Visualizing Sea Level Rise: Connecticut's Coast

Luke Gersz

Natural Resources & the Environment

University of Connecticut

PROJECT SUMMARY

This project's goal was to create a repeatable process that allows one to form a sea-level rise visualization. A working visualization would be available online for easy access, common use and involving interactive manipulation. Application areas include emergency services, public awareness and future storm surge visualization.

APPLICATIONS

Emergency Services: Road with high potential flood rates can be detected. Neighborhoods where road access may be eliminated. Knowledge of possible at risk priority buildings such as hospitals and schools.

Public Awareness: Give individuals the capability to interact with a visualization tool in order to better understand theoretical sea level rise impacts

Storm Surge Visualization: This tool would be the initial step in producing a storm surge prediction model based upon sea level rise in future conditions on the Connecticut coastline.

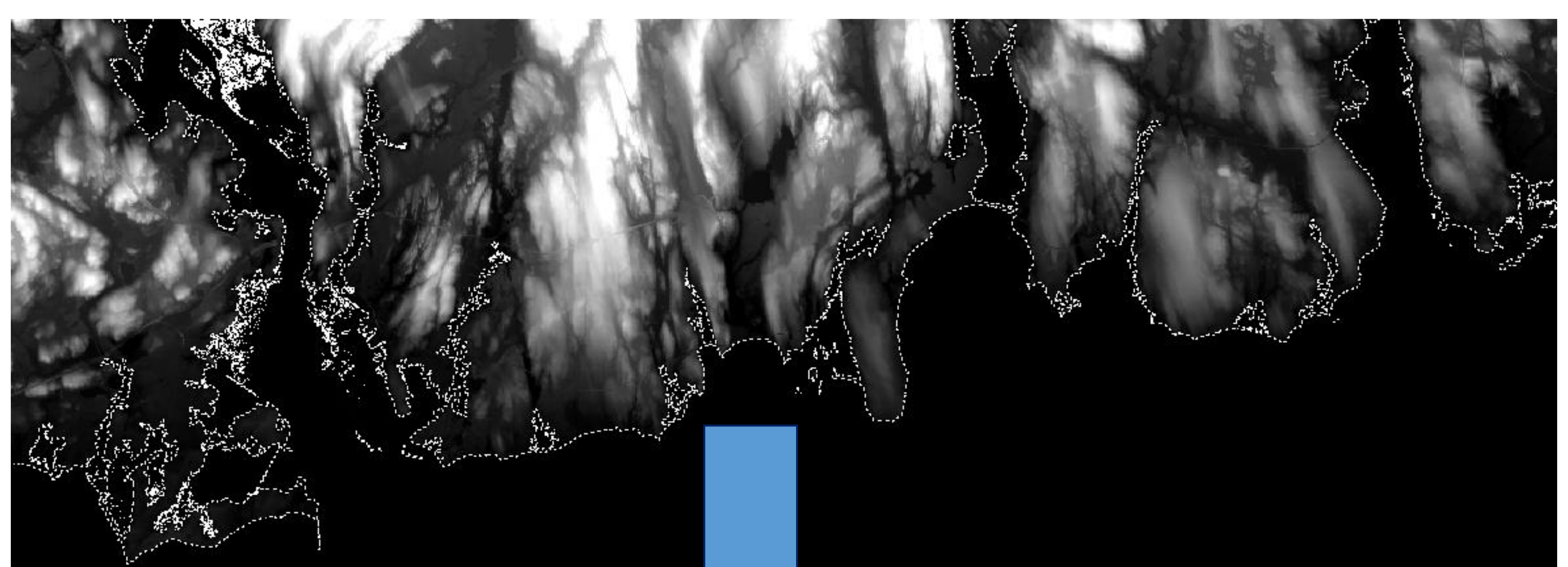

Figure 1

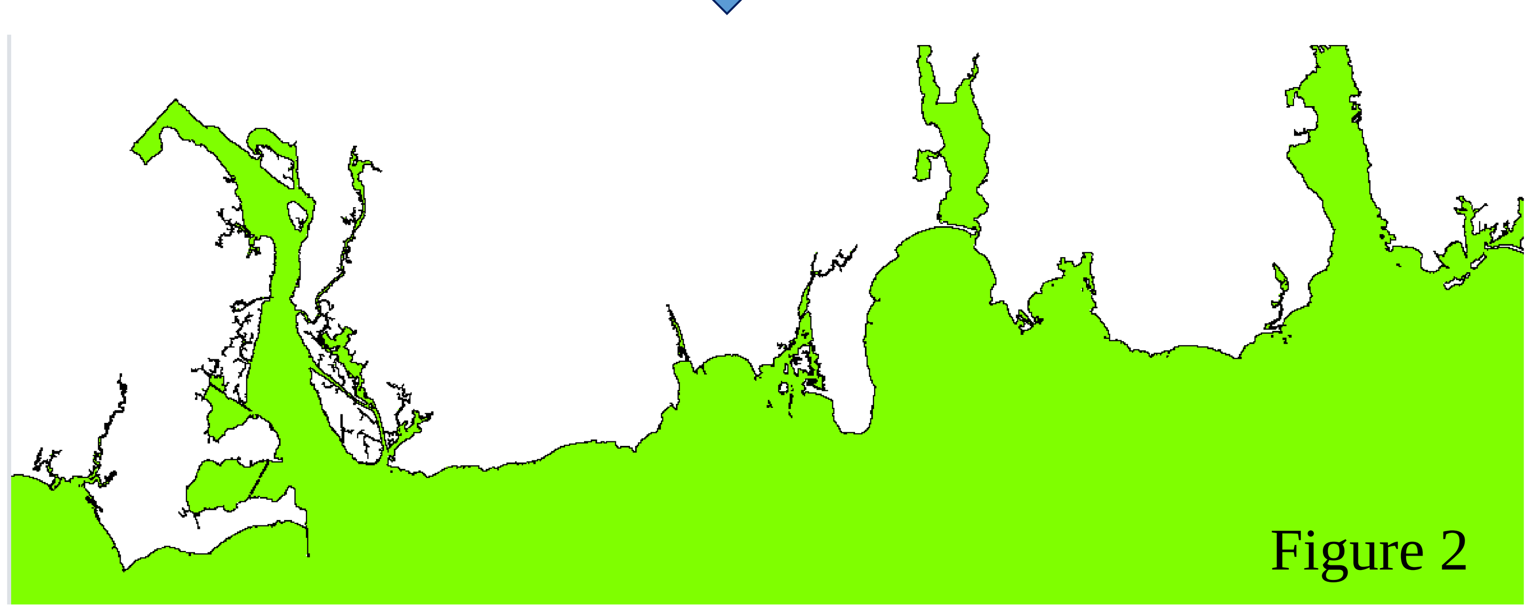

Figure 2

METHODS

The appropriate data files had to be collected and organized:

- LiDAR Data
- Raster Data sets
- Connecticut Base Maps
- Connecticut Road Shapefiles
- Raw elevation Data

Correlation between data files had to be insured. Increments within the X, Y and Z planes were all converted into foot measurements for more usable results and common understanding.

A smaller study area along the Connecticut coastline was created to aid in the process formulation, due to potentially large processing times at all steps in the visualization development. A study area between and including the Thames and Connecticut Rivers was selected due to its large hydrography and potential for displaying the power of this visualization process.

A bare earth flooding model had to be created for a base comparison tool. This elevation file required editing in order to assure proper water movement through varying increases of sea level. All bridges within the study area had to be edited out of the elevation profile in order to allow the water underneath to correctly flow during a pixel growing process. Using editing capabilities of ERDAS Imagine these pixels within the bridge were all changed to correspond to the water height pixel value underneath.

New AOIs were created, and the grow function was used to flood at .1ft increments from 0ft (sea level) up to 4ft. Once the AOI was complete (Figure 1), it was converted to a shapefile (Figure 2). All flood increment shapefiles were then merged together to one single file, allowing for comparison between varying flood levels.

