Elevation: The Base Map

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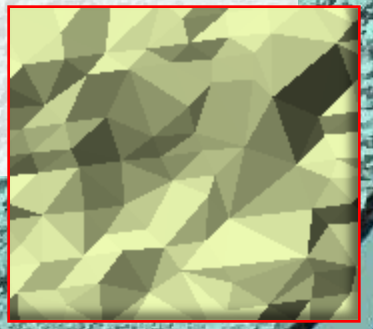
Basic Elevation Types: Points

- **X, Y, Z**
- **Irregular distribution**
- **Cumbersome**
- **Typical sources**
  - Lidar
  - Stereo Photography
  - Ground Survey
- **ASCII, LAS formats**

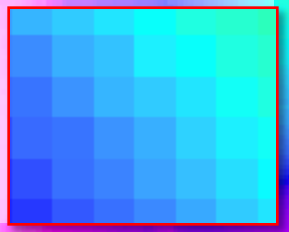
Basic Elevation Types: TIN

- **Triangulated Irregular Network**
- **Surface/Mesh from points**
- **Nonstandard formats**
- **Breaklines**



Basic Elevation Types: Raster

- **Regular grid**
- **Many ways to create**
- **Common Digital Elevation Model (DEM)**
- **Common Formats**

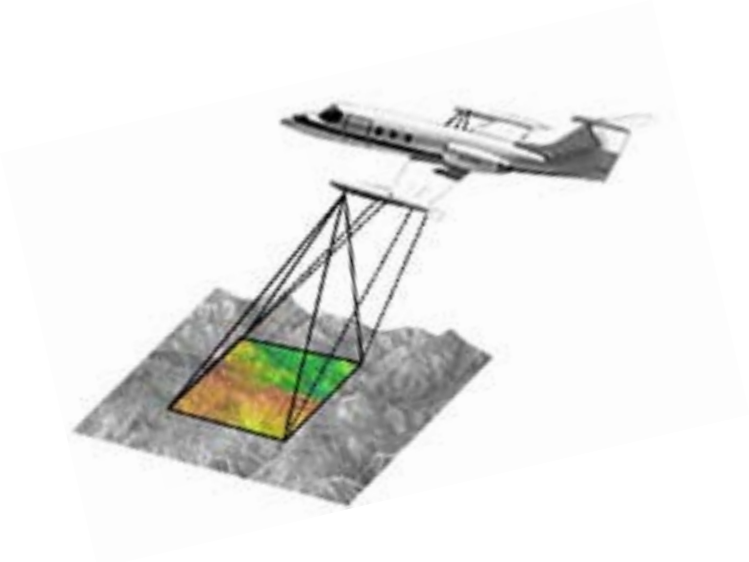


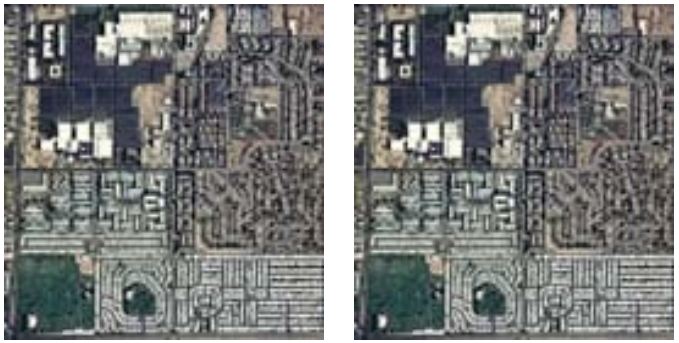
Basic Elevation Types: Contour

- **Lines of Constant Height**
- **Intuitive**
- **Loss of detail**
- **Can be pricey**
- **Shapefile, DXF, etc.**

Technologies for Elevation

- **Ground survey (cm)**
- **Stereo aerial photography (10 cm)**
- **Lidar (10 cm)**
- **IfSAR/InSAR (1 m)**





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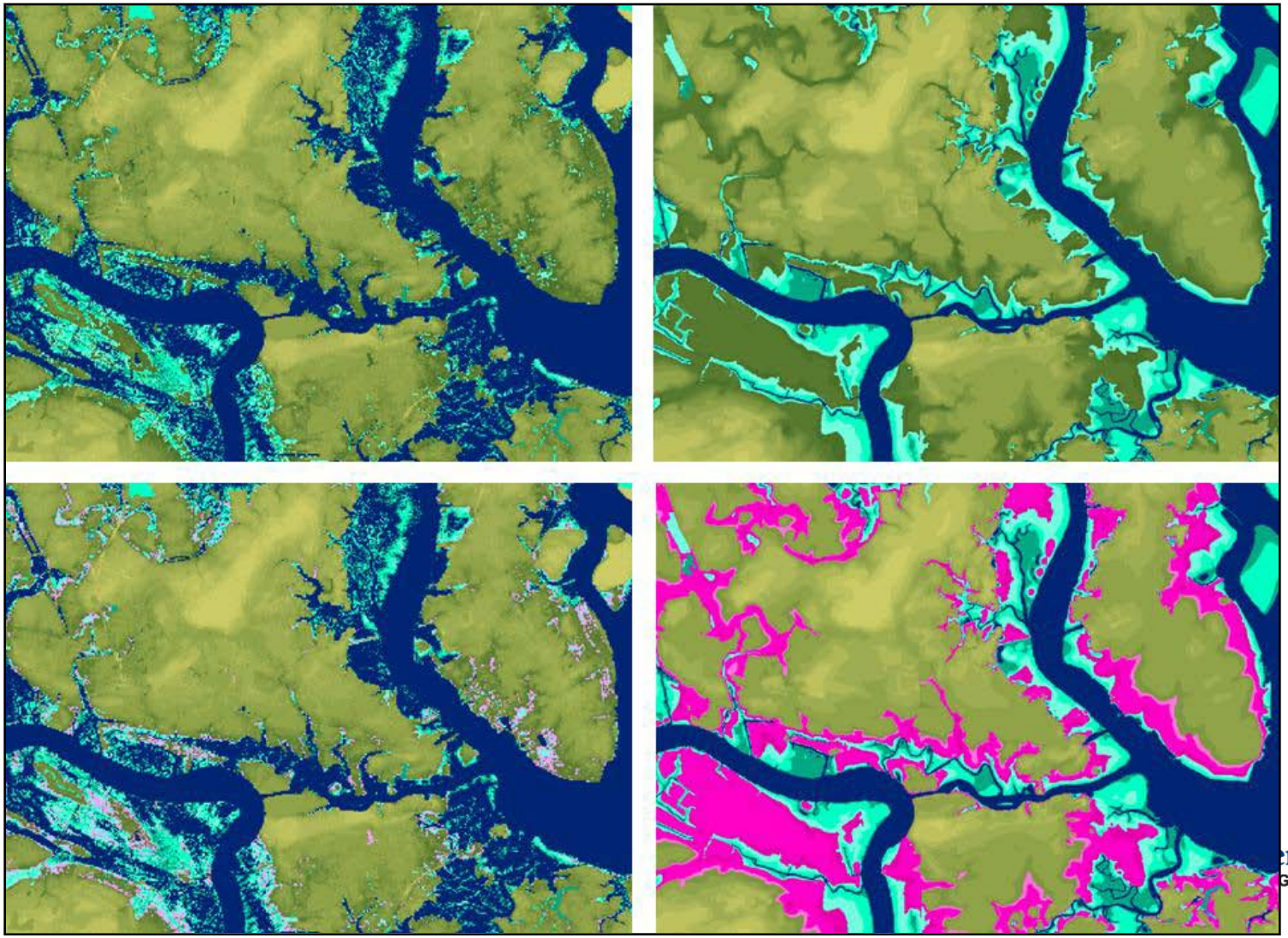
DEM Accuracy and Sea Level Rise Results

