Eastern Shore of Virginia LiDAR Project

The Nature Conservancy
Protecting nature. Preserving life.™

USGS
science for a changing world

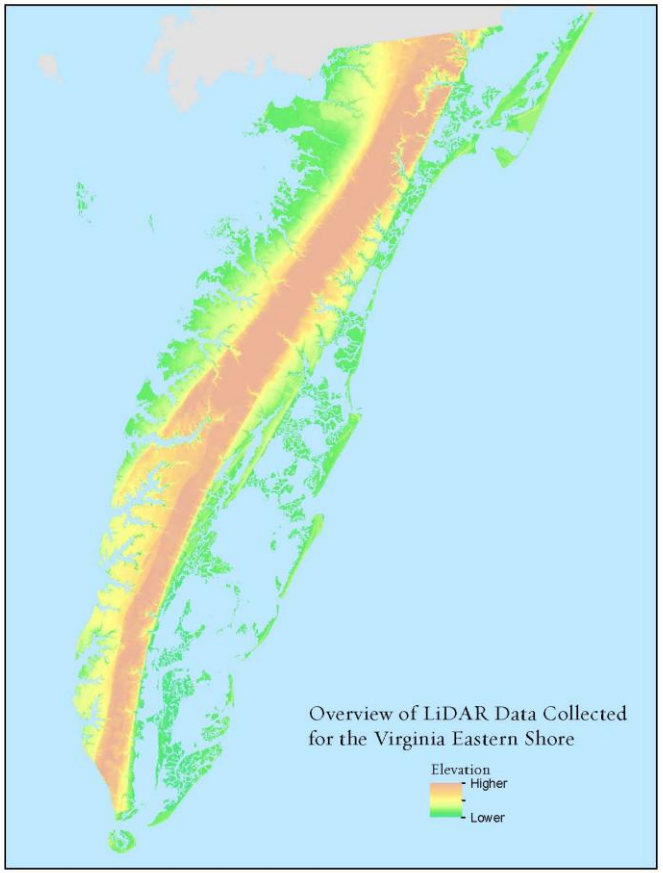
VGIN
Virginia Geographic Information Network

VCR LTER

SANBORN

Dewberry

University of Virginia



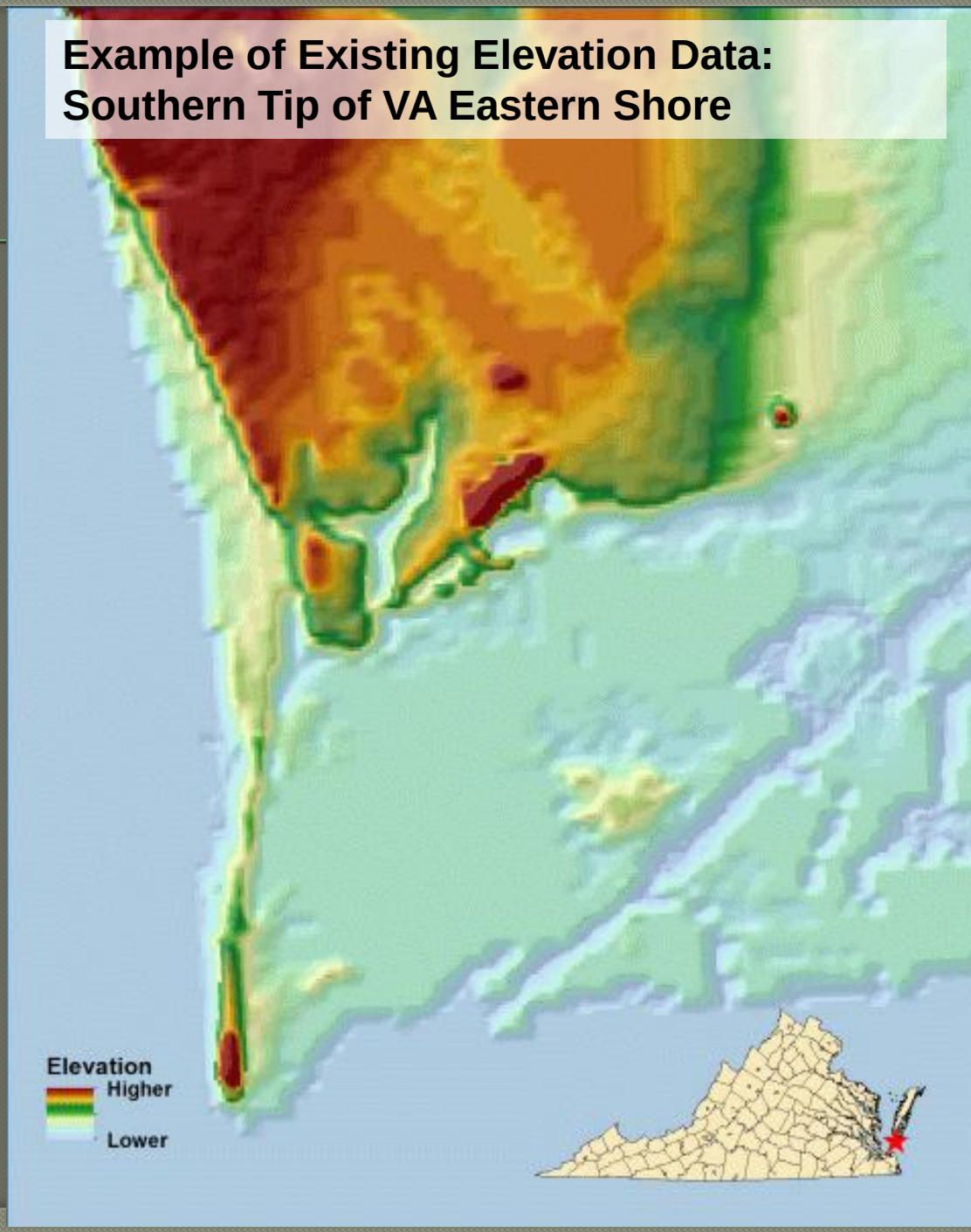
Why do we need accurate elevation data?

