MISSOURI State Freight & Rail Plan

presented to

State Freight and Rail Plan Steering Committee

presented by

Cambridge Systematics, Inc. *with HNTB Corporation, Hg Consult, Inc., Quetica*

August 17, 2020

Guidelines for Virtual Meetings

CAMBRIDGE SYSTEMATICS
Think Forward

01

Plan to log in a few minutes early to avoid any technology issues. Edit your name to also include your organization.

02

Mute yourself if you aren't speaking, but don't put on hold, to avoid background noise.

03

Raise hand or take yourself off mute to ask a comment or interject a statement.

04

Use the chat box to send comments to the moderator during portions of the presentation to be sure that your thought is captured.

05

If bandwidth is a concern for you, consider taking yourself off video during the presentation portion.

We will be using an interactive polling software- please go to www.Menti.com and type in code 74 76 29 4

MoDOT

Today's Agenda

- Welcome
- Recap of Last Meeting and Overview of this Meeting
- Freight Profile Overview
  - Commodity Flow Analysis, Economic Impacts and Freight Generators
  - Highway and Trucking
  - Truck Parking
  - Rail
  - Air
  - Waterways
  - Pipeline
- Freight Network Designation
- Next Steps & Discussion

Introductions

Cheryl Ball
MoDOT Project Manager

Liz Prestwood
MoDOT Deputy Project Manager

Paula Dowell
Project Director

Lisa Destro
Deputy Project Manager

Aaron Bowe
Rail Plan

Mark Berndt
Supply Chains and Logistics

Kip Strauss
Deputy Project Manager

Dan Forbush
Freight Profile Lead

Brian Stewart
Truck Parking Lead

Steve Wells
LRTP Liaison/ Stakeholder Outreach

Buddy Desai
Safety

Robyn Arthur
Stakeholder Outreach

Katie Kirk
Technical Project Manager

Recap of Last Meeting and Overview of this Meeting

Last Meeting Overview

- Overview of Steering Committee
- Overview of State Freight & Rail Plan
- Goals & objectives input
- Input on outcome of the Plan
- COVID-19 impacts and input
- Commodity flow summary
- Missouri Freight and Rail Profile inventory
- Designating the MO Multimodal Freight Network, process, designation criteria, weighting of criteria
- Economic Impact of Passenger Rail

PROJECT MANAGEMENT

Kick-off Meeting

Progress Meetings & Reports

Budget & Schedule

QA/QC

Stakeholder & Public Engagement
- Private sector interviews & industry forums
- Public sector focus groups

Freight Data & Tools
- TRANSEARCH
- Freight Finder
- ATRI & CS LBD
- Shipper freight billing data
- SHIIFT

Plans & Materials
- LRTP
- 2017 Freight Plan
- 2012 Rail Plan
- Airport Economic
- Port Economic

State of the System (Where are we now?)	Strategic Directions (Where do we want to go?)	Resource Allocation (How do we get there?)	Implementation (How do we get it done?)
Data assessment & collection	Forecasts	Alternative investments & strategies	Interactive, on-demand report
Inventory & existing conditions	Vision, goals & performance measures	Trade-off analysis	Implementation plan
Bottleneck analysis	Scenario analysis	Economic impact	Executive summaries
Logistics profile	Needs assessment	Sustainable freight competitiveness	
Economic profile			
Technology			
Missouri Freight & Rail Profile ★			

Missouri Freight Analysis System (MoFAS)

Customized GIS-based tool for data collection & visualiztion, system designation & assessment, freight forecasting, bottleneck analysis, project prioritization, performance measurement

