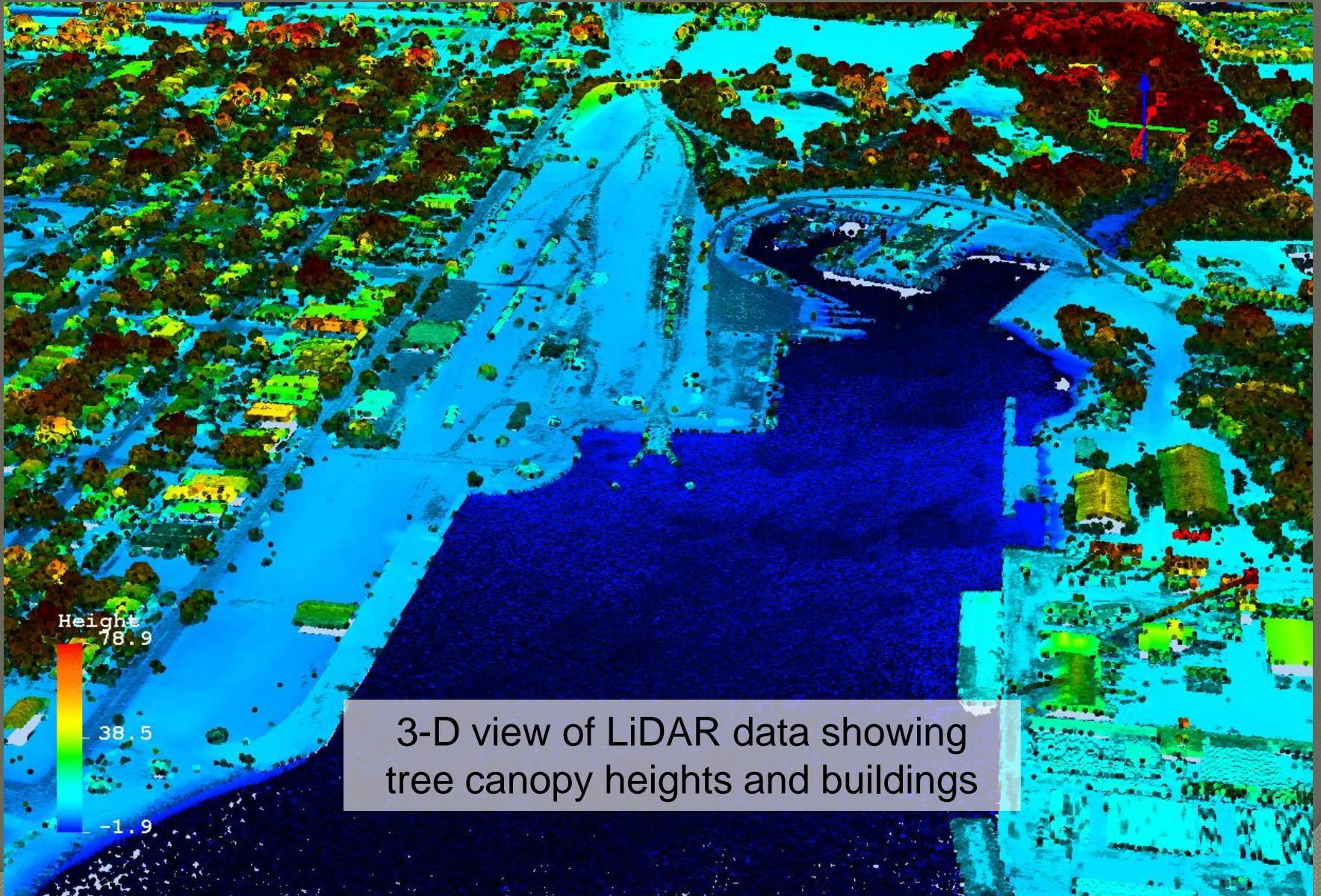
Eastern Shore Community College



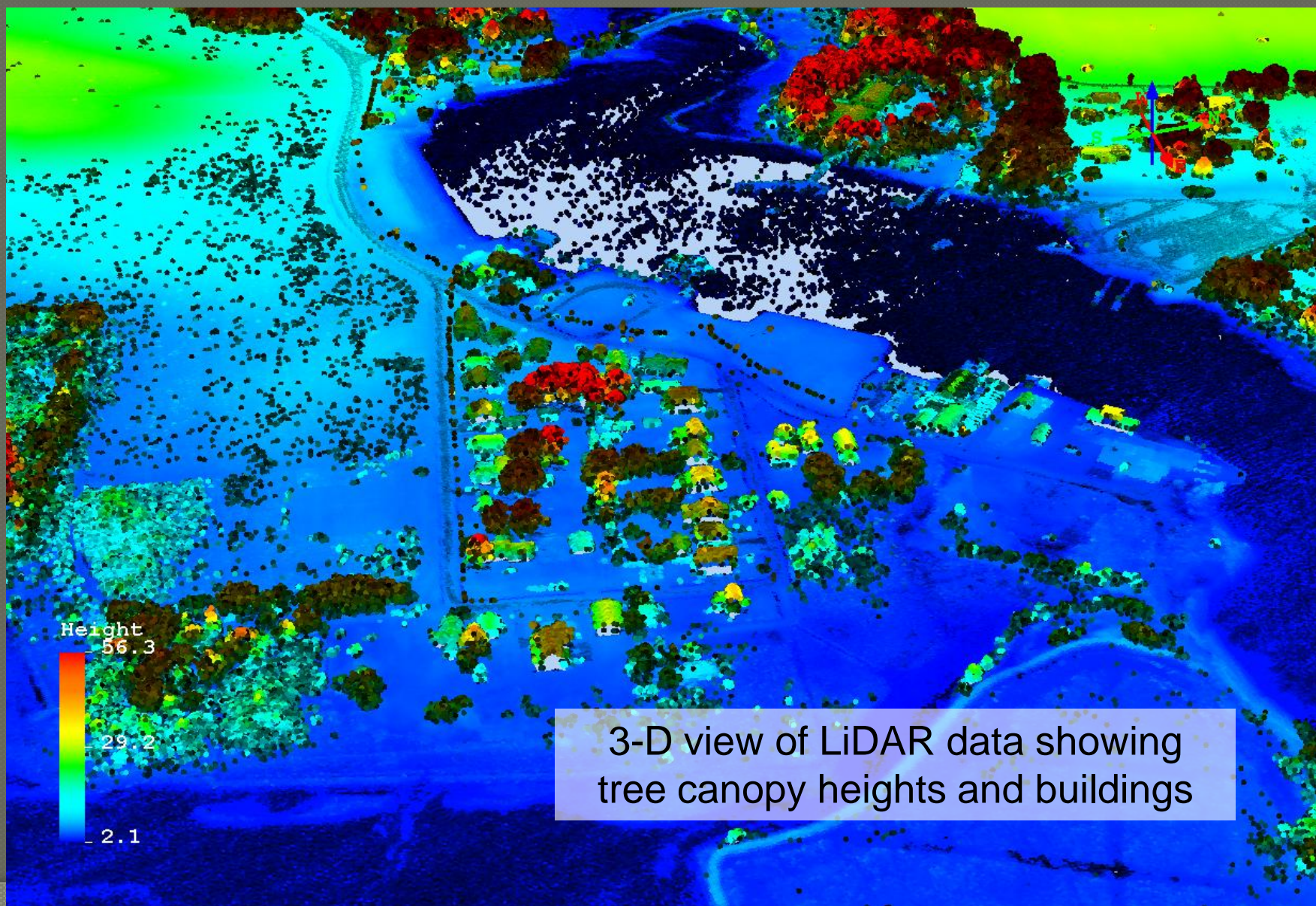