- 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

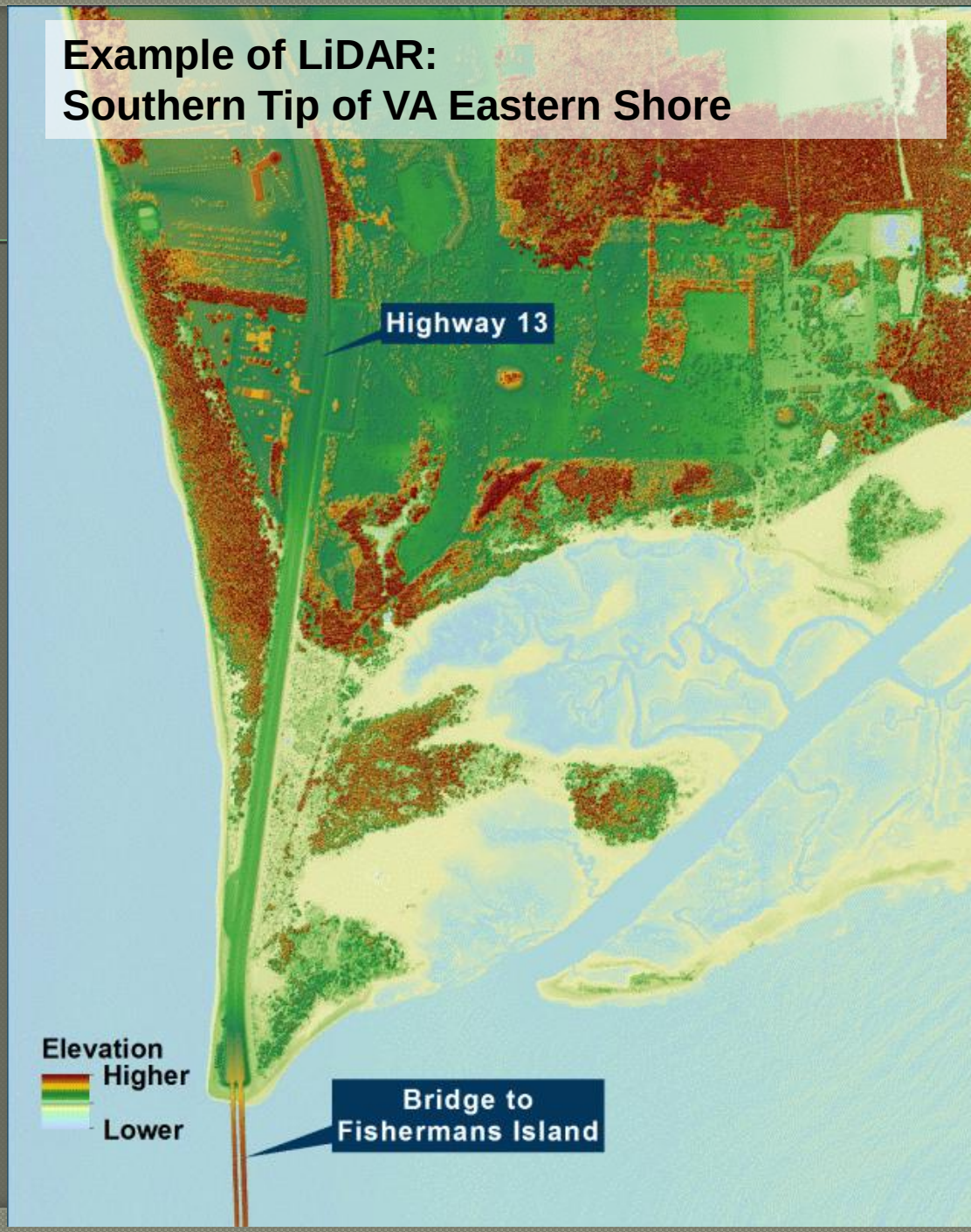
~7 foot vertical accuracy

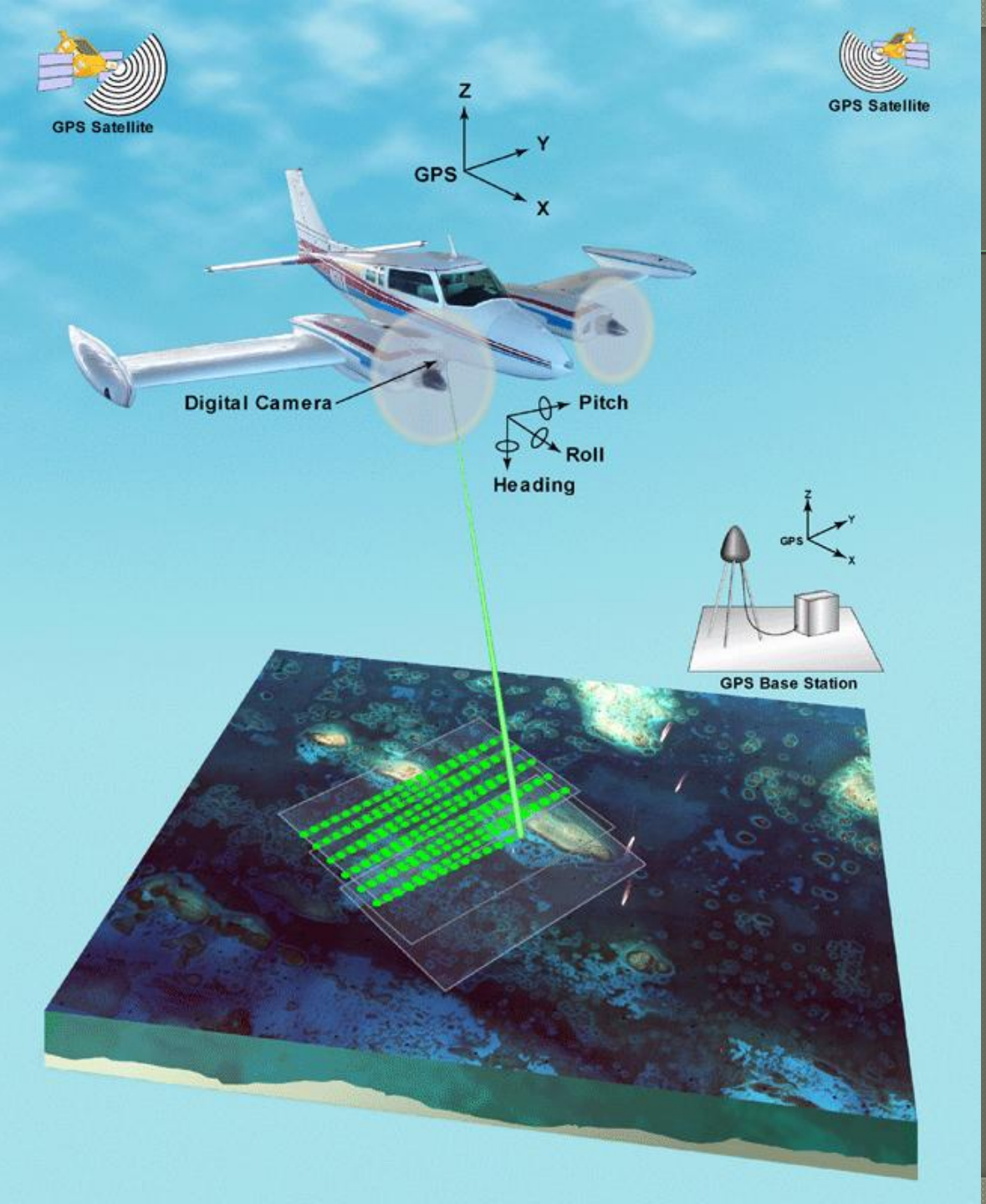


The Solution

- 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





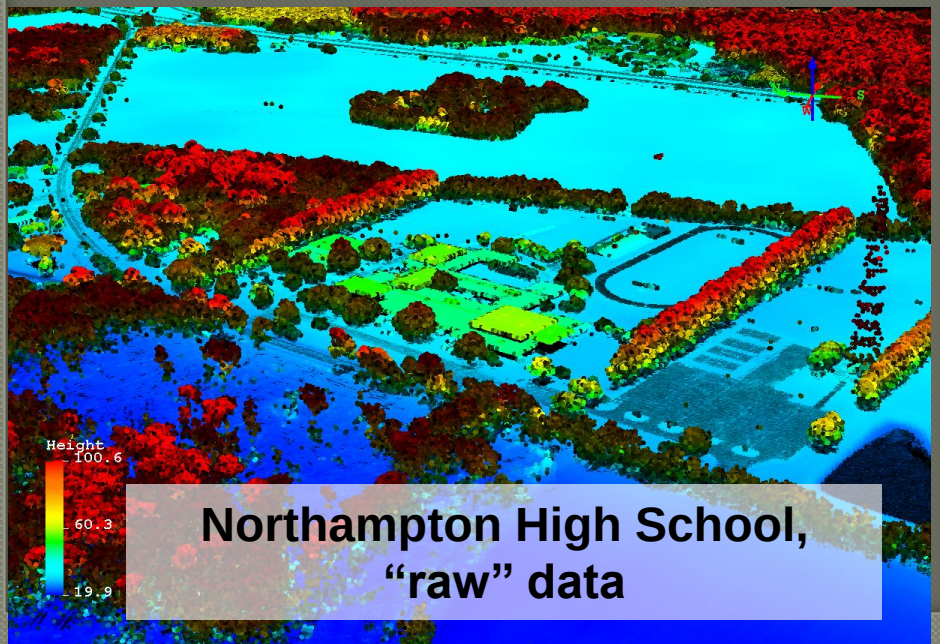
LiDAR

- 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

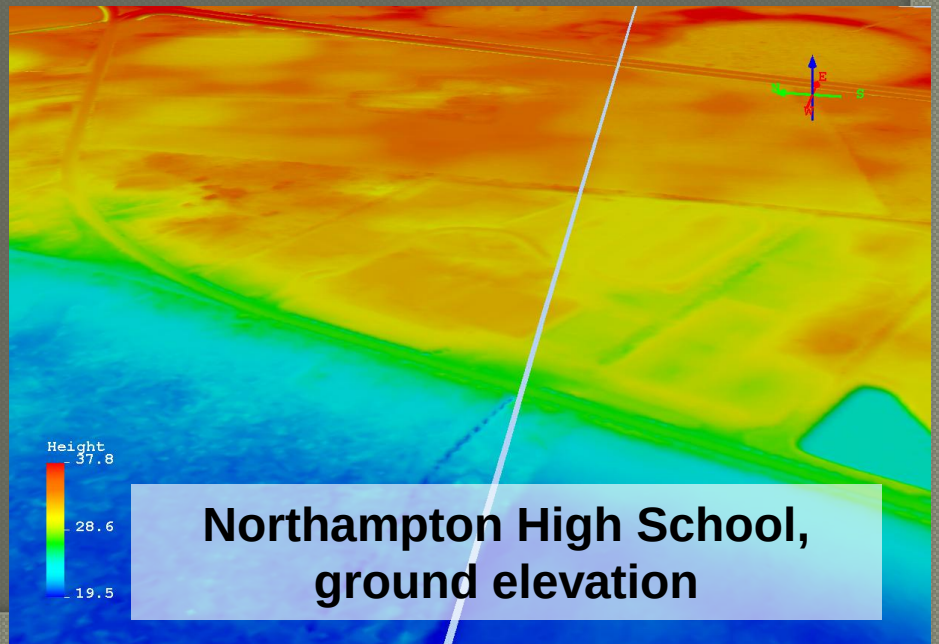
LiDAR Data Comes in Two Forms