★ Where we are now

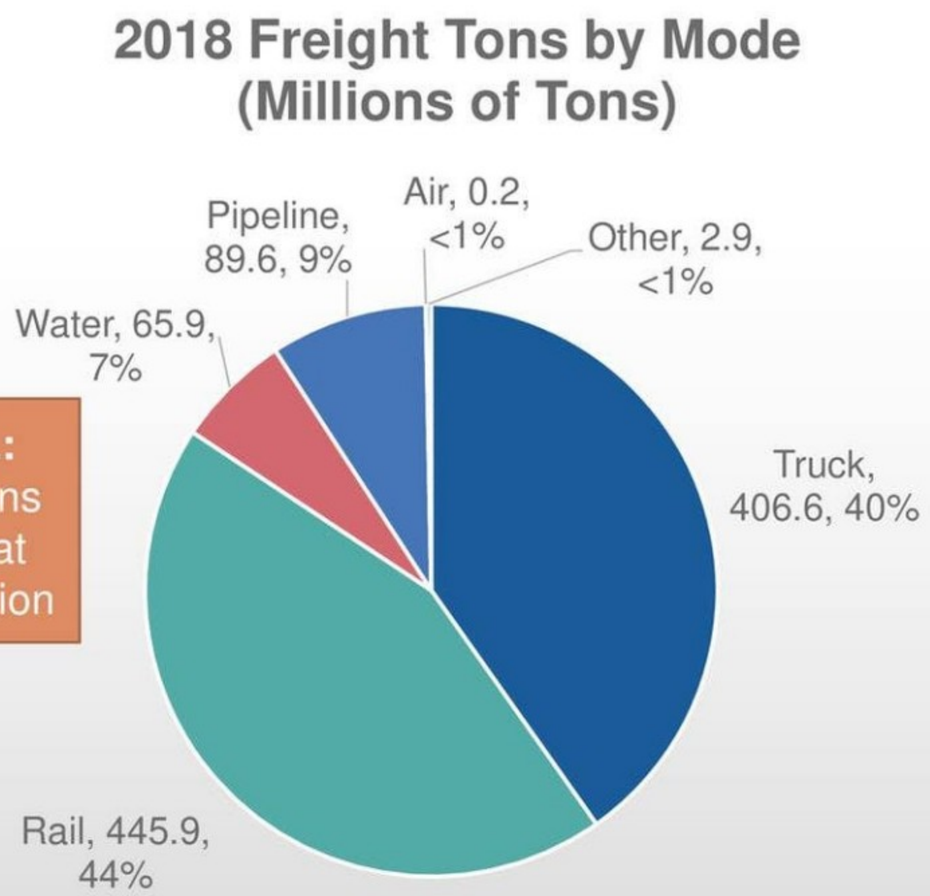
Draft completed

Stakeholder Engagement

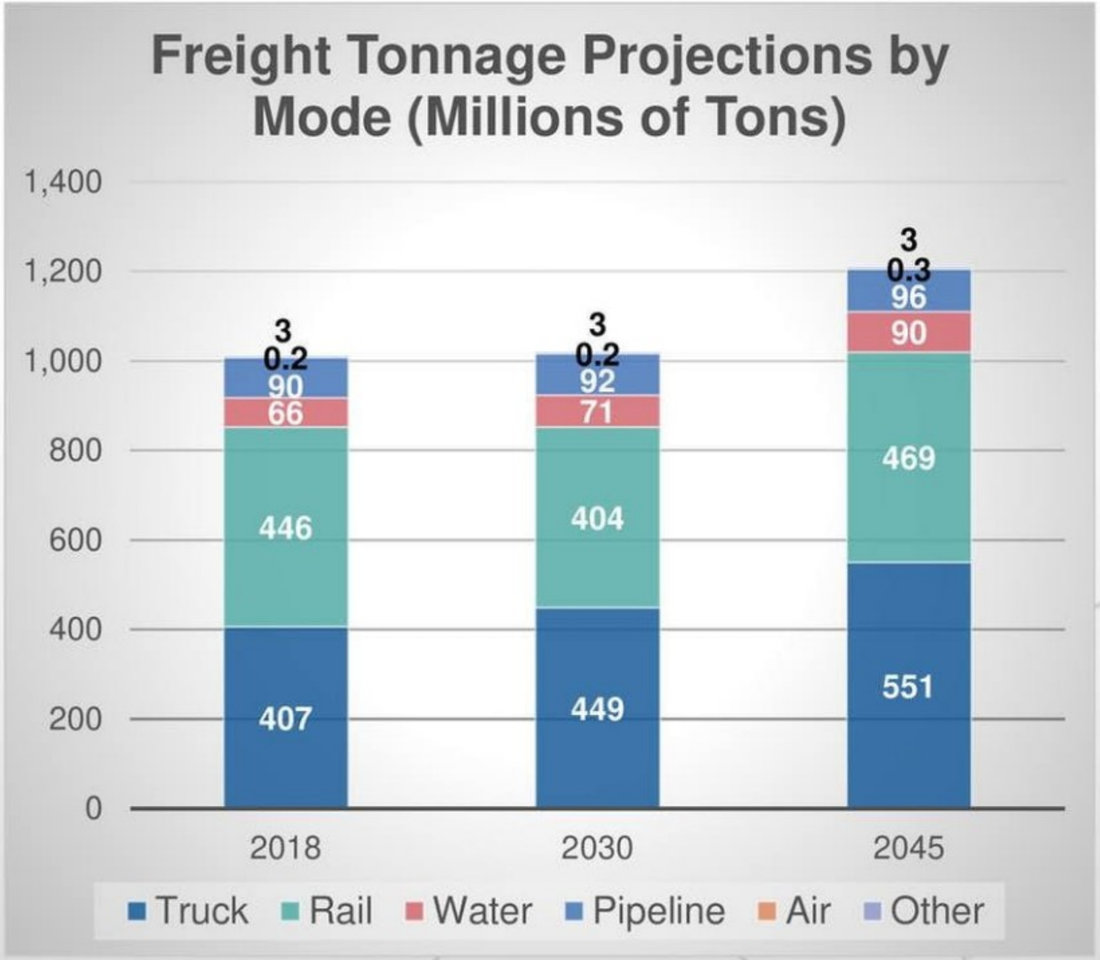
- Initial interviews with key stakeholders
- SFRP Steering Committee
- Interviews and surveys
- Industry forums and focus groups

