

Social and Agricultural Vulnerability to Climate Change Hazards in the Southern Region

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OVERVIEW

Vulnerability dimensions:

- Social vulnerability
 - Socioeconomic
- Agricultural sustainability
 - Economic, social, environmental, institutional

Climate change hazards:

- Drought
- Flooding
- Hurricanes
- Tornadoes

Overall Question: What is the areal extent of both social and agricultural production vulnerability to climate change hazards in the Southern Region?

- Social and agricultural vulnerability conceptualized as inherently coupled systems in the context of hazard exposure and vulnerability

Study Objective: generate solutions for food systems in the face of climate change by assessing social and agricultural hazard vulnerability

METHODS

- **Sample**
 - USDA Southern Region: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, Puerto Rico, South Carolina, Tennessee, Texas, Virginia and the U.S. Virgin Islands
- **Datasets** –
 - SHELUDS
 - Hazard frequencies and crop damages: drought, flood, hurricanes and tornadoes 1960-2019 average for conterminous U.S. and 2000-2019 average for territories
 - SoVI scores and percentiles 2010-2014
 - Census of Agriculture
 - 2017 irrigated acreage
 - US Census
 - TIGER shapefile
- Hazard score based on three quantiles for each of the four hazards

RESULTS

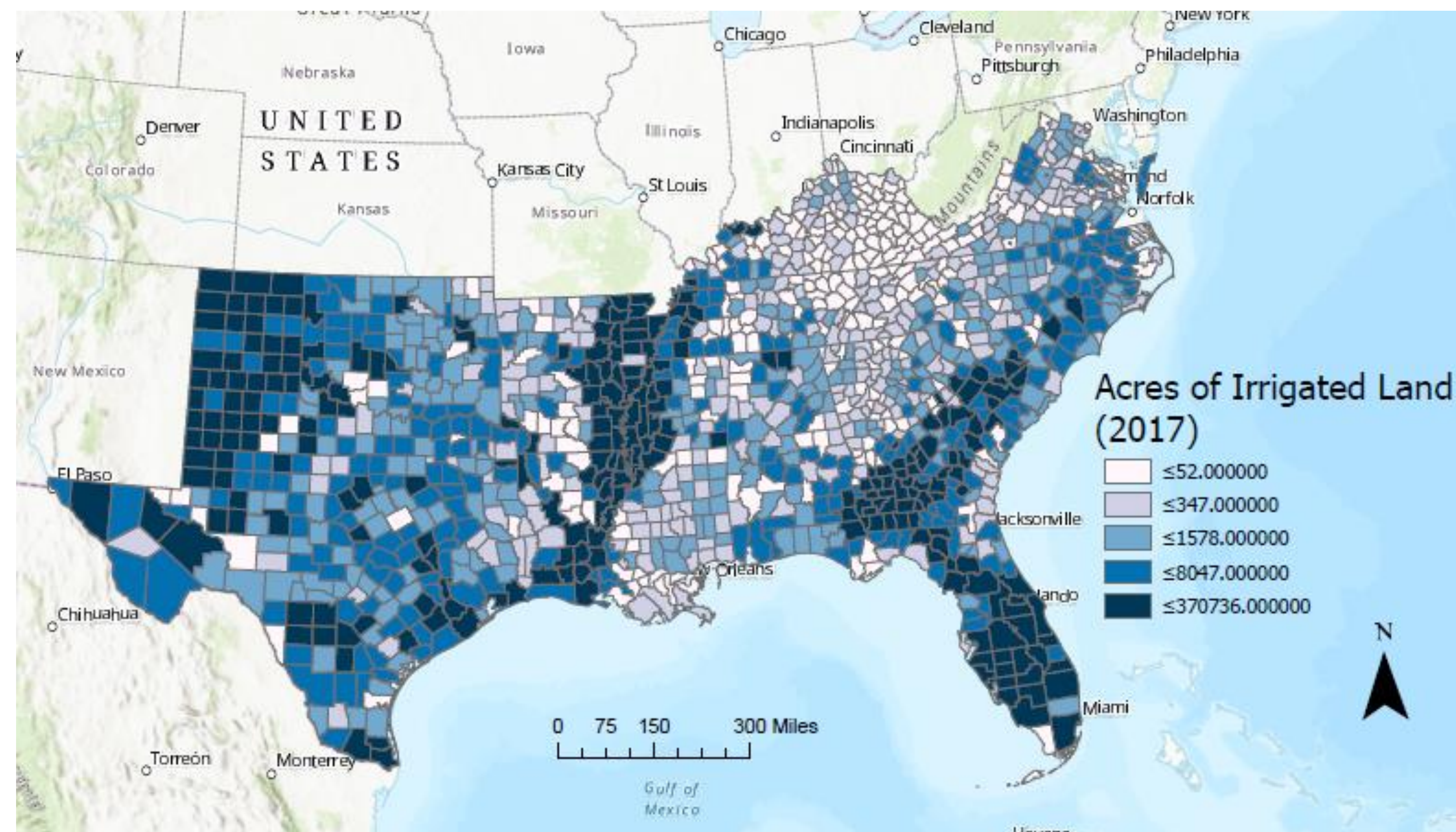


Figure 1. 2017 acres of irrigated land presented as five quantiles in the conterminous portion of the Southern Region by county

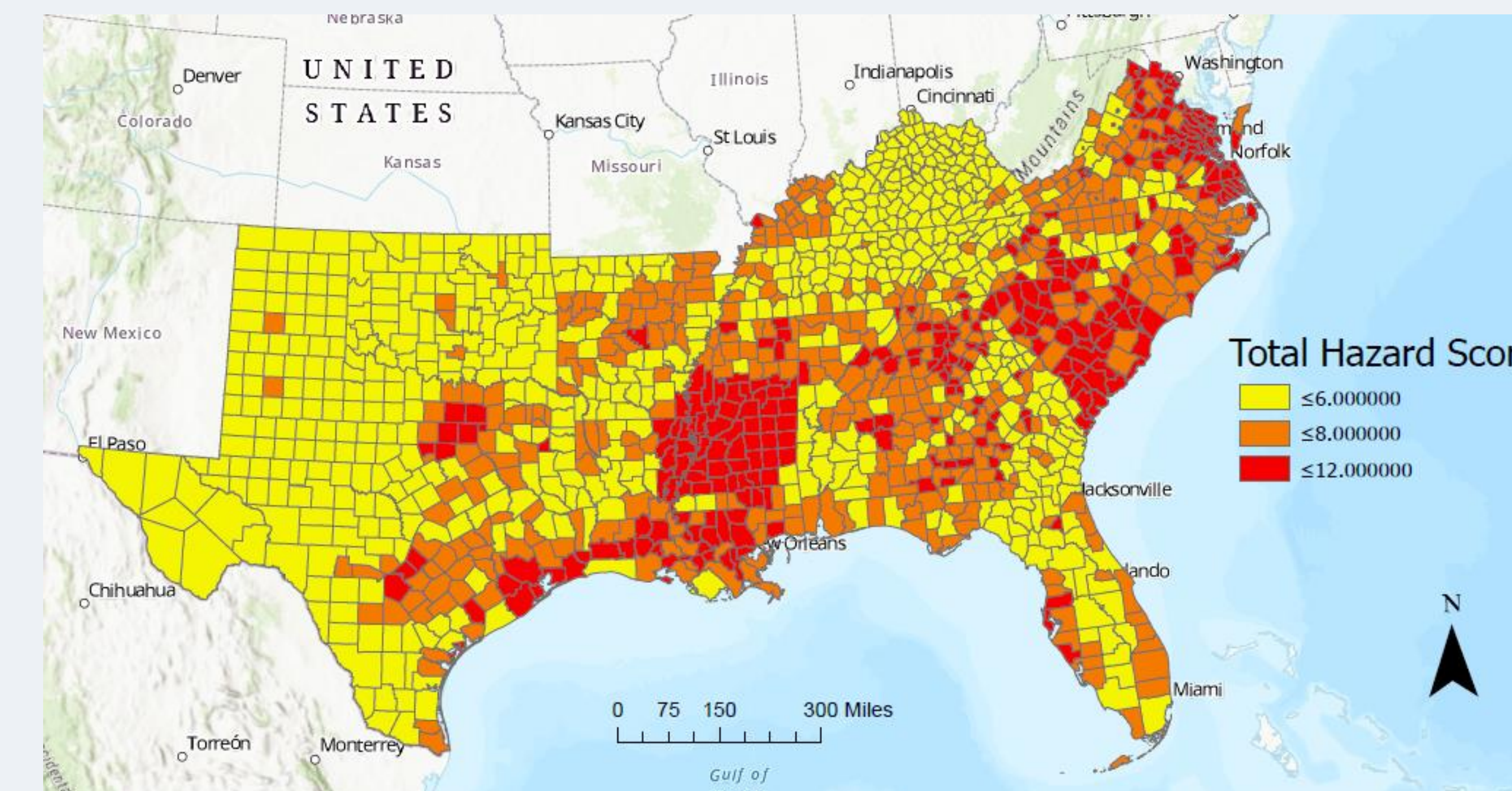


Figure 2. Total hazard scores (the sum of drought, flood, hurricane and tornado scores) presented as three quantiles in the conterminous portion of the Southern Region by county



