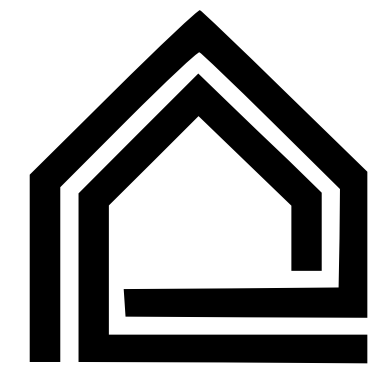


COMMUNITY RESILIENCE IN THE LOWER RIO GRANDE VALLEY

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INTRODUCTION

The purpose of this study is to advance understanding of how resilience and adaptive capacity are measured at the local level utilizing the Baseline Resilience Indicators for Communities (BRIC) framework. While BRIC was originally envisioned using county data, this study utilizes BRIC indicators and a capitals structure (Table 1) to evaluate census tracts in the Texas Lower Rio Grande Valley.

Table 1. Description of Capitals in Framework (Ross, 2013)

Capital	Description
Social Capital	The collective demographic characteristics of the community.
Economic Capital	The economic robustness of a community and its ability to recover from economic disruption post-disaster.
Community Capital	The networks among individuals and the collective action that emerges among community members.
Institutional Capital	A community's disaster mitigation policies and response and recovery plans.
Built Capital	The way a community's roads, highways, and public services affect resilience.
Natural Capital	The way a community has managed its natural resources that serve as barriers to disaster impacts.

METHODS AND MATERIALS

1. Index Construction
 - 37 Variables
 - 216 Census Tracts
2. Internal Consistency (Cronbach's alpha)
3. Validation against SoVI
4. Vizualization
5. Hot Spot Analysis
6. Urban vs. Rural Comparison

