Food Access and Vulnerable Populations: Mapping Food Insecurity in Bolivar & Washington Counties, Mississippi

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Project Overview

PURPOSE OF THE PROJECT

- UNDERSTAND HOW POVERTY, INCOME, AGE, AND VEHICLE ACCESS RELATE TO FOOD ACCESS
- IDENTIFY HIGH-RISK CENSUS TRACTS USING DRIVE-TIME ANALYSIS
- CREATE A COMPOSITE FOOD ACCESS RISK SCORE (0–3)
- SUPPORT COMMUNITY DECISION-MAKING WITH SPATIAL ANALYSIS

Why the Mississippi Delta?

Living in the Mississippi Delta, I see many of these challenges firsthand. Long distances to grocery stores, limited transportation, and the high cost of fresh foods are part of daily life for many families here. This project is meaningful to me because it reflects real issues affecting my own community, not just abstract data. Mapping these patterns helps us make those struggles visible and easier to act on.

1. REGIONS FACES LONG-STANDING STRUCTURAL INEQUALITIES
2. HIGH POVERTY, LOW INCOME, LIMITED TRANSPORTATION
3. RURAL COMMUNITY -> LONG TRAVEL DISTANCES TO FOOD OUTLETS
4. BOLIVAR AND WASHINGTON COUNTIES MIRROR THESE CHALLENGES

Research Question

HOW DO INCOME, VEHICLE OWNERSHIP, AND AGE INTERSECT WITH PHYSICAL ACCESS TO FOOD OUTLETS IN BOLIVAR AND WASHINGTON COUNTIES?

Literature Review: National Findings

- Low-income and rural areas have fewer healthy retail options
- Greater reliance on limited-service outlets (dollar stores, gas stations)
- Distance + economic hardship → nutritional disparities
- Transportation is a core barrier to accessing fresh foods

(Walker et al., 2010; Shanks et al., 2022; Odoms-Young et al., 2024)

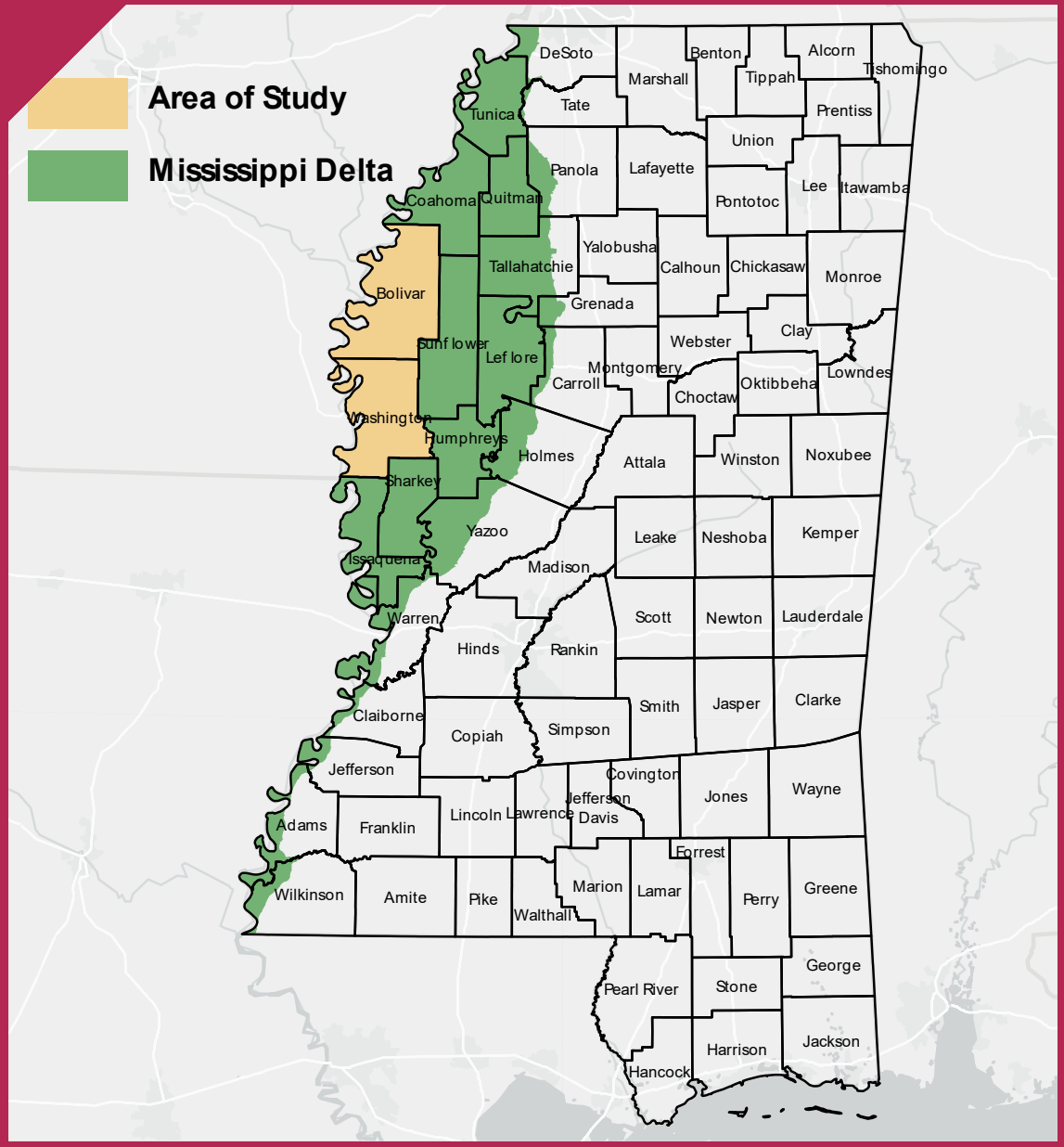
Literature Review: Mississippi Delta Findings