Missouri Freight Profile Overview

Commodity Flow Summary – Tonnage

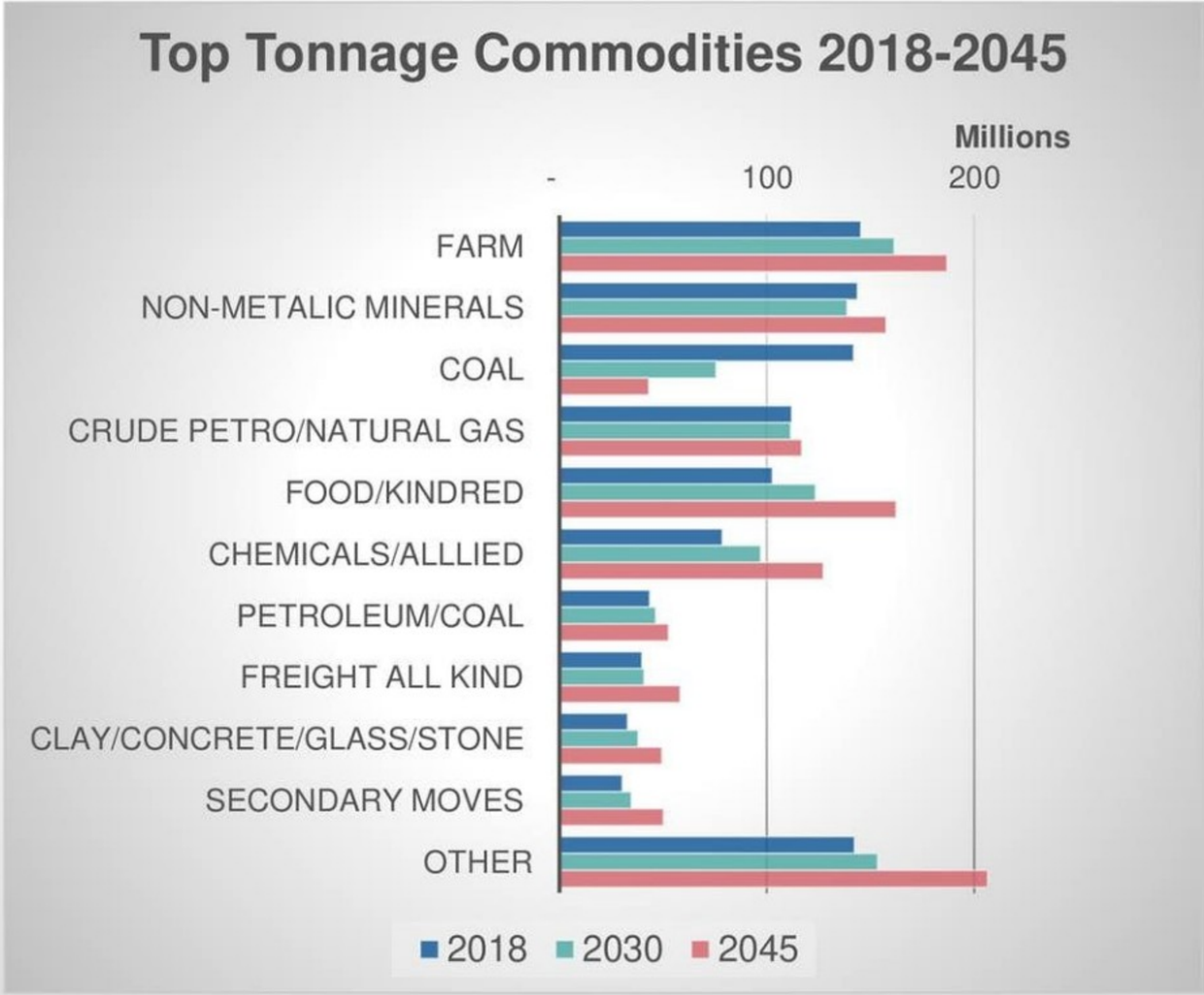


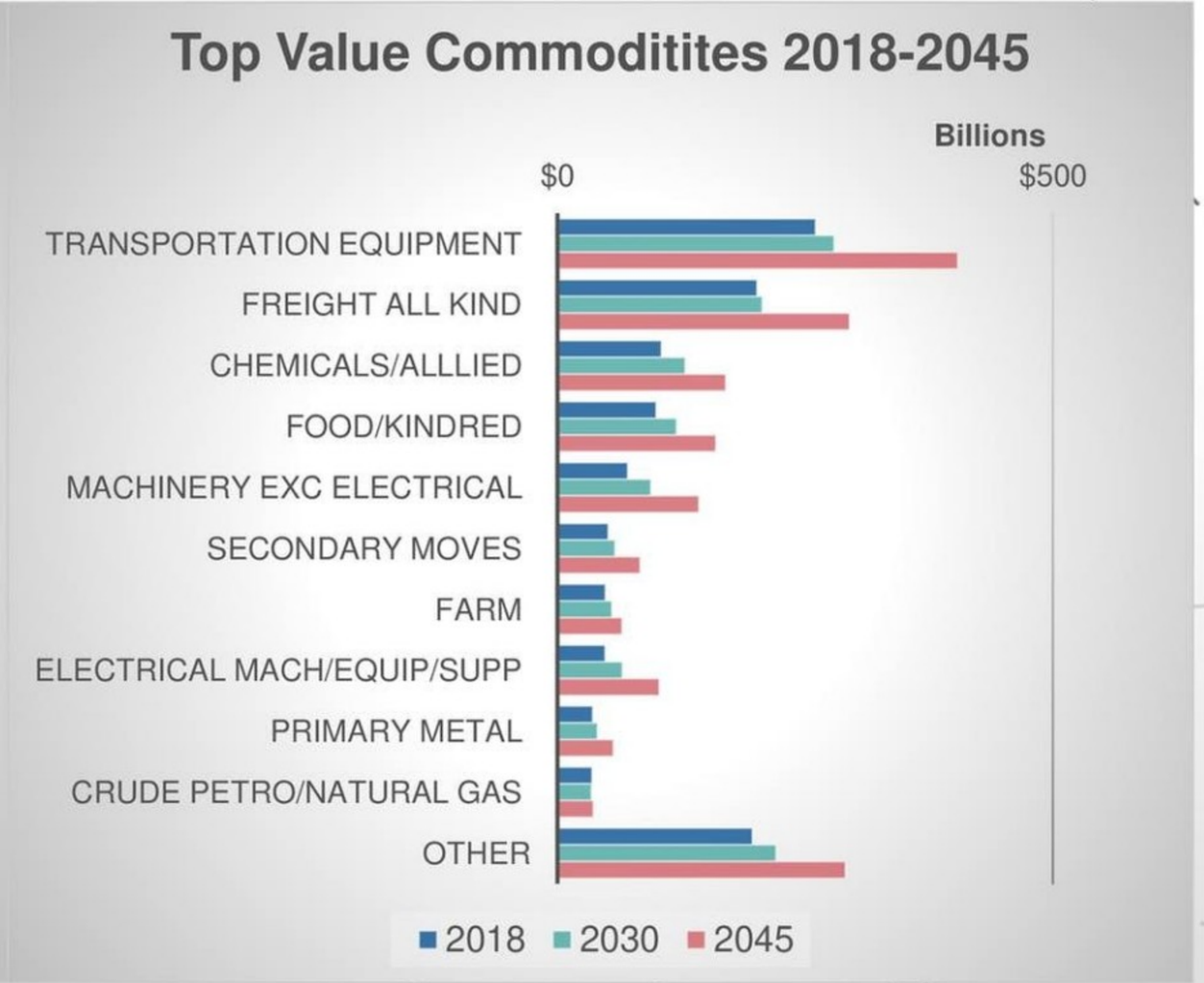
TOTAL:
1.01B tons valued at $1.15 trillion



Sources: IHS Transearch, STB Waybill

Top Commodities



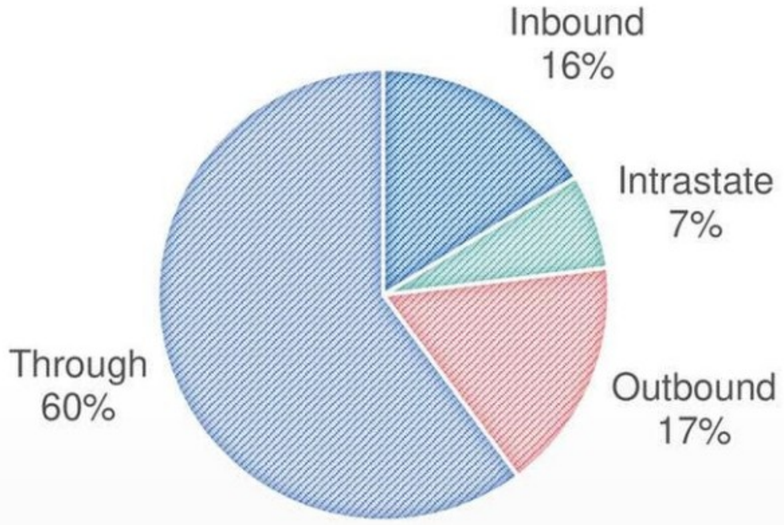


Sources: IHS Transearch, STB Waybill

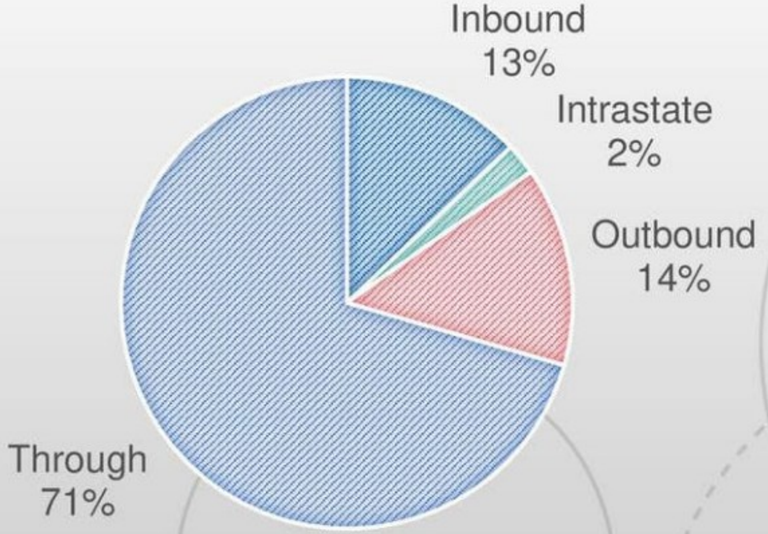
Directional Flow

- In 2018, through traffic comprises the largest share by weight and value
- Inbound & outbound flows roughly even