Nandua Middle and High School



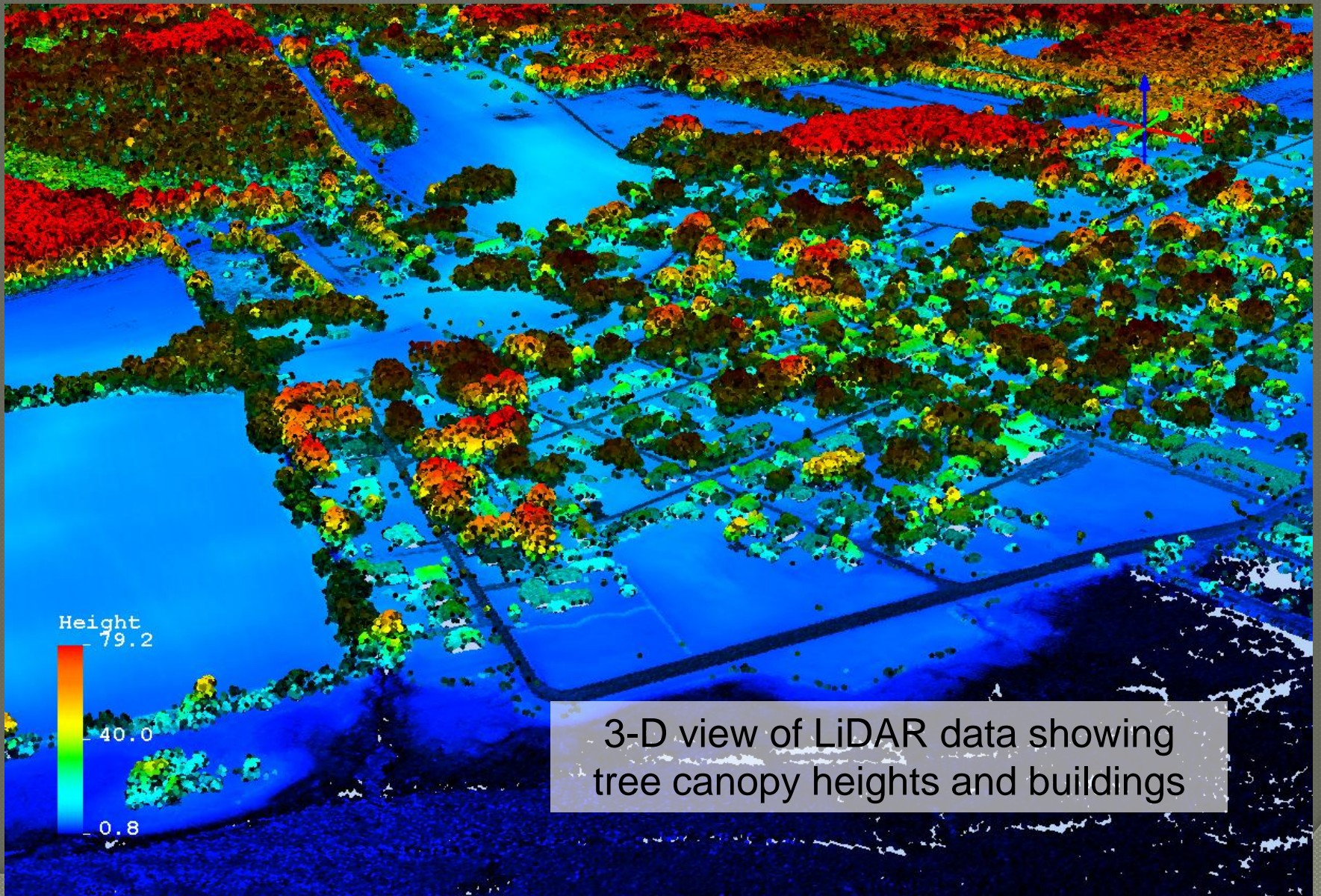
Cape Charles