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



Northampton High School, "raw" data



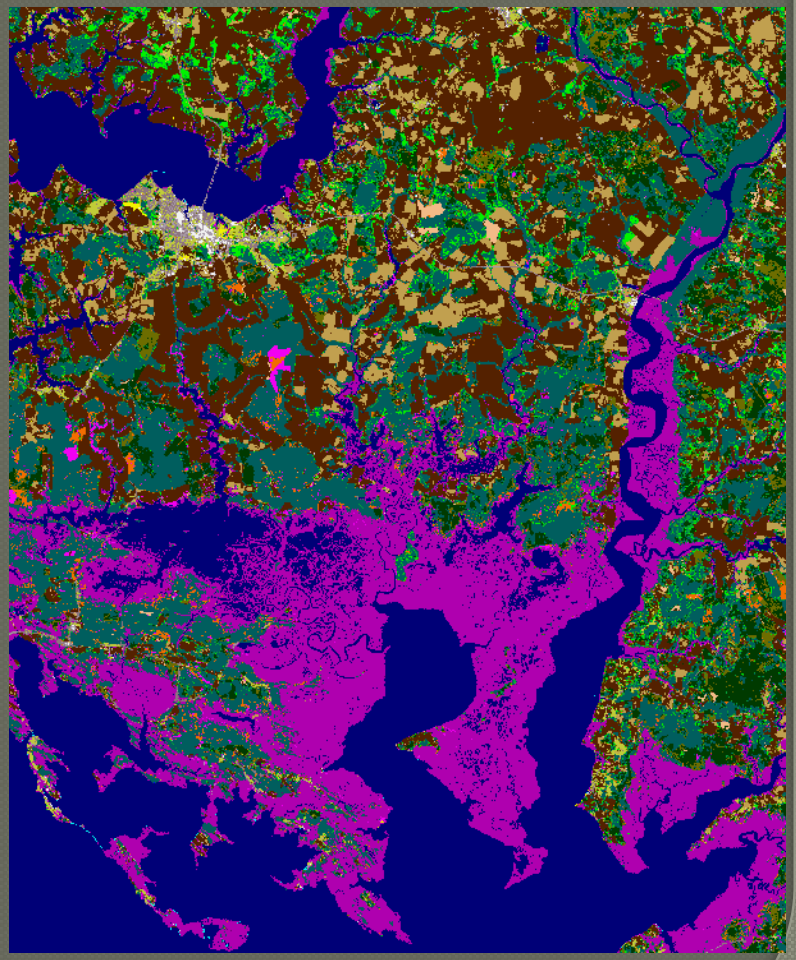
Northampton High School, ground elevation

LiDAR for VA's Eastern Shore

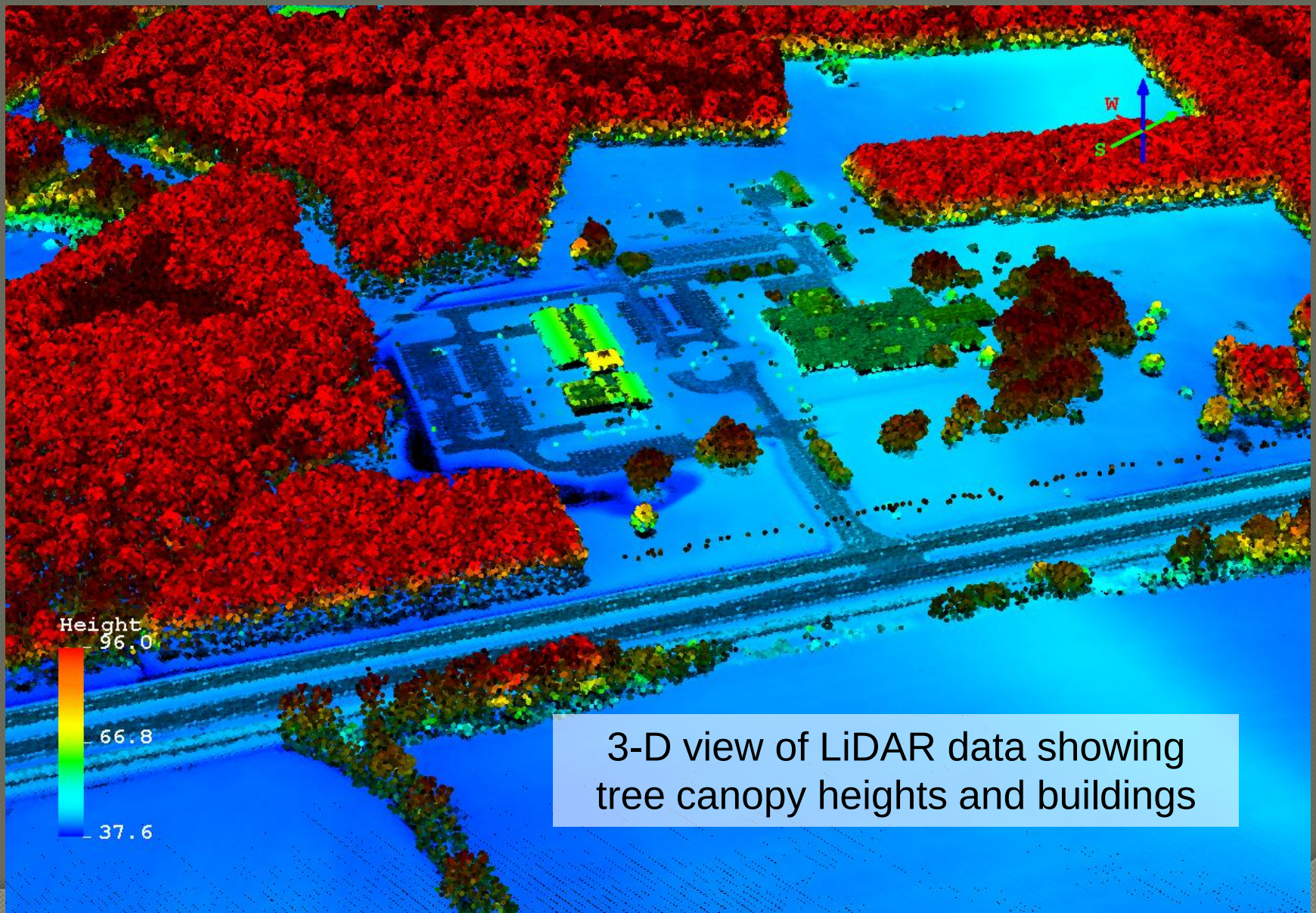
Funded by the Nature Conservancy, VA Coast Reserve Long-Term Ecological Research Project, and U.S. Geological Survey and collected in 2010.