3m lidar DEM
(VA=~20cm)

10m National Elevation Dataset
DEM (VA=~1m)

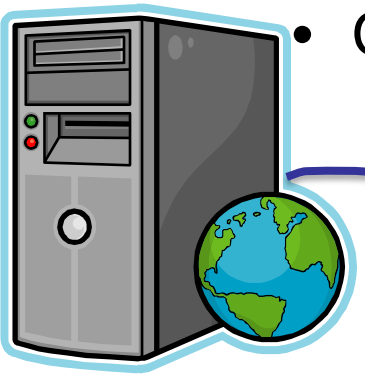
0.5m Sea Level Rise

0.5m Sea Level Rise + 1 Root Mean Square Error (RMSE)



Elevation Data Resources

- **U.S. Geological Survey (USGS) National Elevation Dataset**
- **Lidar Sites:**
  - Digital Coast (*www.csc.noaa.gov/digitalcoast/*)
  - CLICK (*lidar.cr.usgs.gov*)
  - Louisiana Lidar (*atlas.lsu.edu*)
  - North Carolina Lidar (*www.ncfloodmaps.com*)
  - Puget Sound Lidar Consortium (*pugetsoundlidar.ess.washington.edu*)
  - Others?



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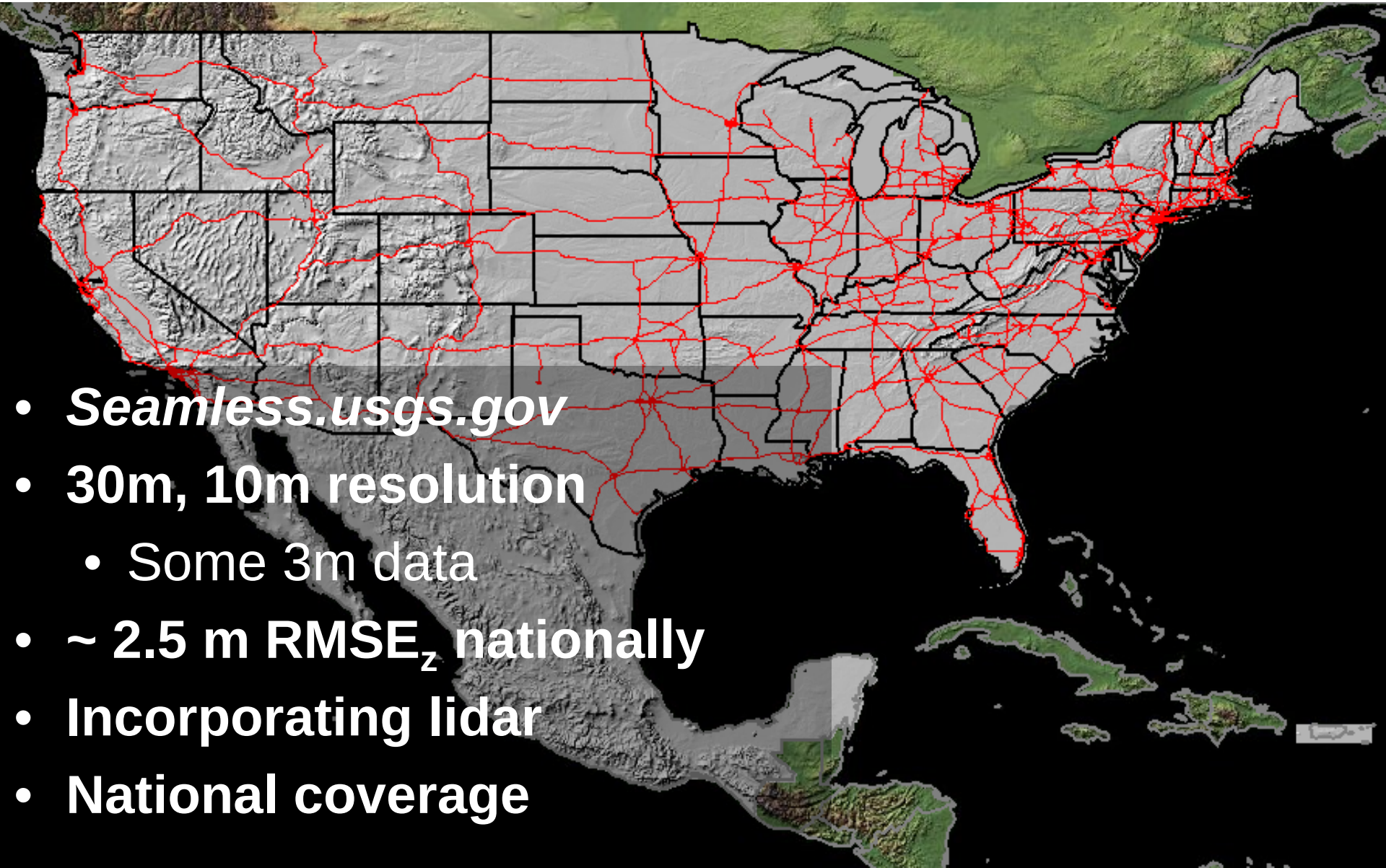
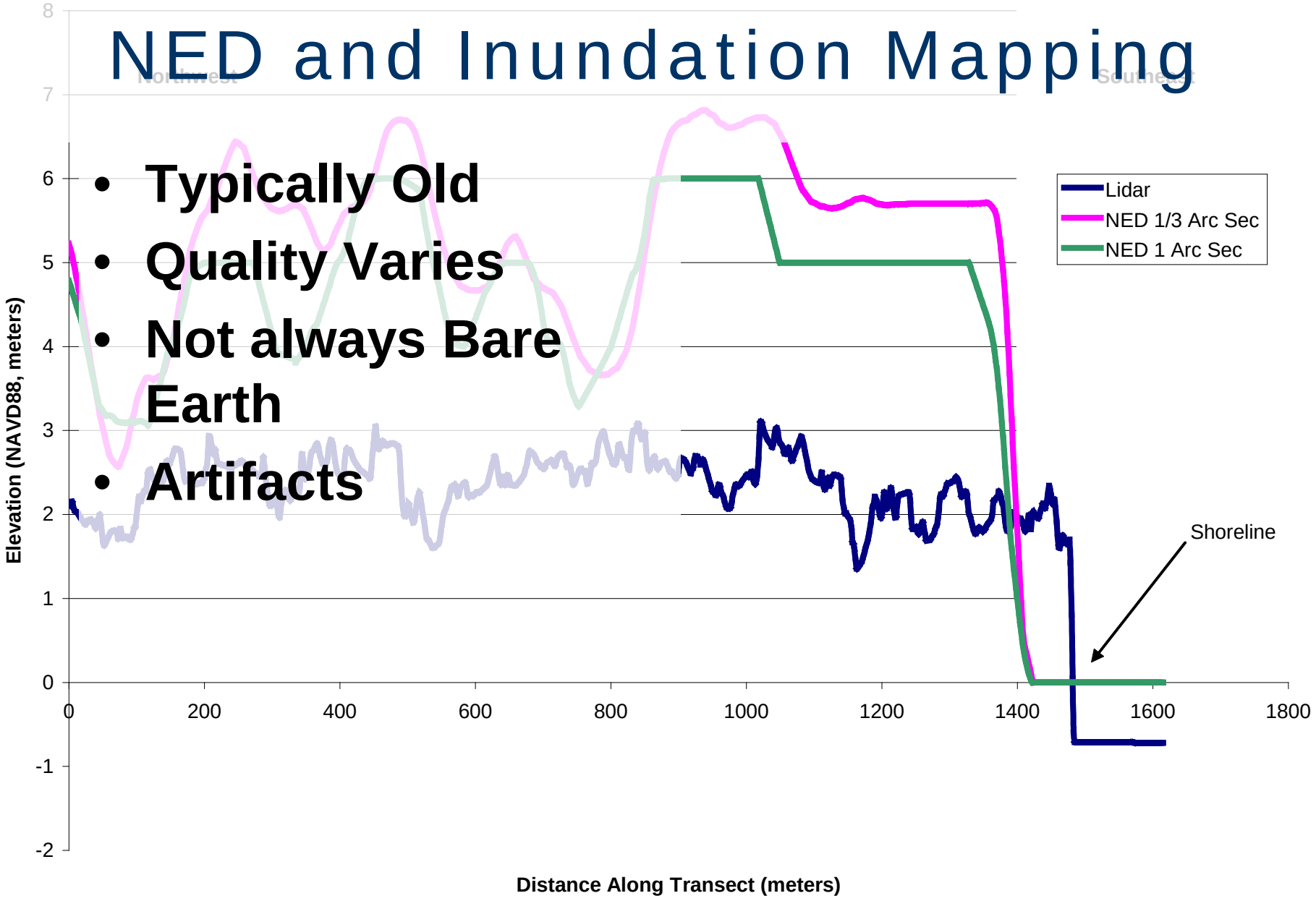
USGS National Elevation Dataset (NED)