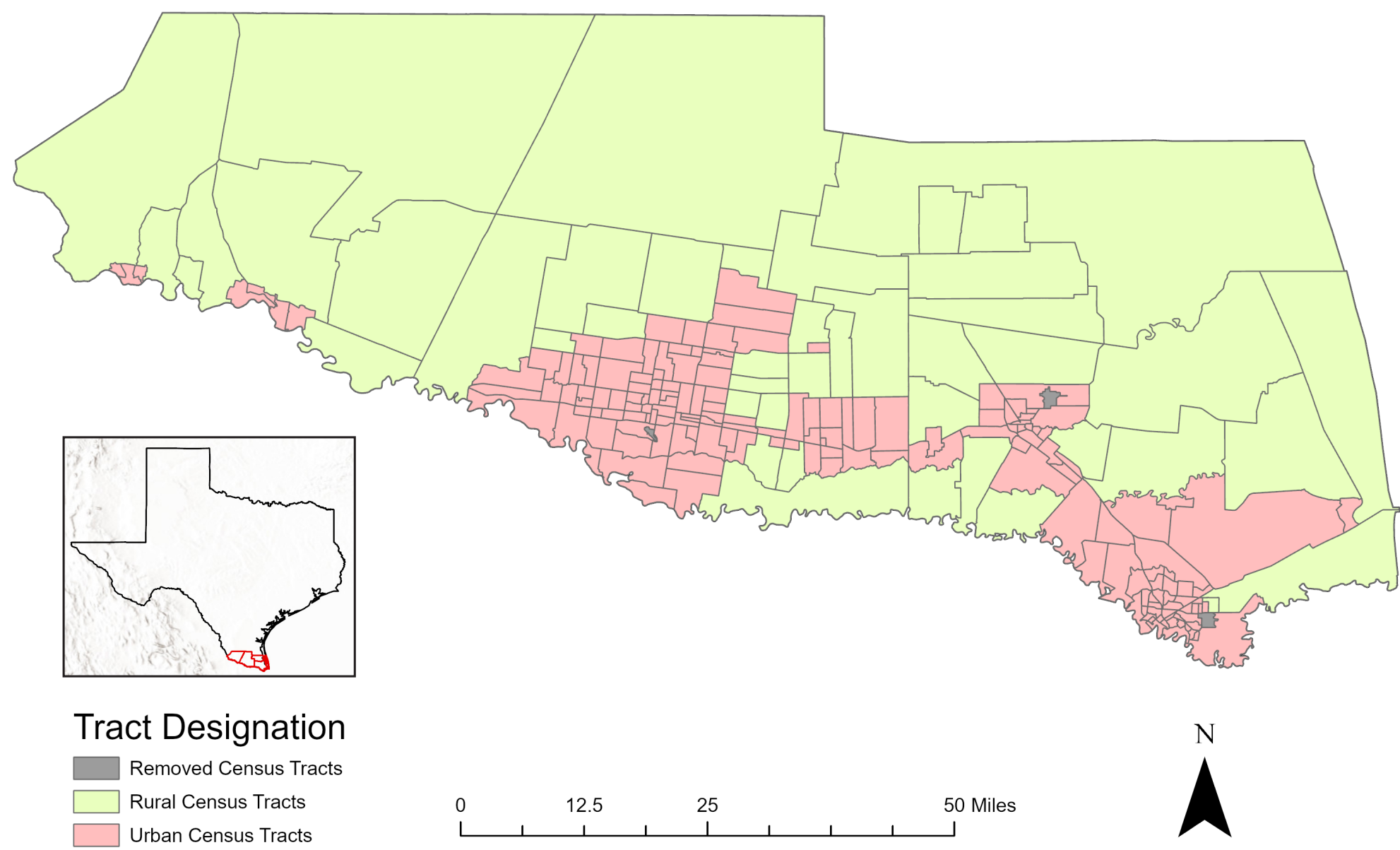


Figure 1. Urban and Rural Tracts in the LRGV
(Census tracts were designated as urban if 30% or more of the tract was included in a municipality or census designated place. All other tracts were designated rural. See Habets & Cutter (2025)).

