

Space-Place Analysis of Water Infrastructure Vulnerability to Coastal Flood Hazards

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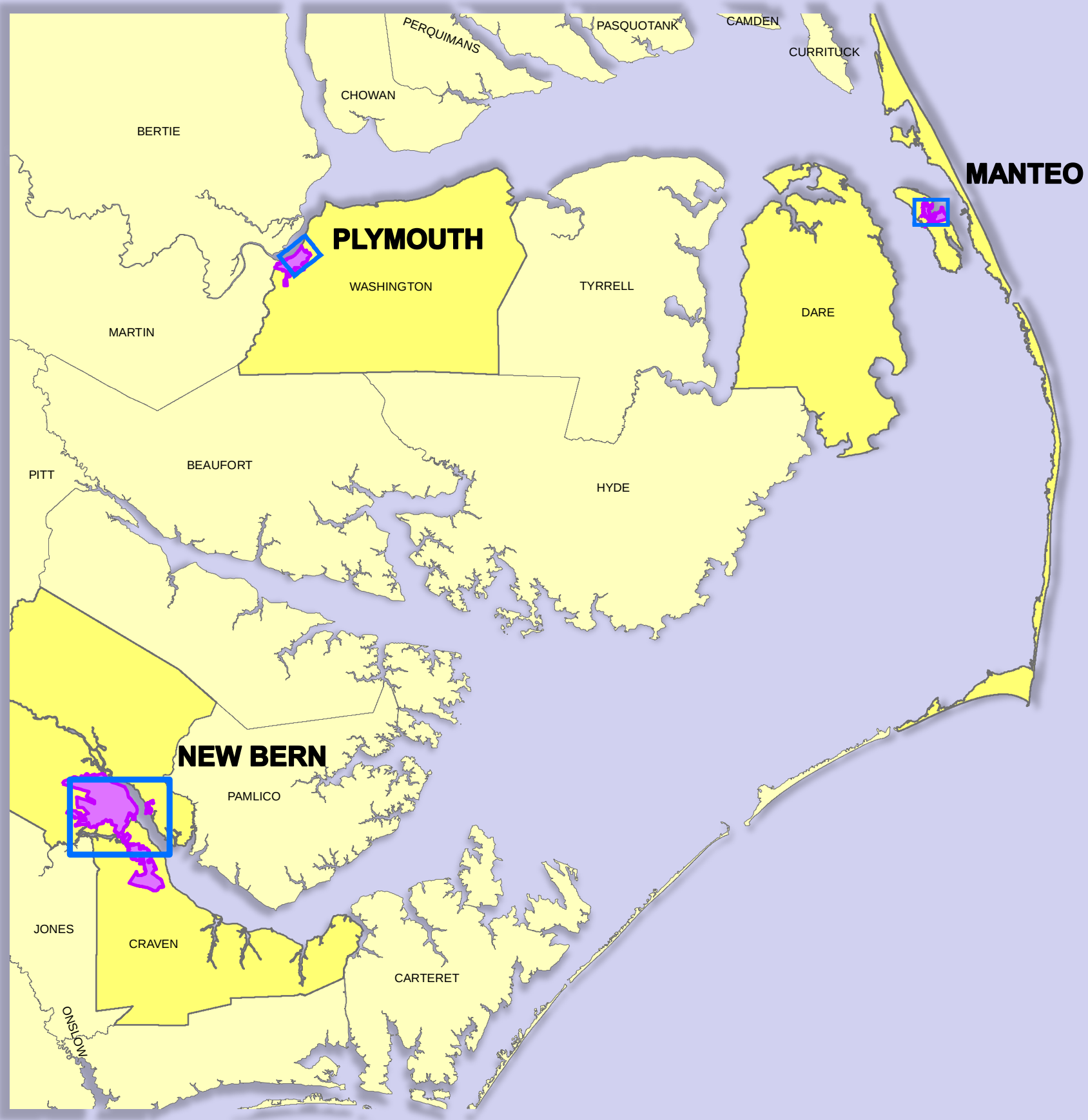
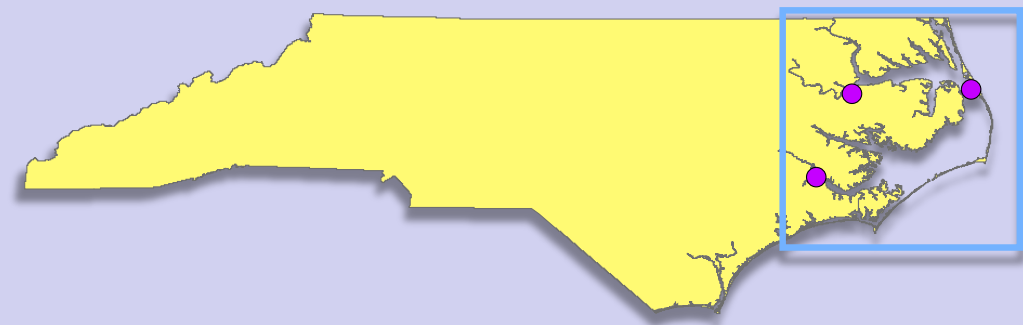