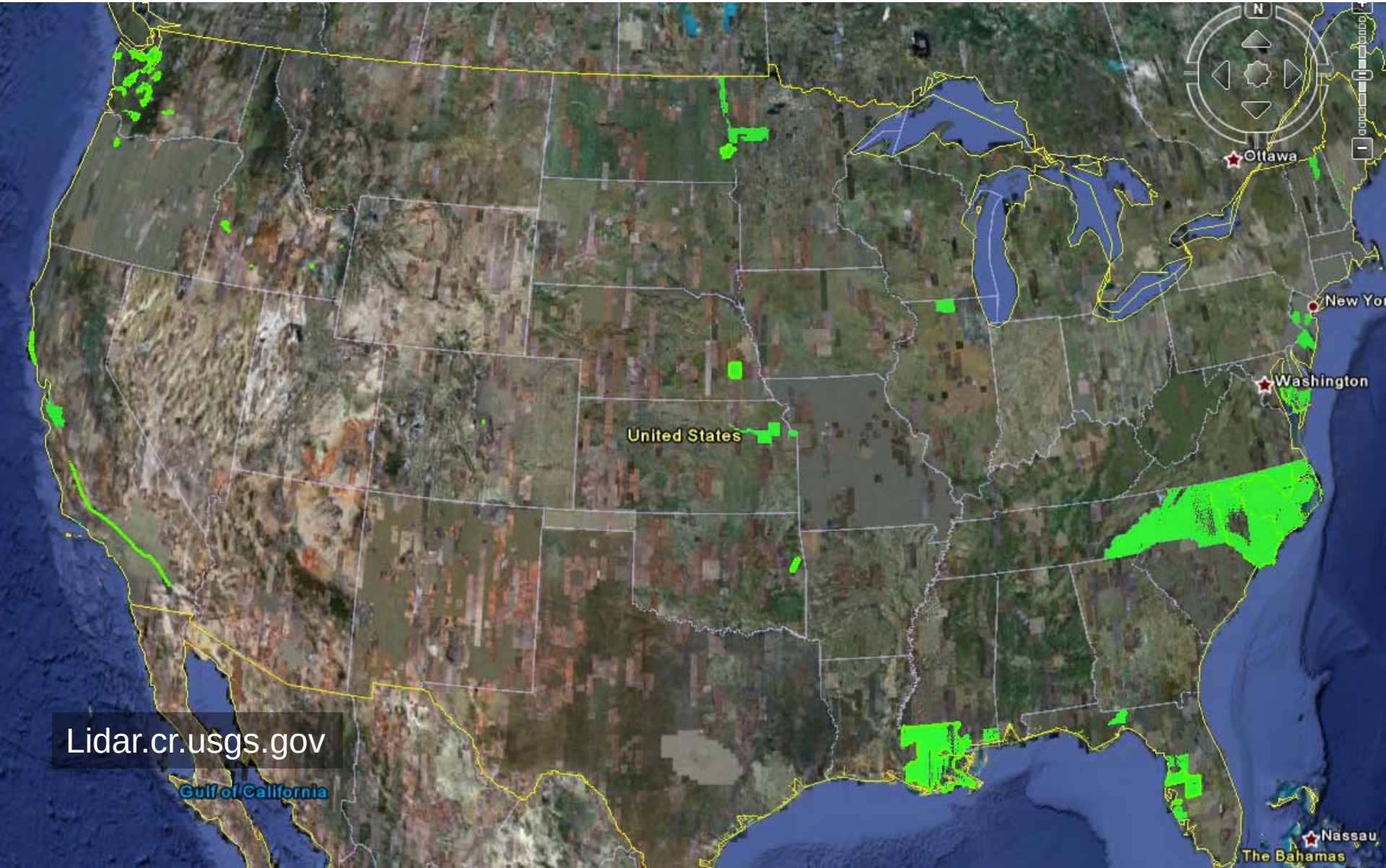
- ***Seamless.usgs.gov***
- **30m, 10m resolution**
  - Some 3m data
- **~ 2.5 m $RMSE_z$ nationally**
- **Incorporating lidar**
- **National coverage**

NED and Inundation Mapping

- **Typically Old**
- **Quality Varies**
- **Not always Bare Earth**
- **Artifacts**