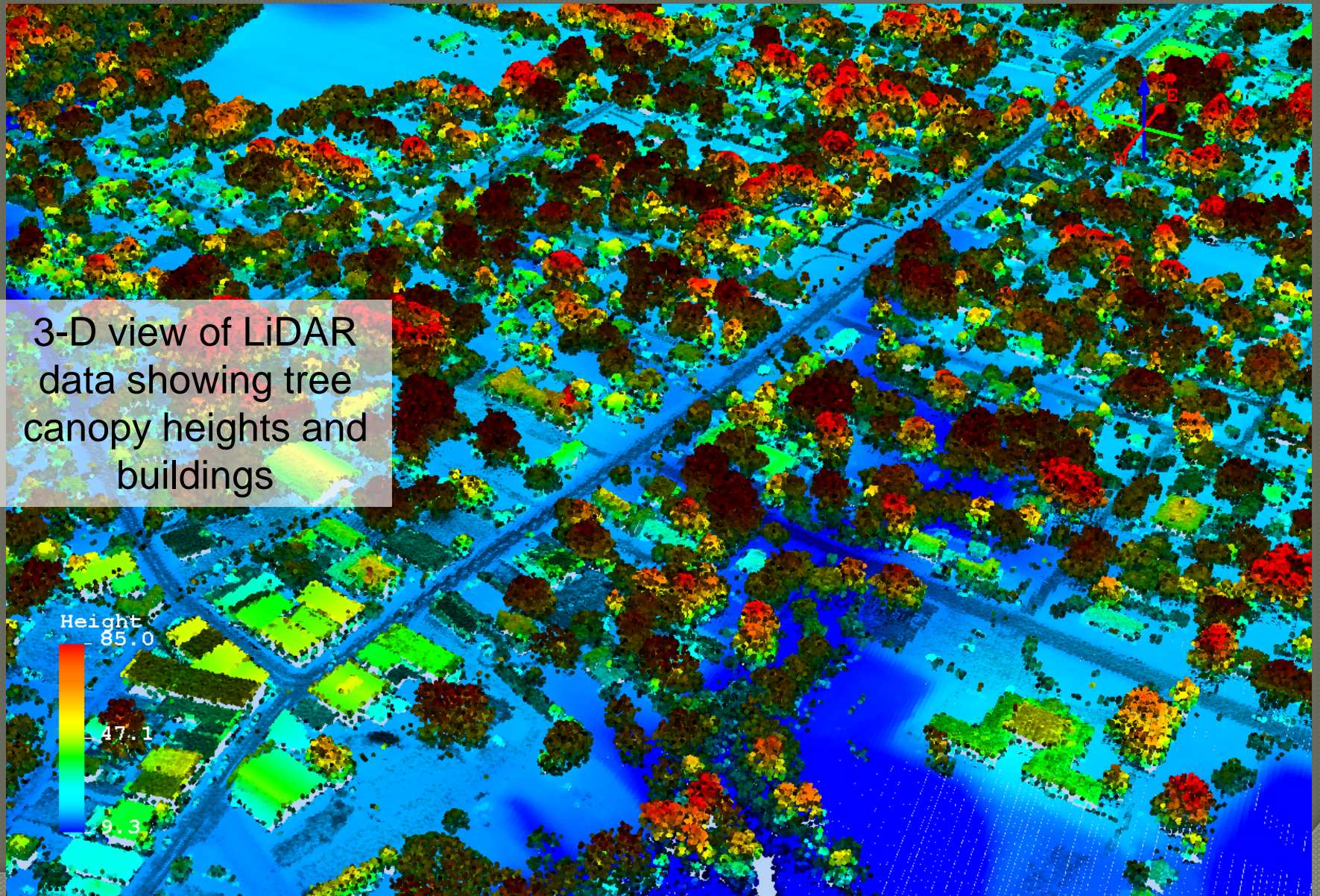
Oyster



Wachapreague



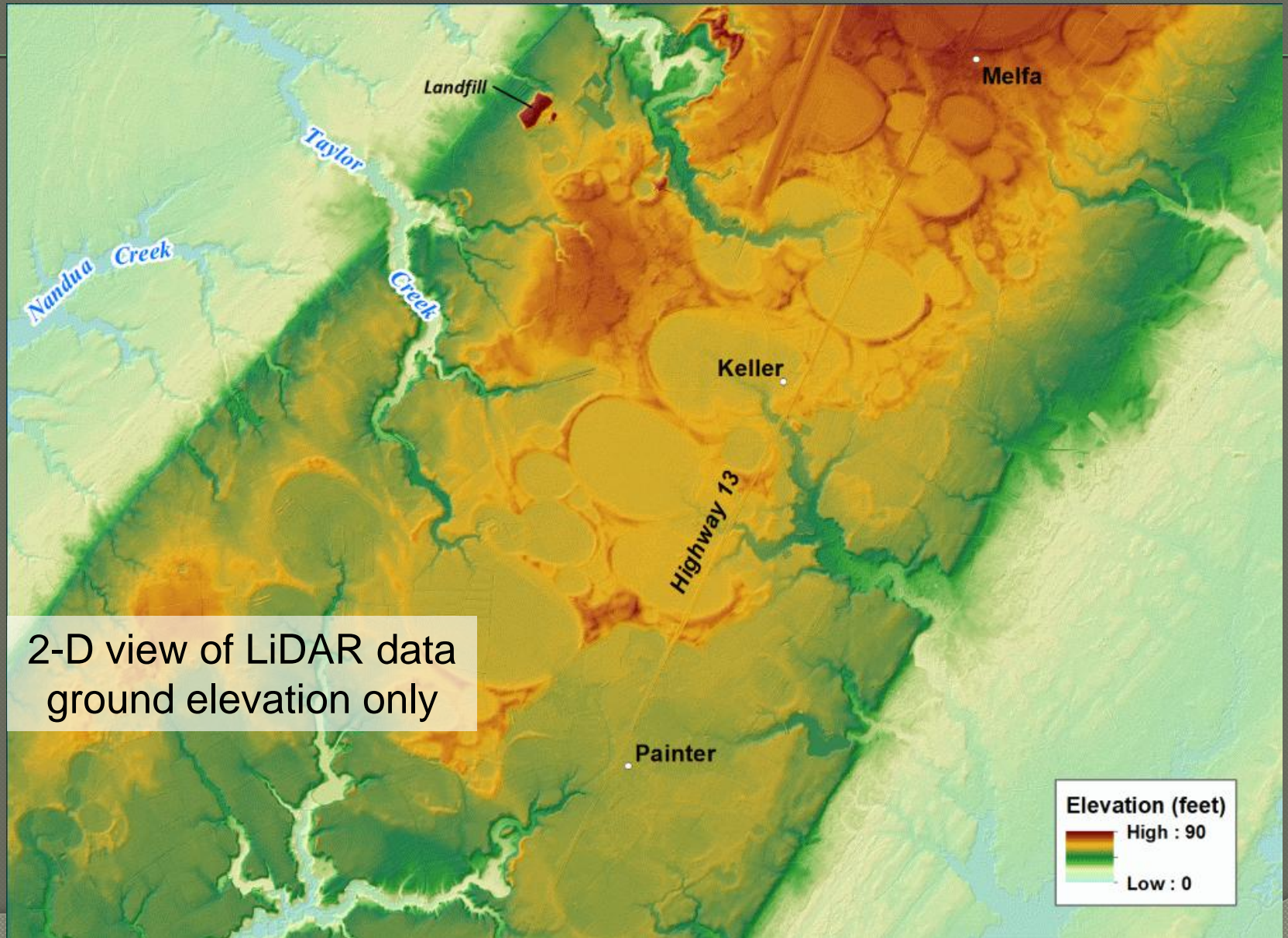