RESULTS

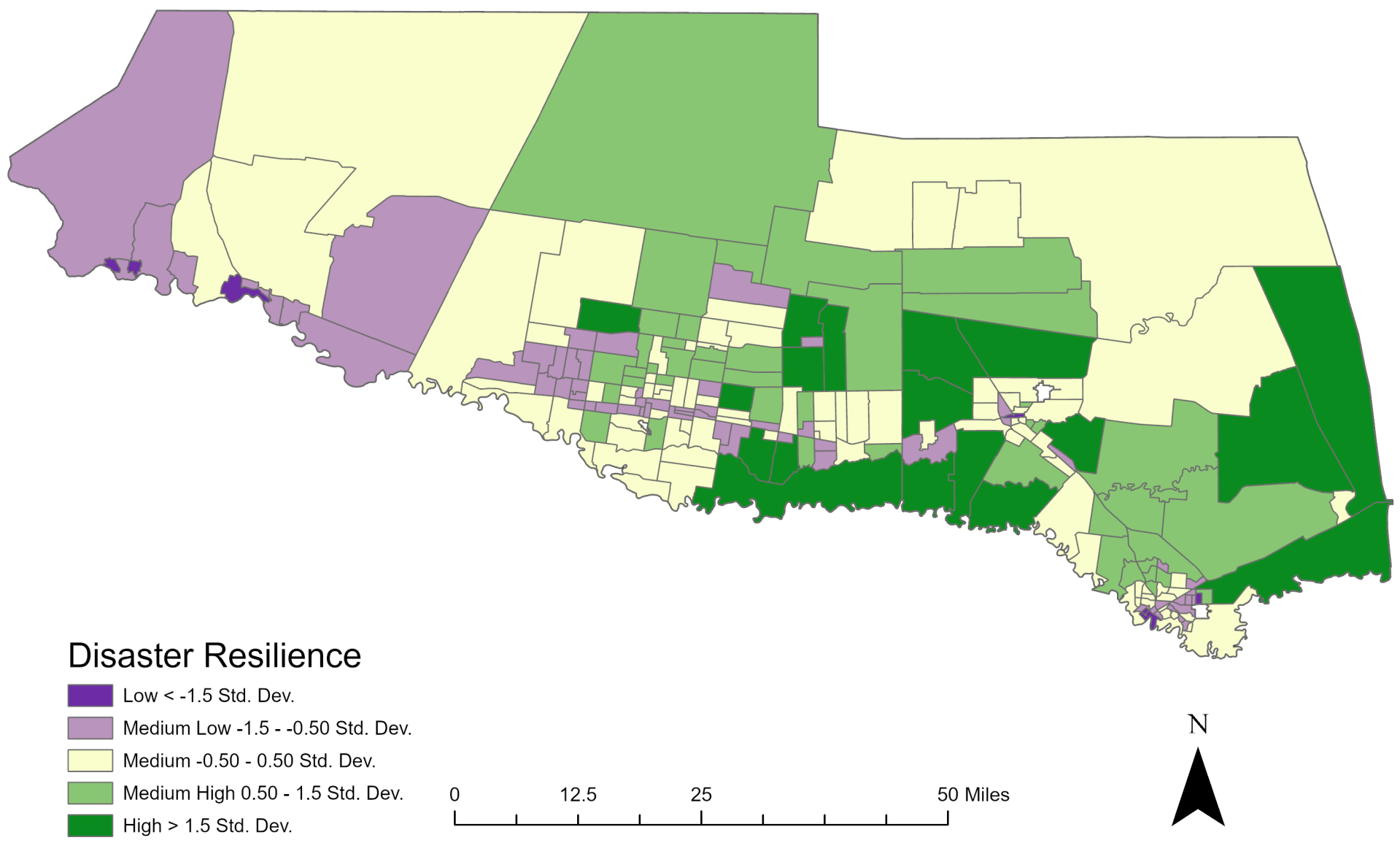


Figure 2. Composite Resilience Index Map

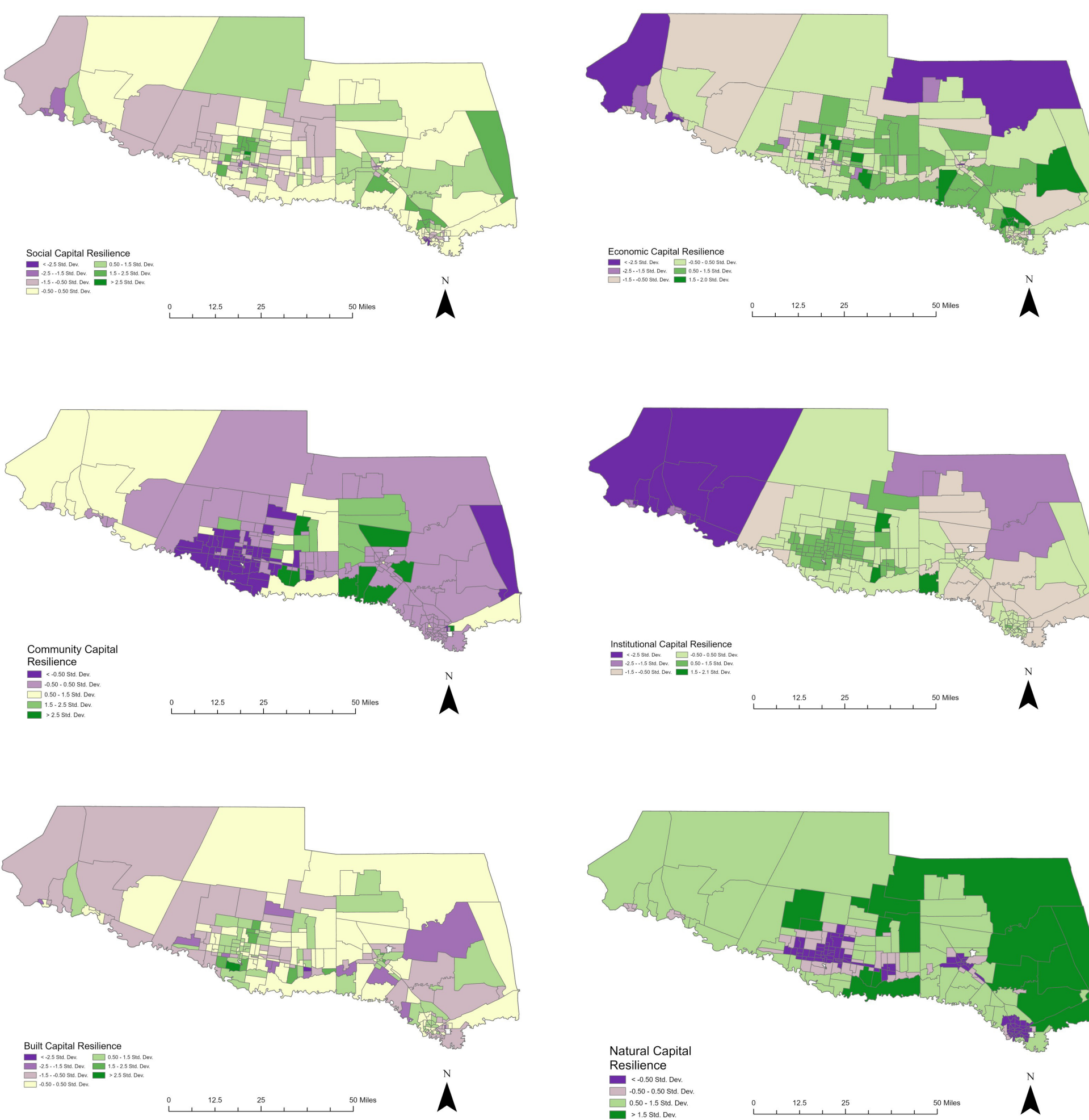


Figure 3. Capital Index Maps

Table 2. Capital Indicator Internal Consistency

Capital	Number of Indicators	Cronbach's Alpha
Social	8	0.779
Economic	8	0.401
Community	6	0.732
Institutional	7	0.176
Built	5	-0.124
Natural	3	0.387

Table 3. Capital Descriptive Statistics

Statistic	Social	Economic	Community	Institutional	Built	Natural
Minimum	0.1384	0.3611	0.0796	0.1412	0.2098	0.0000
Maximum	0.8001	0.7445	0.8802	0.6502	0.6513	0.6626
Mean	0.5199	0.5915	0.2283	0.4602	0.4274	0.1447
SD	0.1102	0.0769	0.1092	0.0896	0.0861	0.1521