LiDAR Applications

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

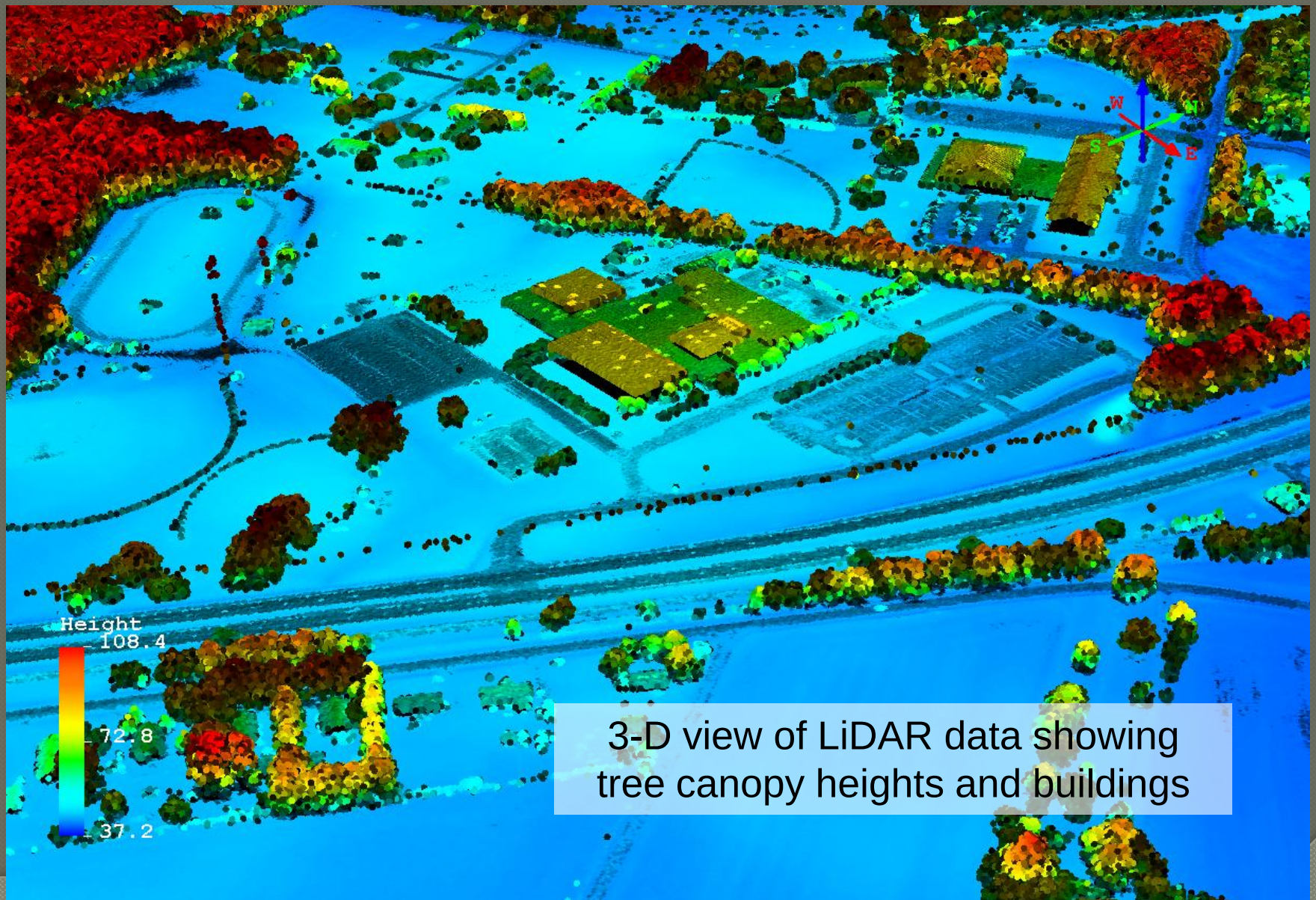


Eastern Shore Community College



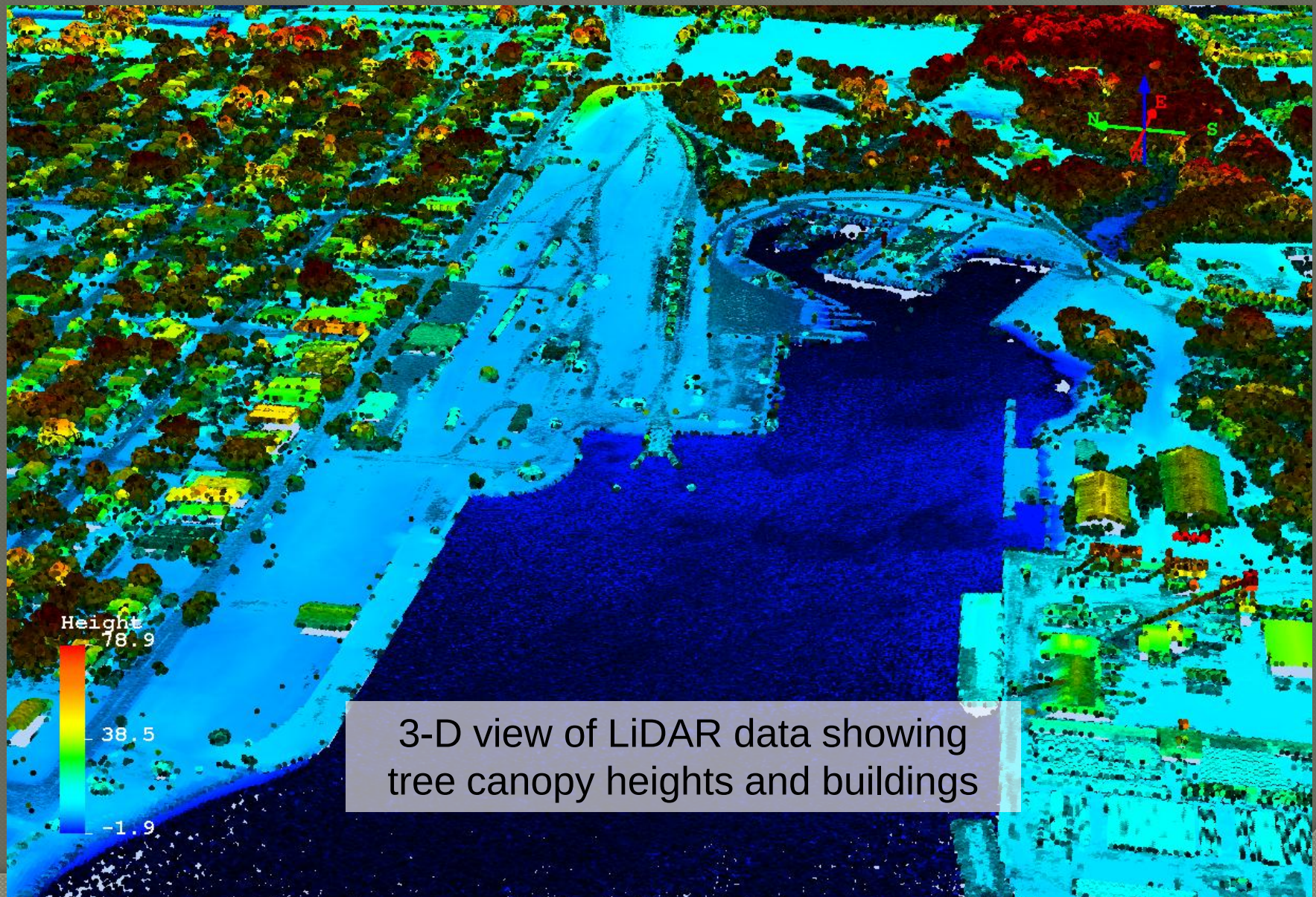
3-D view of LiDAR data showing tree canopy heights and buildings