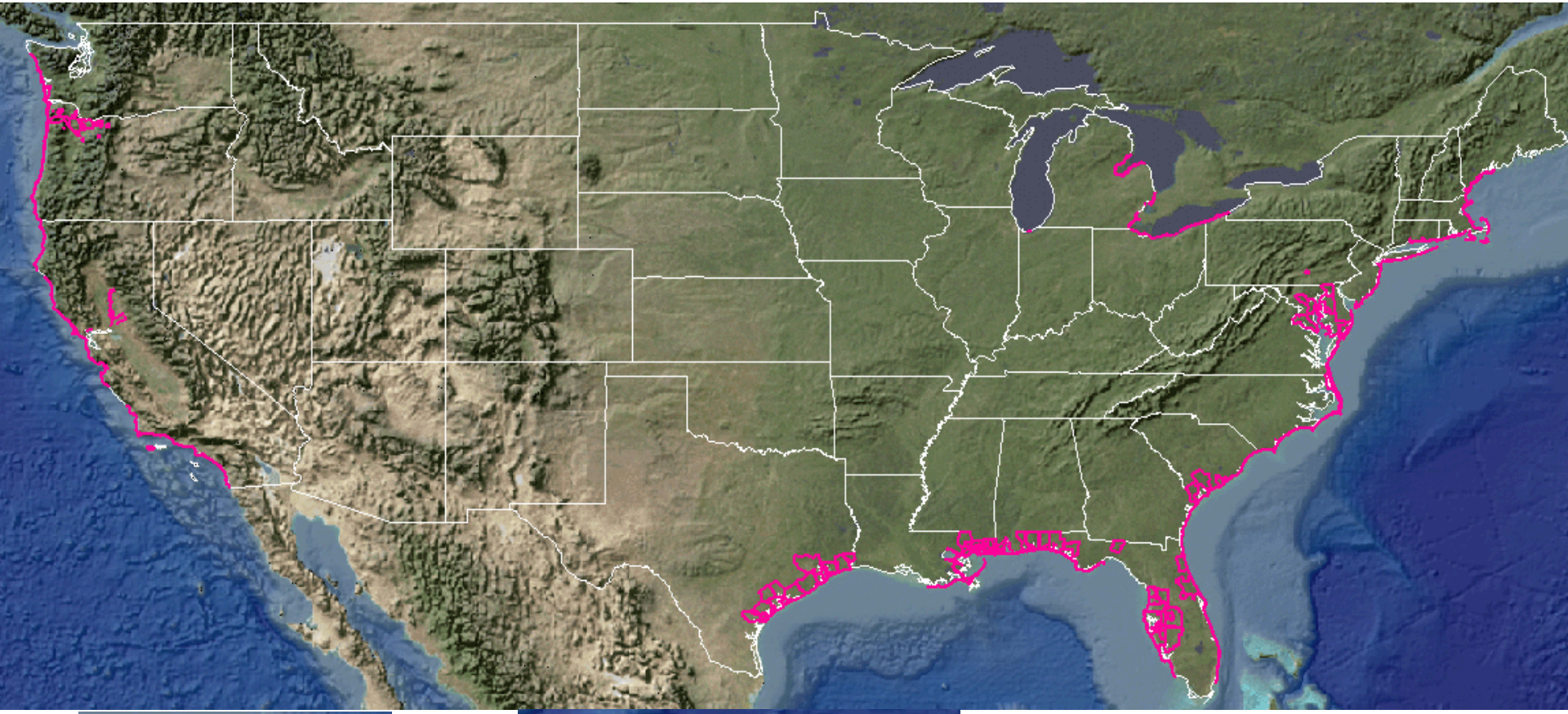


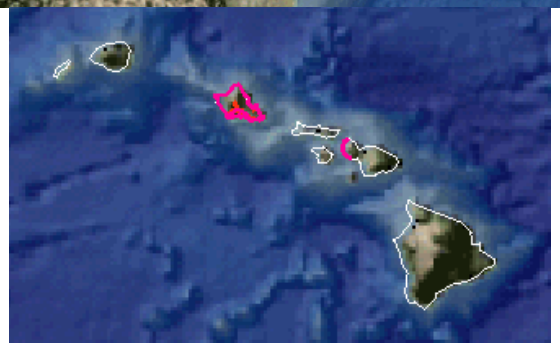
CLICK Data Availability



Lidar.cr.usgs.gov

Digital Coast Lidar Availability





www.csc.noaa.gov/digitalcoast/

