MISSOURI STATEWIDE TRANSIT NEEDS ASSESSMENT STUDY

DEEPER DIVE

SEPTEMBER 28, 2022

LOCHMUELLER GROUP

Project Overview

- ~ Year Long (July 2021 – June 2022)
- Collaborative Effort
  - MoDOT
  - MPTA
  - Agencies
  - Consultant
- First of Its Kind Study
- Companion Piece to Economic Impact Study
- Focus on Big Picture Needs of Transit In Missouri

Project Scope

1. Meetings & Engagement

2. Demographic Profile & Mobility Needs Index

3. Existing Conditions Snapshot (Transit service focused)

4. Mobility Needs Assessment

5. State of Good Repair (SGR) Analysis

6. Policy & Program Recommendations

7. Documentation & Reporting
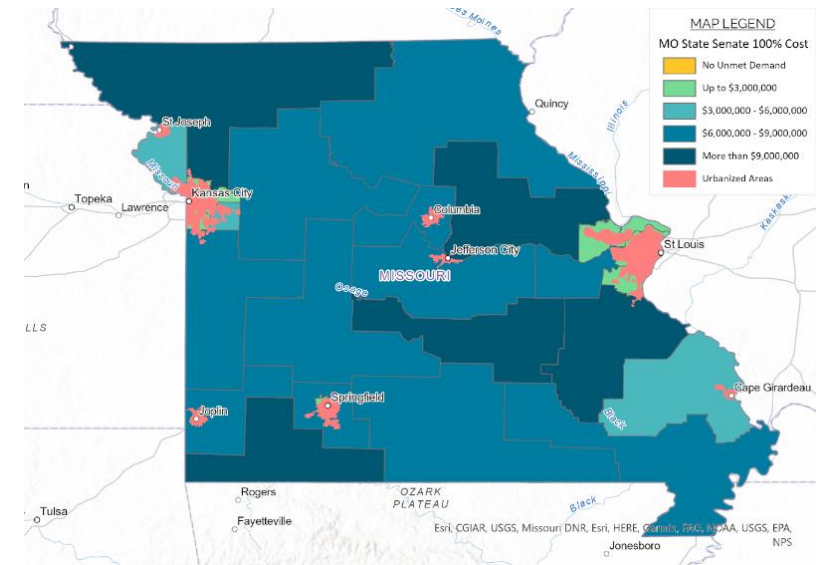
Project Guides

- Statewide in scope & data driven
- Assist local & regional agencies with planning
- Identify gaps (service area(s), service quantity, assets & funding)
- Develop a guide for future mobility enhancements
- Prioritize investments
- Elevate the discussion of transit
- Better deliver services to customers & communities

Key Findings

- Each day 2,000 vehicles, administered, planned and operated by 4,500 workers transports 156,000 riders

- The direct and indirect impact of transit in Missouri is $3.6 billion equally a ~ 7 to 1 ROI

- Transit spending per capita is currently $0.28, well below the peer average of $7.34

- There is an acute labor shortage for operators, mechanics and vehicle maintainers

Key Findings (continued)

- Unmet transit trip needs are in virtually every corner of the state and estimated at 39 million rides which would need $341 million in additional operating dollars to meet (2022)

- Especially needed in nonurban and for non programmed trips

- Vehicle needs are acute and exacerbated by COVID due to chip shortages, supply chain issues and labor issues

- Currently there are more than $240 million in unmet vehicles needs when using the FTA useful life benchmark (ULB) (2022)

LOCHMUELLER GROUP

Agencies

- 32 Agencies Across the State

FIGURE 3. MISSOURI TRANSIT SERVICE PROVIDERS

Dive Topics

- Mobility Needs Index
- Unmet Demand
- State of Good Repair

Mobility Needs Index

- The purpose of determining the mobility needs index is to illustrate where potential demographic factors align to indicate a need for transit services.

- When compared to existing service area boundaries across the state, we can determine if transit needs are being met as measured by the demographic profile of each community, or if "gaps" exist in terms of unmet needs.

Mobility Needs Index

- Developed following the guidance in the "Handbook on Constructing Composite Indicators" created by the Organization for Economic Cooperation and Development (OECD).

- Advantages:
  - Reduce size and scope of multiple indicators
  - Can summarize complex set of indicators; in this case, independent demographic groups that may require transit for a variety of reasons.
  - Supports easy interpretation by policy and/or decision makers

Mobility Needs Index (MNI)

1. Identify indicators

2. Collect data (Zip Code Level)

3. Normalize data

4. Aggregate
   i.   Geometric mean

$$\left(\prod_{i=1}^{n} x_i\right)^{\frac{1}{n}} = \sqrt[n]{x_1 x_2 \cdots x_n}$$
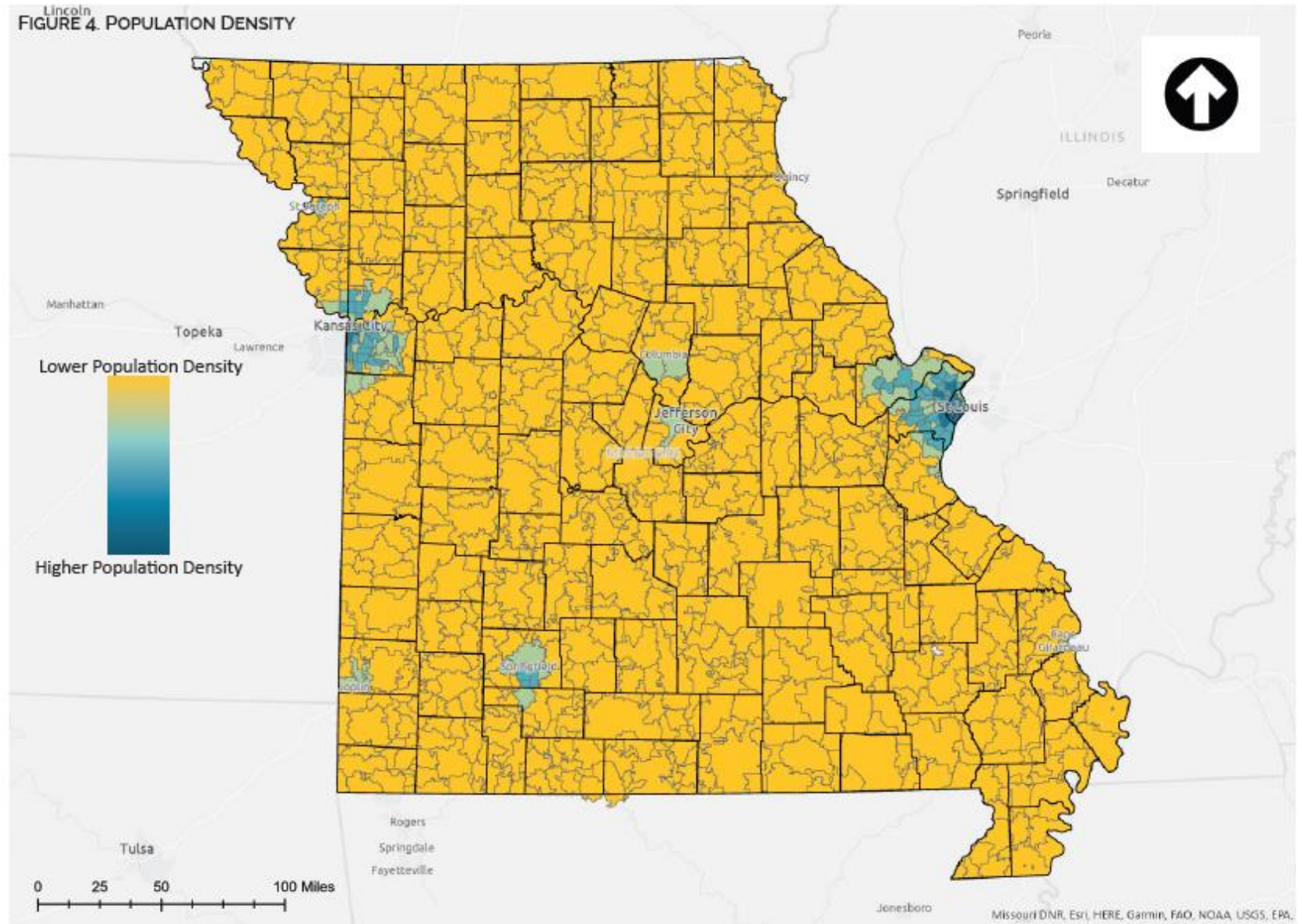
Demographic Indicators