Onancock



3-D view of LiDAR
data showing tree
canopy heights and
buildings

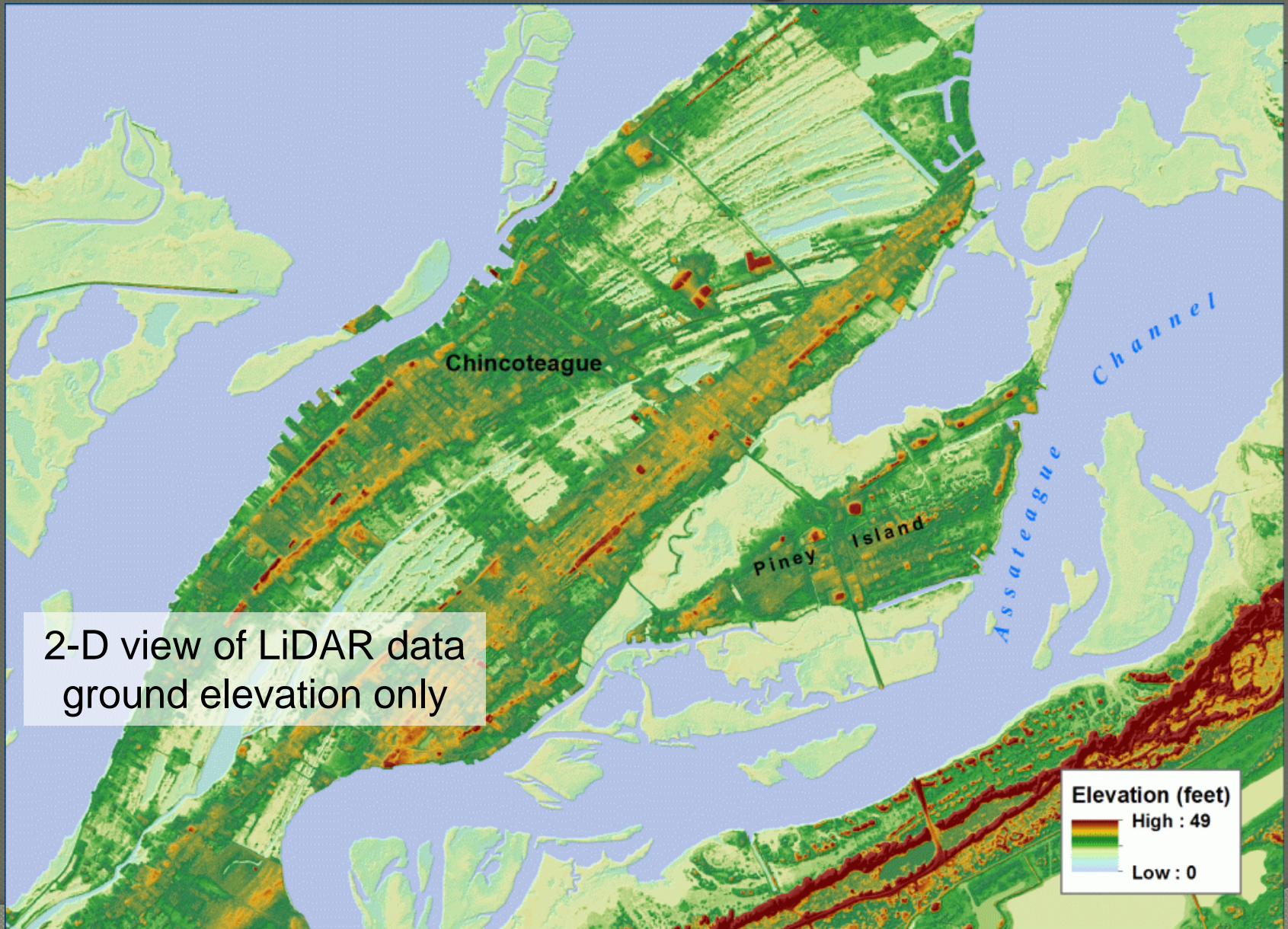
Height
85.0
47.1
9.3

South-Central Accomack County (Melfa, Keller, & Painter)