Building shapefiles were created by uploading LiDAR imagery, using the classify tool to distinguish buildings and then recoding them as a raster image shapefile. These shapefiles are then inputted into the original elevation data and new AOIs can be flooded to create a sea level rise model that allows for buildings to act as barriers to flow.

Building and road shapefiles can be added to these models, and potential problem areas can be determined.

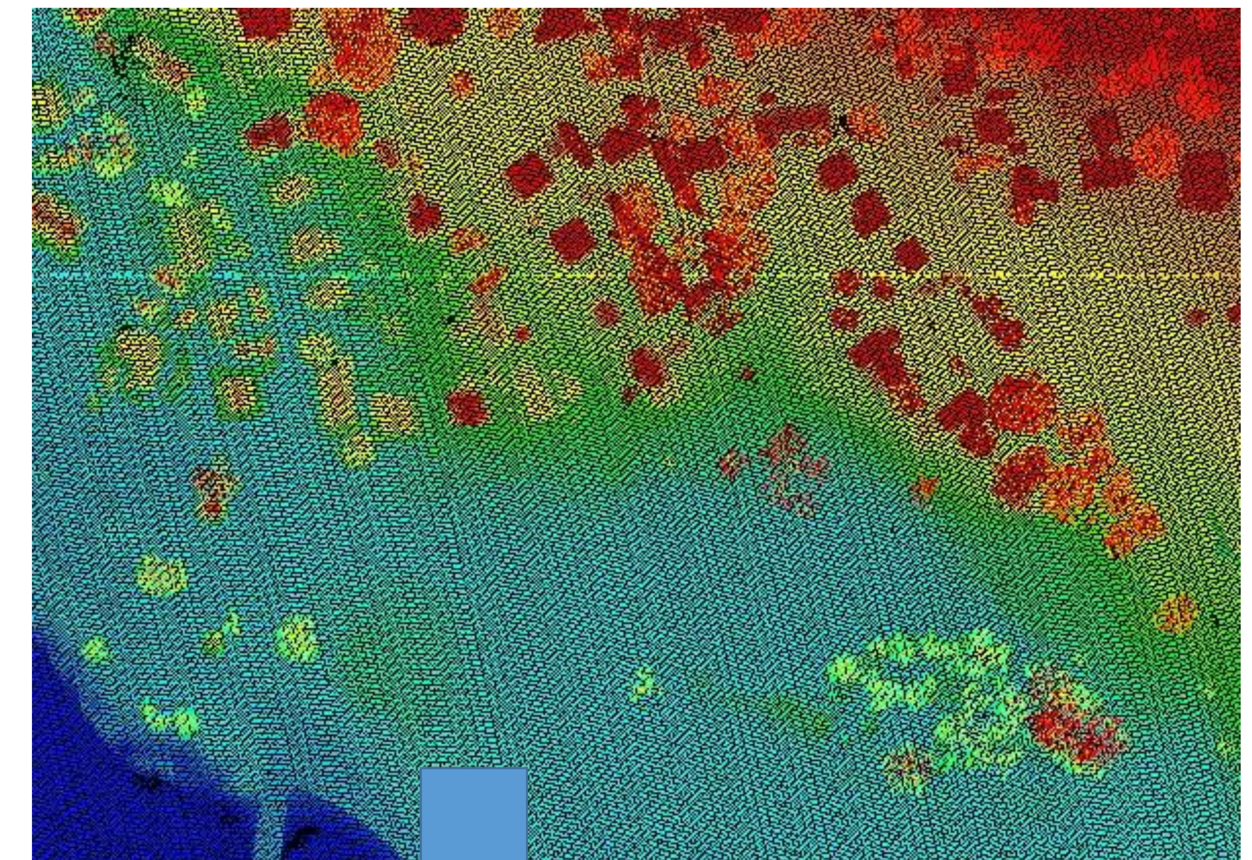

Figure 3

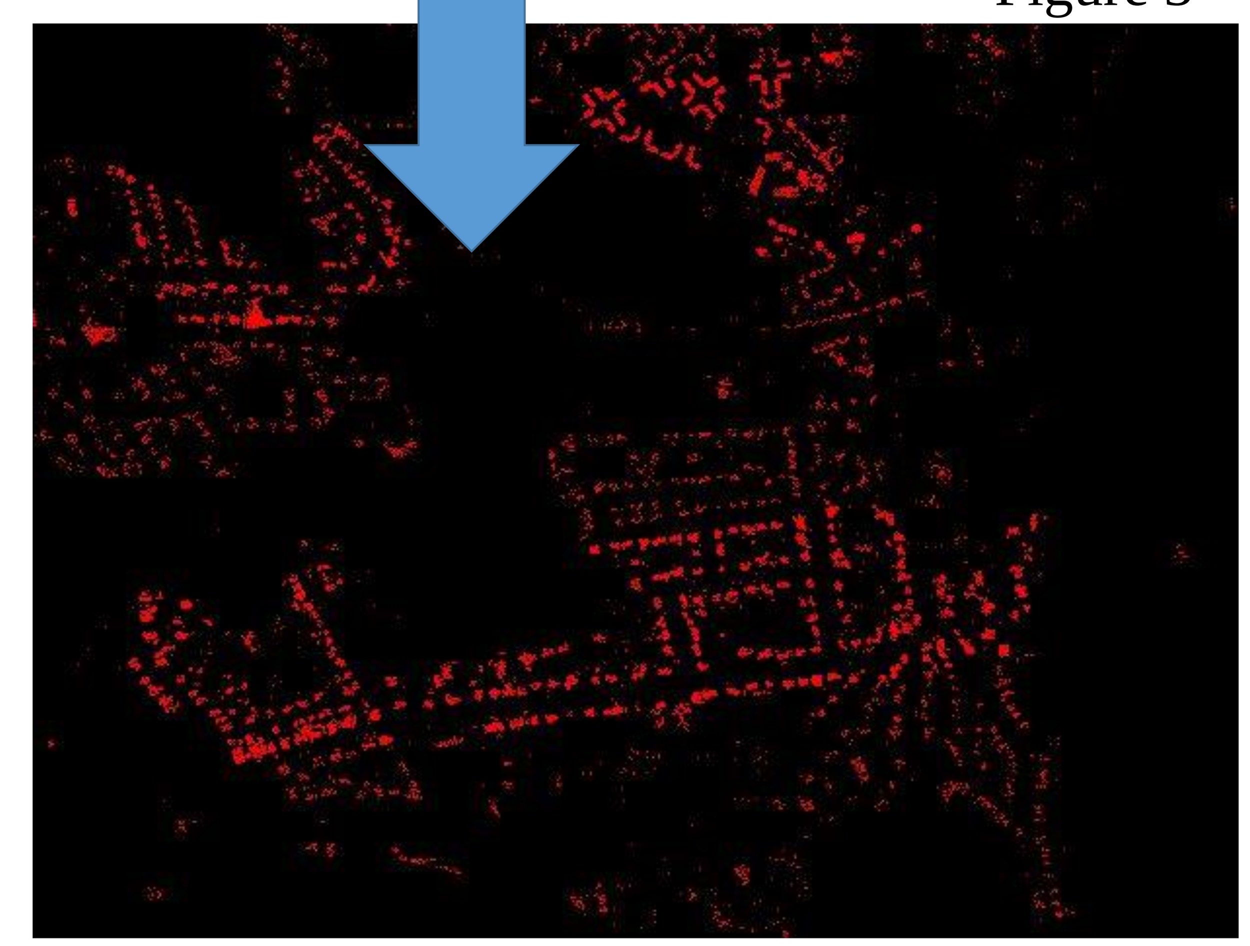

Figure 4

REFERENCES

- Digital Coast Sea Level Rise Viewer. Office For Coastal Management. (Accessed March 2016)
- Surging Seas: Seal Level Rise Analysis. Climate Central. (Accessed March 2016)
- ERDAS IMAGINE: Point Cloud Processing Webcast. Hexagon Geospatial. (Accessed April 2016)

UCONN UNIVERSITY OF CONNECTICUT

Connecticut View http://ctview.uconn.edu

AmericaView http://americaview.org