- Population Density

- Population age 65 and over

- Population age 18 and under

- Population with a disability

- Population in poverty

- Workers without access to a vehicle

*All indicator data comes from ACS 5-year 2019
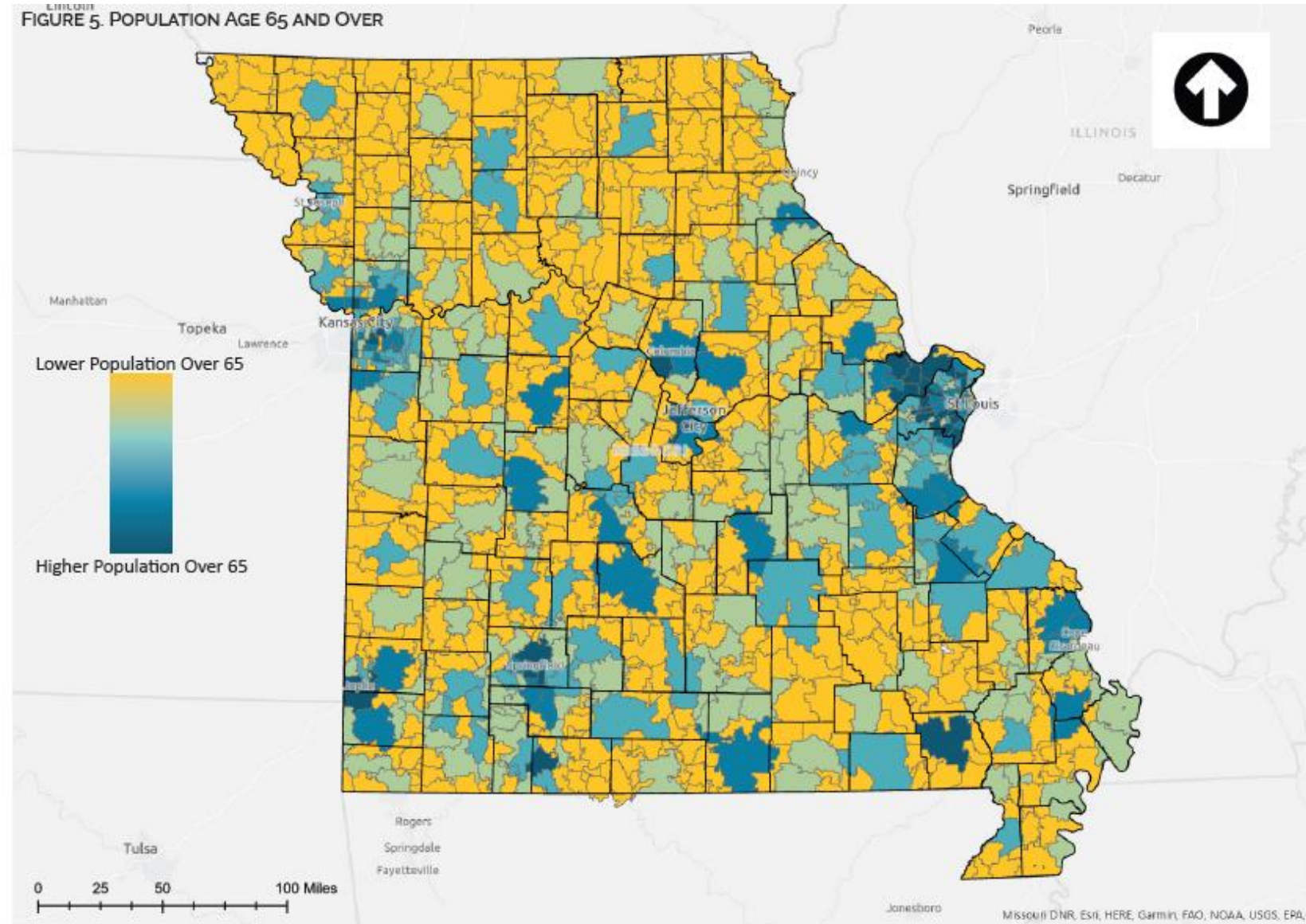
Normalize Data