Department of Geography, Planning & Environment

Purpose

The very costly destruction from Hurricane Sandy (estimated \$200 billion) opened the eyes of policy makers to investigate the vulnerability of coastal areas to riverine flooding, sea level rise, and storm surges. Mitigation efforts can reduce the vulnerability of water infrastructure, potentially saving millions of dollars and also protecting human health by preventing the discharge of hazardous sewage material.

Study Areas

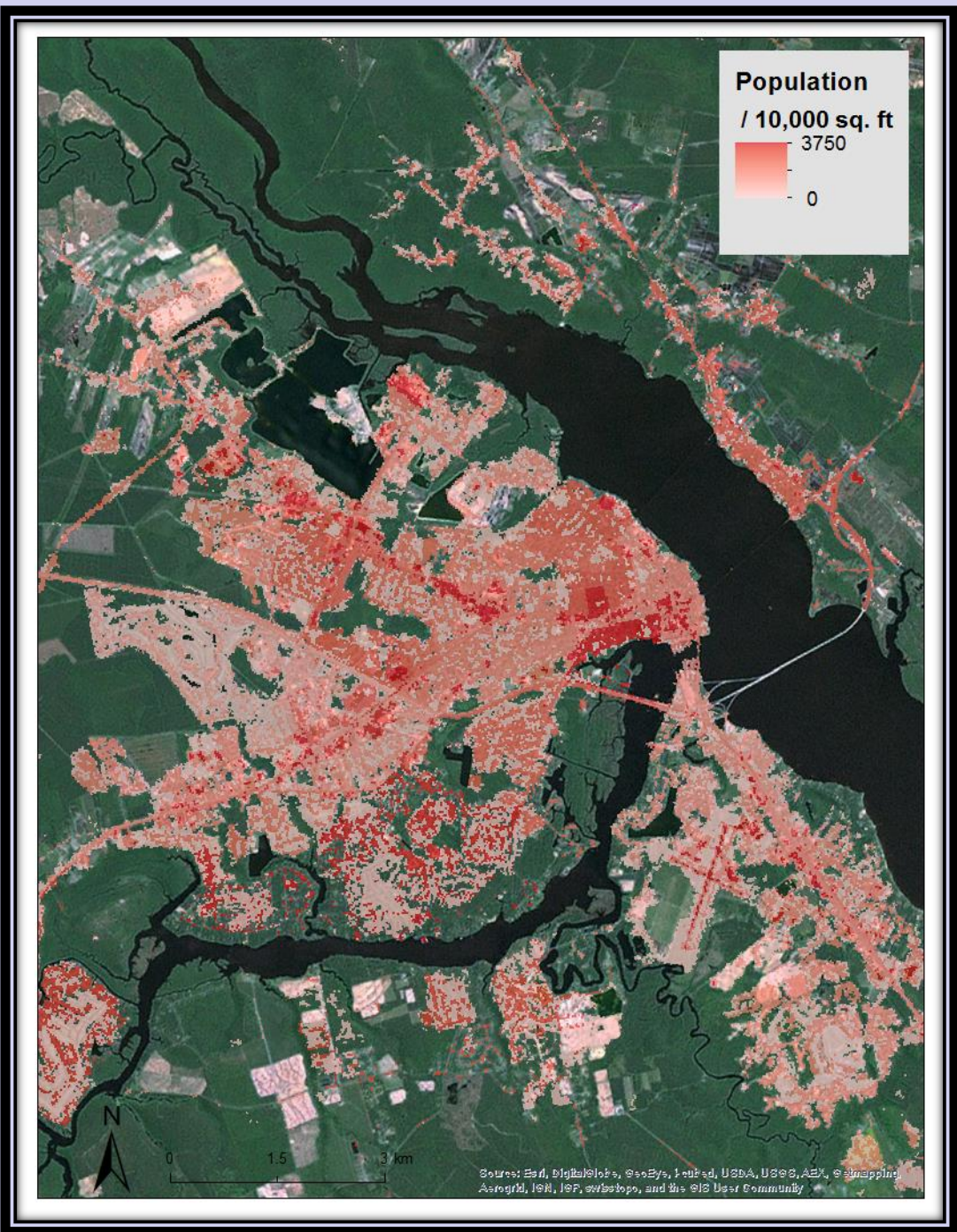


	Plymouth	Manteo	New Bern
Pop. Served by Wastewater System	3,494	2,547	49,217
Treatment Plants	2	2	5
Miles of Clean and Wastewater Lines	79	16	552
Pump Stations	14	7	69

Geospatial Vulnerability Methodology

- LiDAR DEM Hydro-Correction
- Water Utility Infrastructure and Hazard Overlays
- Flood Inundation Modeling
- Dasymetric Mapping