2-D view of LiDAR data
ground elevation only

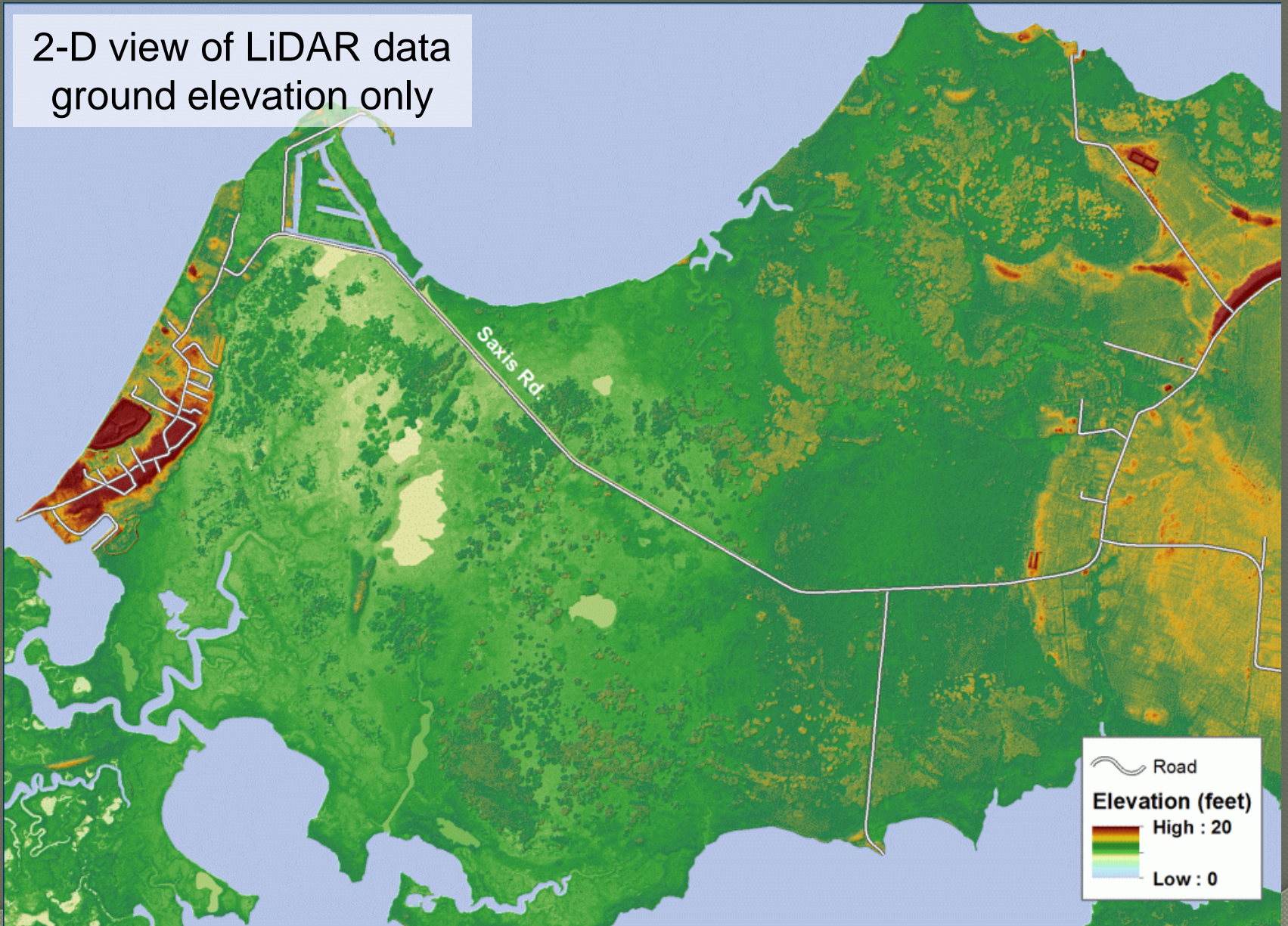
Chincoteague



2-D view of LiDAR data
ground elevation only

Saxis

2-D view of LiDAR data
ground elevation only





Parramore Island

2-D view of LiDAR data
ground elevation only

Limitations for Marsh Mapping

Several flight lines collected data during high-tide periods

- Any marsh that was underwater is treated as WATER not land
- Mostly an issue around Mockhorn Island
- Not an issue for mainland



Data Availability

- Free to public
- Publically accessible via hard drive at A-NPDC (contact Curt Smith) or internet @ lidar.cr.usgs.gov
- GIS or other specialized software needed for data analysis

The screenshot shows the homepage of the USGS Center for LIDAR Information Coordination and Knowledge. The page features a navigation menu with links for Home, Bulletin Board, Data Viewer, Websites/References, Media & Docs, and Contact Us. The main