- Each Indicator at the Zip Code Level is Normalized for Scale

- The MNI is Therefore the Average of the Normalized indicators

- Results Represent the Level of Need(s) Regardless of the Demographics of the Zip Code
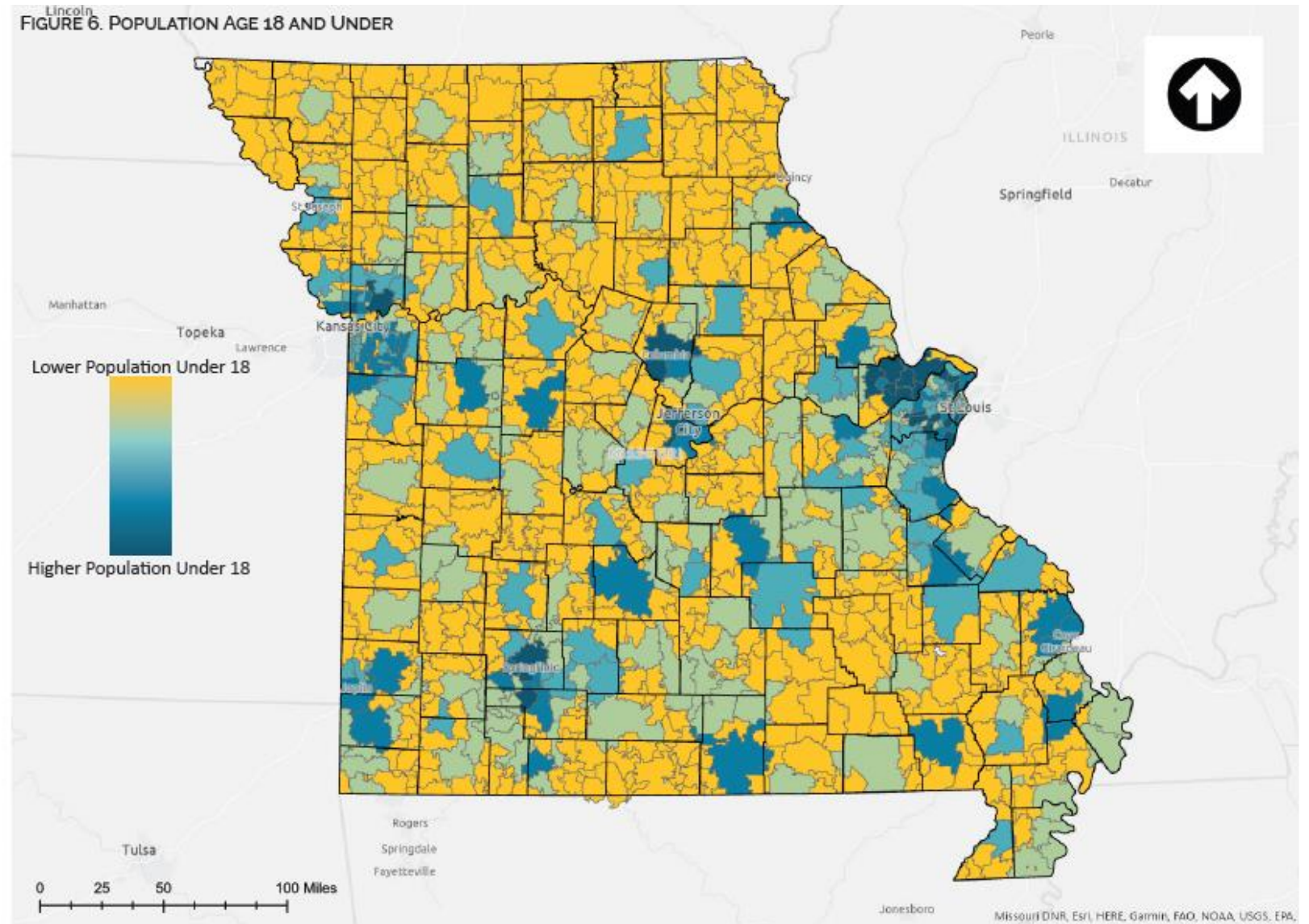
Population Density