Nandua Middle and High School



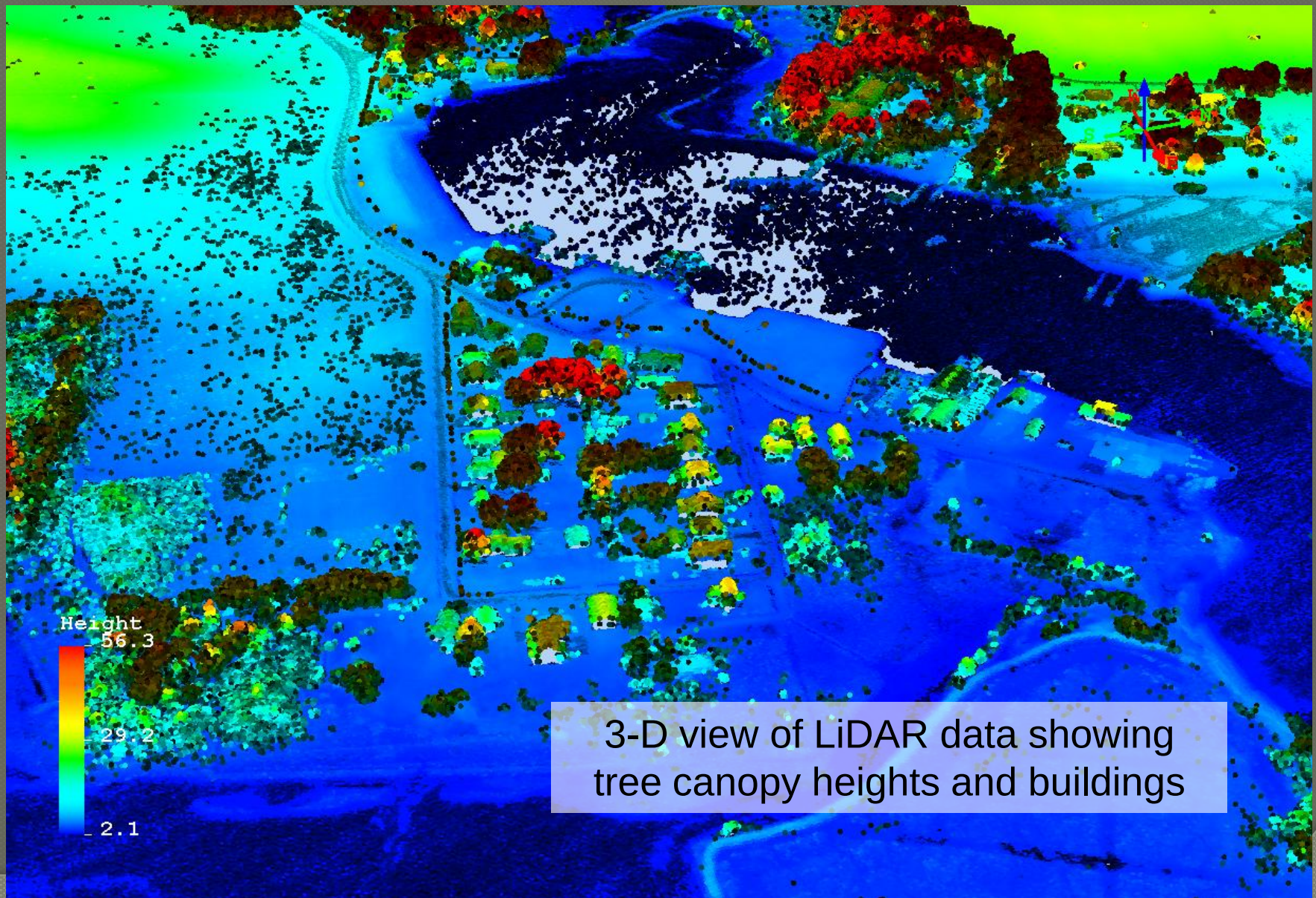
3-D view of LiDAR data showing tree canopy heights and buildings

Cape Charles



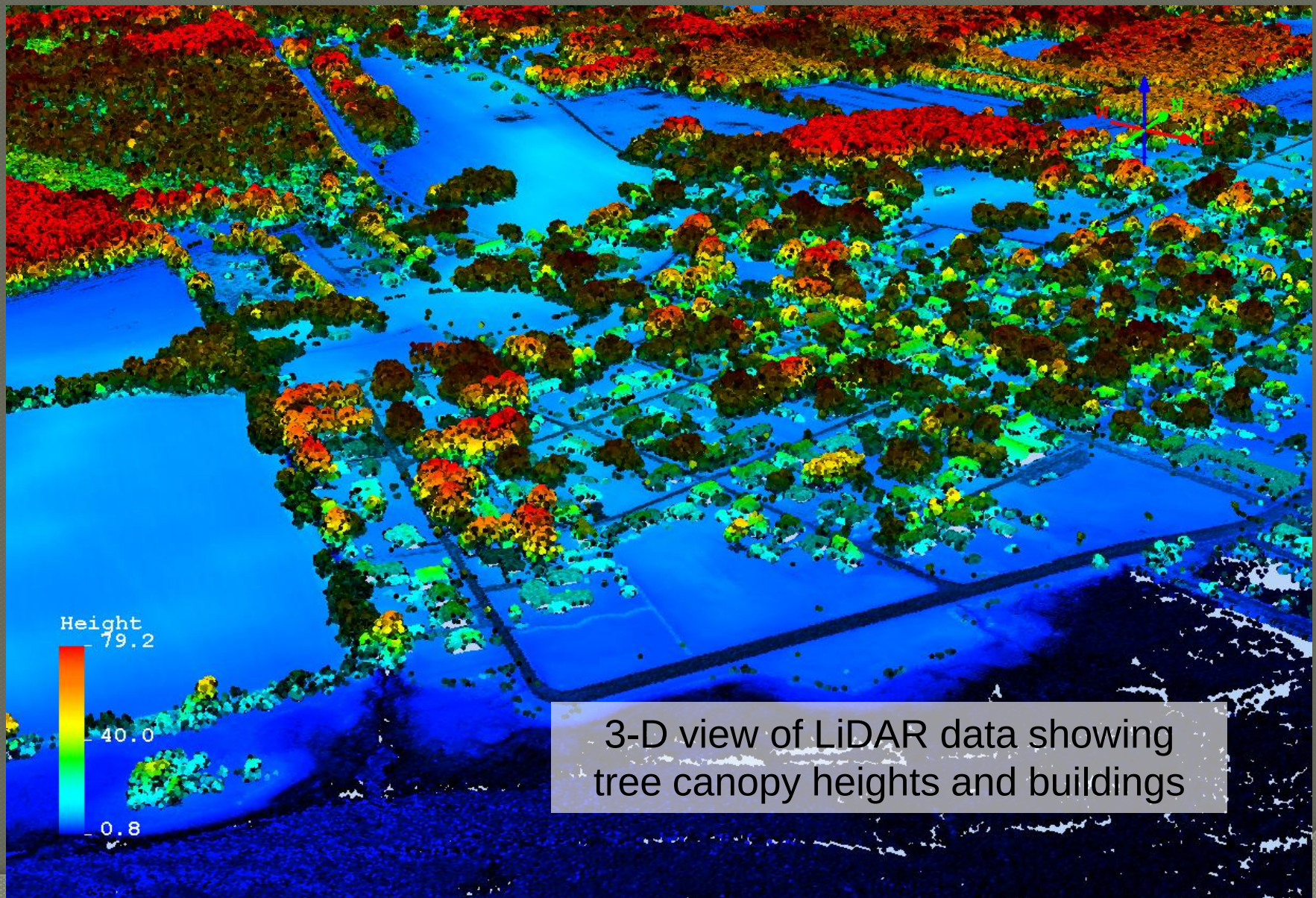
3-D view of LiDAR data showing tree canopy heights and buildings