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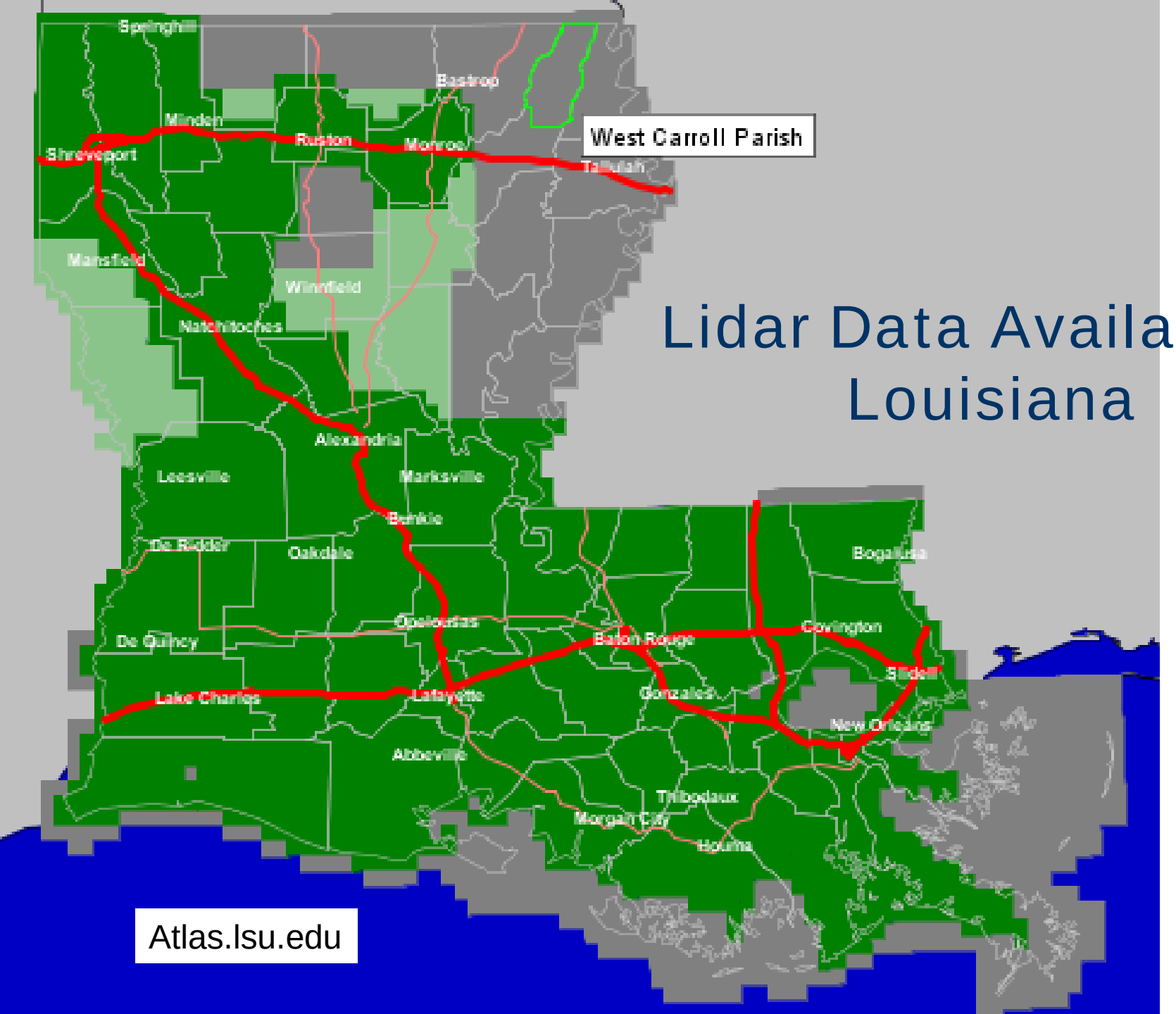
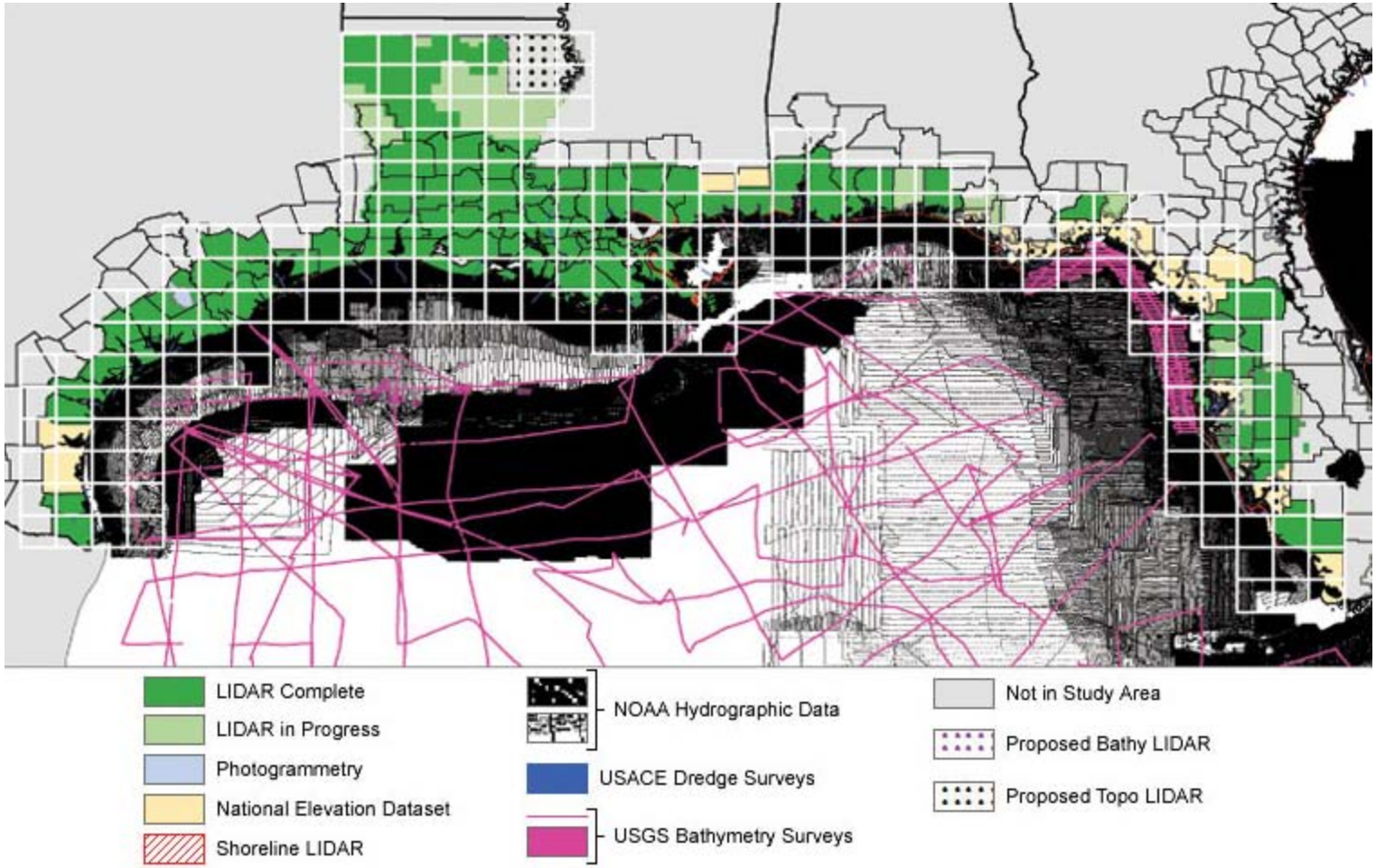
Lidar Data Availability Louisiana