Figure 3. Total hazard scores (the sum of drought, flood, hurricane and tornado scores) presented as three quantiles in Puerto Rico and the U.S. Virgin Islands

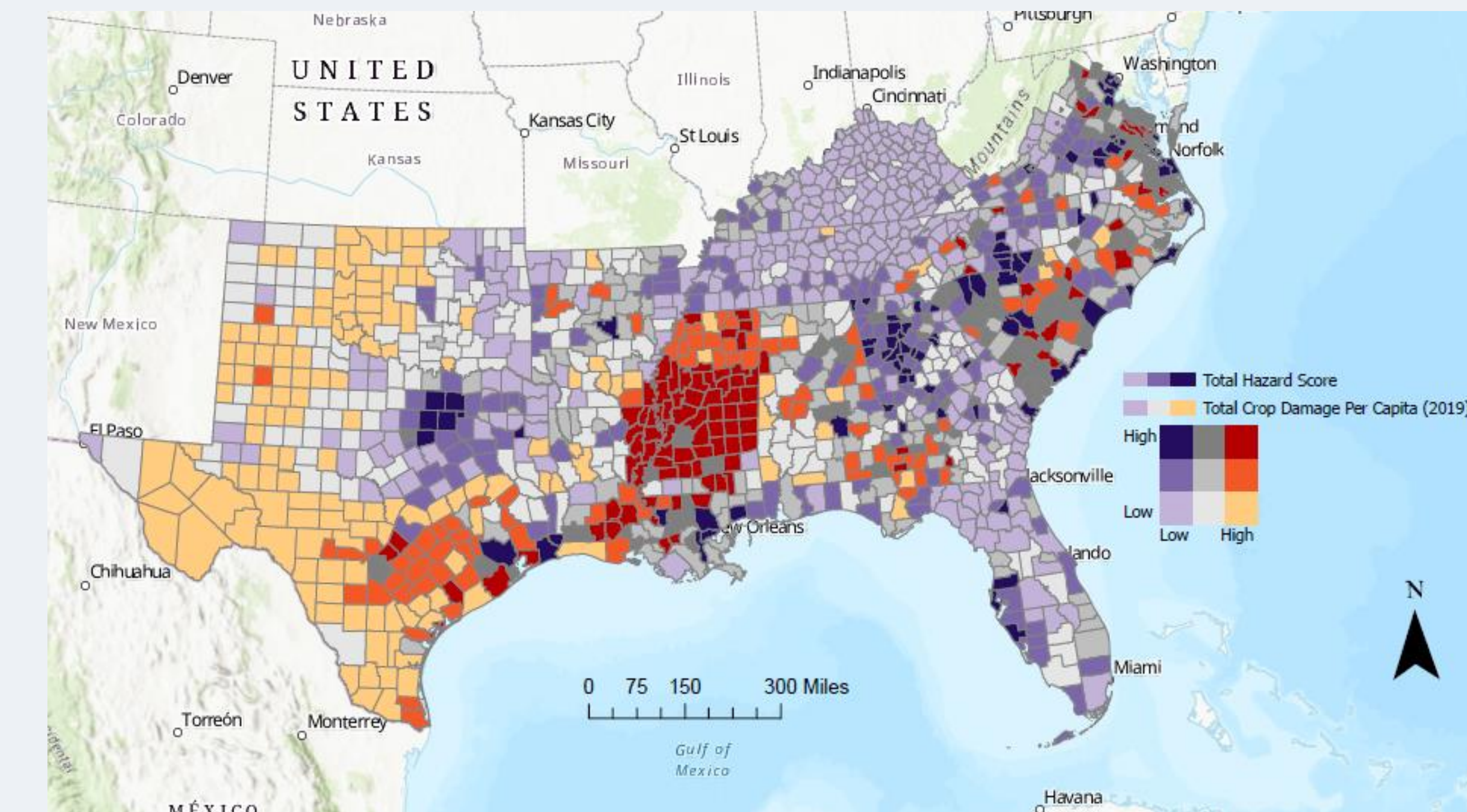


Figure 4. Total hazard scores and total crop damage per capita scores of the conterminous portion of the Southern Region presented in a 3x3 quantile bivariate map by county