TONNAGE BY DIRECTION, ALL MODES

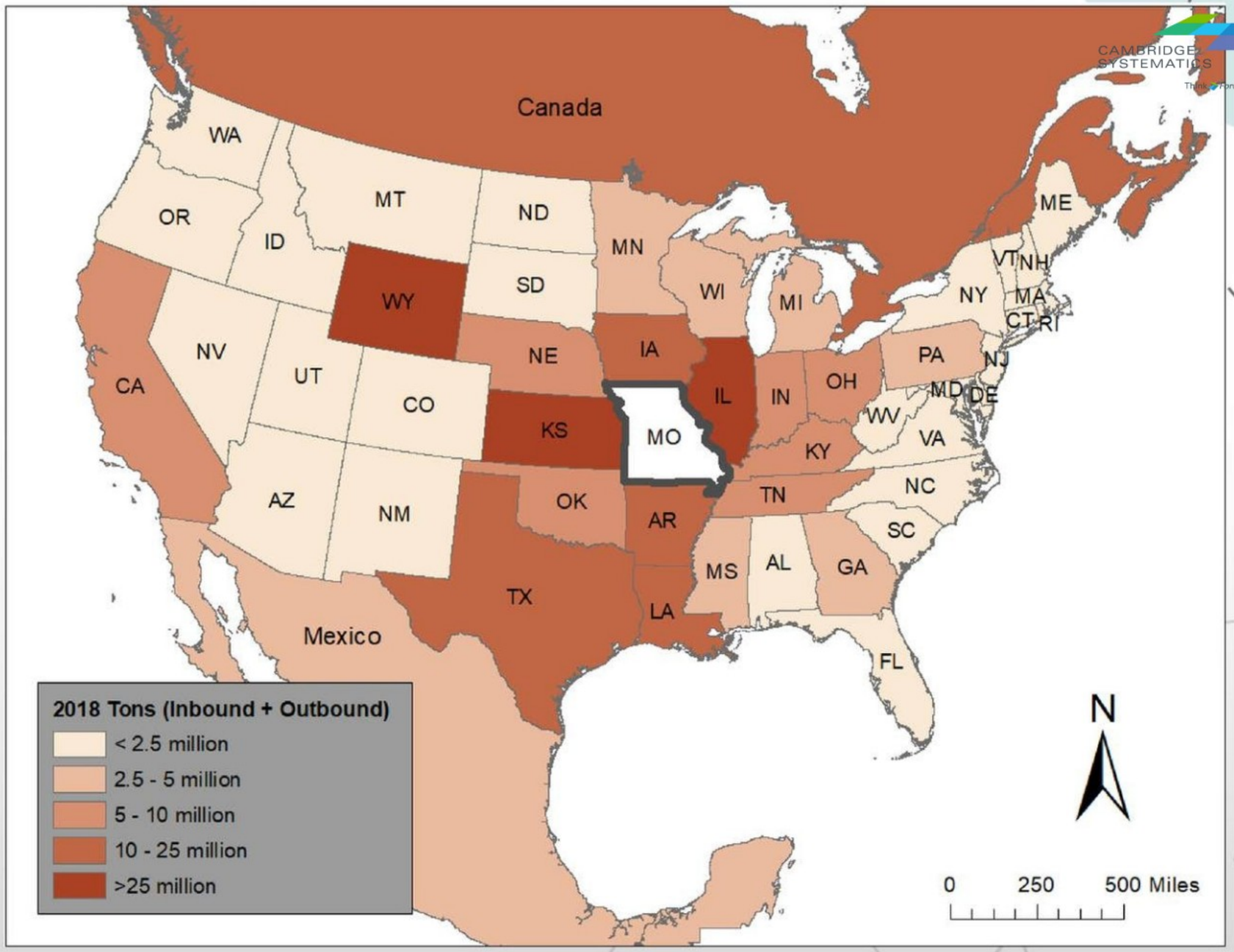


VALUE BY DIRECTION, ALL MODES



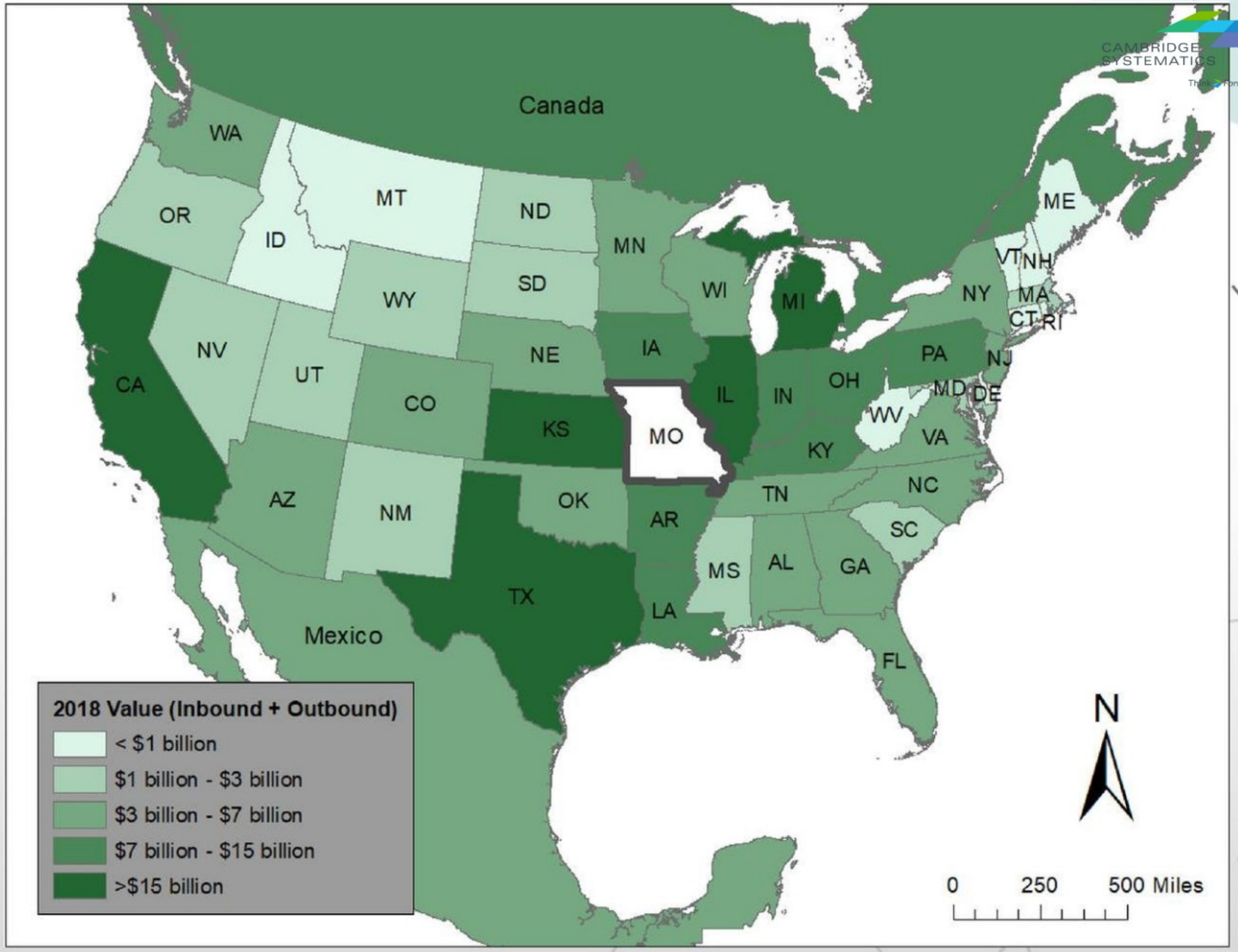
Source(s): IHS Transearch, STB Waybill

Missouri's Domestic Trading Partners by Weight



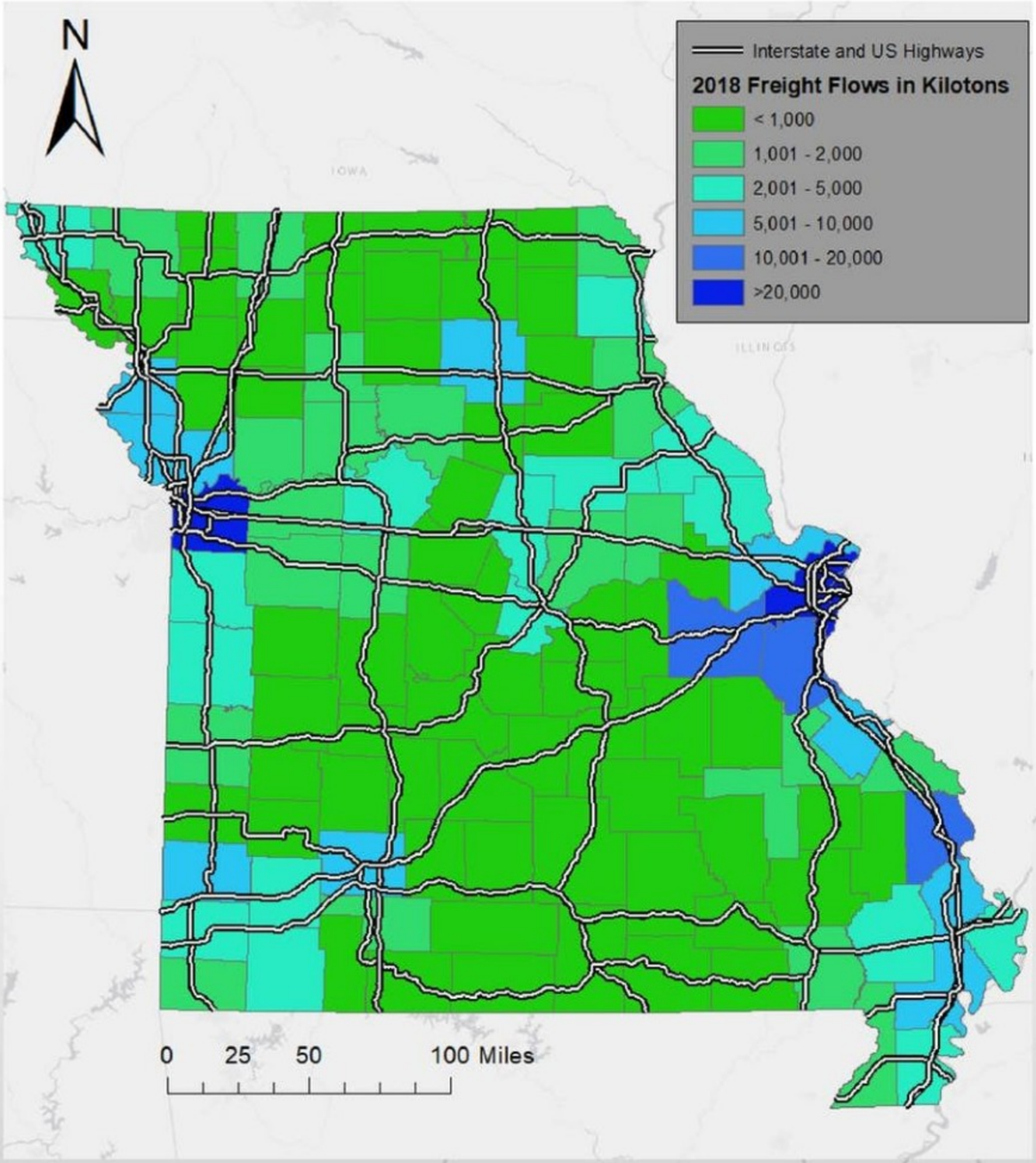
Sources: IHS Transearch and STB Waybill

Missouri's Domestic Trading Partners by Value



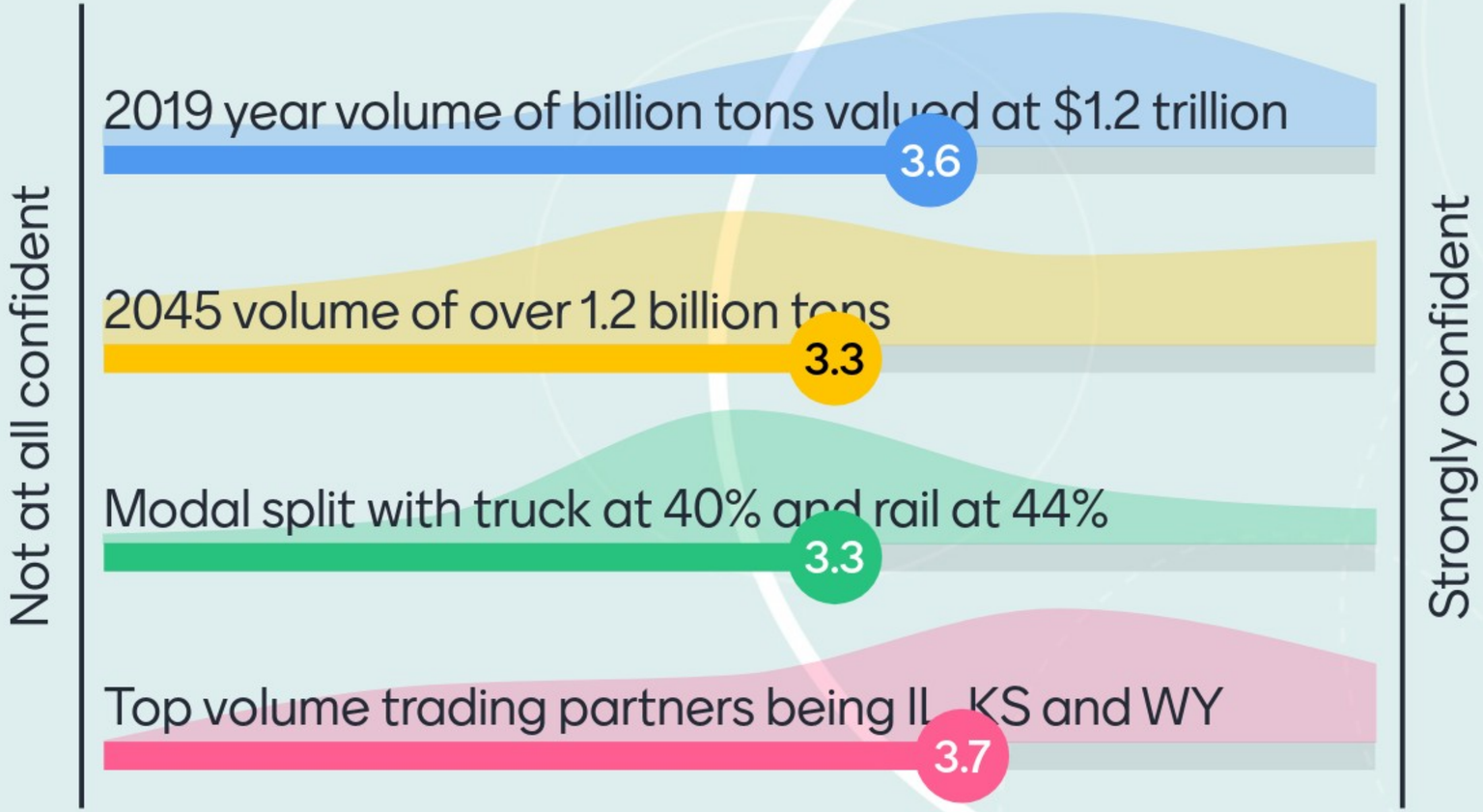
Sources: IHS Transearch and STB Waybill

Freight Generation by Missouri County



Sources: IHS Transearch and STB Waybill

How confident are you in the reported commodity flow findings:



Economic Role of Freight

Sector	Employment	Establishments
Air Transportation *(Suppressed)*	0	7
Rail Transportation	1,413	55
Water Transportation *(Partially Suppressed)*	779	44
Truck Transportation	37,579	3,164
Pipeline Transportation	346	45
Support Activities to Transportation and Warehousing	5,667	417
U.S. Postal Service	14,911	880
Couriers and Messengers	12,318	381
Warehousing and Storage	16,979	418
Total	**89,992**	**5,411**
Statewide (All Establishments)	**2,812,888**	**208,913**