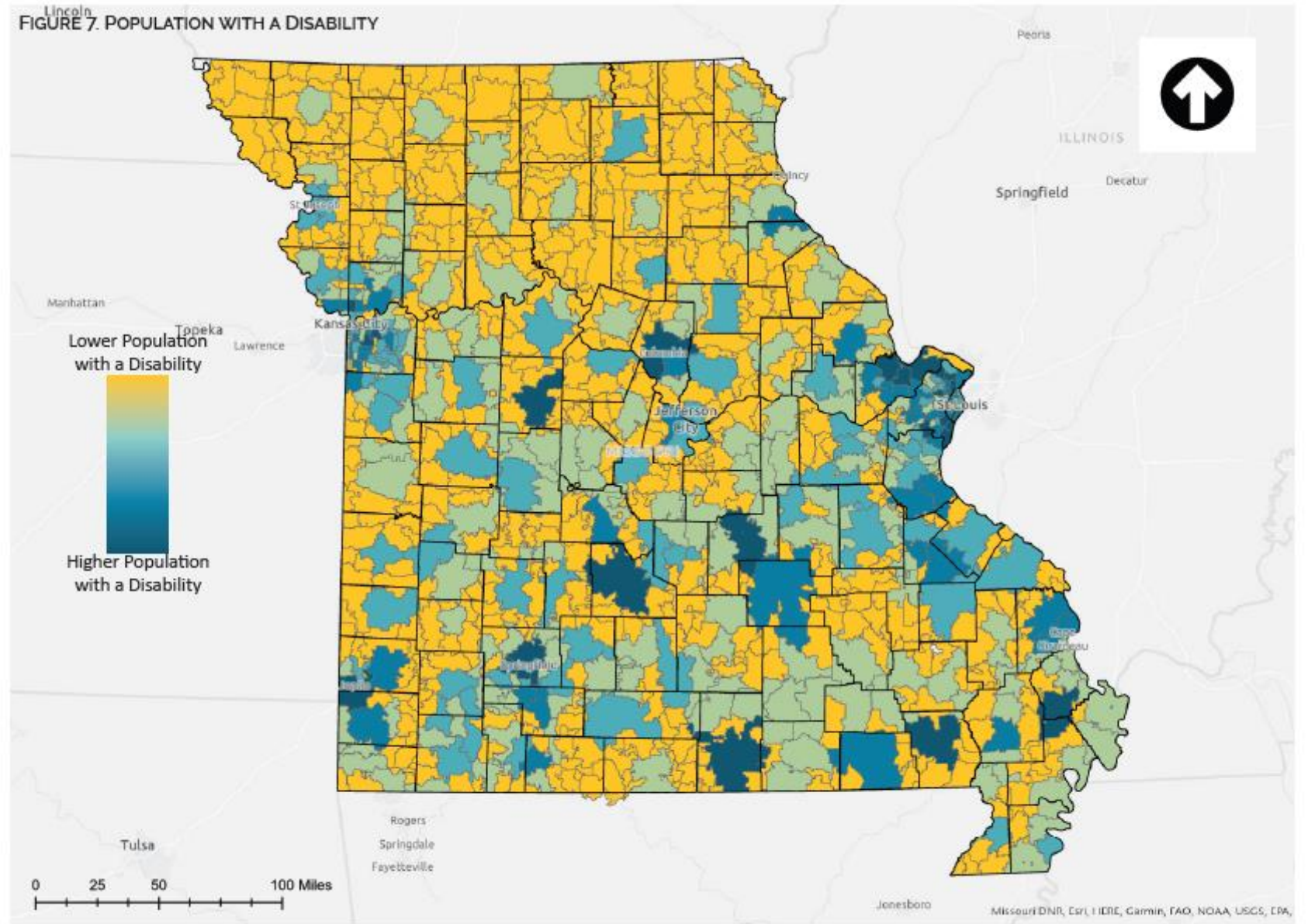

FIGURE 4. POPULATION DENSITY

Population age 65 and over

Population age 18 and under

FIGURE 6. POPULATION AGE 18 AND UNDER

Lower Population Under 18

Higher Population Under 18

Population with a disability

FIGURE 7. POPULATION WITH A DISABILITY

Lower Population with a Disability

Higher Population with a Disability

Population in poverty

FIGURE 8. POPULATION IN POVERTY

Workers without access to a vehicle

FIGURE 9. WORKERS WITH NO VEHICLES

Less Workers with no Vehicle

More Workers with no Vehicle

0 25 50 100 Miles
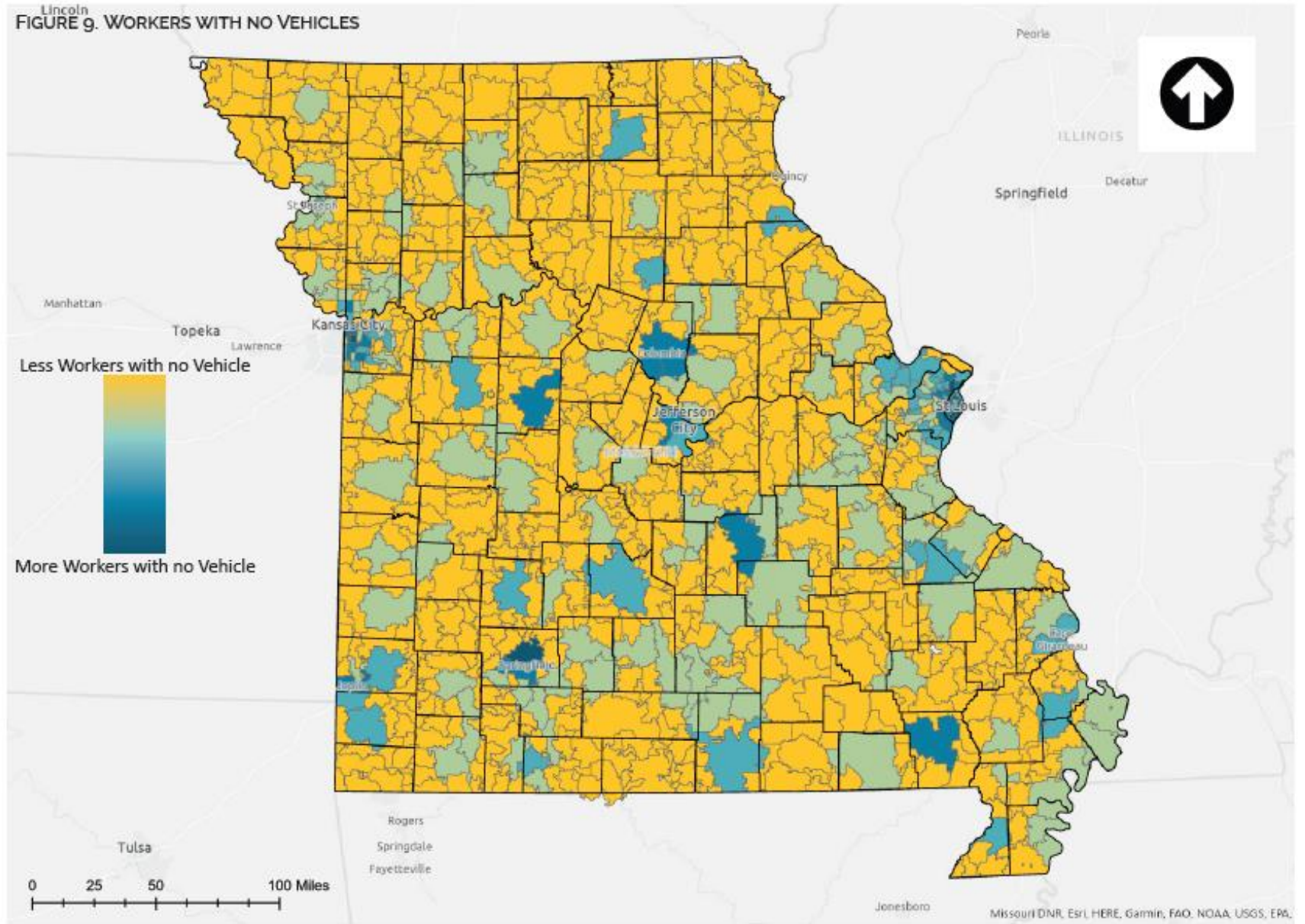
Mobility Needs Index

FIGURE 10. MOBILITY NEEDS INDEX

Lower Mobility Needs Index
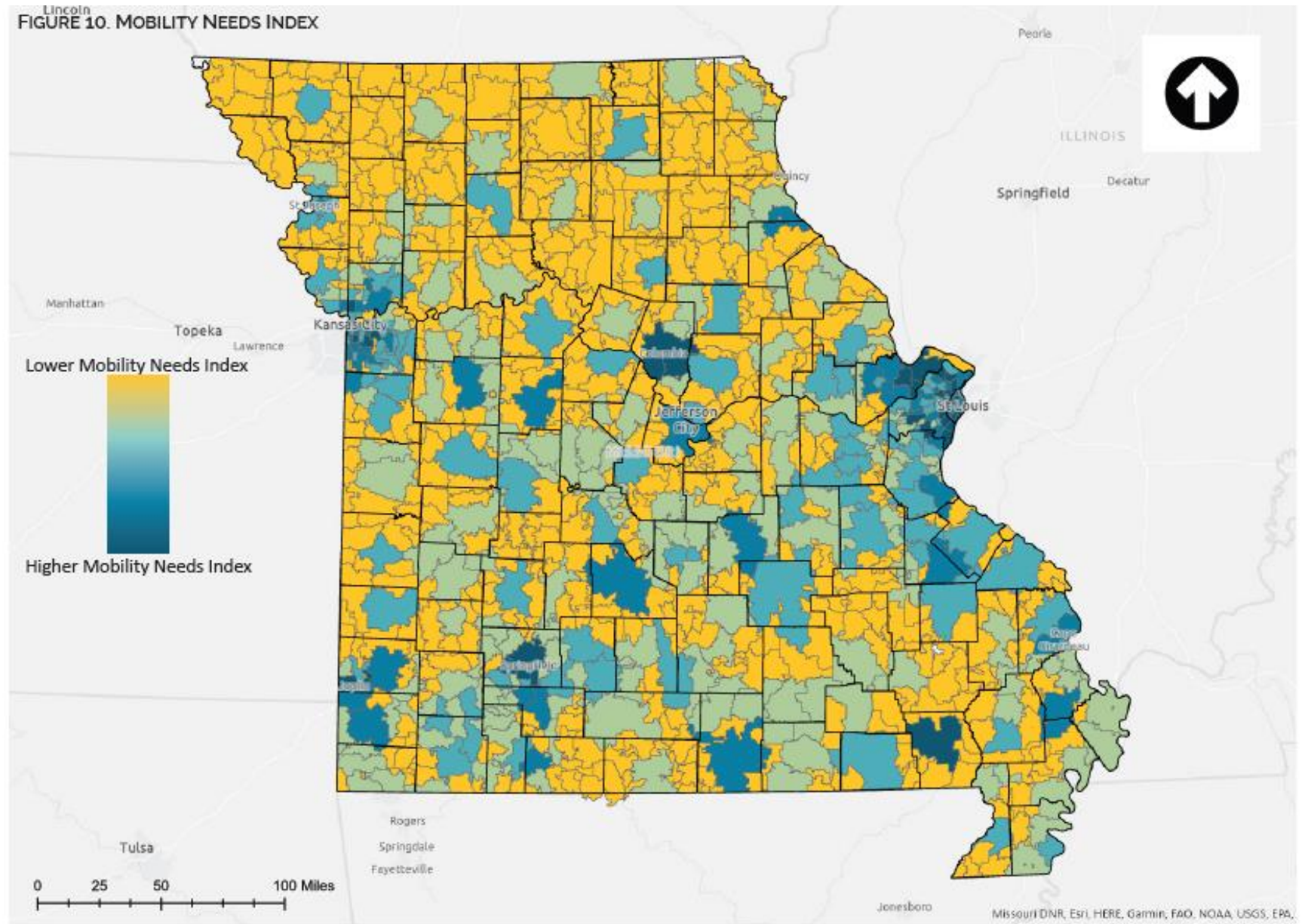
Higher Mobility Needs Index

MNI Summary

- 25% of Missouri zip codes have a high need for transit, where the MNI is higher than the state average.
- Those zip codes represent approximately 82% of the state's total population.
  - This shows that the need for transit is statewide and not concentrated solely in urbanized areas.
- Exurban and rural areas across the state demonstrate the need for transit despite lower population densities
- 101 of 115 counties include a zip code with a high need for transit