Oyster



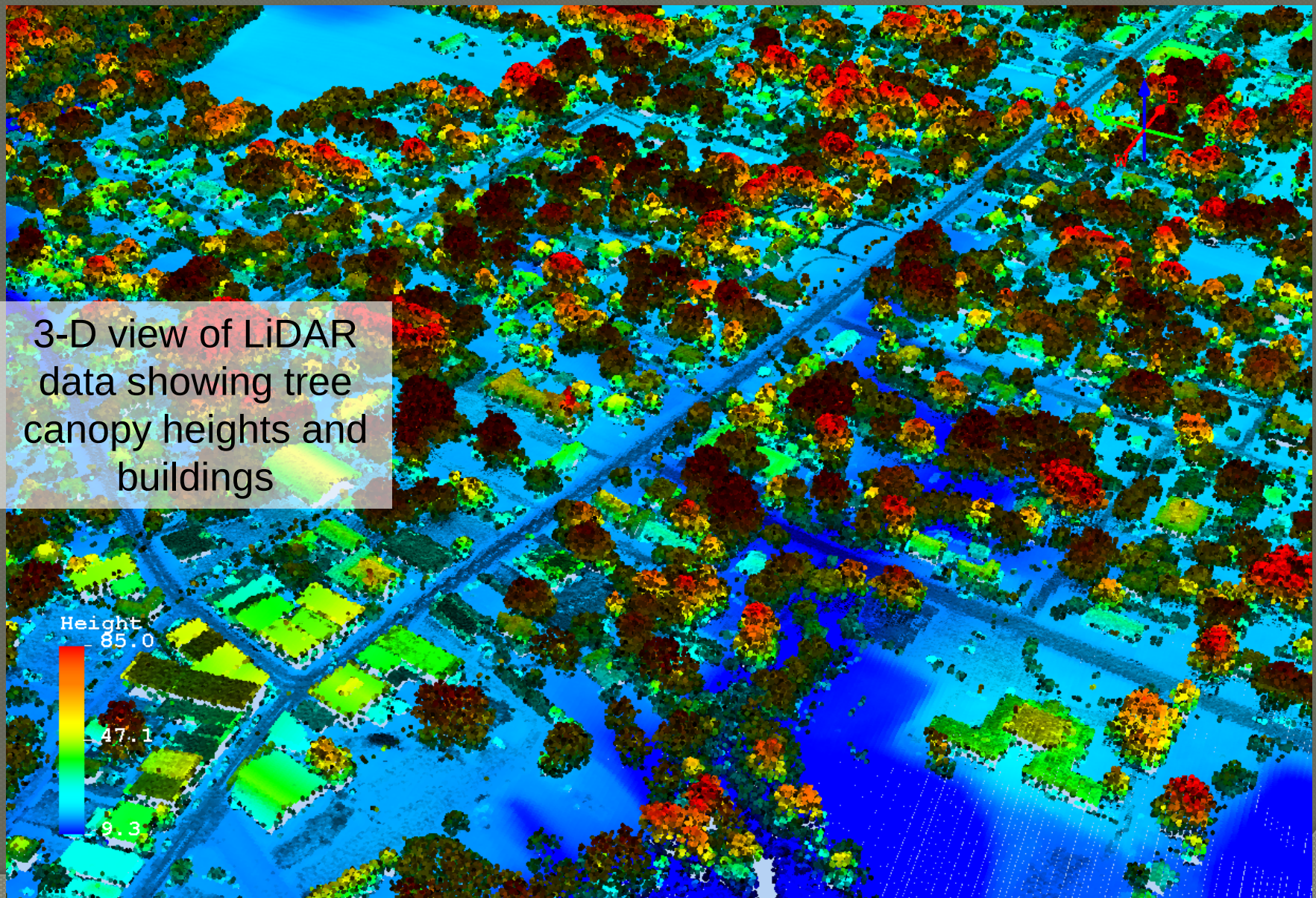
3-D view of LiDAR data showing tree canopy heights and buildings

Wachapreague



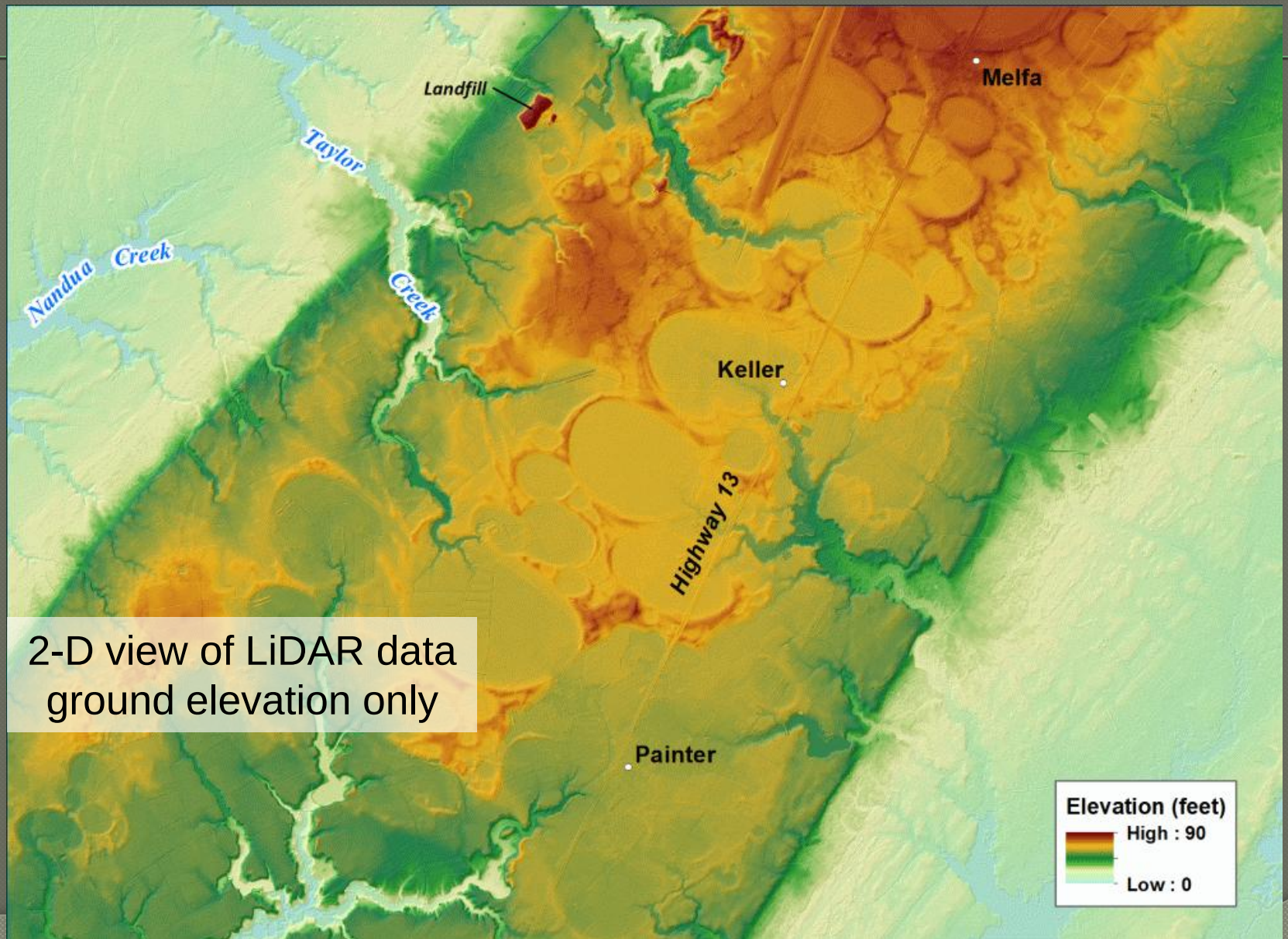
3-D view of LiDAR data showing tree canopy heights and buildings