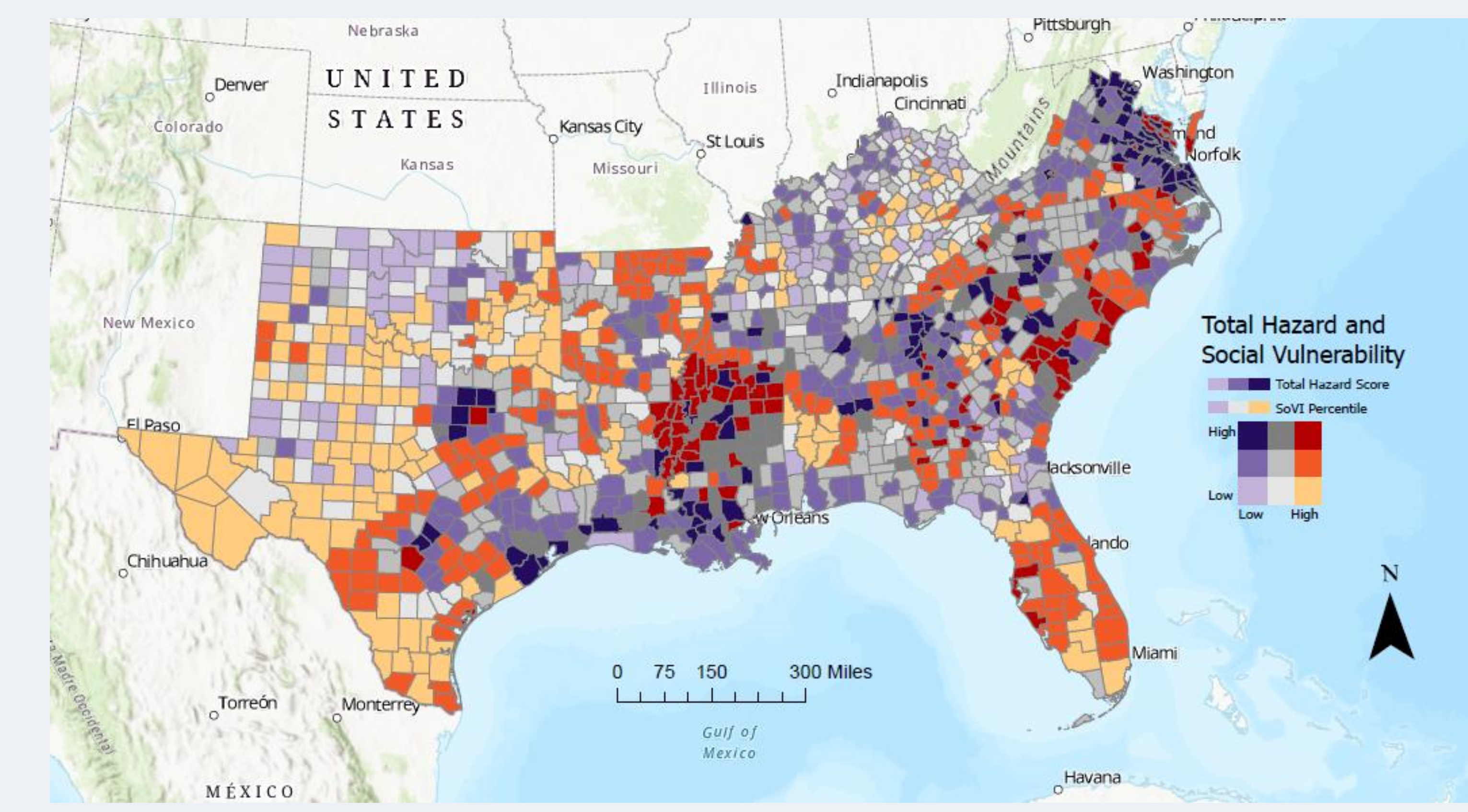


Figure 5. Total hazard scores and SoVI percentiles of the conterminous portion of the Southern Region presented in a 3x3 quantile bivariate map by county

DISCUSSION

Conclusions:

- Coupled social and agricultural vulnerability is a critical consideration to assessing overall vulnerability
 - Policy and intervention implications

Limitations:

- Data availability for Puerto Rico and the U.S. Virgin Islands
- Only two agricultural vulnerability indicators used in analysis

Future Research:

- Constructing a social-agricultural vulnerability index
- Smaller unit of analysis
- Weighting scheme
- Different GIS methodologies
 - Smoothing, clustering, time series