- 73 of 101 counties do not currently have a local service provider

Determining Potential Demand

- Large Urban Systems
  - Based on a comparative analysis of similar peer systems in US
  - Examines potential demand for service based on hours, coverage, etc., of the peer systems
- Small Urban Systems
  - Formula based approach
  - Examines service characteristics, population, and major transit trip generators
- Rural Systems
  - Formula based approach
  - Examines demographics like mobility needs index

- Not derived from a travel demand forecasting model
- Potential demand indicated in number of transit trips compared to existing ridership to estimate potential unmet demand

Unmet Potential Demand

- Statewide Needs
  - Large Urban
  - Small City
  - Rural, General
  - Rural, Program
- Total of 39M+ trips
- Costs of ~$171 - $342M
- Broken down by urban
  - KC and St. Louis
  - State House & Senate geographies

System Type	Unmet Demand (trips/year)	100% Unmet Demand Cost	50% Unmet Demand Cost
Large Urban	22,571,080	$141M	$71M
Small City	167,340	$1.3M	$630,000
Rural, General	8,619,076	$157M	$79M
Rural, Program	7,643,767	$42M	$21M
TOTAL	39,001,263	$342M	$171M

Major Urban Needs

FIGURE 11. MOBILITY NEEDS INDEX ST LOUIS
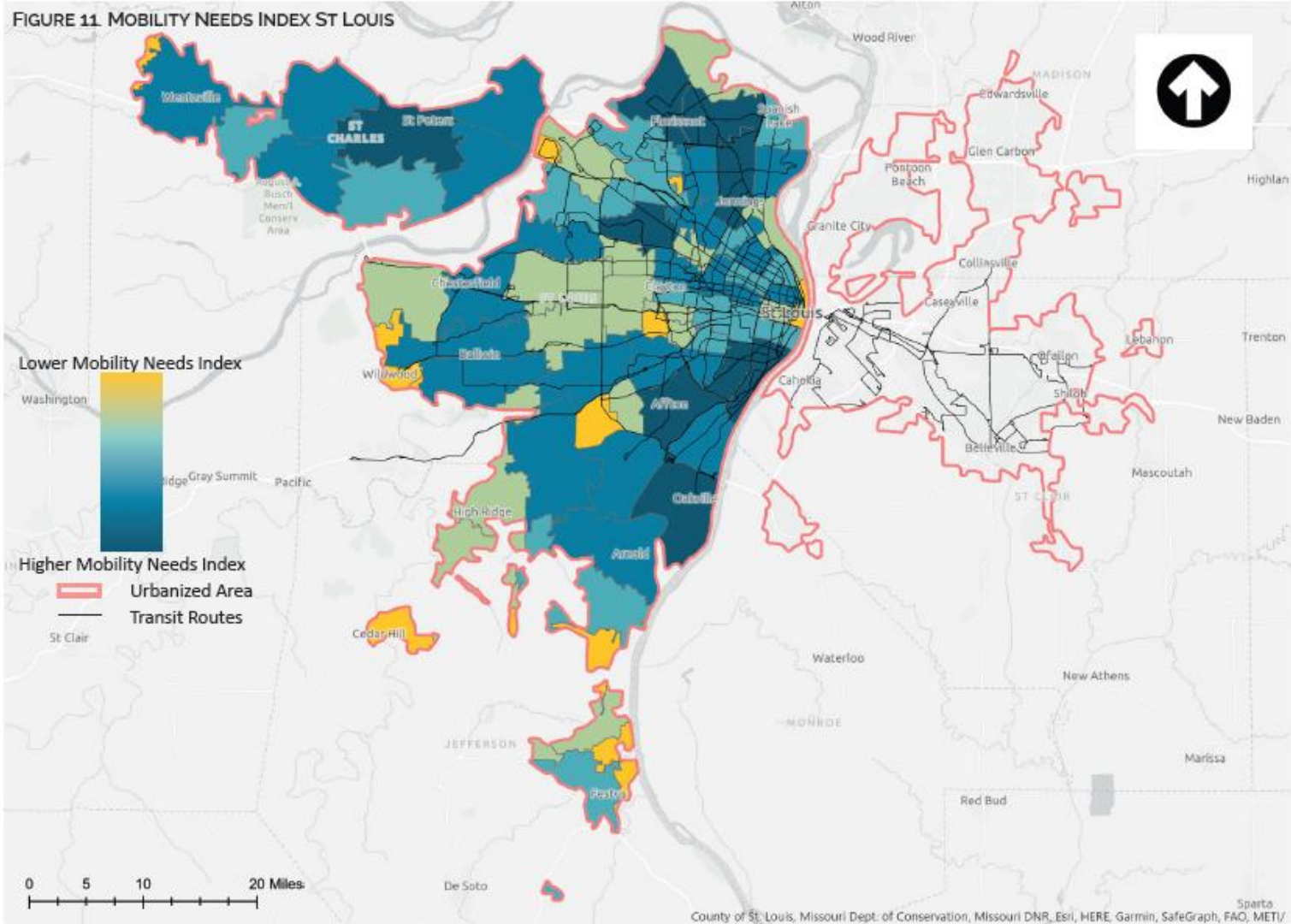
Major Urban Needs