Onancock



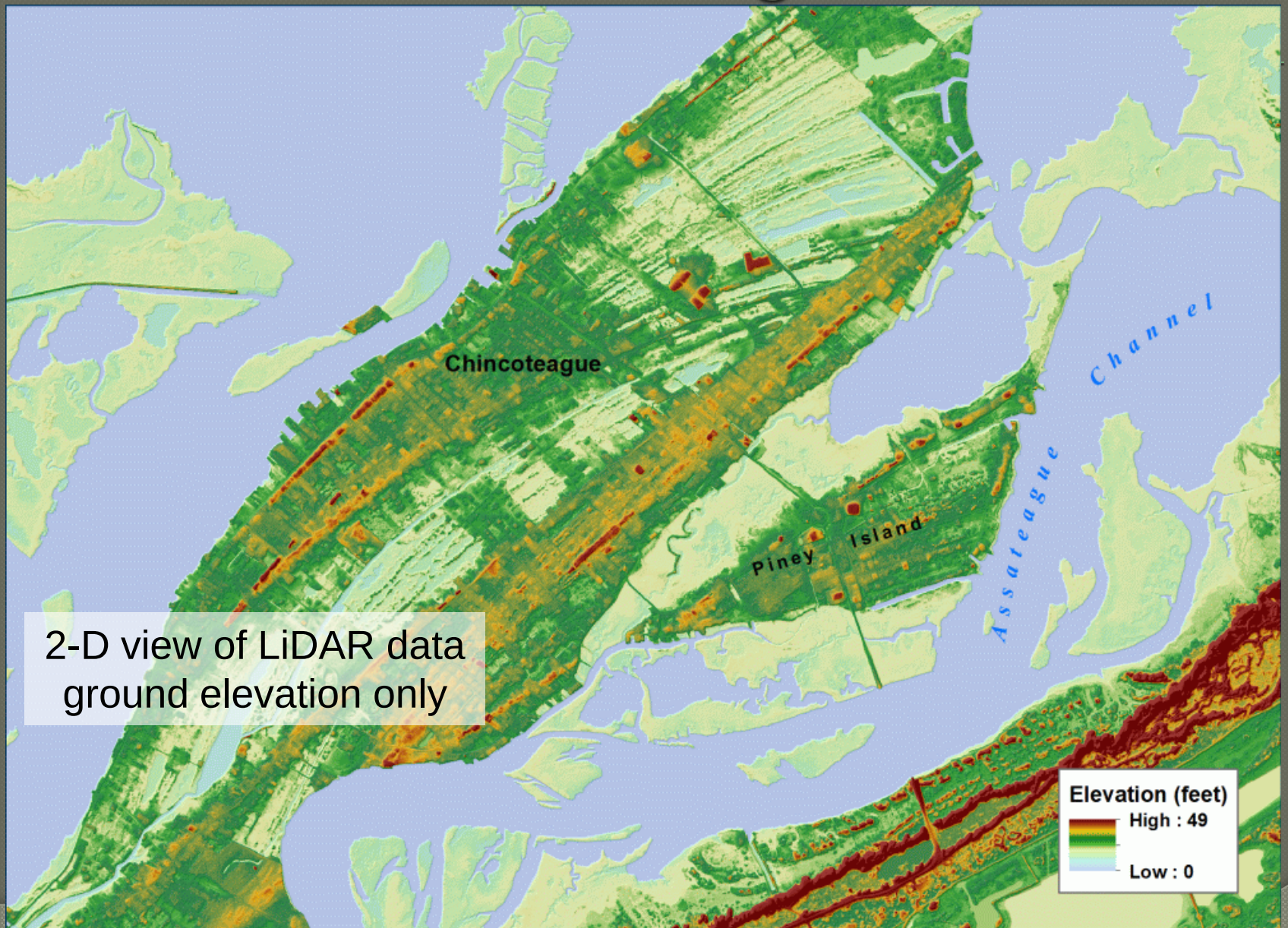
3-D view of LiDAR data showing tree canopy heights and buildings

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

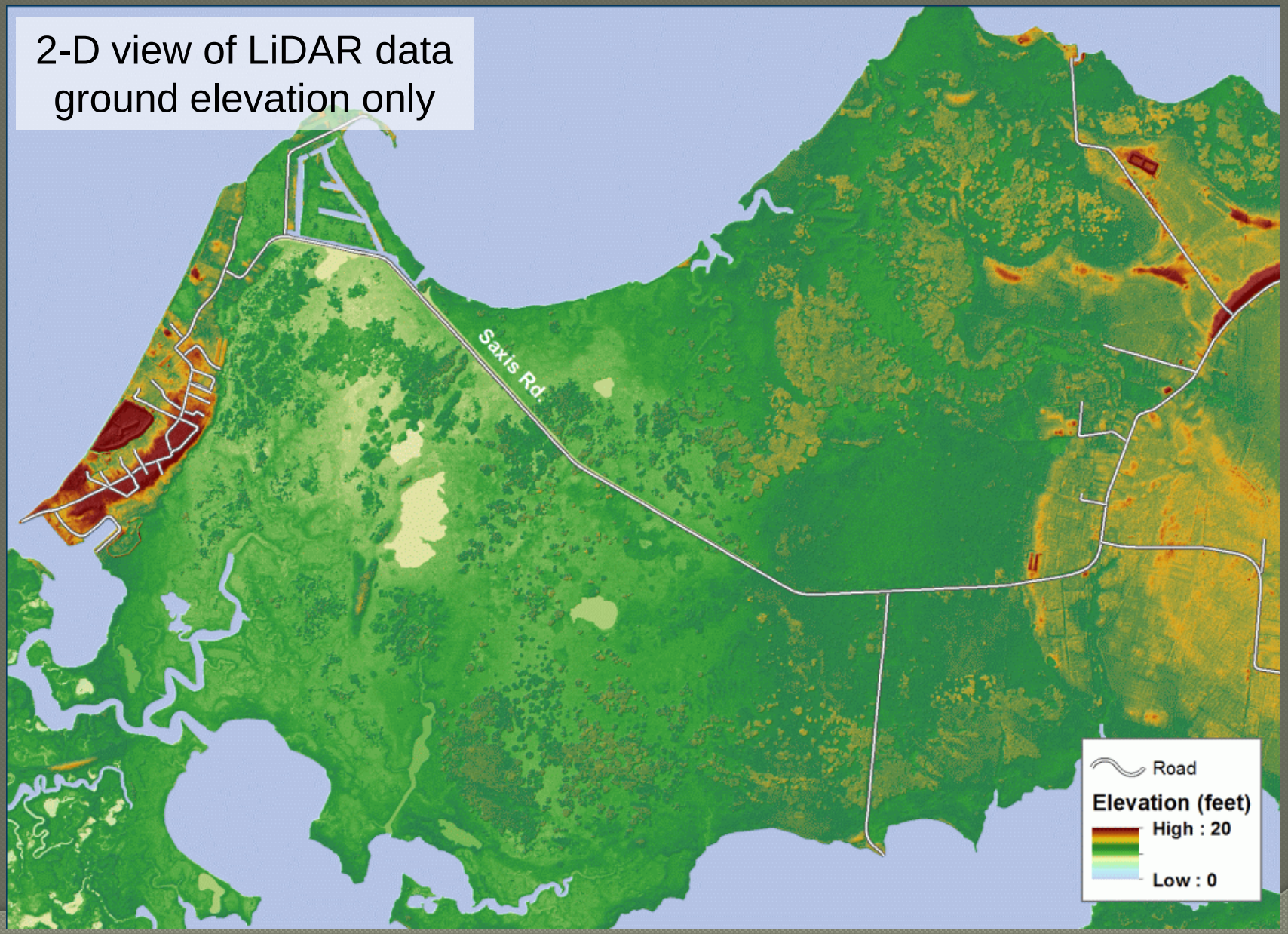


2-D view of LiDAR data
ground elevation only

Chincoteague



Saxis


2-D view of LiDAR data
ground elevation only
Saxis Rd.
Road
Elevation (feet)
High : 20
Low : 0