content area is divided into three sections: Discrete-return point clouds, Bare Earth, and USGS-NASA-NPS EAARL Data. Each section includes a small image and a brief description of the data available. The USGS logo is visible in the top left corner, and contact information is in the top right corner.

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Welcome to the USGS Center for LIDAR Information Coordination and Knowledge

Home | Bulletin Board | Data Viewer | Websites/References | Media & Docs | Contact Us

CLICK
Center for LIDAR Information Coordination and Knowledge

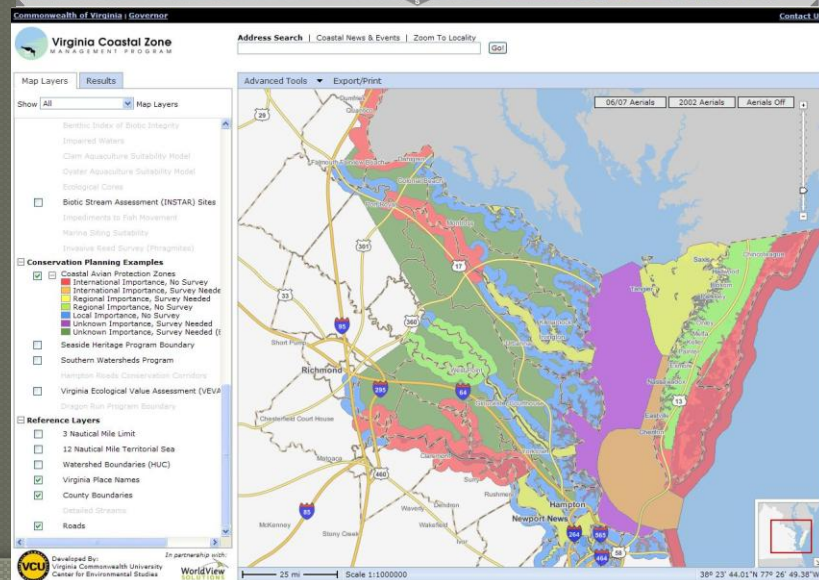
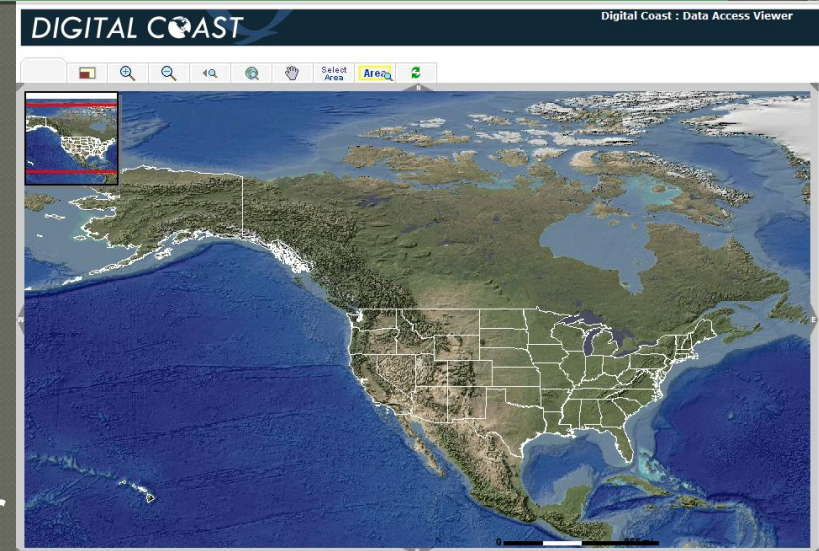
Discrete-return point clouds
Find out more about discrete-return lidar: See if publicly-available lidar is in your area of interest; ask and answer questions about the data, processing, derivatives and more on our bulletin board; look for articles and other websites about lidar.