FIGURE 12. MOBILITY NEEDS INDEX KANSAS CITY
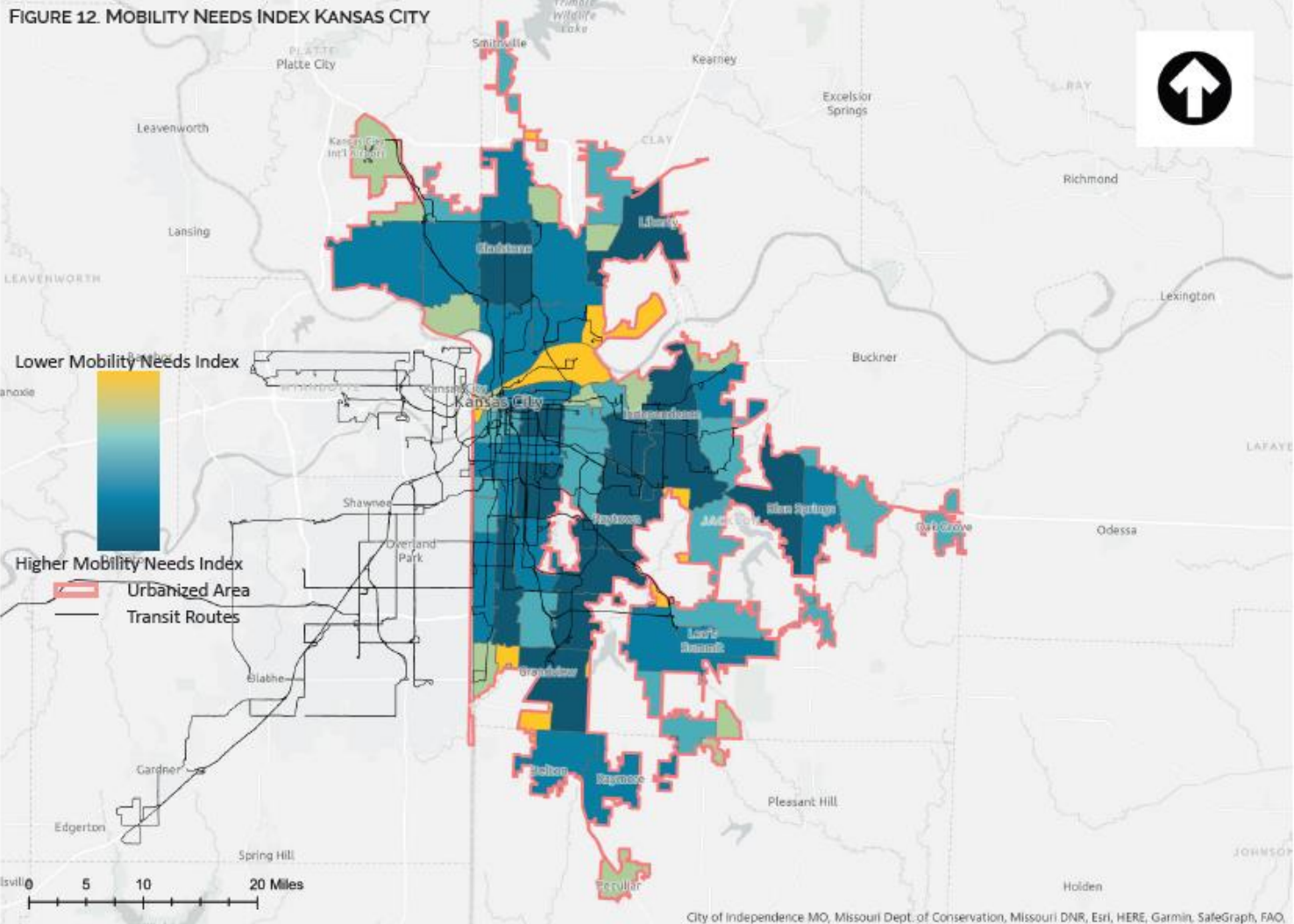
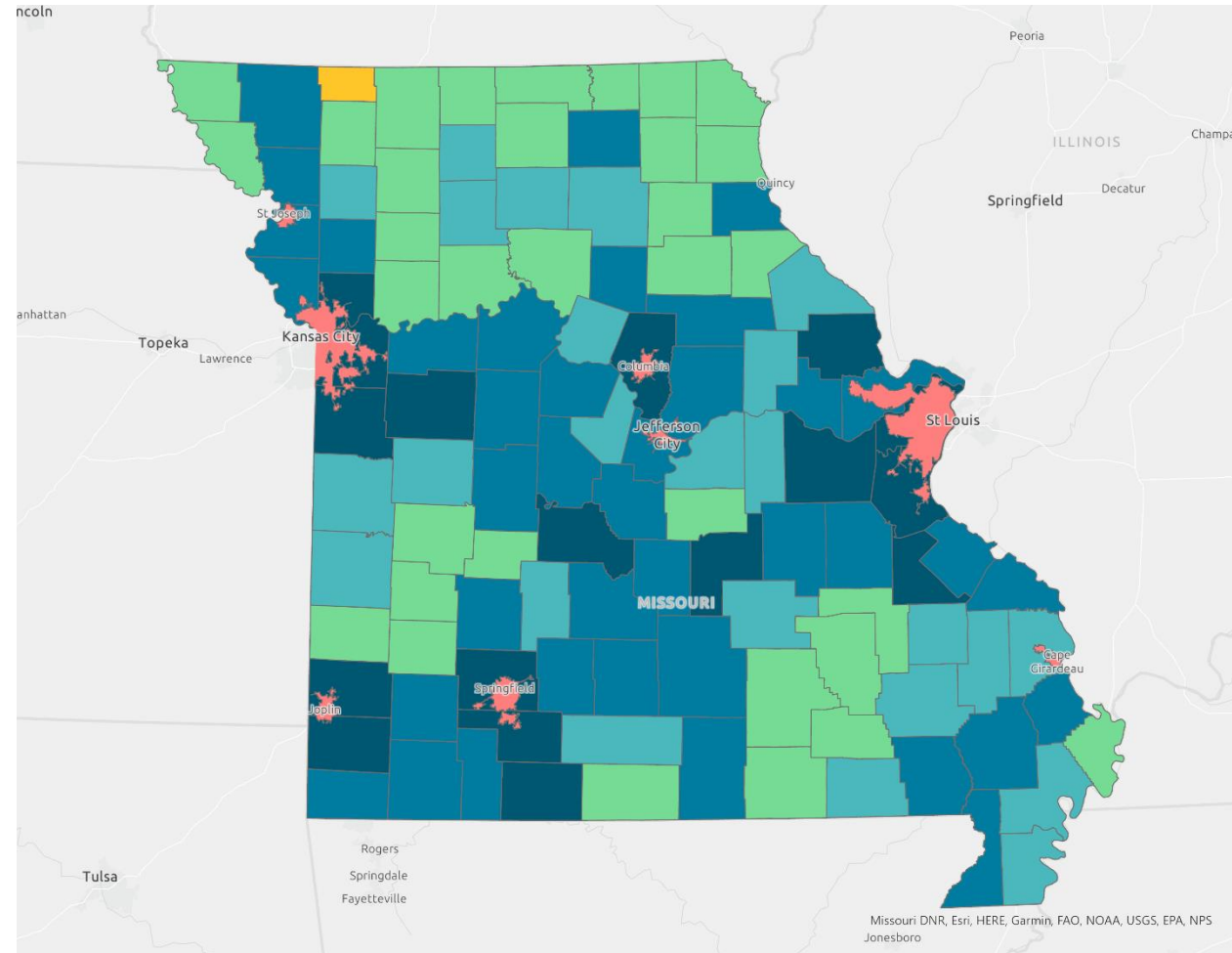# Rural (General) Unmet Demand