- Long distances to grocery stores are common
- Higher food costs + poor freshness reduce access to healthy foods
- Many residents rely on SNAP, WIC, and food pantries
- Transportation gaps and aging populations increase vulnerability

(Hathaway, 2025; Halfacre et al., 2022; CREW, 2024)

Study Area

- BOLIVAR & WASHINGTON COUNTIES IN THE MISSISSIPPI DELTA
- PREDOMINANTLY RURAL AND MAJORITY AFRICAN AMERICAN
- HIGH POVERTY RATES AND LOWER MEDIAN HOUSEHOLD INCOMES
- LIMITED NUMBER OF FULL-SERVICE GROCERY STORES
- WIDELY DISPERSED RURAL COMMUNITIES



Data Sources

ACS 2023 (5-YEAR ESTIMATES):

POVERTY RATE (S1701)

MEDIAN HOUSEHOLD INCOME (B19013)

AGE 65+ (S0101)

HOUSEHOLDS WITHOUT A VEHICLE (B08201)

FOOD OUTLET SOURCES:

DELTA HEALTH ALLIANCE

MISSISSIPPI FOOD NETWORK

GOOGLE MAPS

USDA SNAP RETAILER LOCATOR

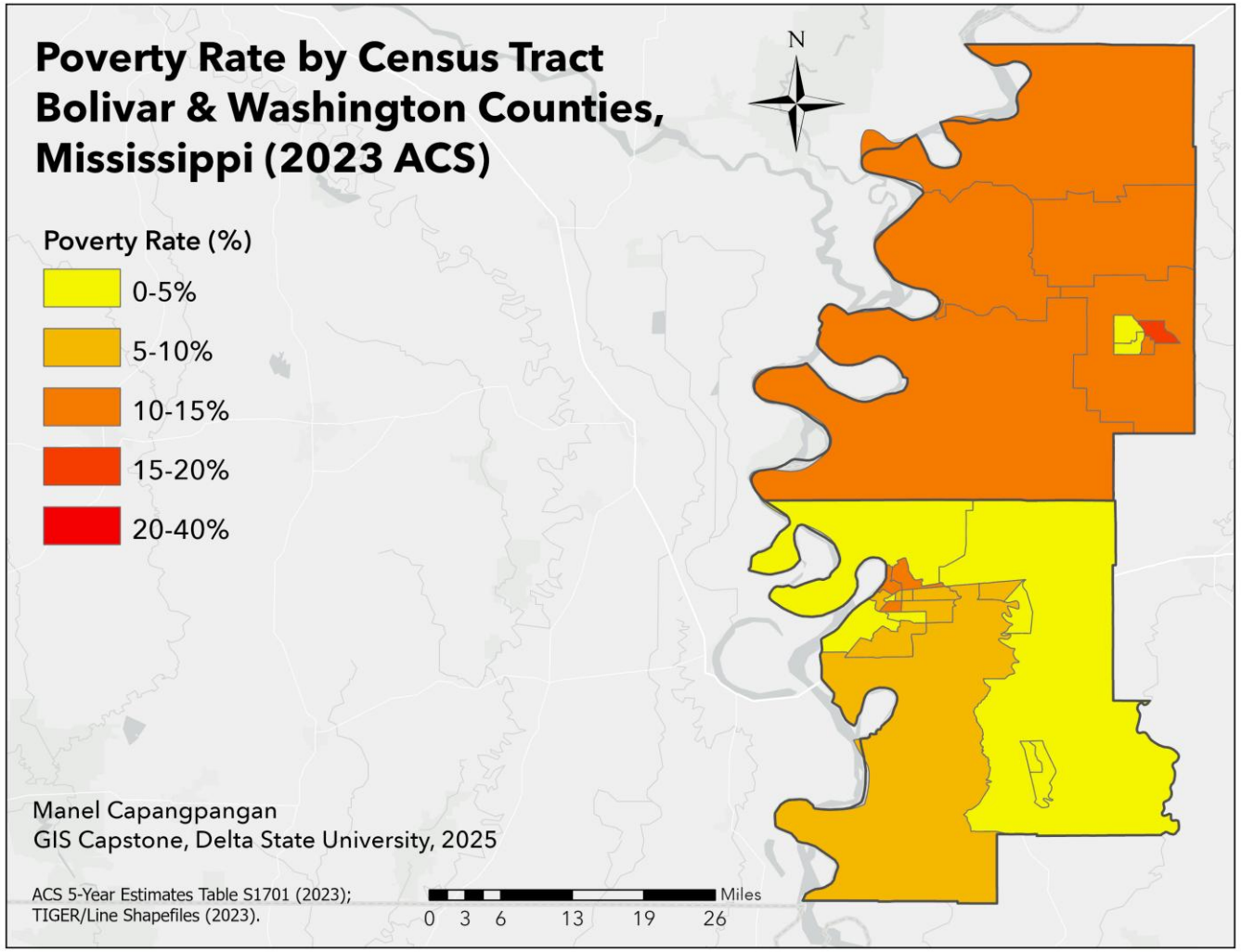
GIS Methods

- **Cleaned and geocoded food outlet data**
- **Generated 10- and 15-minute drive-time polygons**
- **Joined ACS data to census tracts**
- **Applied classification breaks used in paper**
- **Created composite RiskScore (0–3):**
  +1 poverty ≥ 20%
  +1 income below county median
  +1 age 65+ ≥ 20%
  +1 no vehicle ≥ 10%

Poverty Rate Map

Key Findings:

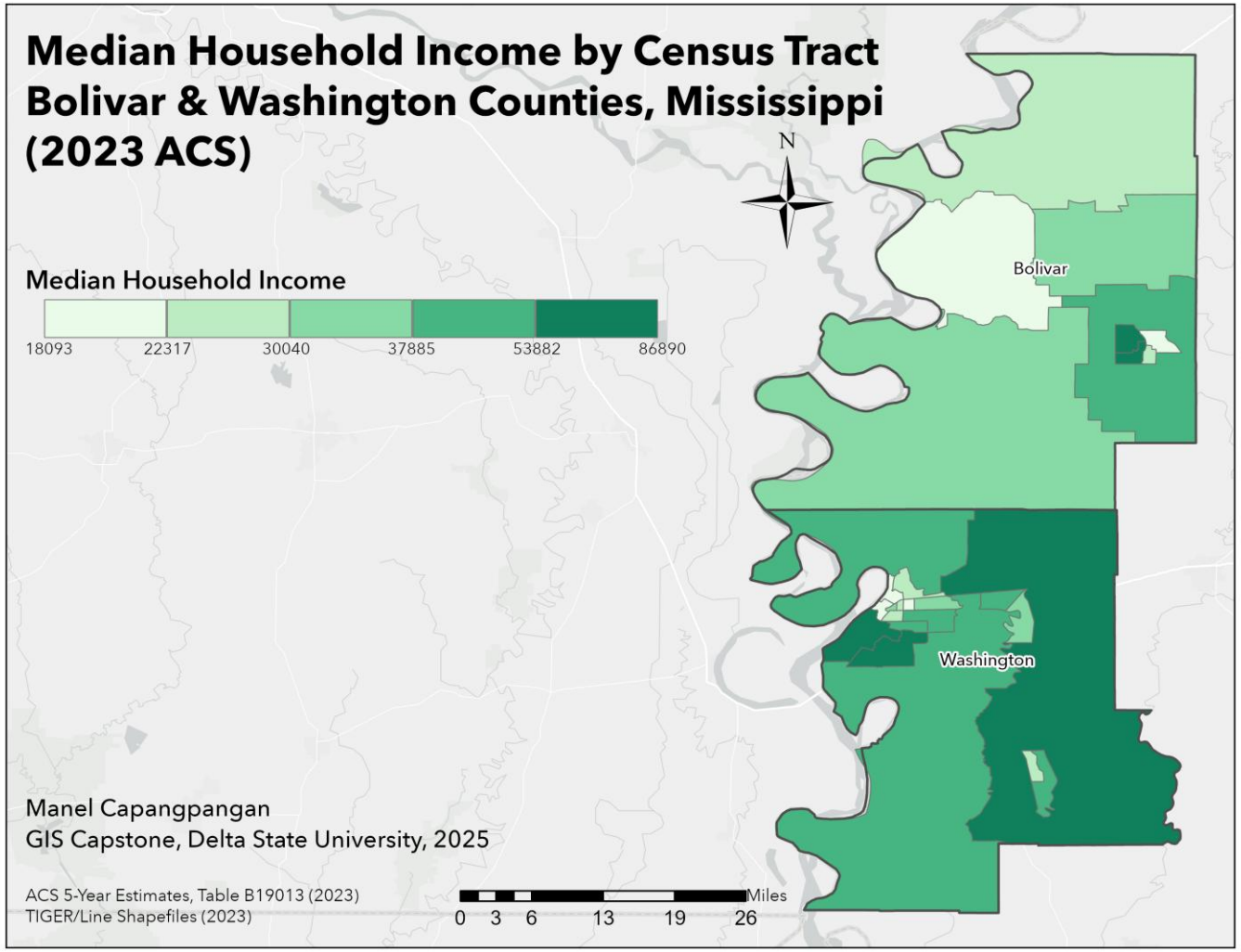
- High poverty concentrated in central and southern tracts
- Many overlap with other vulnerability indicators



Median Household Income Map

Key Findings:

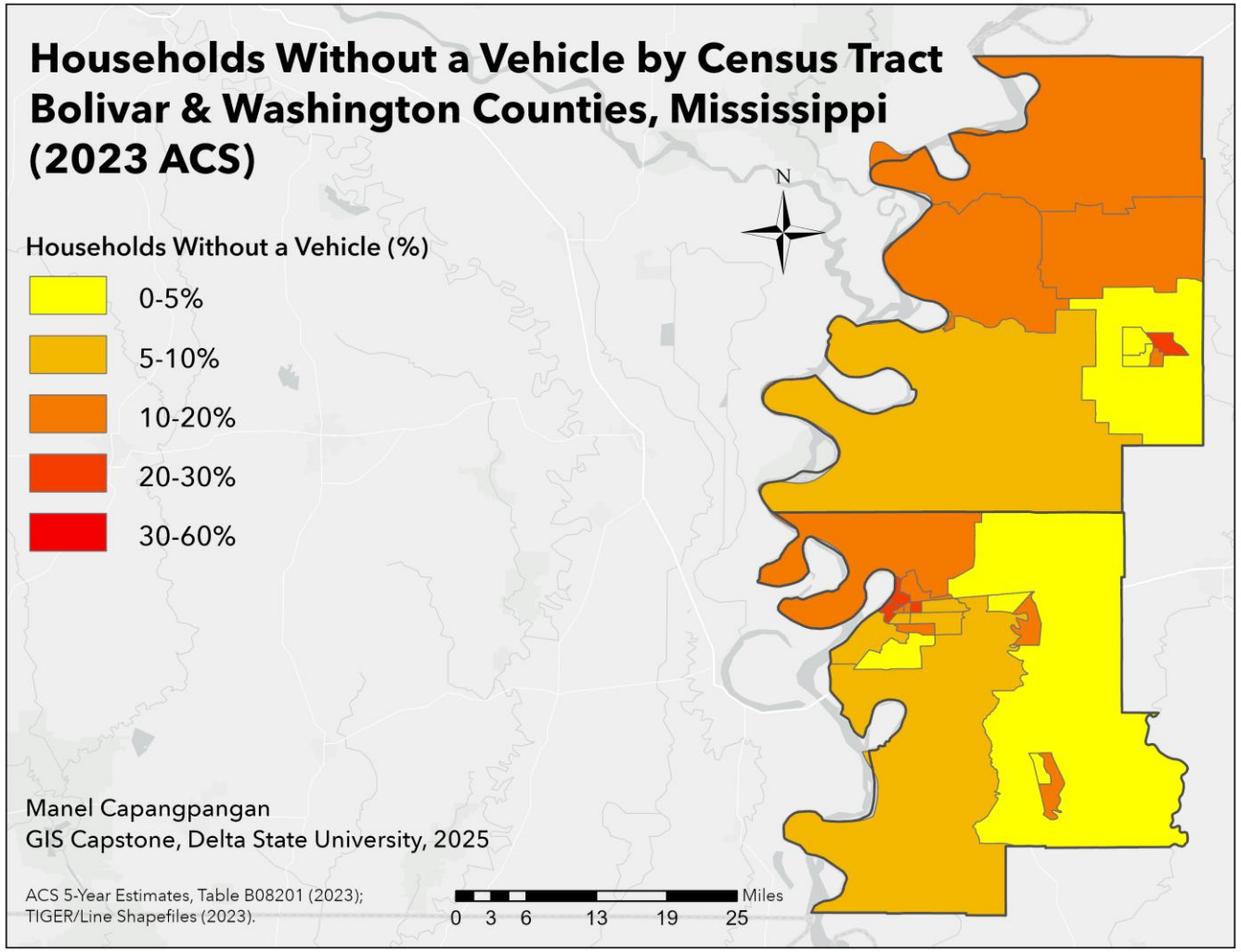
- Lower income tracts correspond with high-poverty areas
- Several rural tracts fall below county medians



Households Without a Vehicle

Key Findings:

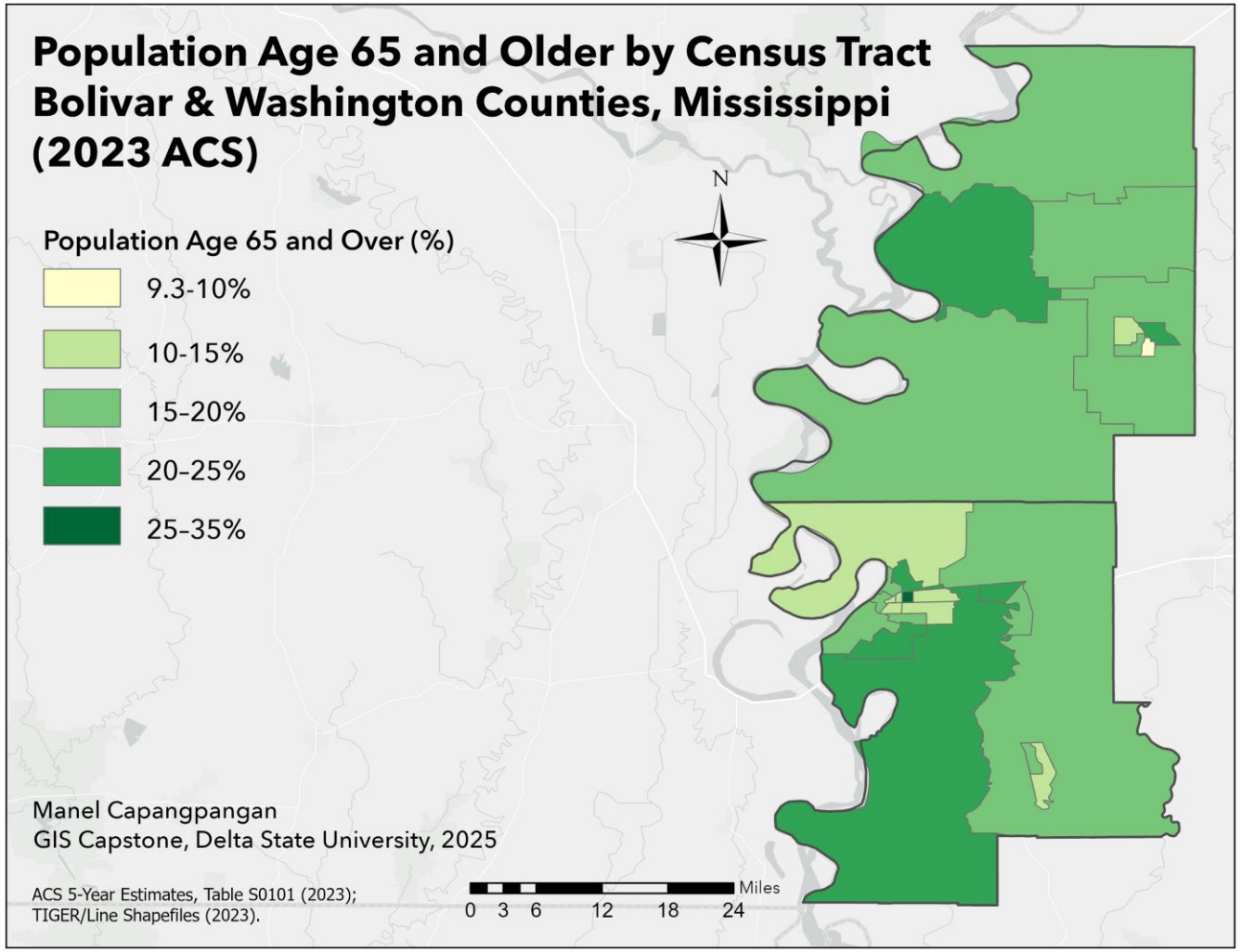
- Lack of vehicle access limits mobility
- Affects older adults and low-income families disproportionately



Population Age 65+

Key Findings:

