

NOAA OFFICE FOR COASTAL MANAGEMENT

Creating Employment Statistics in Inundation Zones to Analyze and Communicate Risk

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May 10, 2023

Employment in Coastal Inundation Zones: Introducing the Data

- To understand how inundation creates risk to employees and businesses in coastal areas.
- Data reported as aggregated statistics at state, county levels.



Data Description

- Data classified by North American Industry Classification System (NAICS) codes.
- Available by state for marine-dependent sector and by total employment at county level.
- Coastal geographies are consistent with NOAA coastal shoreline counties, states.
- Available across a suite of NOAA hazard inundation layers.

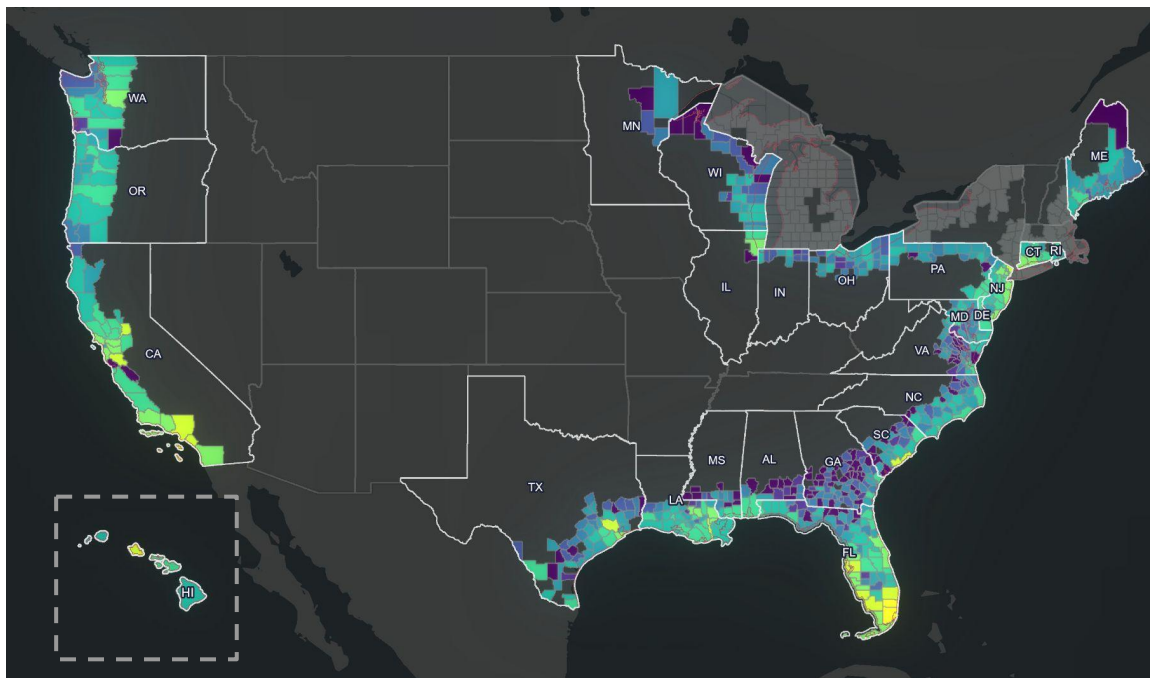


Data Development Protocols

- Partnered with Bureau of Labor Statistics to draw data from longitudinal database and public Quarterly Census of Employment and Wages, and intersected with hazard layers developed at NOAA Office for Coastal Management.
- Layers include FEMA special flood hazard layer, sea level rise, SLOSH (sea, lake, overland surge from hurricane), and tsunami zones. Lake level rise to come later.



FEMA Special Flood Hazard Area



Establishments in FEMA SFHA 2019

Business Establishments

11000 - 30000

3600 - 10000

1300 - 3500

420 - 1200

160 - 410

56 - 150

25 - 55

15 - 24

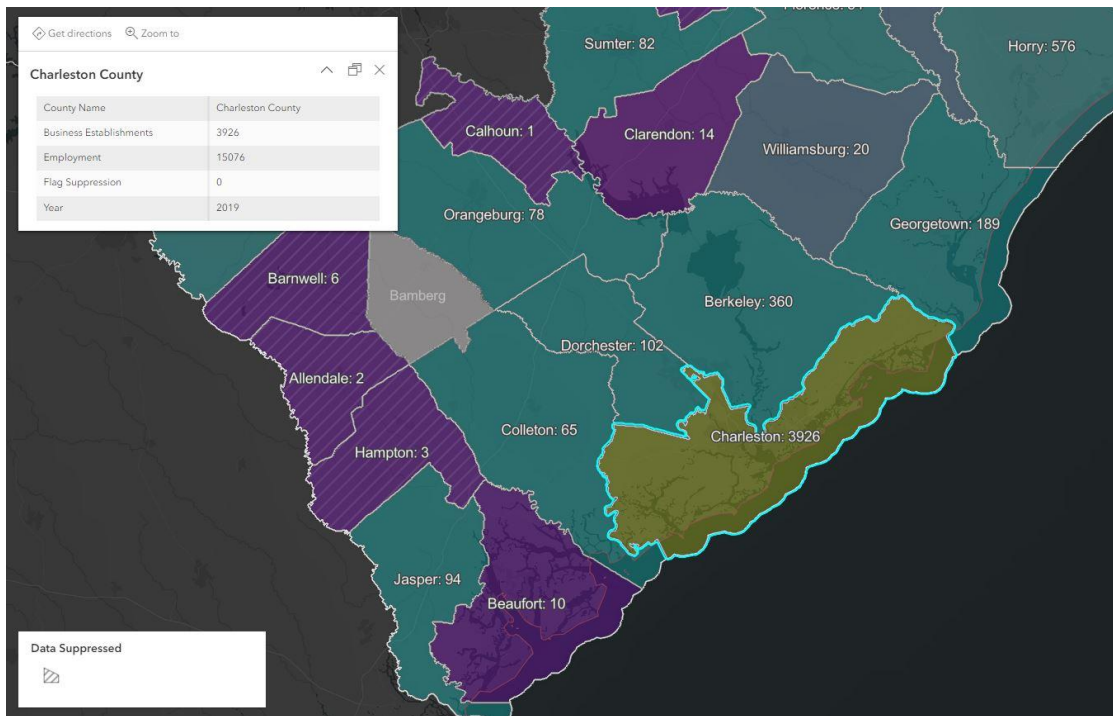
11 - 14

0.0 - 10

Coastal County - Non-Participating States

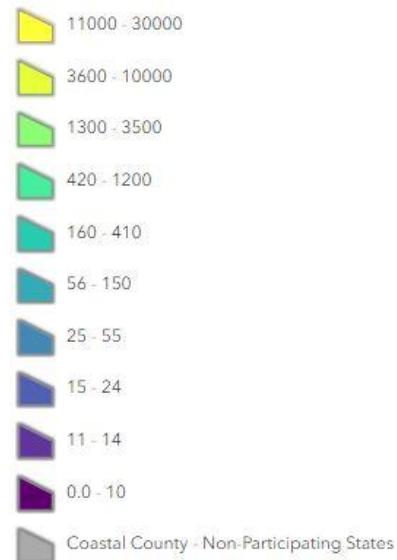


FEMA Special Flood Hazard Area (Continued)

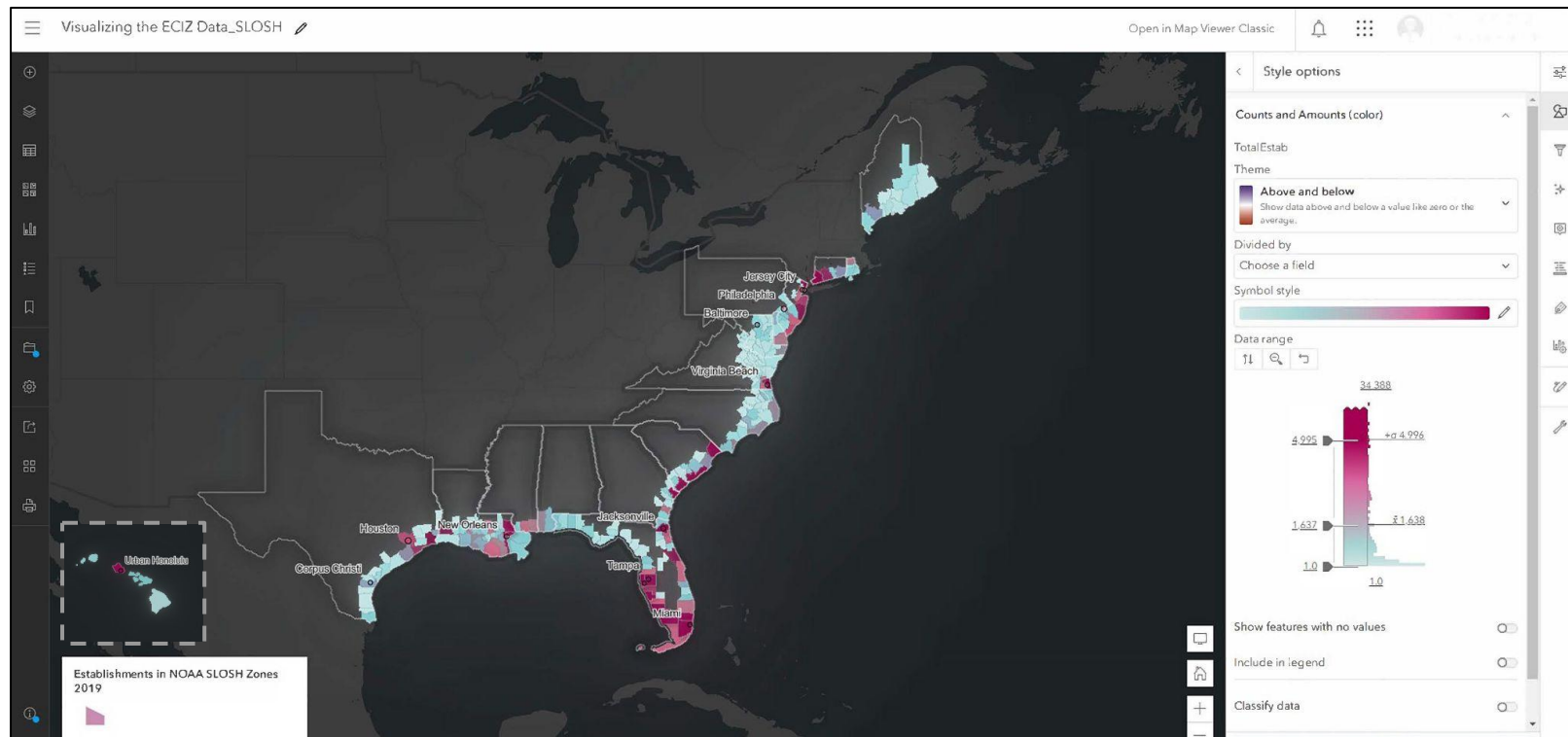


Establishments in FEMA SFHA 2019

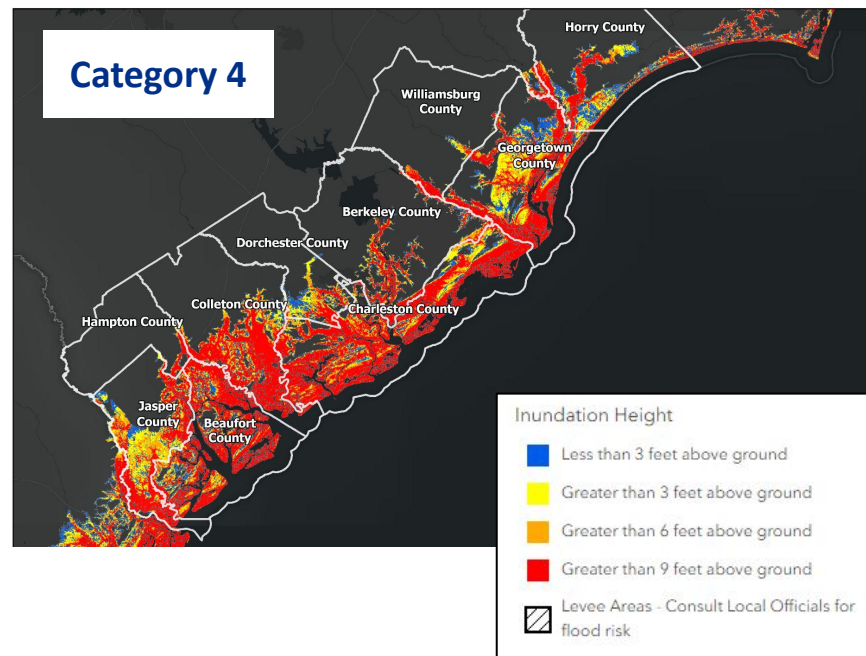
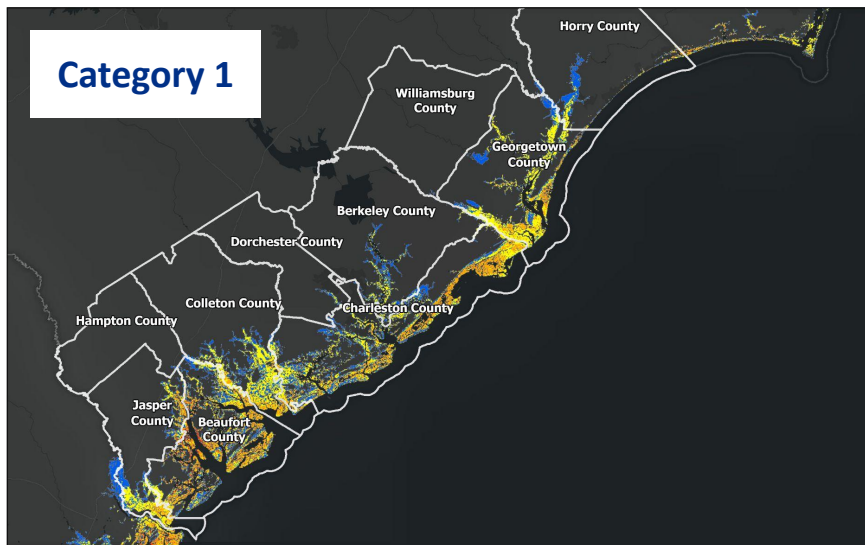
Business Establishments



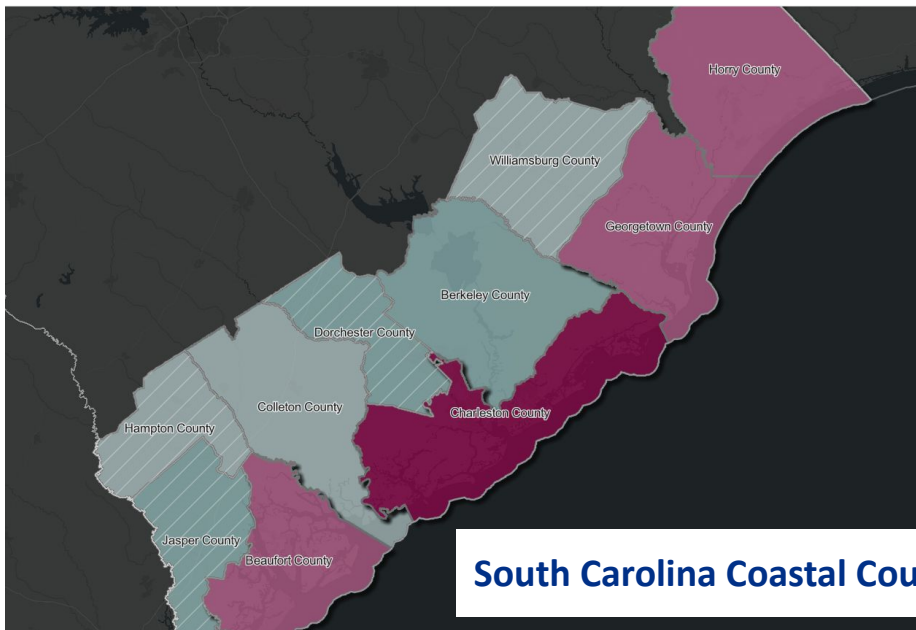
Storm Surges Due to Hurricanes



Storm Surges (Continued)



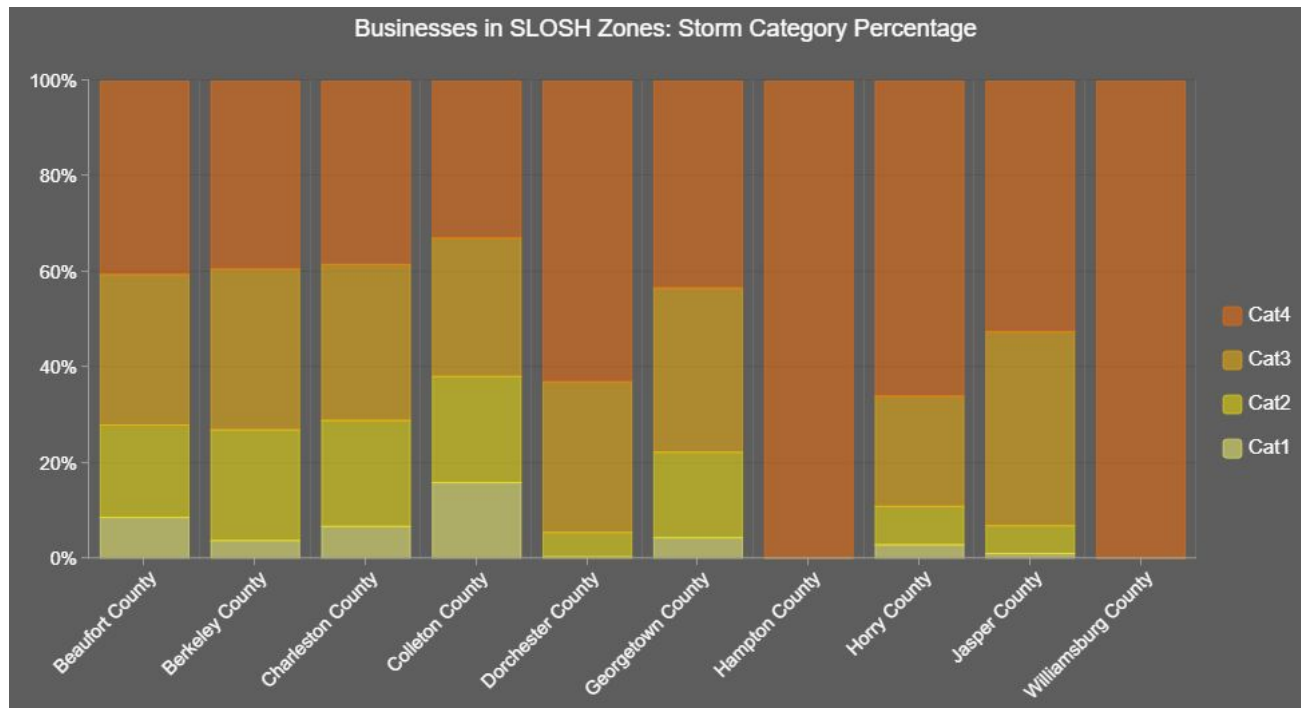
Storm Surges (Continued)



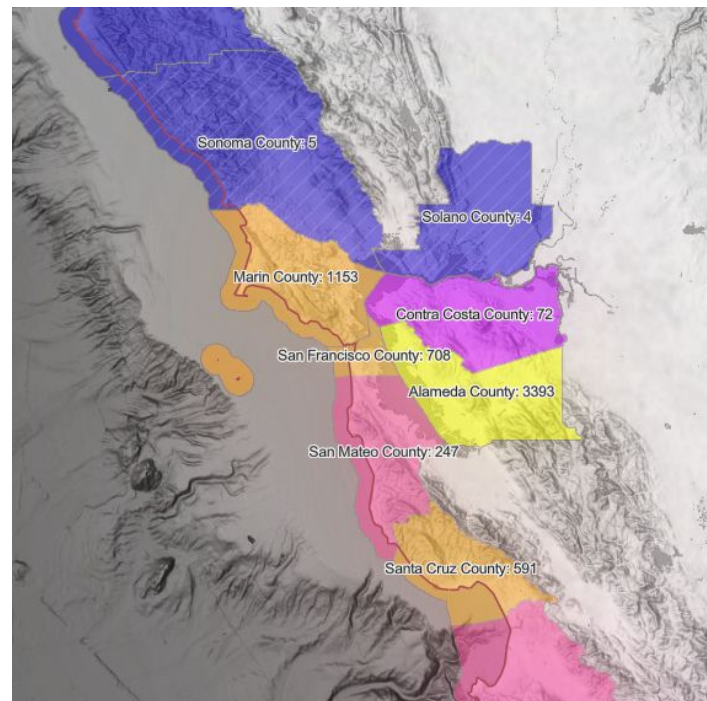
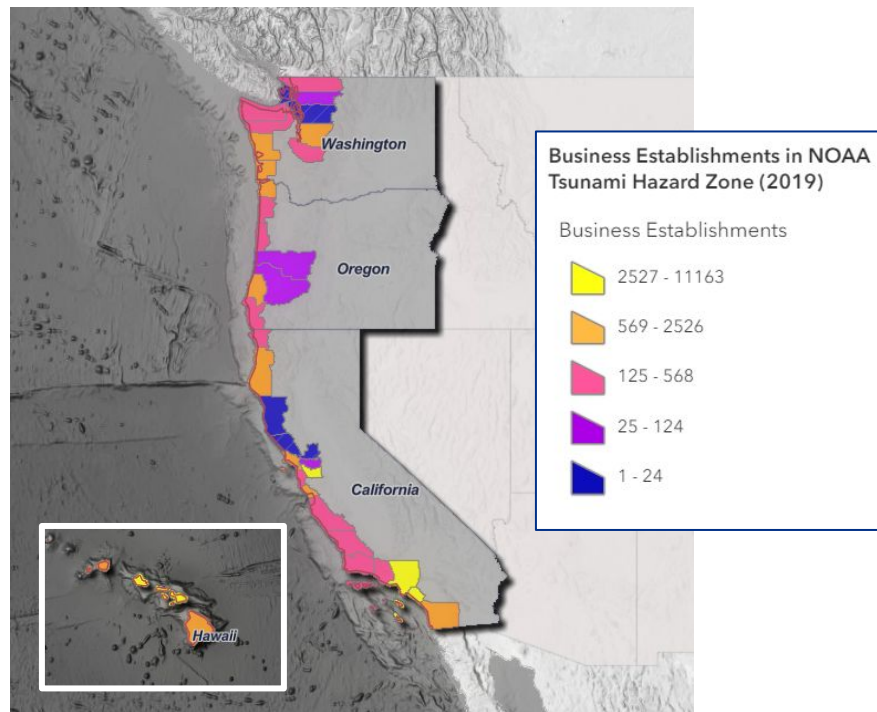
South Carolina Coastal Counties



Storm Surges (Continued)



Tsunami Zones



Shortcomings, Data Gaps

- Four states (Michigan, New Hampshire, New York, Massachusetts) do not participate in Bureau of Labor Statistics data exchange program. Hence, unable to generate employment statistics for those states.
- Alaska does not have statewide FEMA coverage.
- Currently not developed for lake level rise layers.



Next Steps, Moving Forward

- Hope to develop series of rigorous data visualizations, considering integrating this into a dynamic tool, perhaps Sea Level Rise Viewer.
- With annual data production, will be able to observe employment levels evolve alongside refined hazard layers.
- Add updated lake level data into analysis to understand inundation risks better in Great Lakes region.



Questions?

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Employment in Coastal Inundation Zones
<https://coast.noaa.gov/digitalcoast/data/coastal-inundation-zones.html>



Acknowledgements

- Eastern Research Group Staff
- Bureau of Labor Statistics Staff
- NOAA Economists (Ravi Chittilla), Data Stewards, Geospatial Analysts



Visual Output Ideas

Insights to show what can be done with data

- A. National scale: characterize by ecoregions
- B. **Regional scale: SLOSH – rate of population change - southward migration**
- C. **State scale: businesses in SFHA California atmospheric rivers flooding event, vulnerability, median household income; Zoom into bay area – highlight hydrography Silicon Valley, underlying geography**
- D. State scale: CSO Ida story (hurricane track)



Data Development Protocols (Continued)

- Working with Eastern Research Group, team developed a python script to pull employment data from BLS longitudinal database and intersect those geographies with hazard layer(s).
- Using python libraries (numpy, pandas) ensures replicability to generate data annually. As more years of data are generated, can generate a time series to understand risk to employment by sector and geography over time.



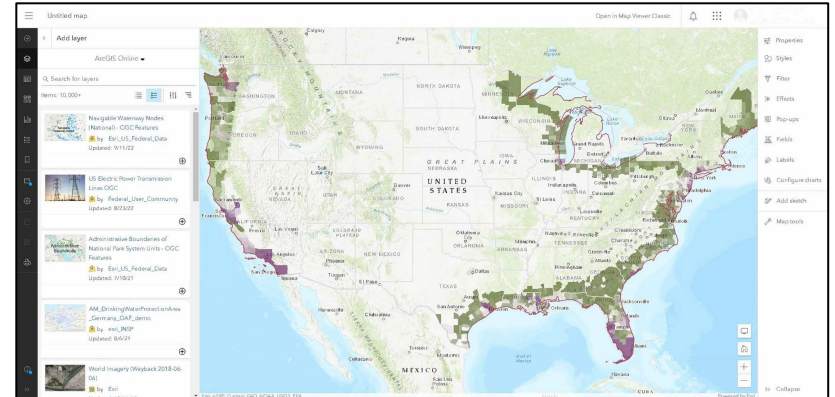
Geospatial Data Technical Details

- Raster faster, vector better (sort of).
- Hazard data converted into raster to conduct geoprocessing in timely, efficient manner.
- SLOSH, sea level rise were rasterized for performance.
- Tsunami layer natively vector was ok considering fewer geographies, smaller data set.

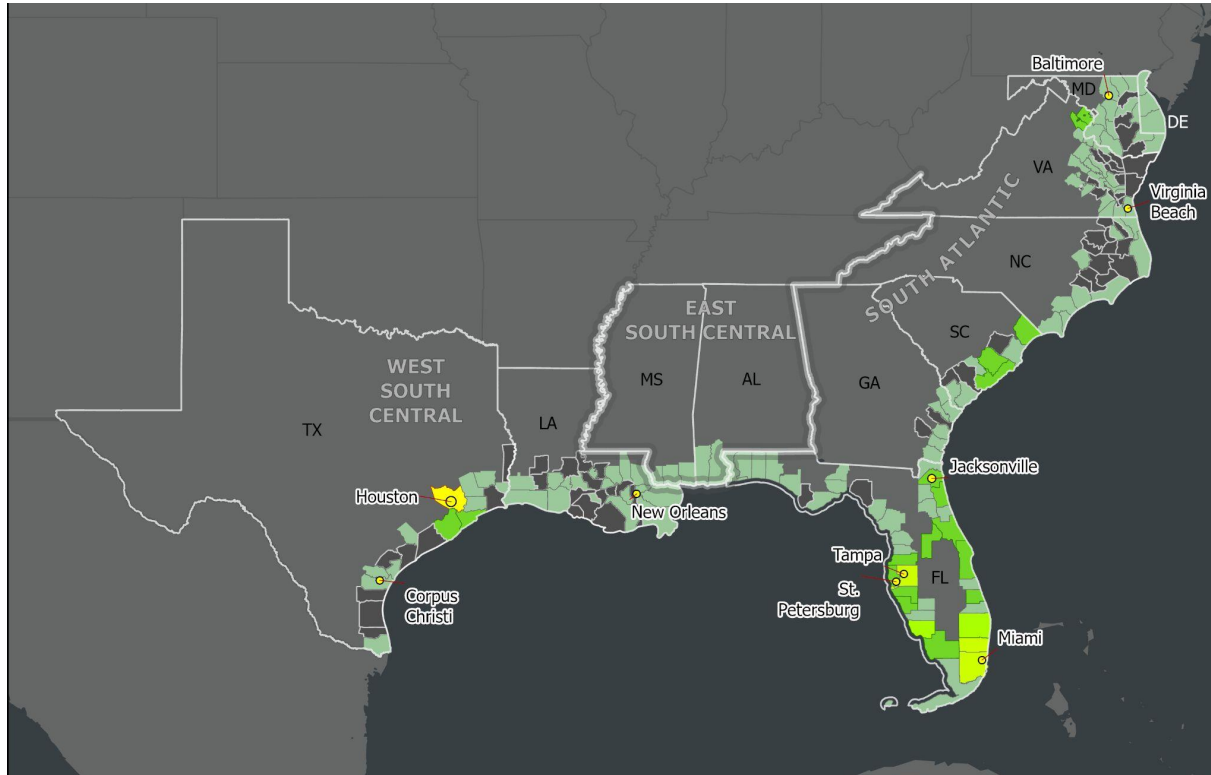


Visualizing the Data

- Join tabular data to Census Bureau TIGER/Line County shapefiles.
- Publish for the public on NOAA's ArcGIS Online (AGOL) GeoPlatform.



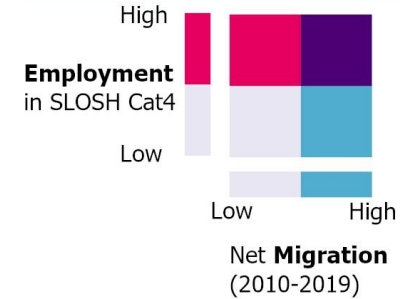
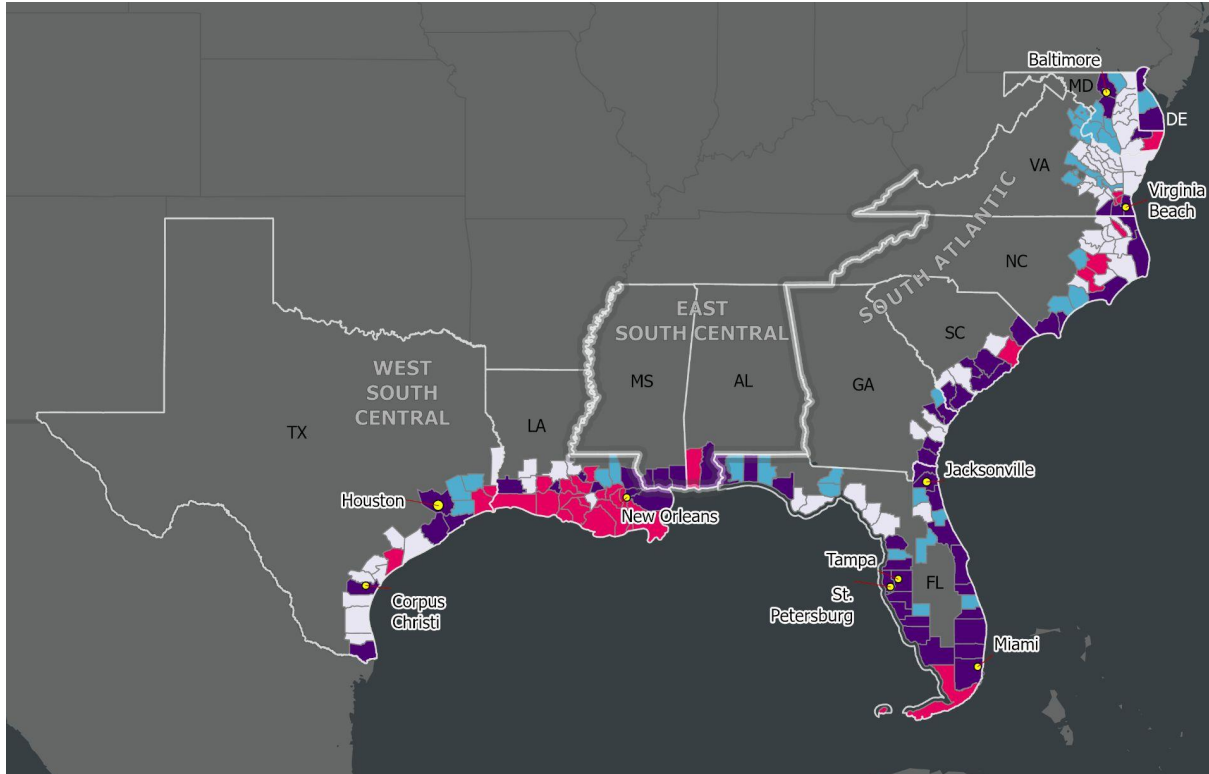
Regional Analysis & Insights



Net Population Estimate 2010-2019



Regional Analysis & Insights



Business Establishments & Employment in FEMA SFHA, Counties aggregated by EPA Ecoregion (III)