65.8 tons per Missourian in 2018

1,927.6 tons per business establishment

Approach to Quantifying Total Economic Impact

Step 1. Analyze Direct Impacts – Direct employment and freight activity

Step 2. Estimate Enterprise Impacts

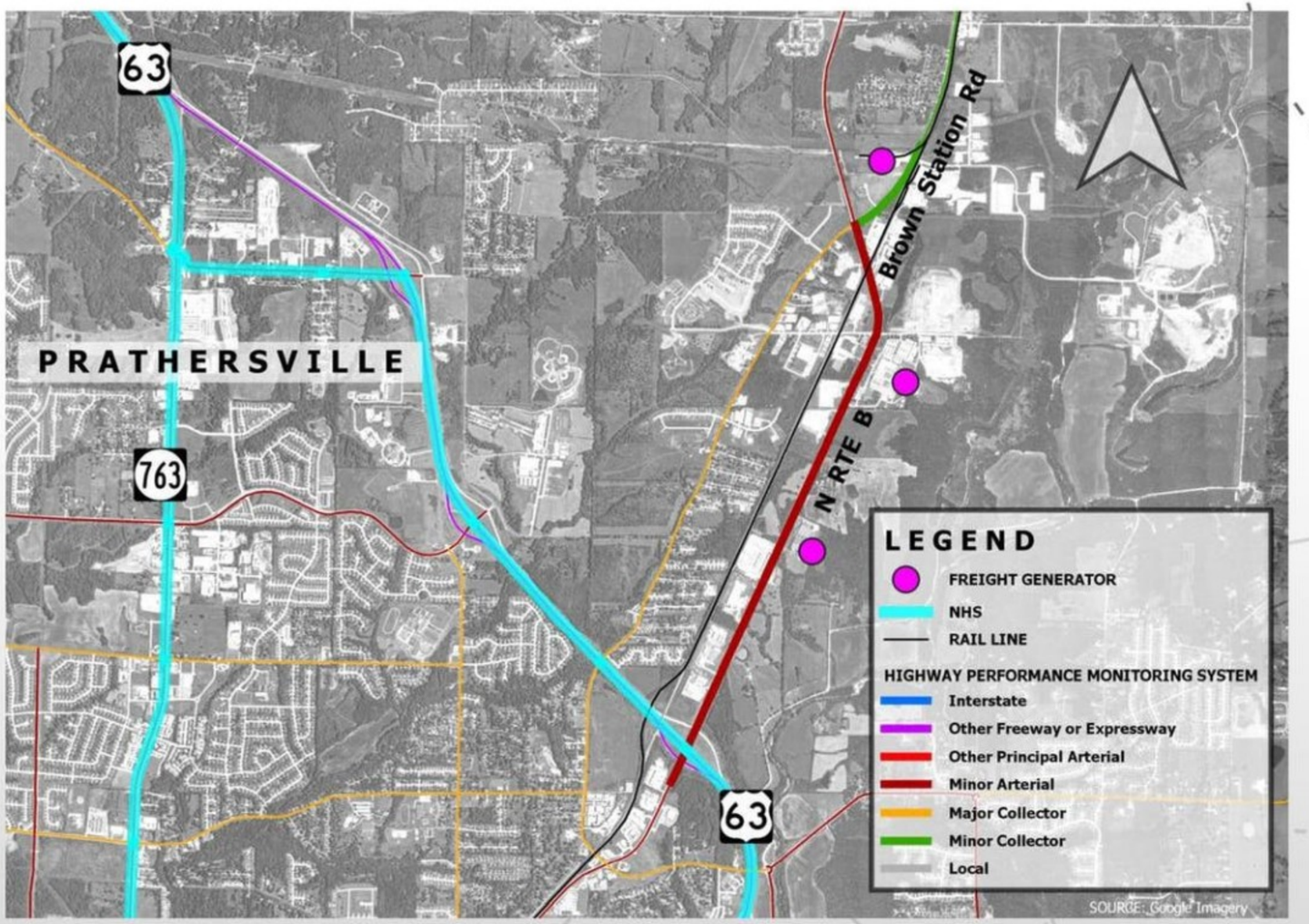
Step 3. Estimate Amount (Tonnage and Value) of Freight Moved

Step 4. Estimate Importance of Freight Intensive Industries

Step 5. Model Total Economic Impacts

Freight Generators - First/Last Mile Inventory

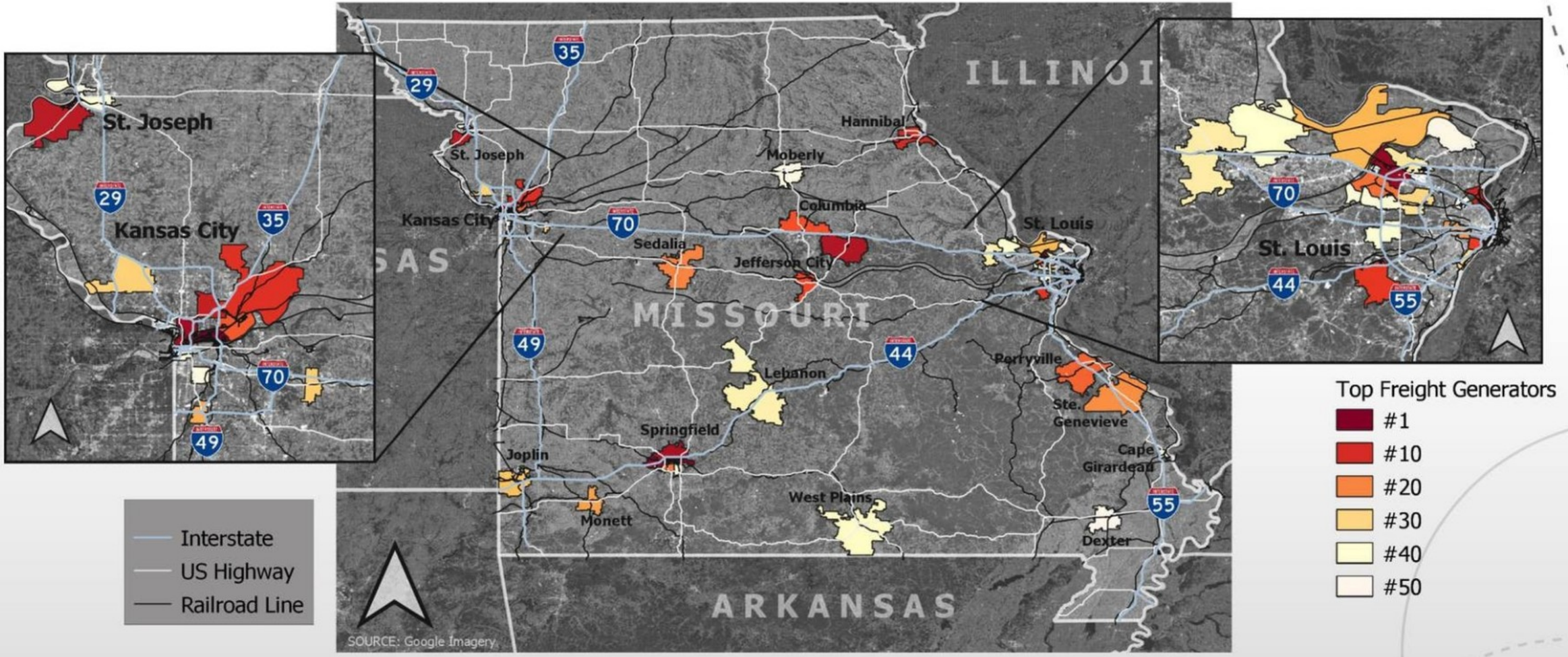
- 250 Freight Generators
  - IHS Freight Finder
    - Tons > 200,000
    - Employment > 400
    - Sales > $300 million
  - SFP Inventory
    - Intermodal Ramps
    - Truck-to-Rail Transloads
    - Warehouses
- Highway Performance Monitoring System (HPMS)
  - Segments not on NHS