Atlas.lsu.edu

Topo/Bathy Data Availability



www.csc.noaa.gov/topobathy

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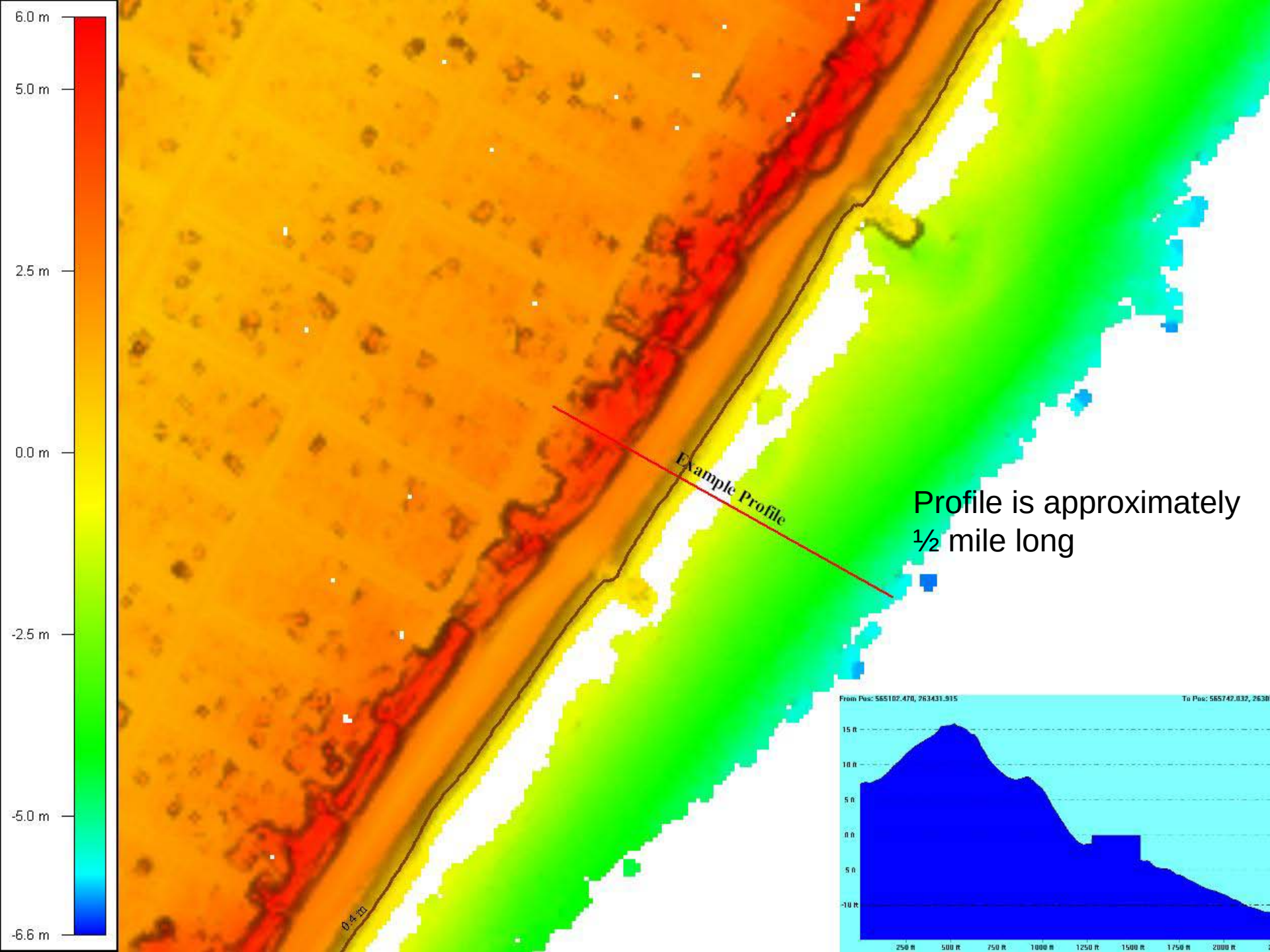
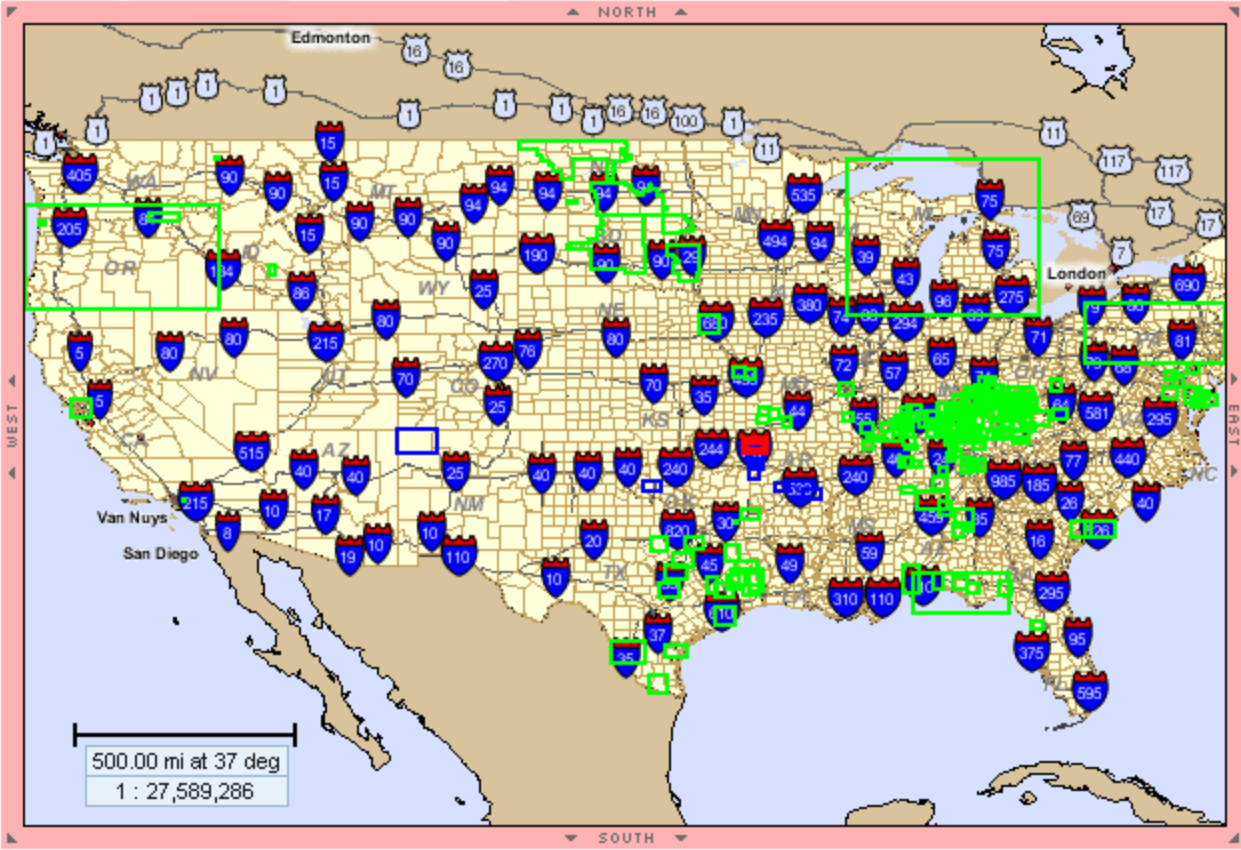