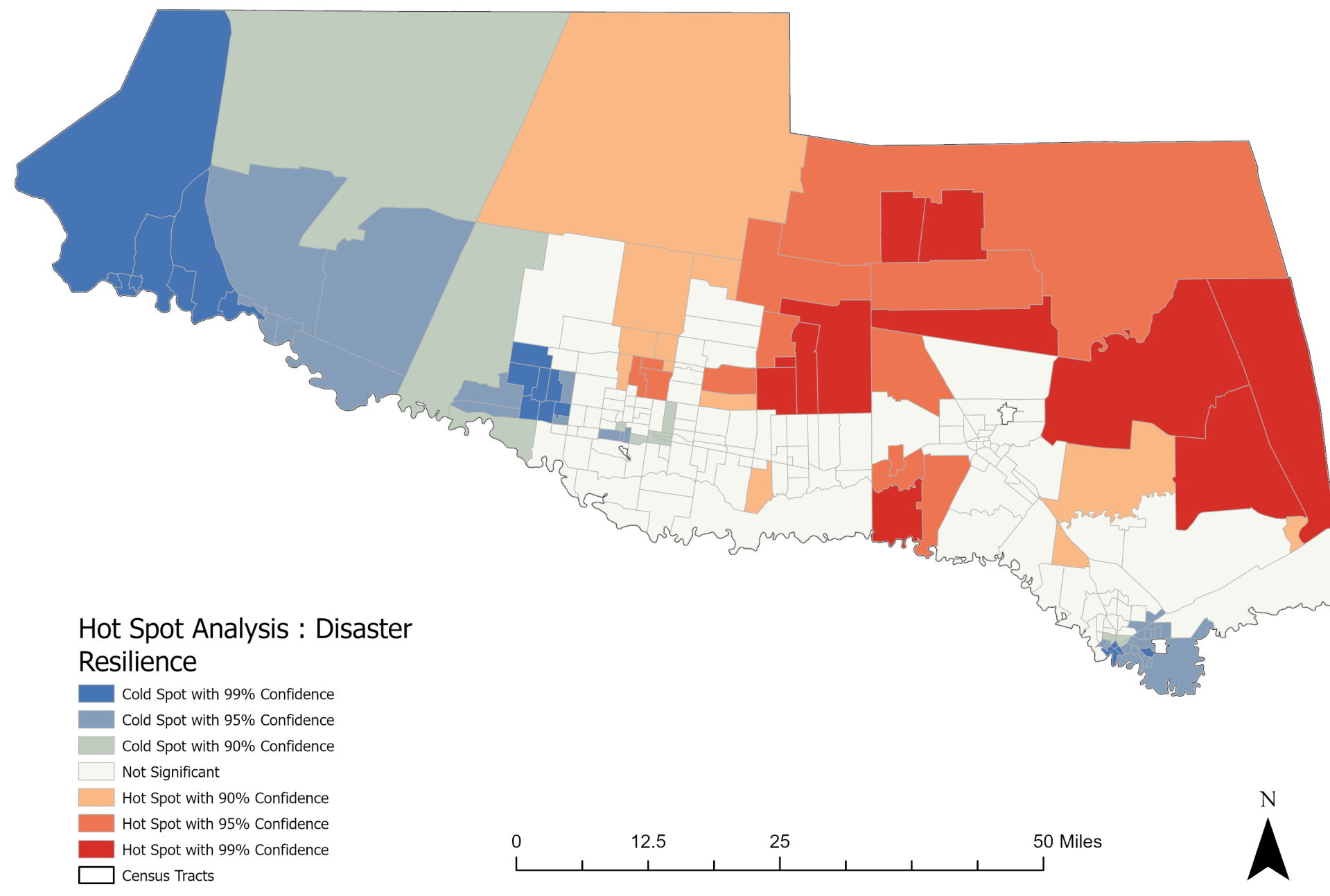


Figure 4. Composite Hot Spot Analysis Map

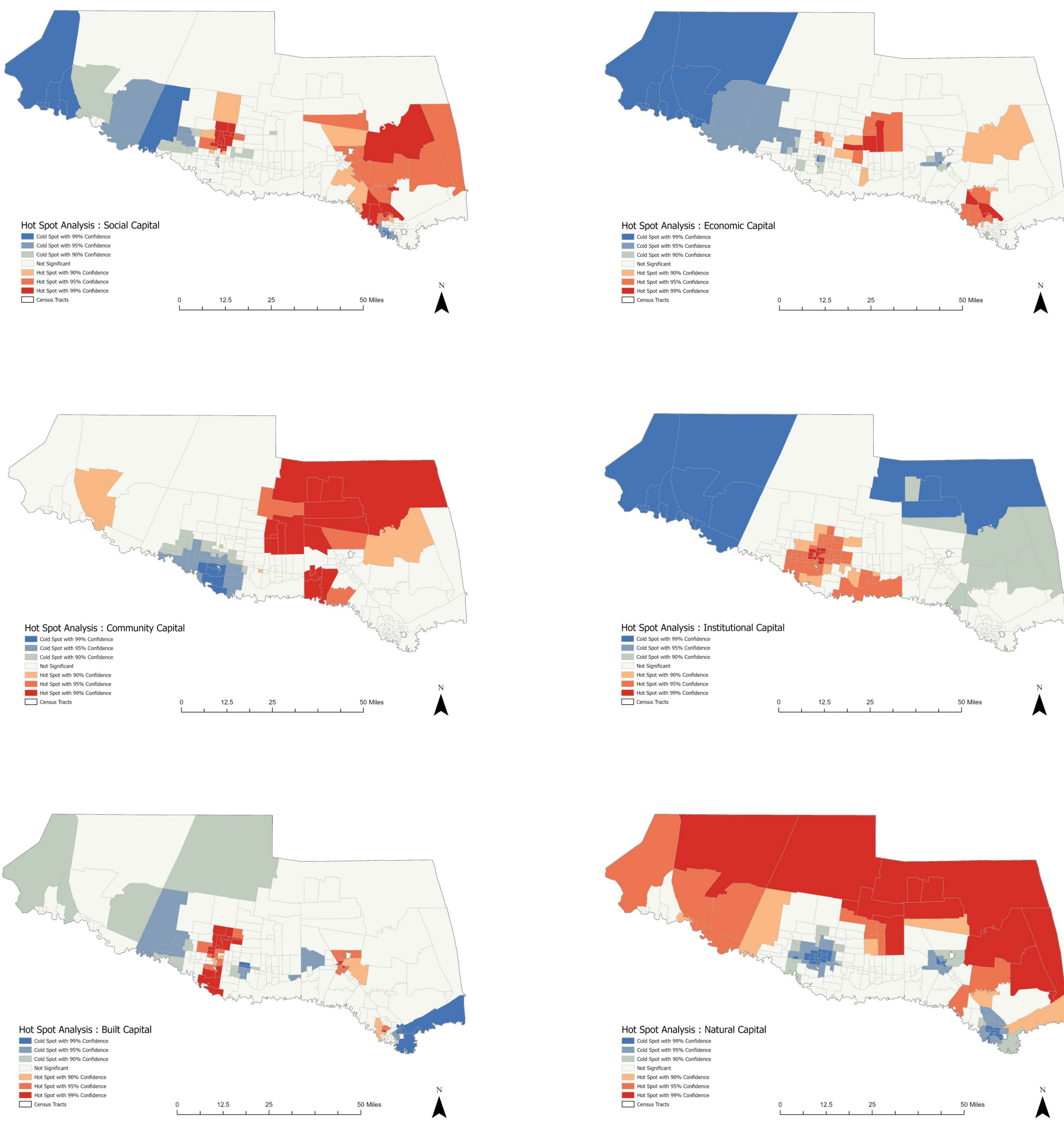


Figure 5. Capital Hot Spot Analysis Maps

Table 4. BRIC Validity Comparison with SoVI®

Study	Pearson r	R2	α
Our Study	-0.500	0.250	0.01
Cutter, Ash & Emrich (2014)	-0.5	0.25	0.01
Buck et al. (2023)	-0.5	0.21	0.01

Table 5. Urban-Rural Tract Comparison

Designation	No. of Census Tracts	Composite Index	Social Capital	Economic Capital	Community Capital	Institutional Capital	Built Capital	Natural Capital
Urban	171	2.290	0.520	0.588	0.188	0.477	0.429	0.089
Rural	45	2.682	0.522	0.605	0.380	0.397	0.423	0.356
p-value		<.001	.914	.275	<.001	<.001	.625	<.001

CONCLUSIONS

- Identify where community resilience strengths and weakness are and where those strengths and weaknesses are significant.
- Supports more targetd policies, programs, and interventions to increase community resilience.
- Supports further use of BRIC as a sub-county option for evaluating local resilience metrics.
- More research needs to solidify a clear methodology for selecting indicators below the county level.
- Additional research can focus on which resilience indicators are important to specific localities.

APPLICATIONS

- Communities can use the framework and methodology to replicate results.
- Policy makers can use results to create more targeted policies, programs, and interventions to increase local resilience.
- Researchers can use the methodology to move closer to understanding indicators of resilience at the local level.

REFERENCES

1. Cutter, S. L., Ash, K. D., & Emrich, C. T. (2014). The geographies of community disaster resilience. *Global Environmental Change*, 29, 65-77. <https://doi.org/10.1016/j.gloenvcha.2014.08.005>
2. Gao, J. (2022). *Fundamentals of spatial analysis and modelling*. CRC Press.
3. Habets, M., & Cutter, S. L. (2025). A community resilience index for place-based actionable metrics. *Risk Analysis*, 45(7), 1648-1661. <https://doi.org/10.1111/risa.17684>
4. NASEM, (National Academies of Sciences, Engineering, and Medicine). (2019). *Building and measuring community resilience: Actions for communities and the Gulf Research Program* (030948975X). T. N. A. Press.
5. Ross, A. D. (2013). *Local disaster resilience: Administrative and political perspectives*. Routledge.

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