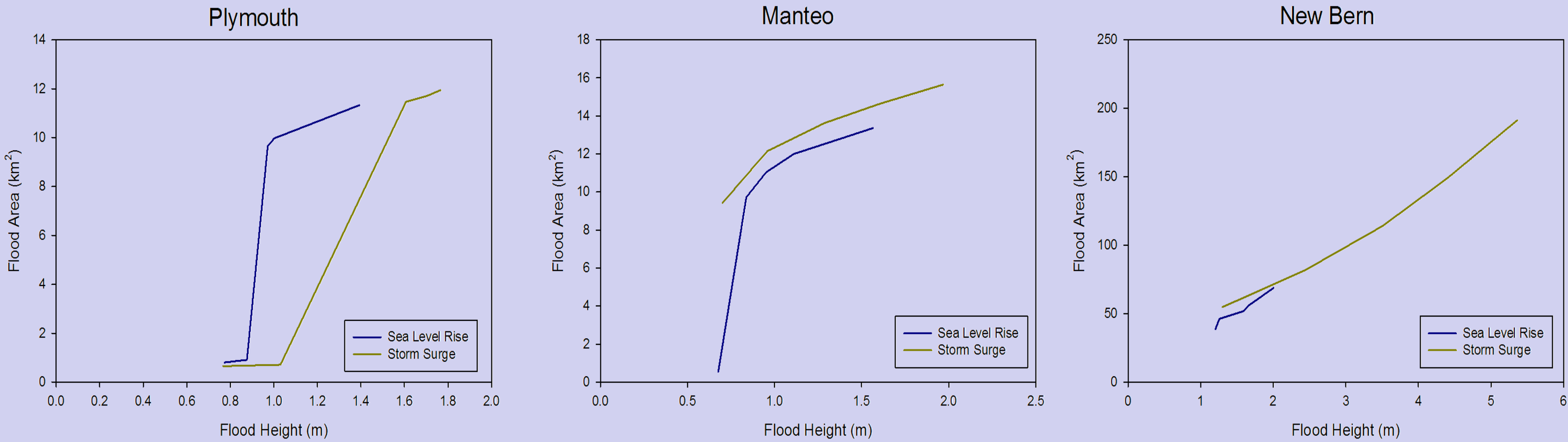
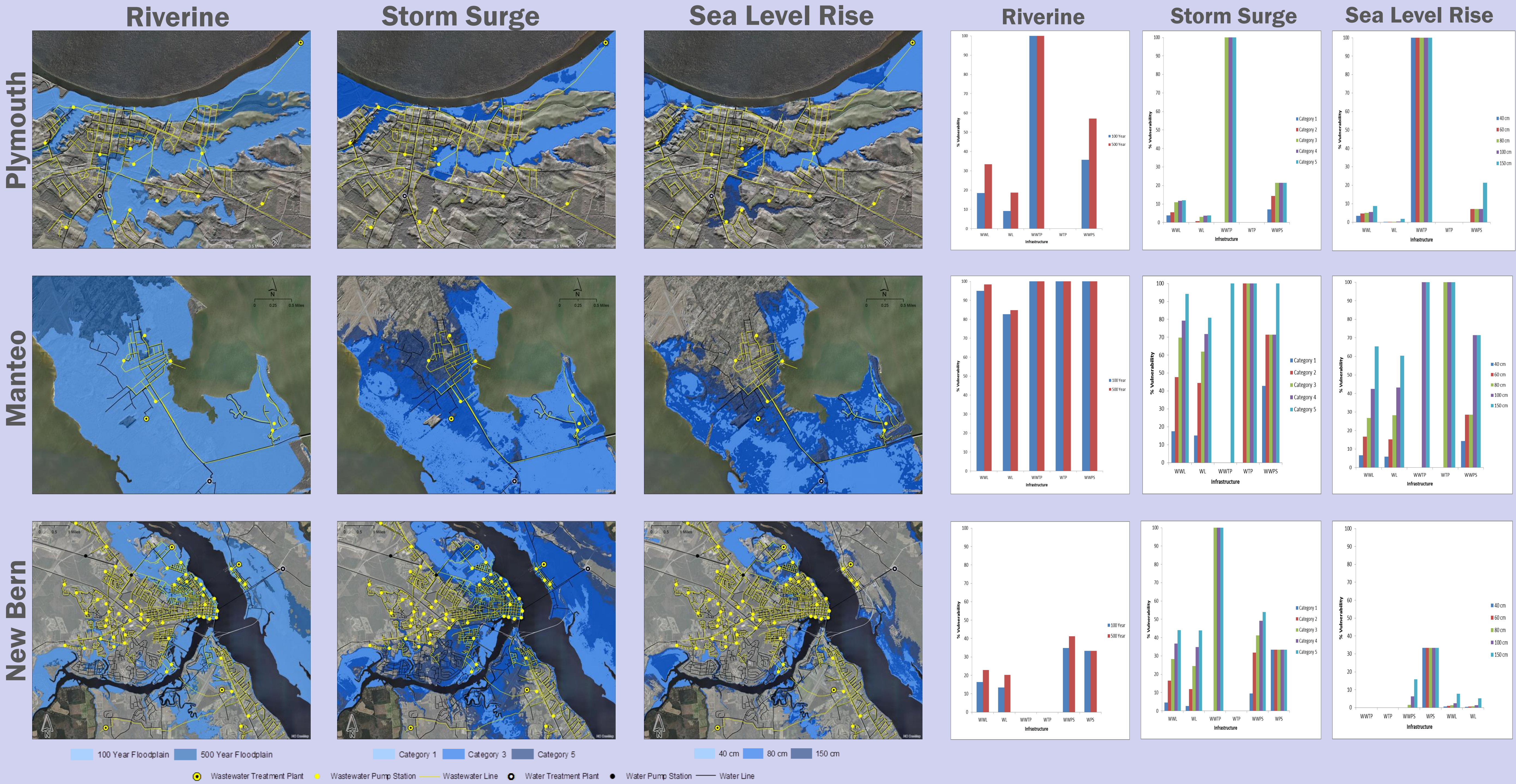
2004 Census block groups were redistributed using land cover data to find a population count vulnerable to flooded infrastructure



GIS model to “burn” known ditches and canals into DEMs, improving the accuracy of inundation modeling.

Dasymetric mapping redistributes population to a pixel basis

FLOOD HAZARDS



Discussion

The geomorphology and geography of development of the coastal areas heavily influence which flood hazard accounts for most of the vulnerability to the communities. The wide mouth of the Neuse River in New Bern provides plenty of room to generate a larger storm surge, while the wide floodplain within Plymouth increases its relative vulnerability from riverine flooding. This floodplain's low elevation area is also especially vulnerable to the advance of sea level rise. Manteo's low and flat topography makes it highly vulnerable to all of the coastal hazards.

All three of these communities have at least one wastewater treatment plant vulnerable to several different hazard types. Manteo and Plymouth both only have 1 wastewater treatment plant, which are both vulnerable to all three coastal flood hazards. Manteo shows the greatest long term vulnerability to sea level rise, while New Bern and Plymouth will be able to reduce their long term vulnerability by moving just a few key pieces of infrastructure.

Special Thanks To
Calvin Harmin