6.0 m
5.0 m
2.5 m
0.0 m
-2.5 m
-5.0 m
-6.6 m
Example Profile
Profile is approximately ½ mile long

National Digital Elevation Program Project Tracker

- **Project Types**
  - Planned
  - In work
  - Recently completed
- **Federal**
- **State (NSGIC)**
- **Harvested by Geospatial One Stop (GOS)**



www.ndep.gov

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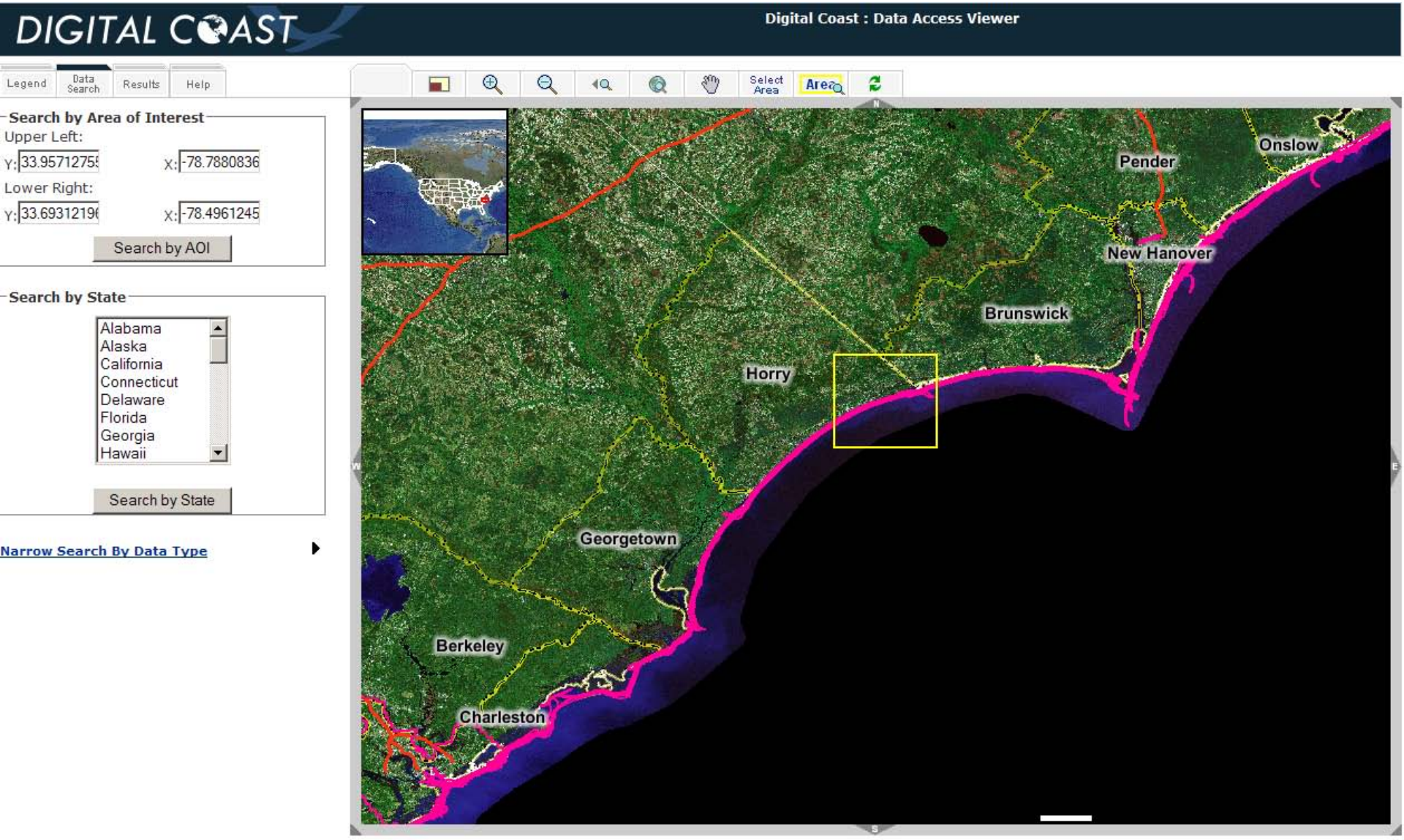
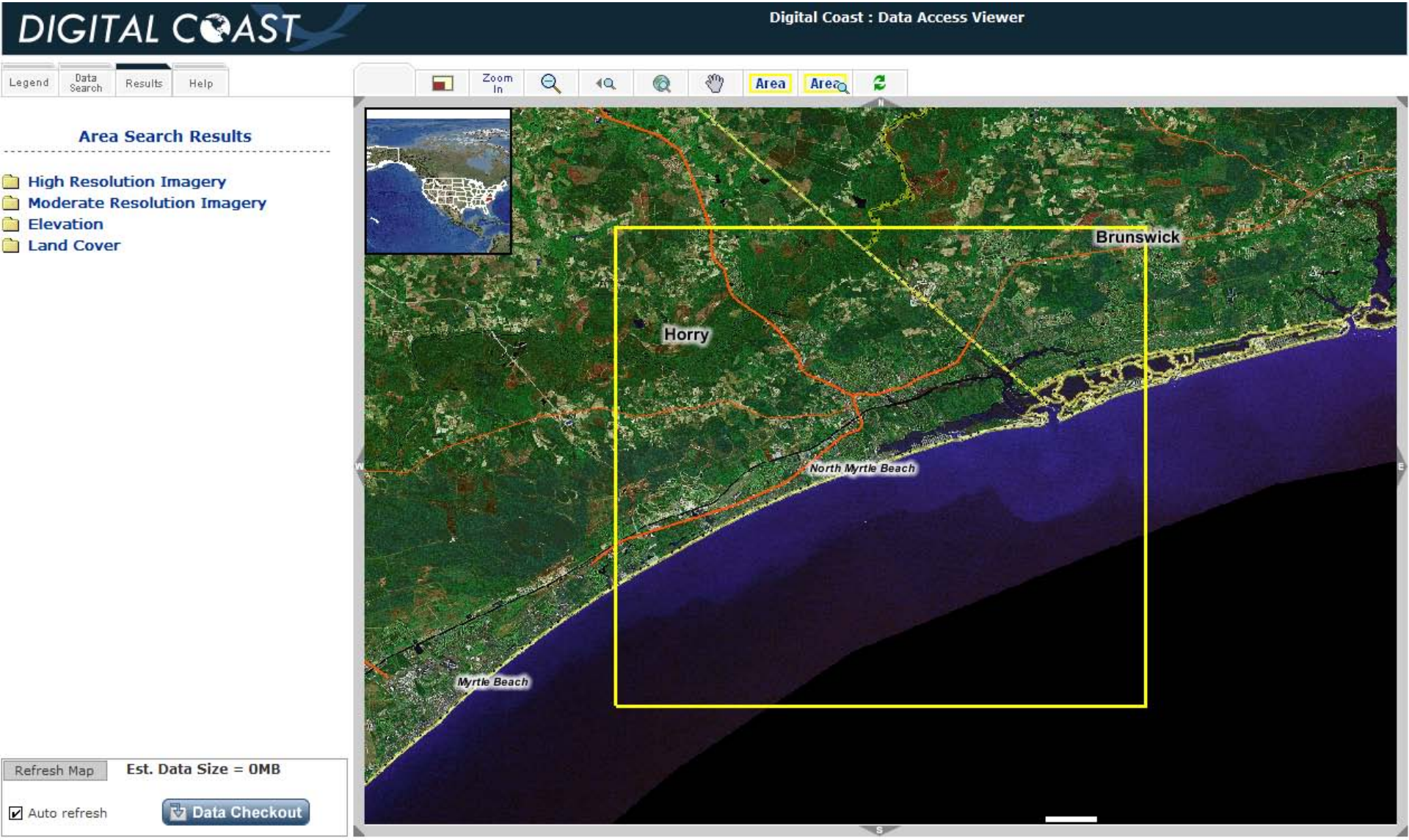
Summary