Parramore Island

2-D view of LiDAR data ground elevation only

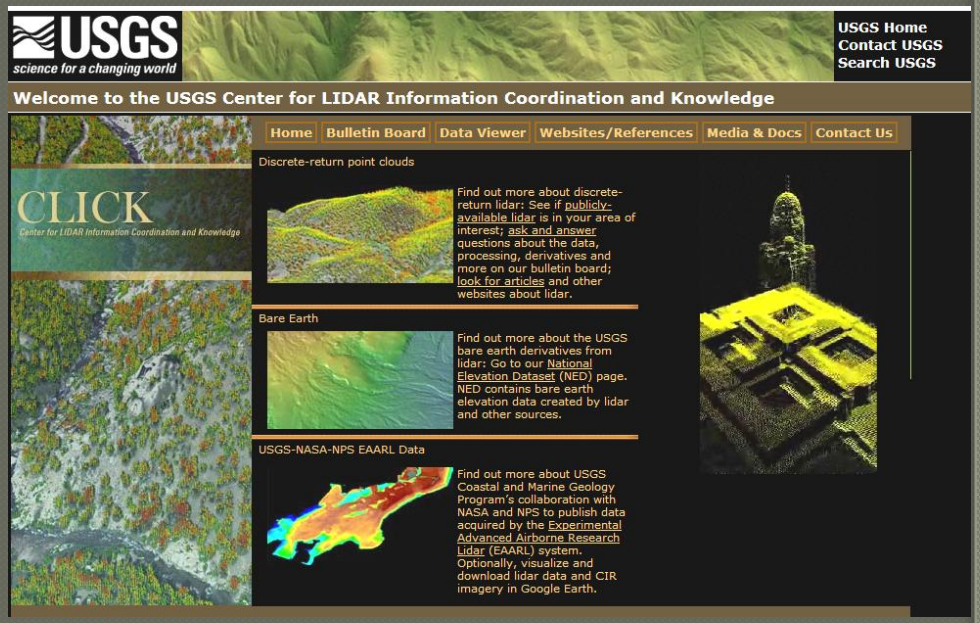
Limitations for Marsh Mapping

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

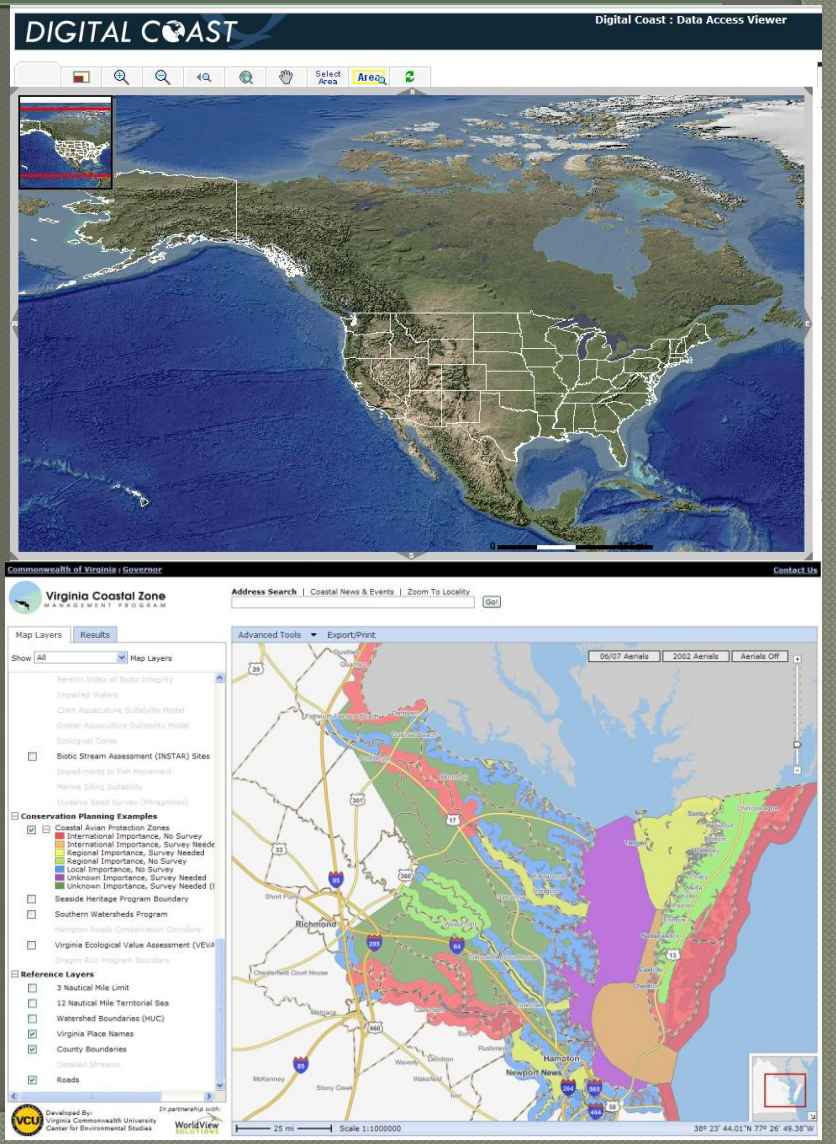
Data Availability

- 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



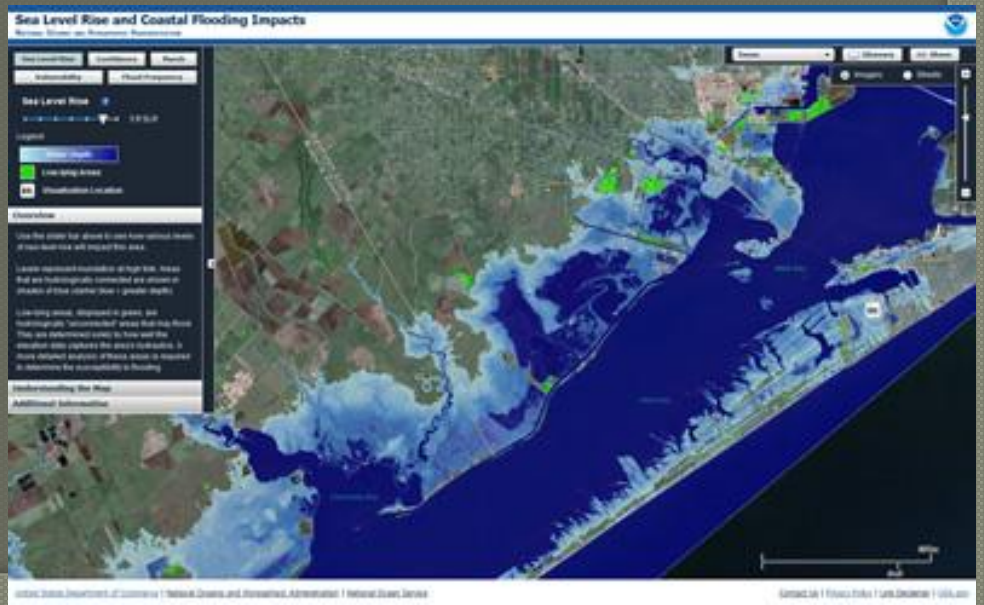
Online Data Viewing

- 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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VGIN
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Virginia's Eastern Shore
A-NPDC

Virginia Coastal Zone
MANAGEMENT PROGRAM

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE