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Identifying Socially Vulnerable Communities in Coastal Virginia

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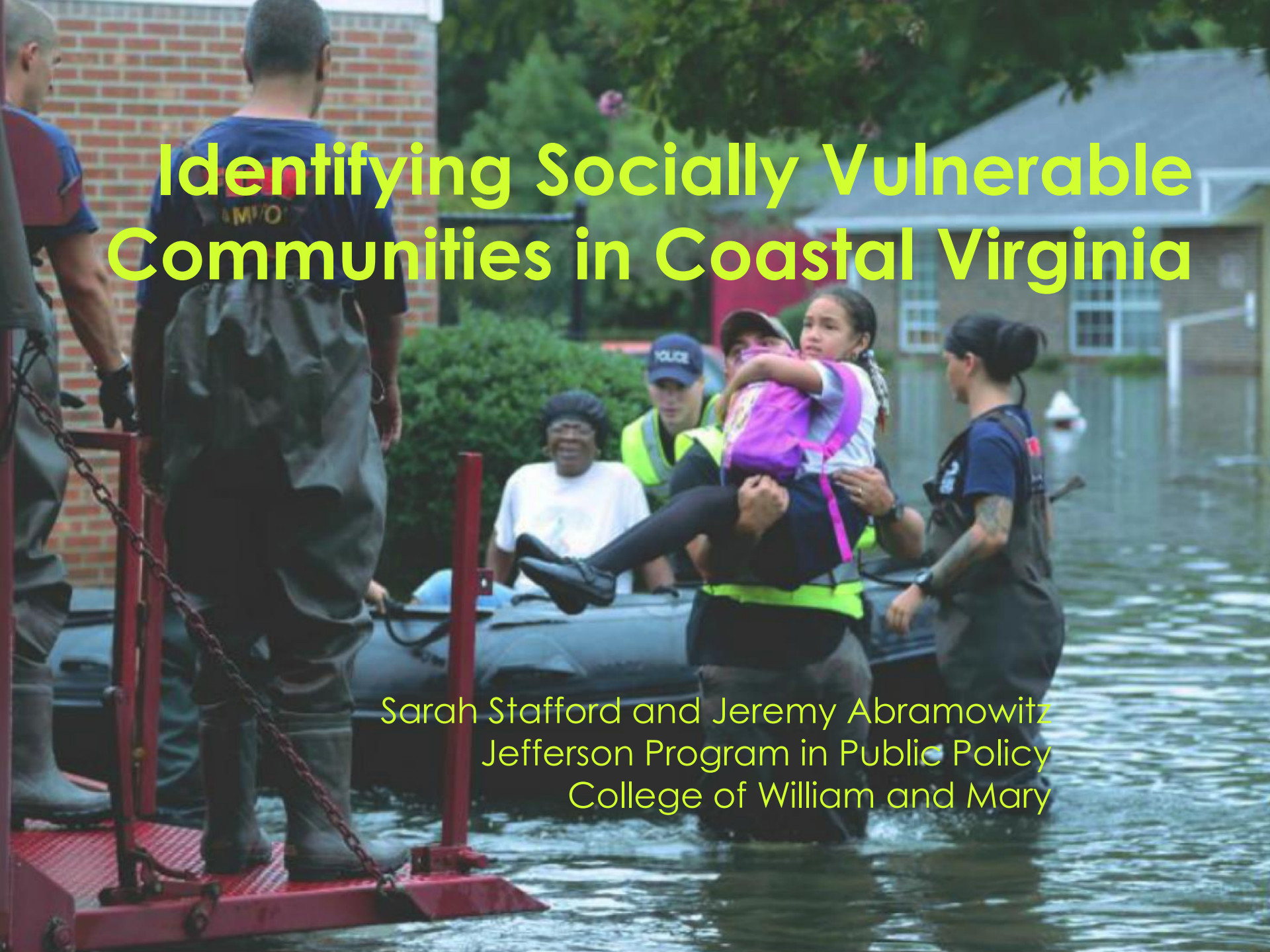

Identifying Socially Vulnerable Communities in Coastal Virginia

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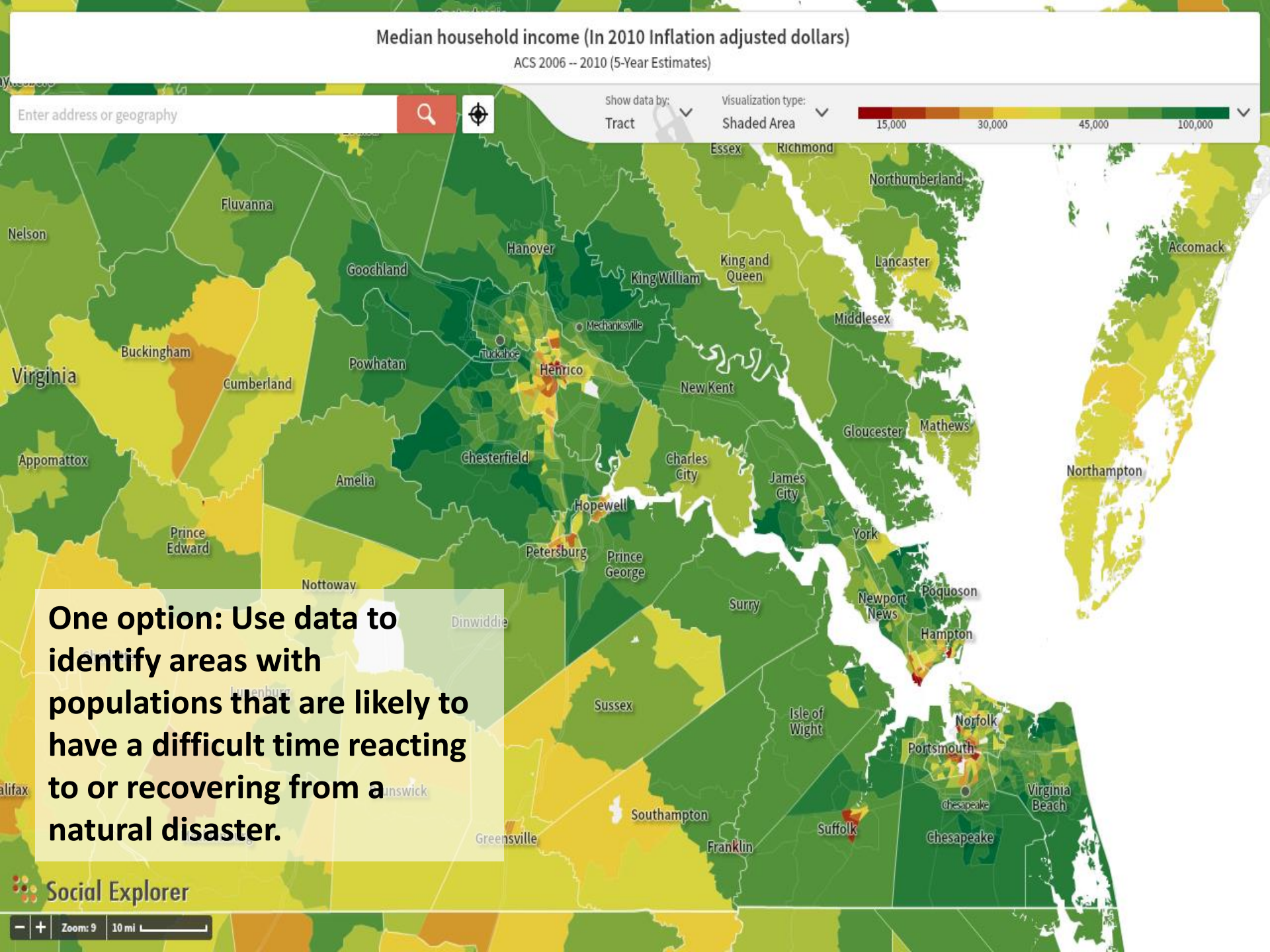
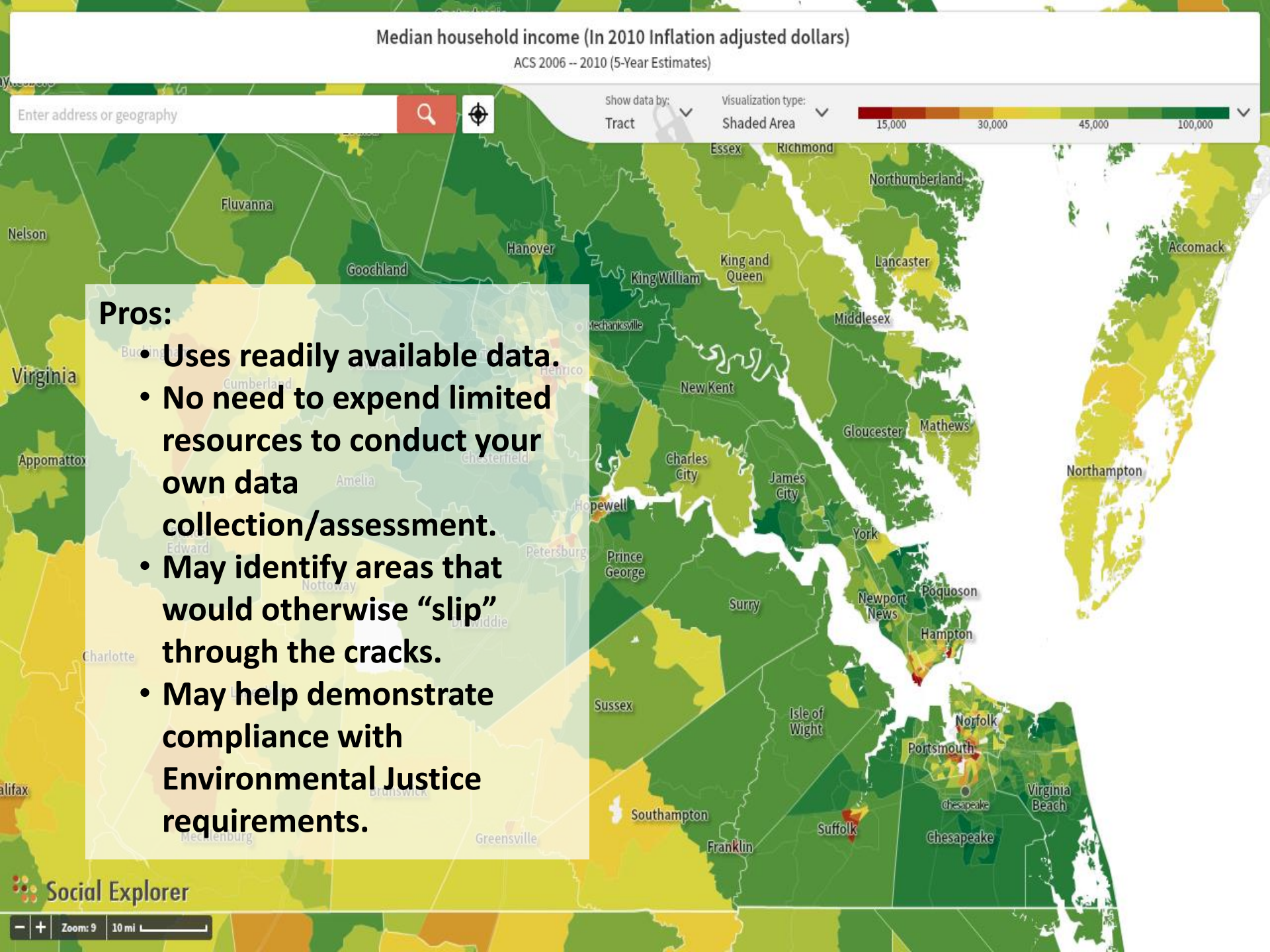
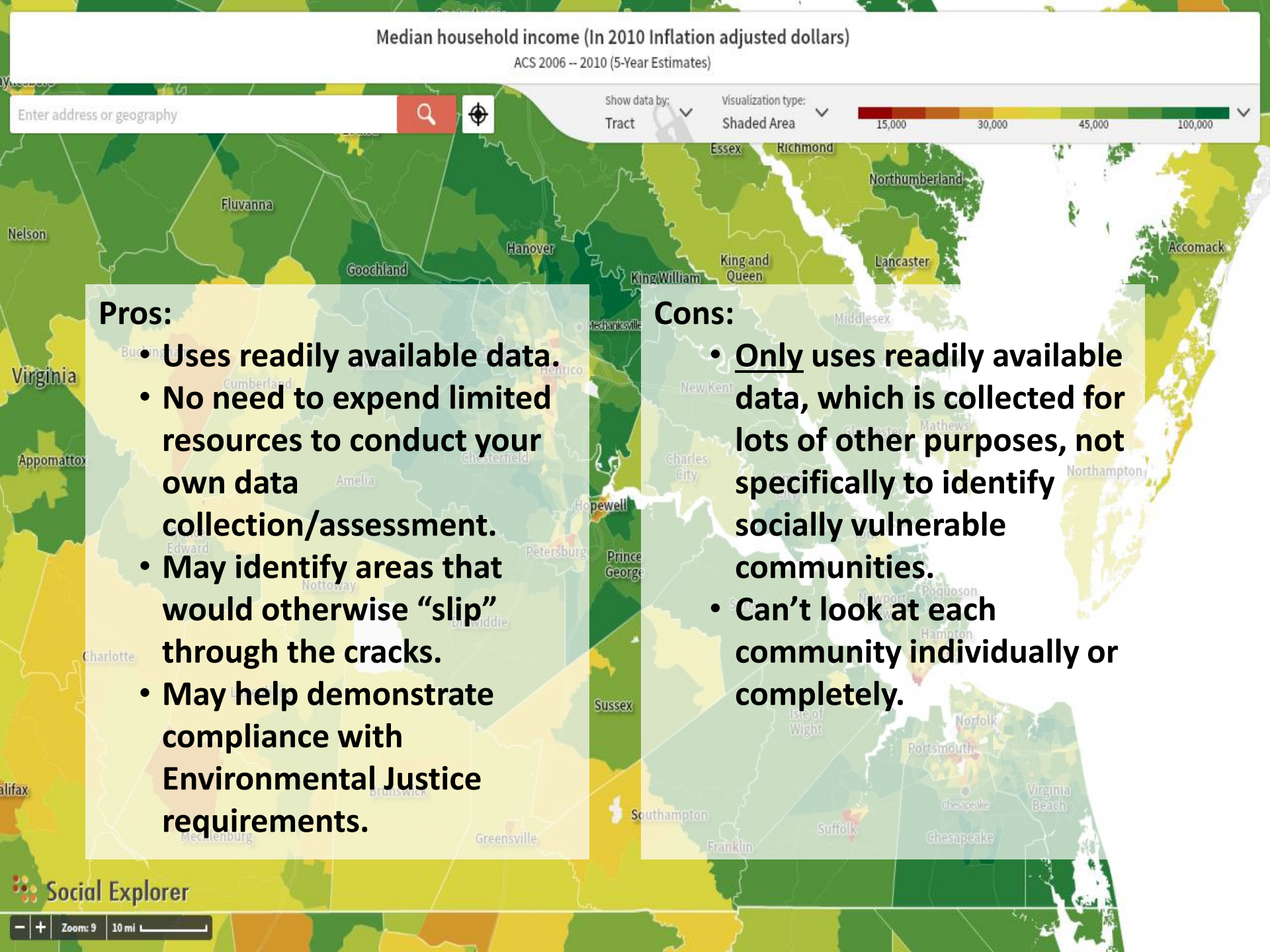


One option: Use data to identify areas with populations that are likely to have a difficult time reacting to or recovering from a natural disaster.



Pros:

- **Uses readily available data.**
- **No need to expend limited resources to conduct your own data collection/assessment.**
- **May identify areas that would otherwise "slip" through the cracks.**
- **May help demonstrate compliance with Environmental Justice requirements.**



Pros:

- **Uses readily available data.**
- **No need to expend limited resources to conduct your own data collection/assessment.**
- **May identify areas that would otherwise "slip" through the cracks.**
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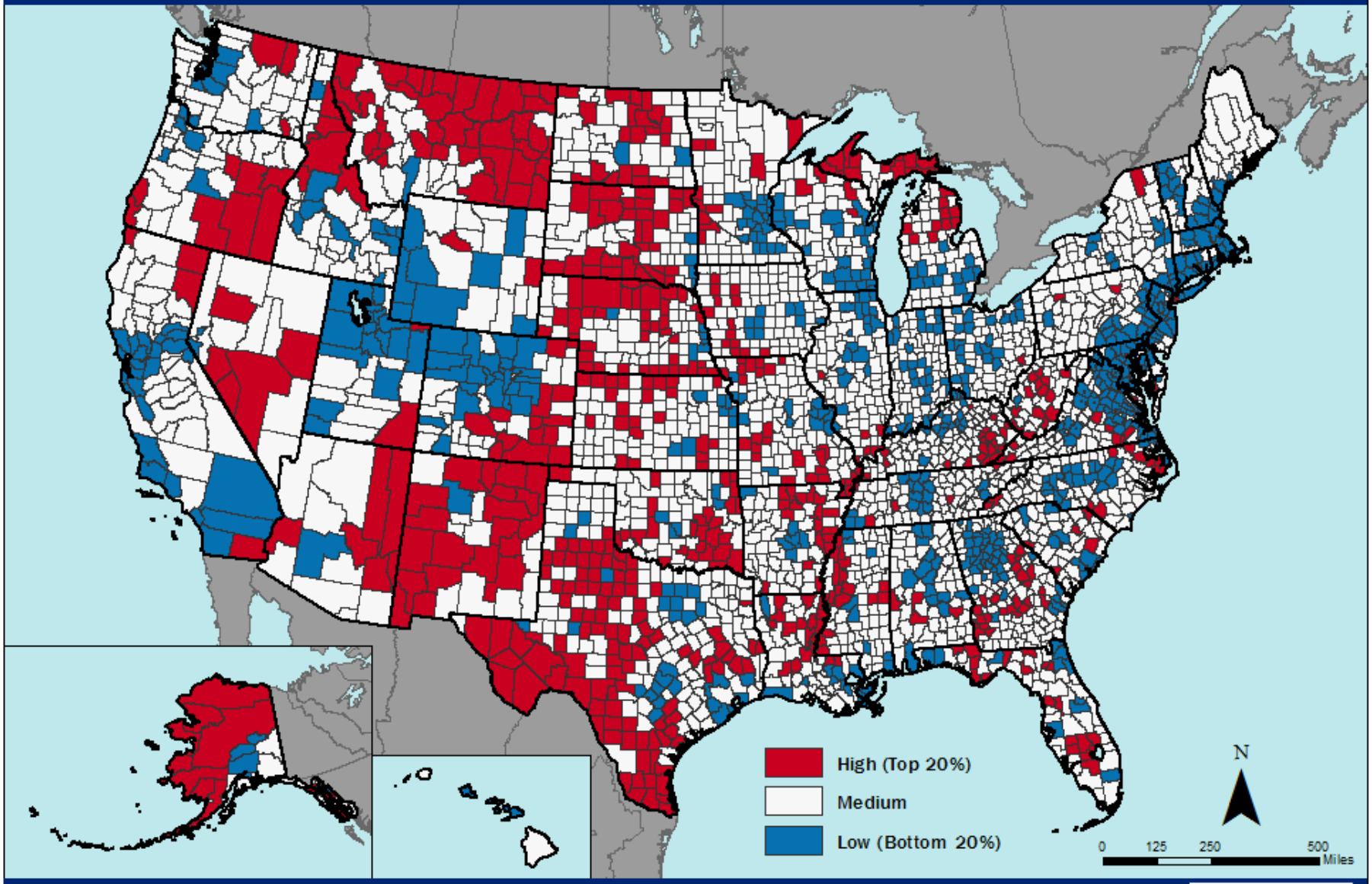
Cons:

- **<u>Only</u> uses readily available data, which is collected for lots of other purposes, not specifically to identify socially vulnerable communities.**
- **Can't look at each community individually or completely.**

Social Vulnerability to Environmental Hazards



Social Vulnerability Index 2006-10
Based on U.S. Census 2010 & American Community Survey, 2006-2010

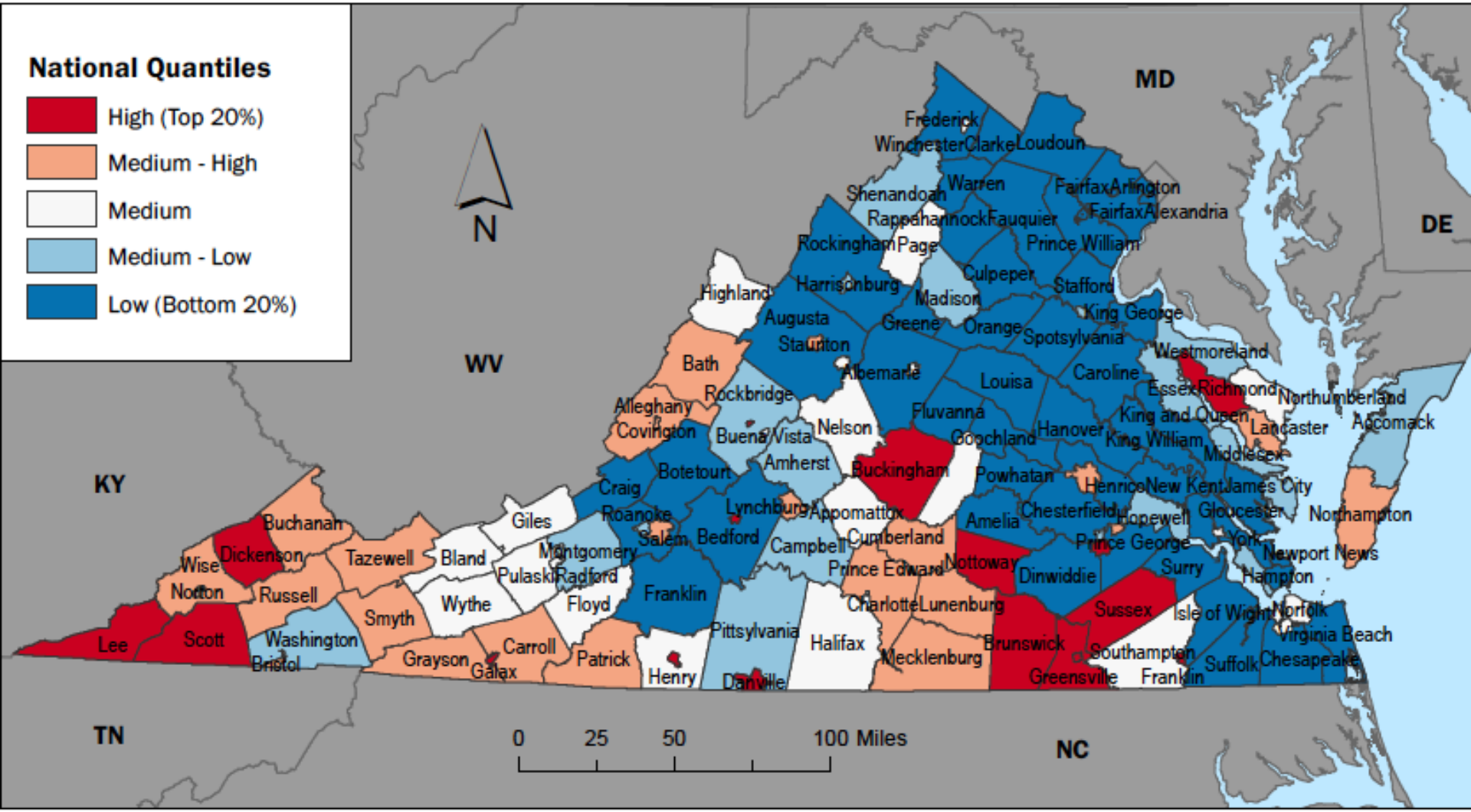
HVRI

Social Vulnerabilty Index (SoVI)

- Uses Principal Component Analysis to reduce a large matrix of data to a single index of vulnerability.
- Larger values indicate a more vulnerable community.
- All values are relative – there is no absolute measure of vulnerability.

Social Vulnerability to Environmental Hazards
State of Virginia

County Comparison within the Nation



Social Vulnerability to Environmental Hazards
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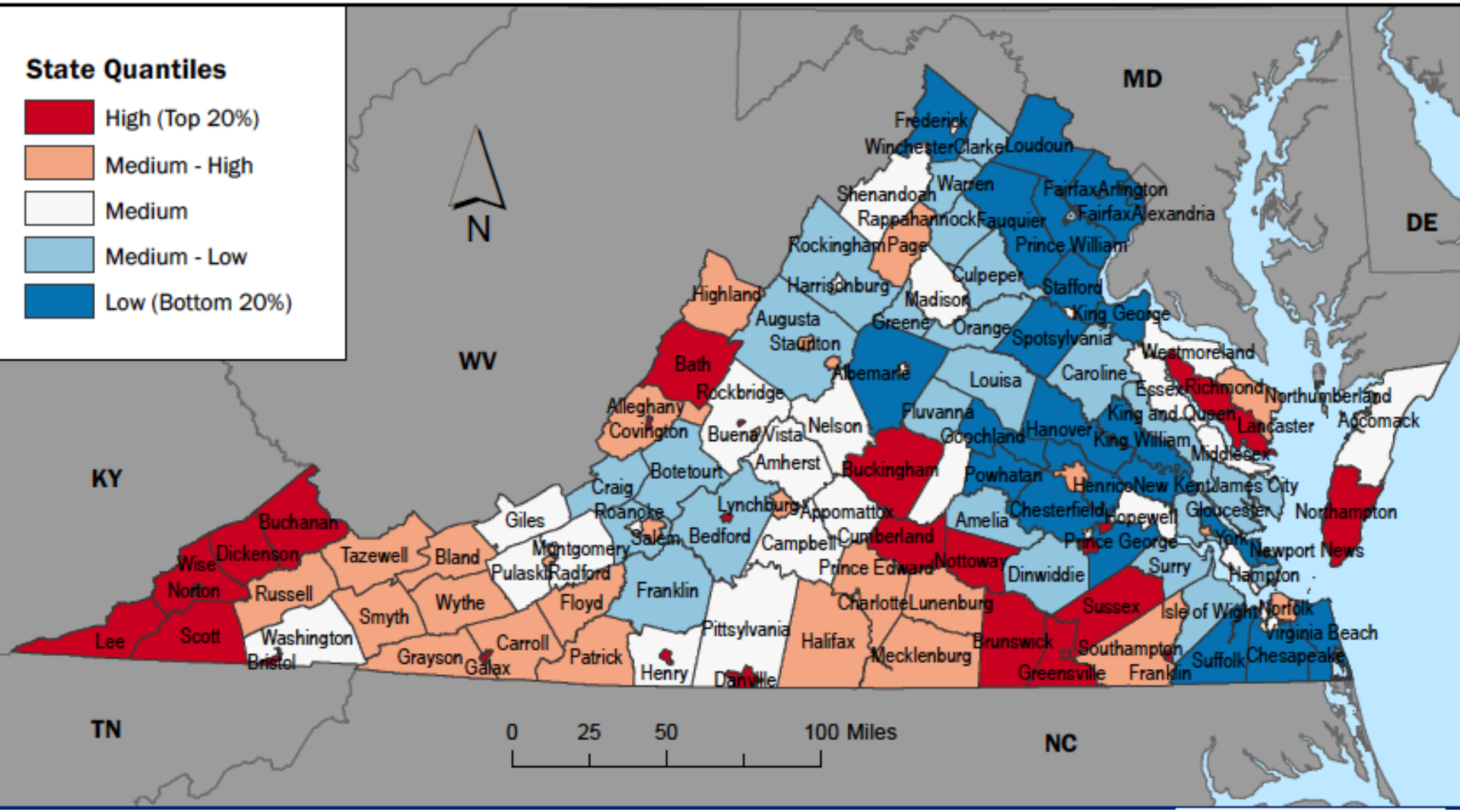


What Data is Used?

- Different sets of variables have been used for different iterations, but generally includes:
  - Age (mean age; pct. over 65, under 5)
  - Race (pct. Black, Hispanic, Asian, Native American)
  - Financial status (mean income, house value, and rent; pct. in poverty, unemployed, receiving soc. security)
  - Household characteristics (pct. female head of household, renter, living in mobile homes; mean number in household)
  - Other (pct. employed in service industries, extractive industries; pct. in nursing homes, without HS degree; pct. Female labor force participation)

Limitations of SoVI

- Geographic scope and level of analysis affects the determination of vulnerability.
- Interpretation is difficult.
- Tracts that “hit” on lots of different factors score higher than tracts that hit on just one factor, but one factor alone may be enough to make a community vulnerable.
- Not as objective as it might seem.
  - The researcher must use her judgment at various steps in the process because the relationship between the different data elements and vulnerability is not always obvious or uni-directional.

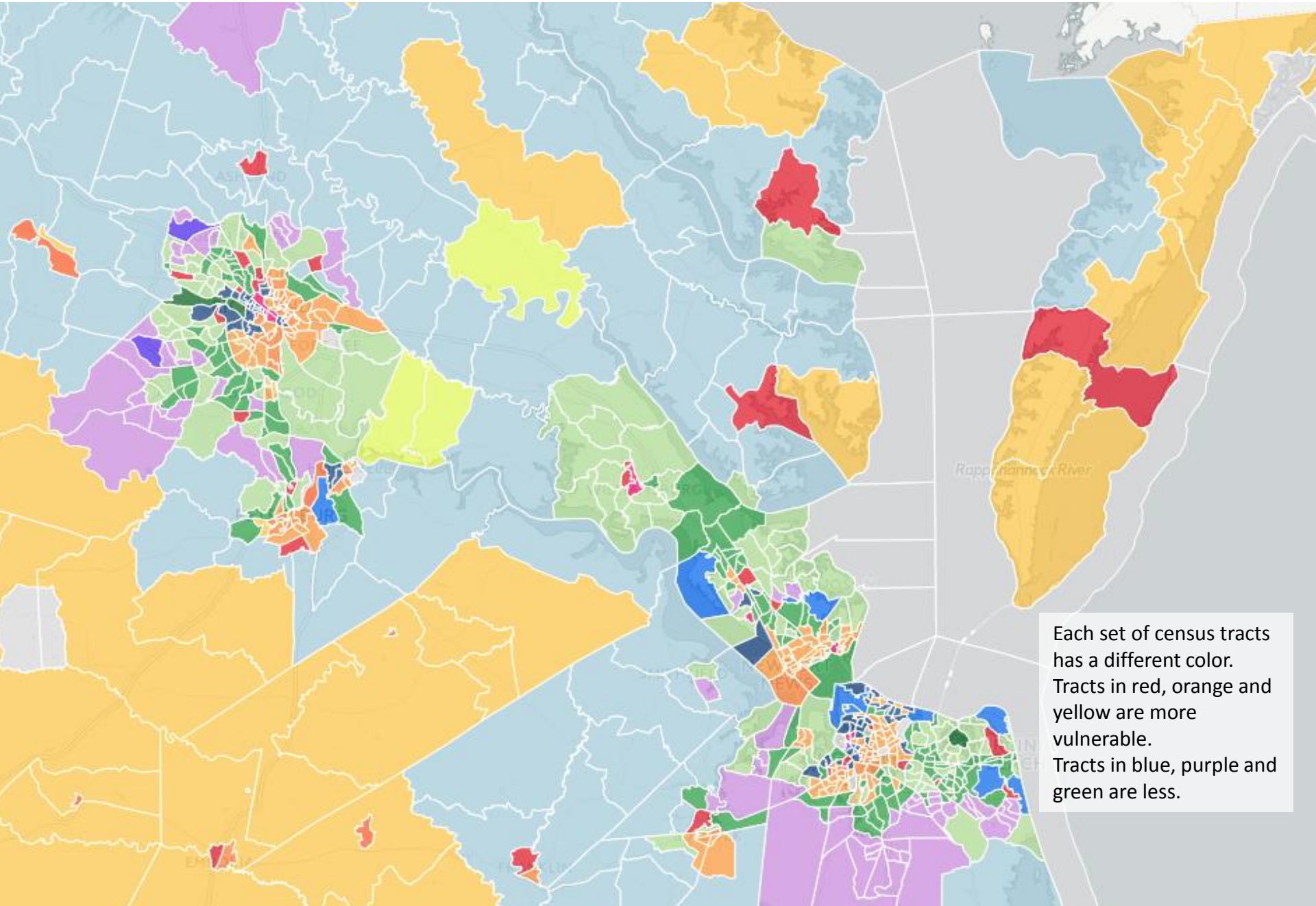
Alternative Approach

- Rather than reduce a large matrix of data to a single index of vulnerability, we are using a cluster analysis to identify different “sets” of census tracts that look similar to each other.
- We can then look at the characteristics of each set and determine whether tracts in that set are socially vulnerable.

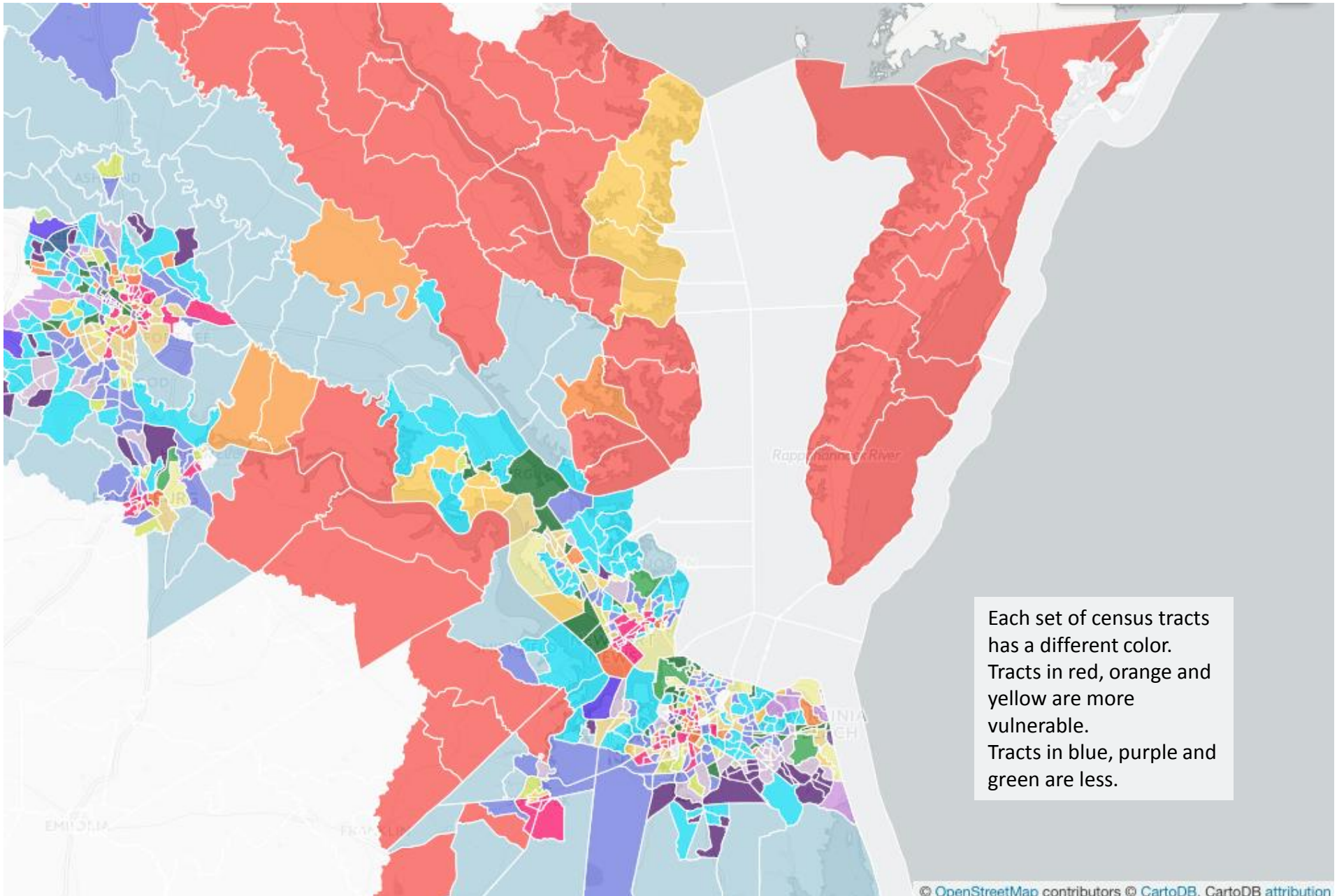
Cluster Analysis

- Pros
  - Identifies tracts that may be vulnerable in only one or two dimensions.
  - Allows factors to be considered holistically.
  - Allows researchers to make the vulnerability determination.
- Limitations
  - Researchers have to make value judgments.
  - Clustering process can miss some vulnerable tracts and can include non-vulnerable tracts.

Preliminary Categorization for all of Virginia



Preliminary Categorization for Coastal Virginia



Using the Results

- Regardless of which data-driven method used is used, the results need to be validated.
  - We plan to “ground-truth” the results of both the SoVI and cluster analysis by holding focus groups with community leaders to see which communities are successfully identified and which are missed.
- We also need to evaluate how well any vulnerability measure predicts a community’s resilience.
  - To do this, we need to find a robust measure of resilience as well as appropriate events that test a community’s resilience.