Unmet Rural Demand by Political District
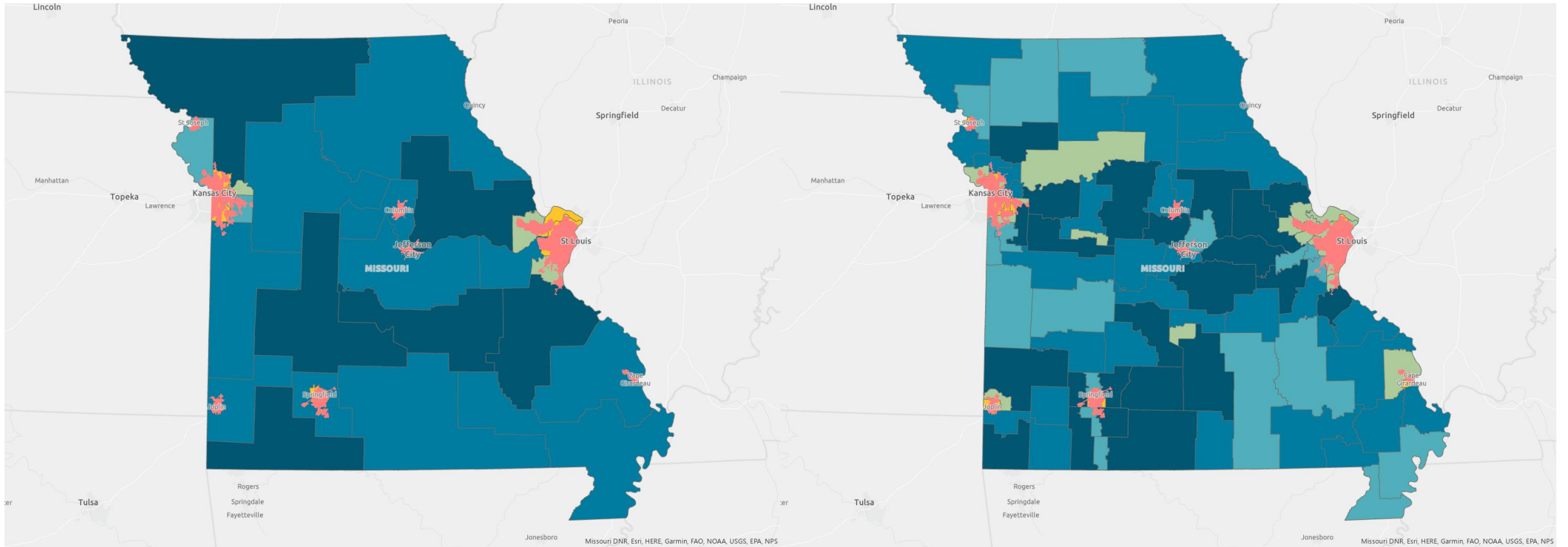
Rural Need by State Senate District

Rural Need by State House District

LOCHMUELLER GROUP

State of Good Repair (SGR) Analysis

- Collected all reported Transit Asset Management (TAM) Plans
- Collected FY 2021 Vehicle Inventory & Mileage
  - Sections 5309, 5310, 5311, 5316 & 5317
- Cutaways, Van, Buses (2,418 vehicles)
- Compared Mileage & Age to Useful Life Benchmarks (ULB) as determined by MoDOT & FTA
- MoDOT = no more than 45% beyond ULB
- FTA = 0% beyond ULB

Useful Life Benchmark (ULB)