Bare Earth
Find out more about the USGS bare earth derivatives from lidar: Go to our National Elevation Dataset (NED) page. NED contains bare earth elevation data created by lidar and other sources.

USGS-NASA-NPS EAARL Data
Find out more about USGS Coastal and Marine Geology Program's collaboration with NASA and NPS to publish data acquired by the Experimental Advanced Airborne Research Lidar (EAARL) system. Optionally, visualize and download lidar data and CIR imagery in Google Earth.

Online Data Viewing

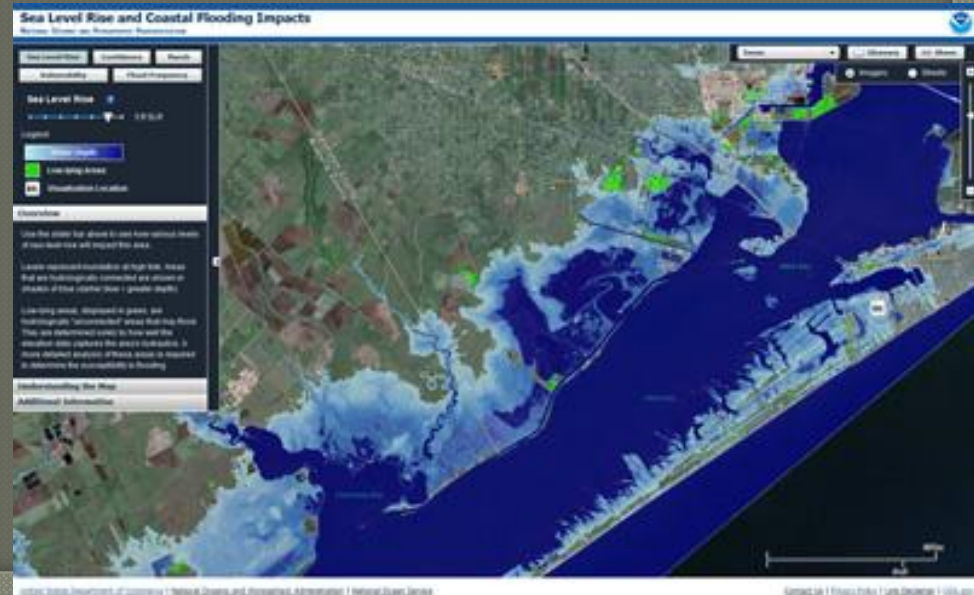
- NOAA CSC Digital Coast Viewer
www.csc.noaa.gov/digitalcoast
- Coastal GEMS
www.deq.state.va.us/coastal/coastalgems.html
- VIMS Shoreline Inventory Viewer
- Accomack and Northampton Counties (possibly)



LiDAR Products under development

- NOAA coastal vulnerability products
 - Sea-level inundation maps with confidence levels
 - Marsh migration maps
 - Shallow coastal flooding maps
 - Social and economic vulnerability maps

- Updated FEMA Flood Insurance Rate Maps



Further Questions and Contact

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Protecting nature. Preserving life.™

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