- **High-resolution high-accuracy data are spatially spotty**
- **Inundation mapping has been the driver for new elevation data**
- **Local government often has better data than the public domain**
- **Many states are trying to improve their statewide elevation data**

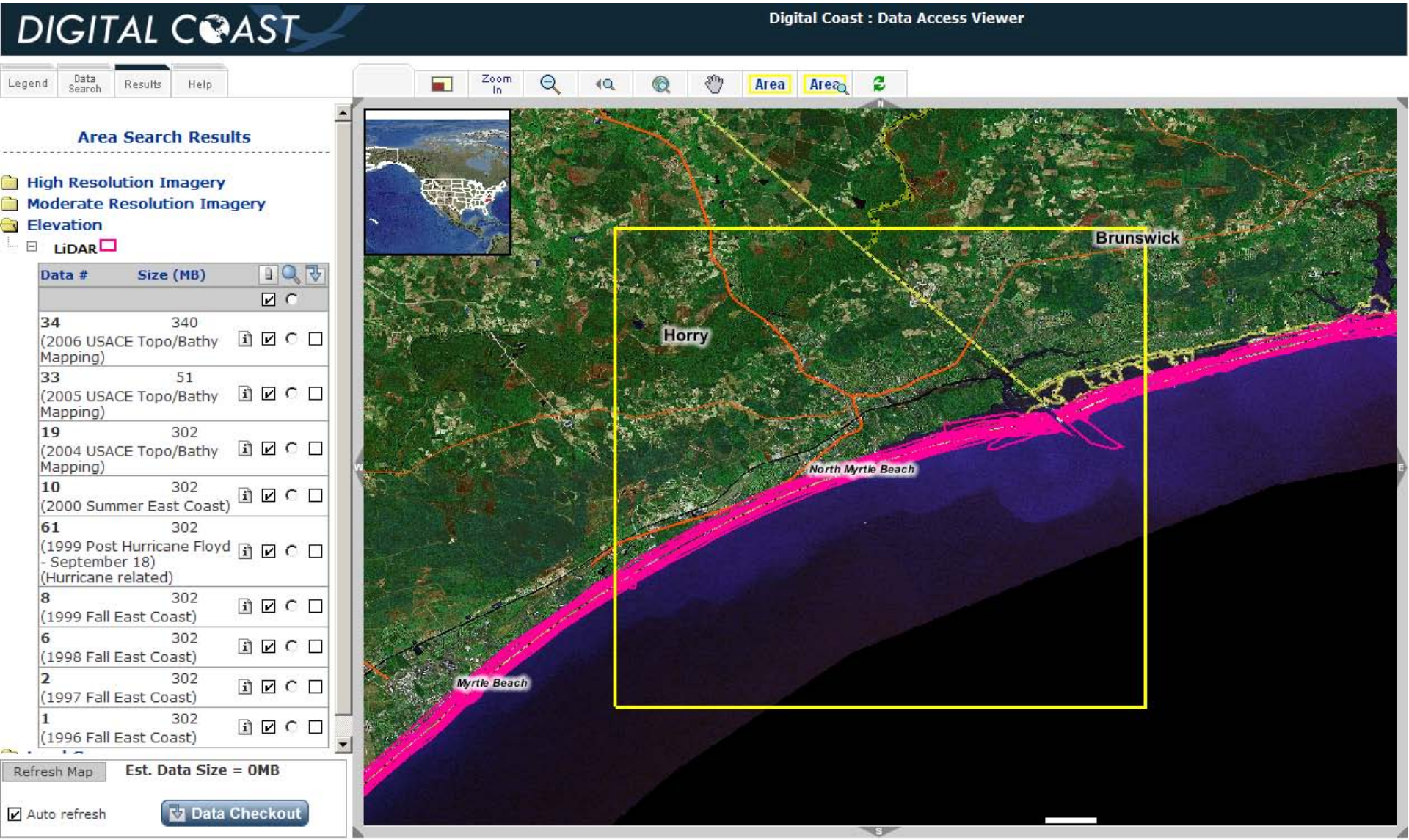
Example Download



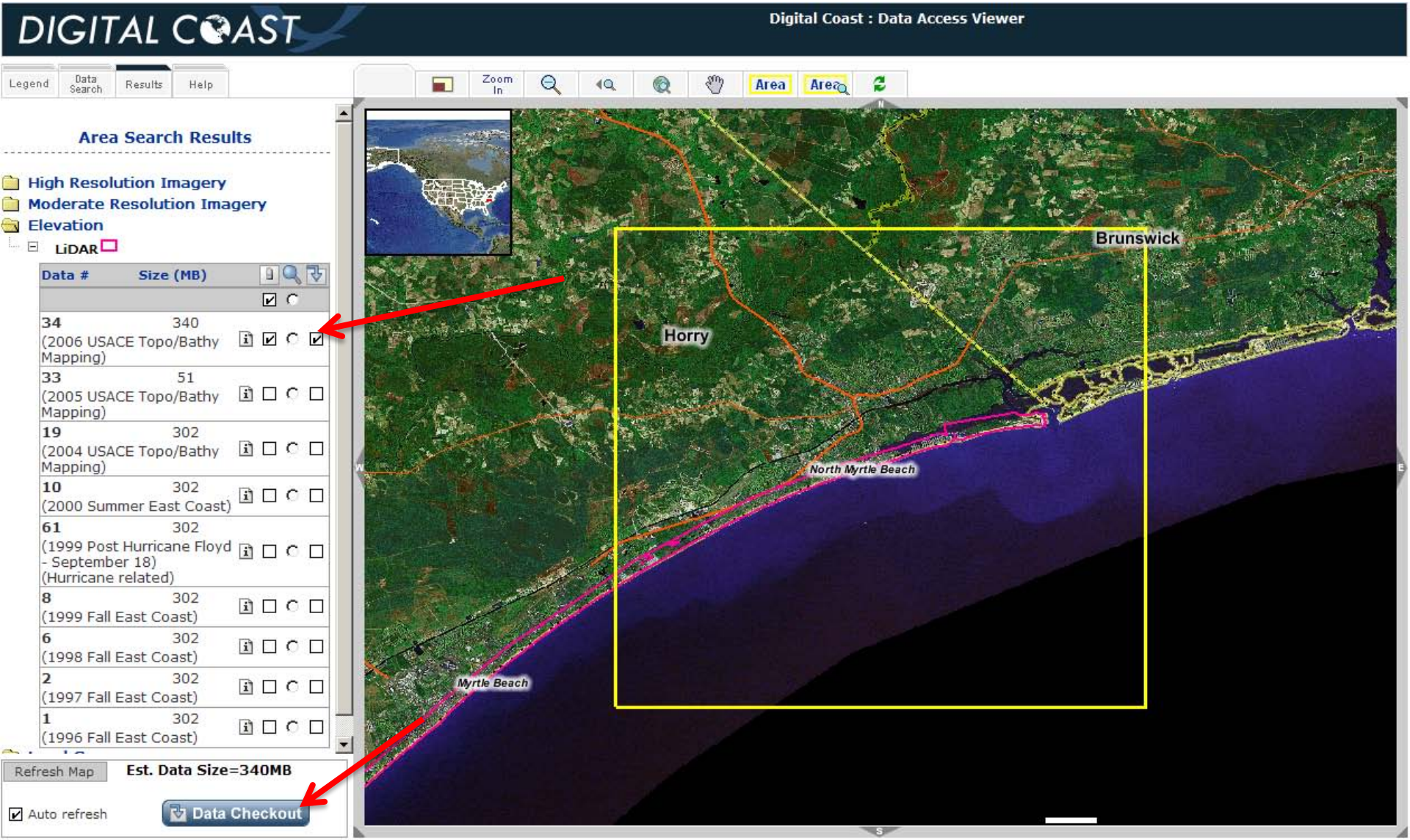
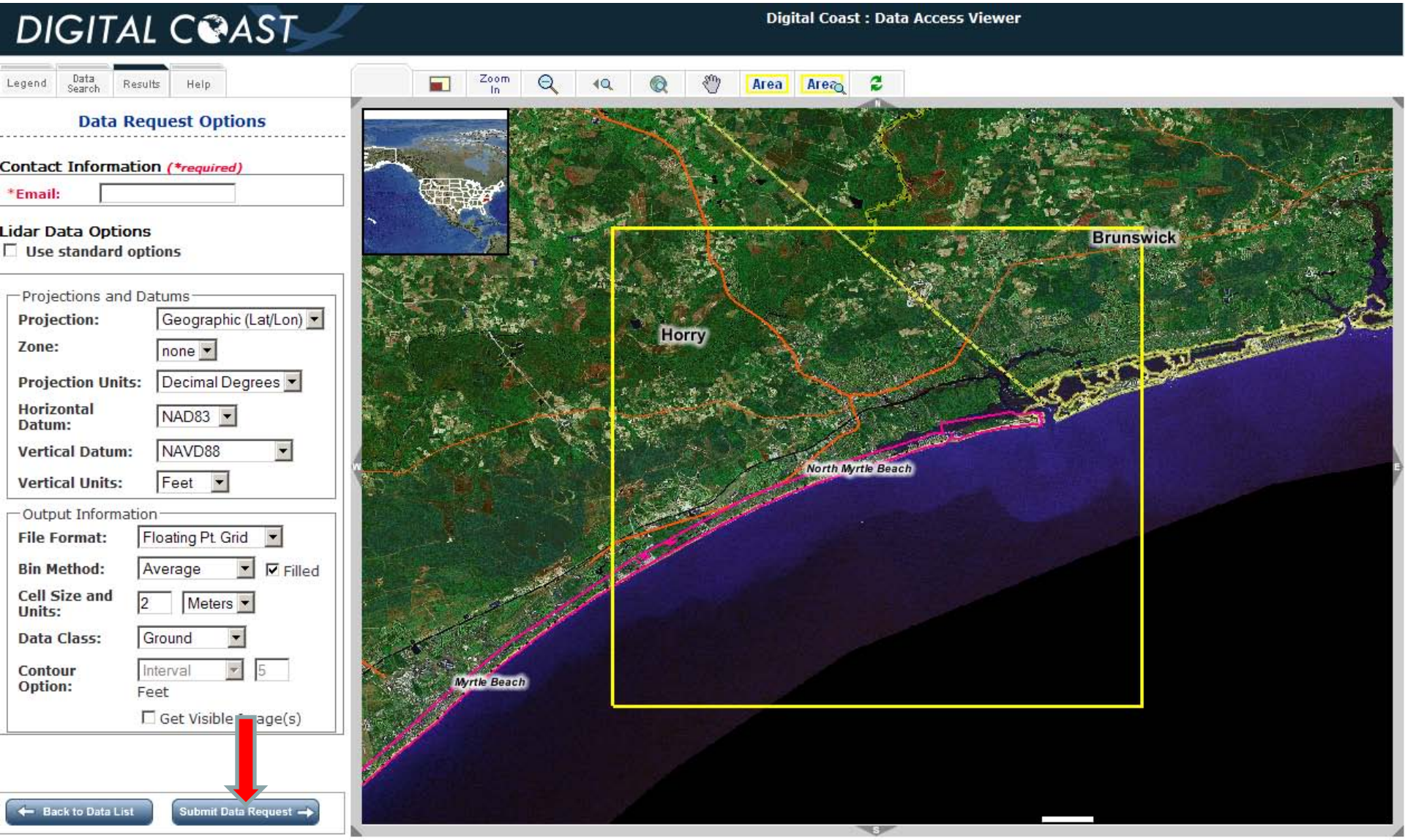
Searched by Area of Interest



Expand Elevation Folder



Pick Desired Dataset(s)



Choose Options and Submit