- NTD & TAM Final Rule

- Age vs. ULB threshold

- Average number of years for a vehicle to reach a 2.5 rating on the FTA Transit Economic Requirements Model (TERM) Scale

FTA Replacement Schedule

Vehicle Type		Default ULB (in years)
AB	Articulated bus	14
AG	Automated guideway vehicle	31
AO	Automobile	8
BR	Over-the-road bus	14
BU	Bus	14
CC	Cable car	112
CU	Cutaway bus	10
DB	Double decked bus	14
FB	Ferryboat	42
HR	Heavy rail passenger car	31
IP	Inclined plane vehicle	56
LR	Light rail vehicle	31
MO	Monorail vehicle	31
MV	Minivan	8
RL	Commuter rail locomotive	39
RP	Commuter rail passenger coach	39
RS	Commuter rail self-propelled passenger car	39
SB	School bus	14
	Steel wheel vehicles	25
SR	Streetcar	31
SV	Sport utility vehicle	8
TB	Trolleybus	13
	Trucks and other rubber tire vehicles	14
TR	Aerial tramway	12
VN	Van	8
VT	Vintage trolley	58

Rolling Stock by Type & Agency

FIGURE 16. ROLLING STOCK BY VEHICLE TYPE

- All Others, 8%
- Van, 6%
- Minivan, 15%
- Cutaway, 40%
- Bus, 31%
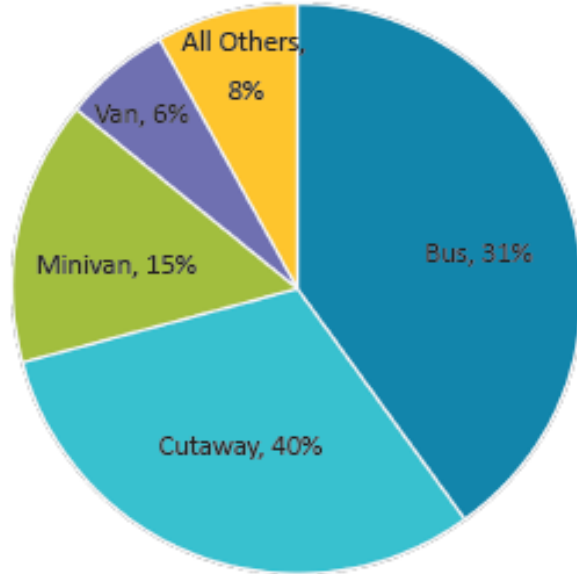
FIGURE 17. ROLLING STOCK BY TRANSIT AGENCY

- All Others, 14%
- SMTS, 7%
- KCATA, 17%
- Bi-State, 26%
- OATS, 36%

LOCHMUELLER GROUP
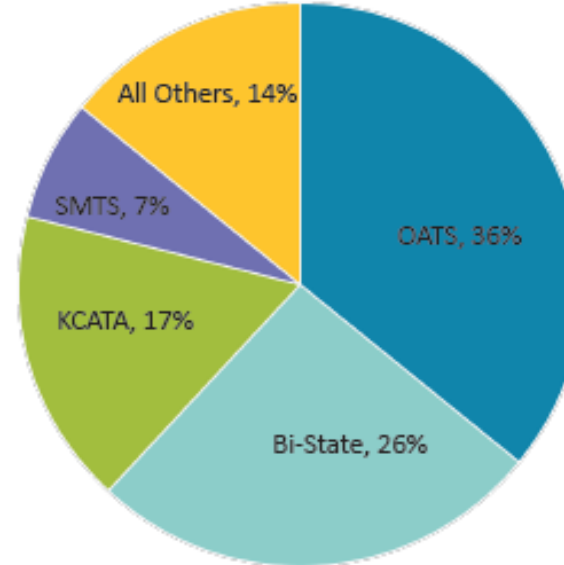
Inventory Beyond ULB

TABLE 10. MISSOURI INVENTORY BEYOND USEFUL LIFE

Vehicle Type	Total Number of Assets	Useful Life Benchmark (years)	Total Assets Beyond ULB	Percentage of Asset Class Beyond ULB
BU – Bus	741	14	138	19%
AB – Articulated Bus	14	14	14	100%
VN – Van	158	8	26	16%
CU – Cutaway Bus	960	10	414	43%
AO – Automobile	76	8	17	22%
MV – Minivan	373	8	129	35%
SV – Sport Utility Vehicle	5	8	0	0%
LR – Light Rail Vehicle	87	31	31	36%
SR – Streetcar	4	31	0	0%

Pricing Points

TABLE 11. VEHICLE PER UNIT REPLACEMENT COSTS

Vehicle Type	Estimated Vehicle Cost
BU - Bus	$600,000
AB - Articulated Bus	$1,330,000
VN - Van	$66,000
CU - Cutaway Bus	$97,000
AO - Automobile	$24,000
MV - Minivan	$36,000
SV - Sport Utility Vehicle	$30,000
LR - Light Rail Vehicle	$3,000,000
SR - Streetcar	$6,430,000

Replacement Assumptions

- For MoDOT ULB, only 8 vehicles in backlog

- For FTA ULB, 769 vehicle in backlog ($42.3M / year for next 12)

TABLE 12. COST TO ACHIEVE STATE OF GOOD REPAIR

Vehicle Type	Total Beyond ULB	Cost to Achieve 100% SGR	Backlog to Meet MoDOT Standard	Cost to Achieve MoDOT Standard
BU - Bus	138	$82,800,000	0	$0
AB - Articulated Bus	14	$18,620,000	8	$10,640,000
VN - Van	26	$1,716,000	0	$0
CU - Cutaway Bus	414	$40,158,000	0	$0
AO - Automobile	17	$408,000	0	$0
MV - Minivan	129	$4,644,000	0	$0
SV - Sport Utility Vehicle	0	$0	0	$0
LR - Light Rail Vehicle	31	$93,000,000	0	$0
Total	769	$241,346,000	8	$10,640,000

TABLE 13. VEHICLE REPLACEMENT COSTS BY YEAR

Year	Estimated Cost
Year 1 (2023)	$34,387,000
Year 2 (2024)	$24,704,000
Year 3 (2025)	$22,233,000
Year 4 (2026)	$59,687,000
Year 5 (2027)	$52,194,000
Year 6 (2028)	$39,665,000
Year 7 (2029)	$55,171,000
Year 8 (2030)	$71,968,000
Year 9 (2031)	$12,639,000
Year 10 (2032)	$41,410,000
Year 11 (2033)	$76,037,000
Year 12 (2034)	$18,252,000

Questions?