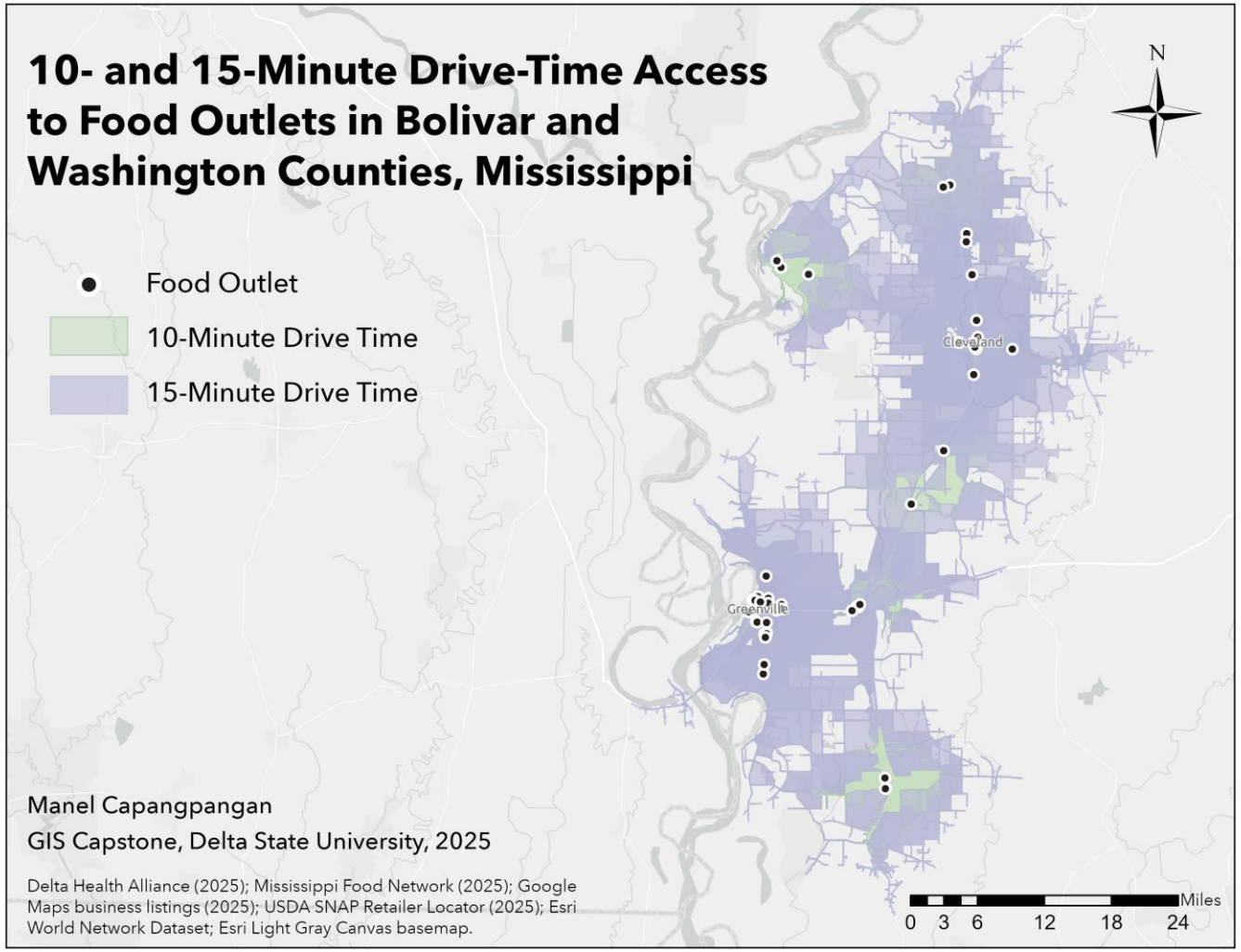
- Several tracts have high concentrations of older adults
- Increased risk due to mobility and transportation needs



Drive-Time Service Areas

Key Findings:

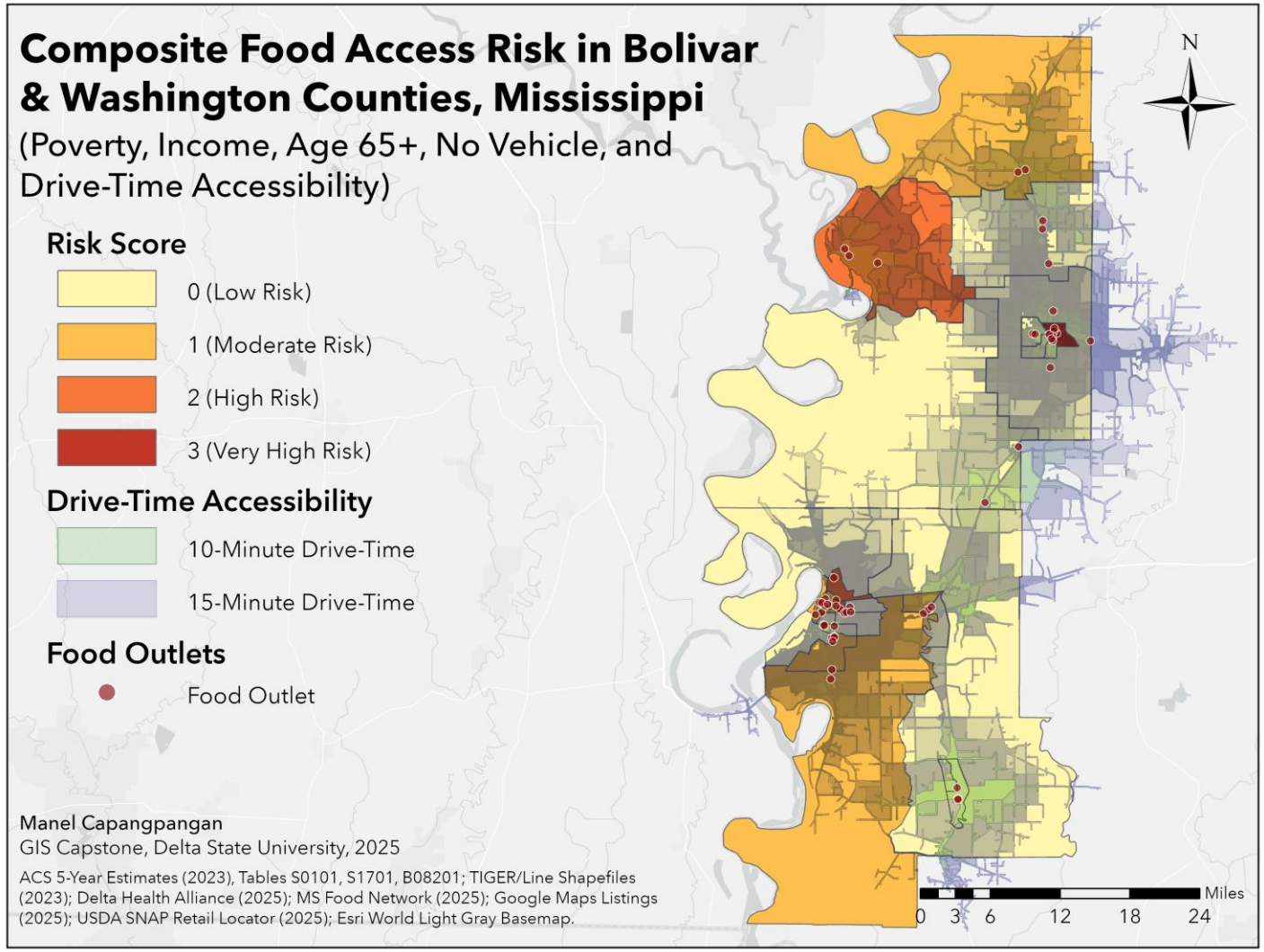
- Many rural tracts fall outside 10- and 15-minute zones
- Longer travel distances to full-service grocery outlets



Composite Food Access Risk Score

High-Risk Tracts (2–3):

- Combine poverty, low income, age, and no vehicle
- Represent communities facing multiple overlapping disadvantages



Findings

1. SOCIAL AND GEOGRAPHIC VULNERABILITIES OVERLAP STRONGLY
2. RURAL TRACTS BEYOND DRIVE-TIME ZONES SHOW THE HIGHEST RISK
3. TRANSPORTATION BARRIERS STRONGLY INFLUENCE FOOD ACCESS
4. PATTERNS MATCH DELTA-SPECIFIC LITERATURE AND COMMUNITY EXPERIENCES

Recommendations

Transportation Support:

- Shuttle programs, volunteer drivers, reduced-fare options

Improve Food Availability:

- Mobile markets, pop-up produce stands, small-retailer incentives

Strengthen Food Assistance:

- Expand SNAP/WIC awareness
- Support EBT at farmers' markets
- Strengthen pantry networks

Use GIS for Planning:

- Composite map helps identify priority areas
- Useful for agencies, nonprofits, and local governments

Conclusion

Food insecurity is shaped by both social and geographic factors
GIS reveals where vulnerabilities overlap most heavily
High-risk tracts can guide targeted interventions
Results support community-informed planning in the Mississippi Delta

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Thank you

DELTA FOOD ACCESS EXPLORER EXPERIENCE BUILDER

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