Identifying Top Freight Generators

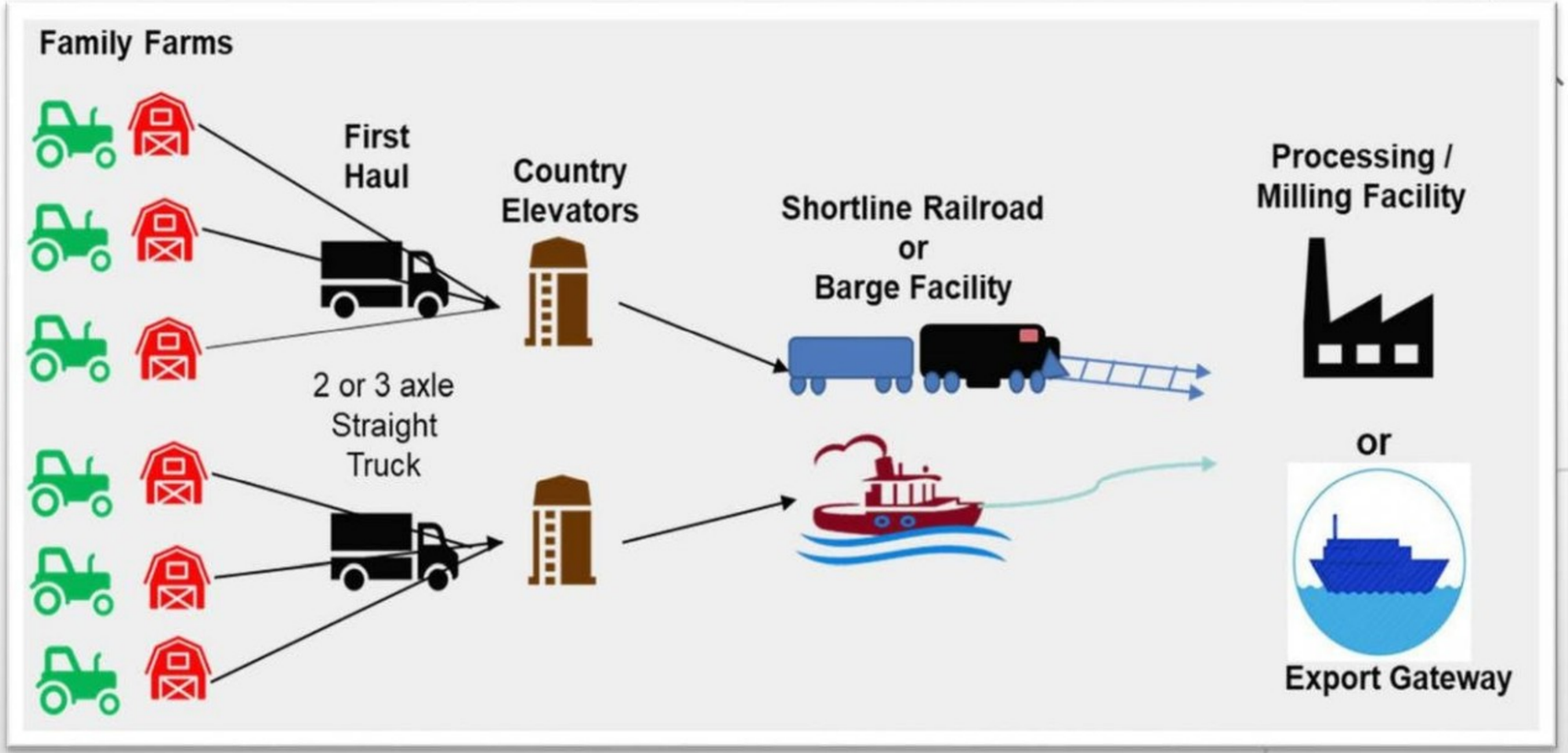
- IHS Freight Finder
  - Business location based
  - NAICS information
  - In and outbound tonnages
  - Aggregated to 5-digit zip code
  - Sample
- Bill of Lading (BOL)
  - Origin-Destination based
  - NAICS information
  - Shipment weight in pounds
  - Aggregated to 5-digit zip code
  - Sample

Top 50 Zip Codes



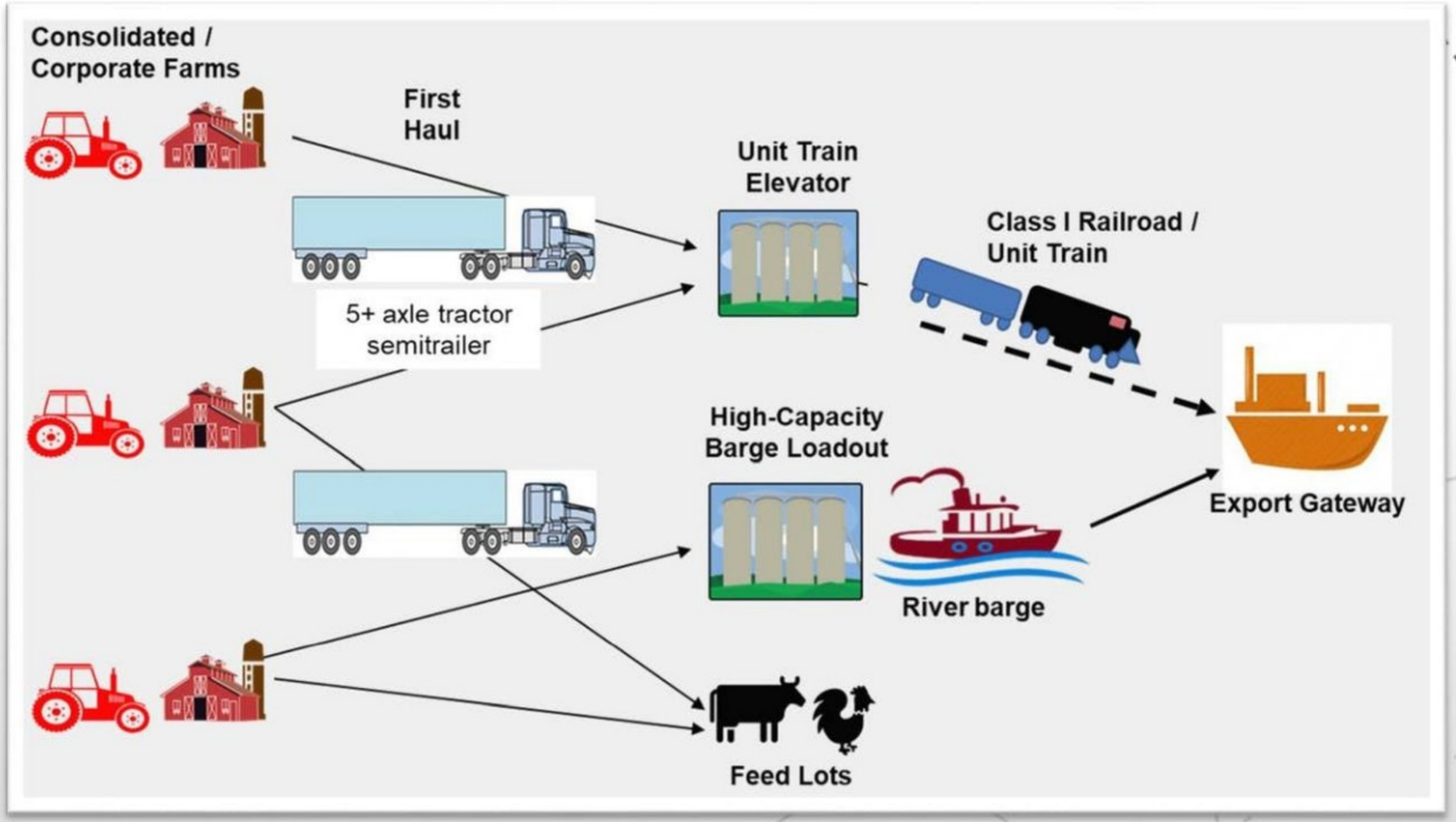
Freight Facilities: Grain Elevators

Pre-Staggers Act, (1980) Grain Supply Chain



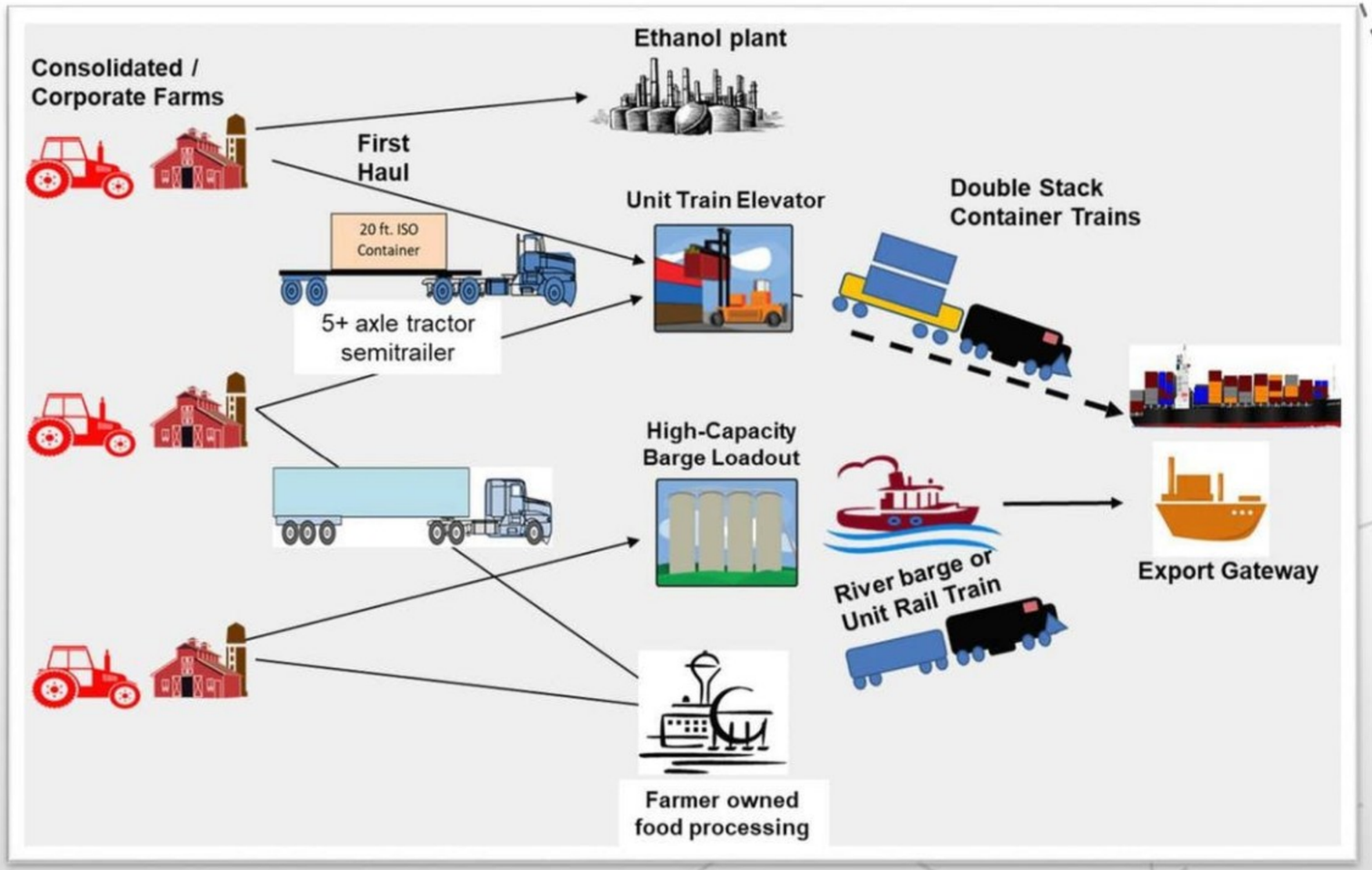
Freight Facilities: Grain Elevators

Post-Staggers Act, Grain Supply Chain



Freight Facilities: Grain Elevators

Emerging Grain Supply Chain



What freight generating supply chains are important to include in the analysis?

Inbound Plant foods /fertilizer to the state is high volume business.

Ecommerce, auto manufacturing, agriculture, energy, retail, high-value items, pharm

Timber Industry

Agriculture w/soybean oil manufacturing, food manufacturing, expanding the STL region's aviation/automotive manufacturing, live animal shipments for air cargo.

energy

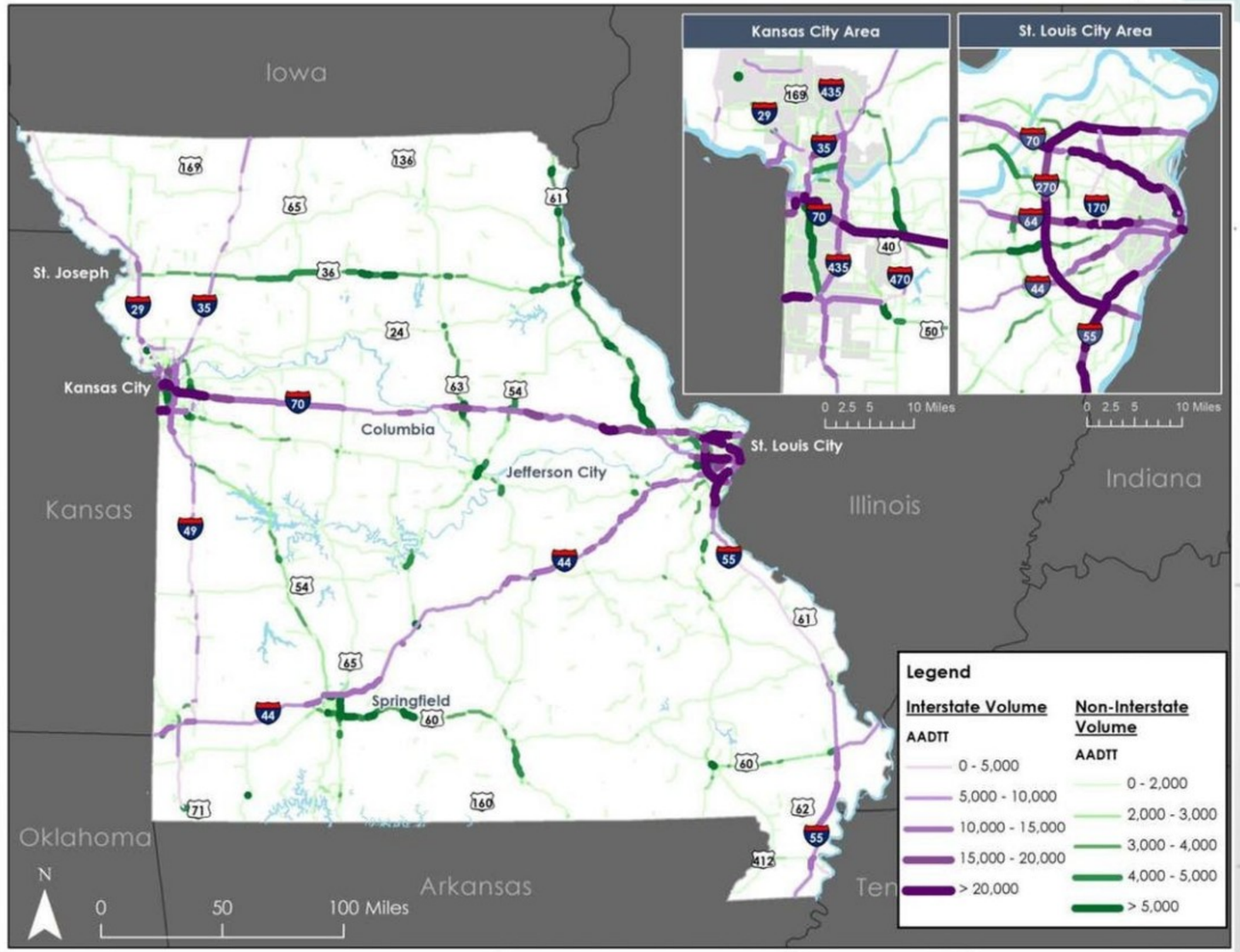
Minerals and rock - high weight impacts highway system and must be accounted for when buying transload equipment

Boats in SW Missouri

Highway and Trucking

Truck Traffic

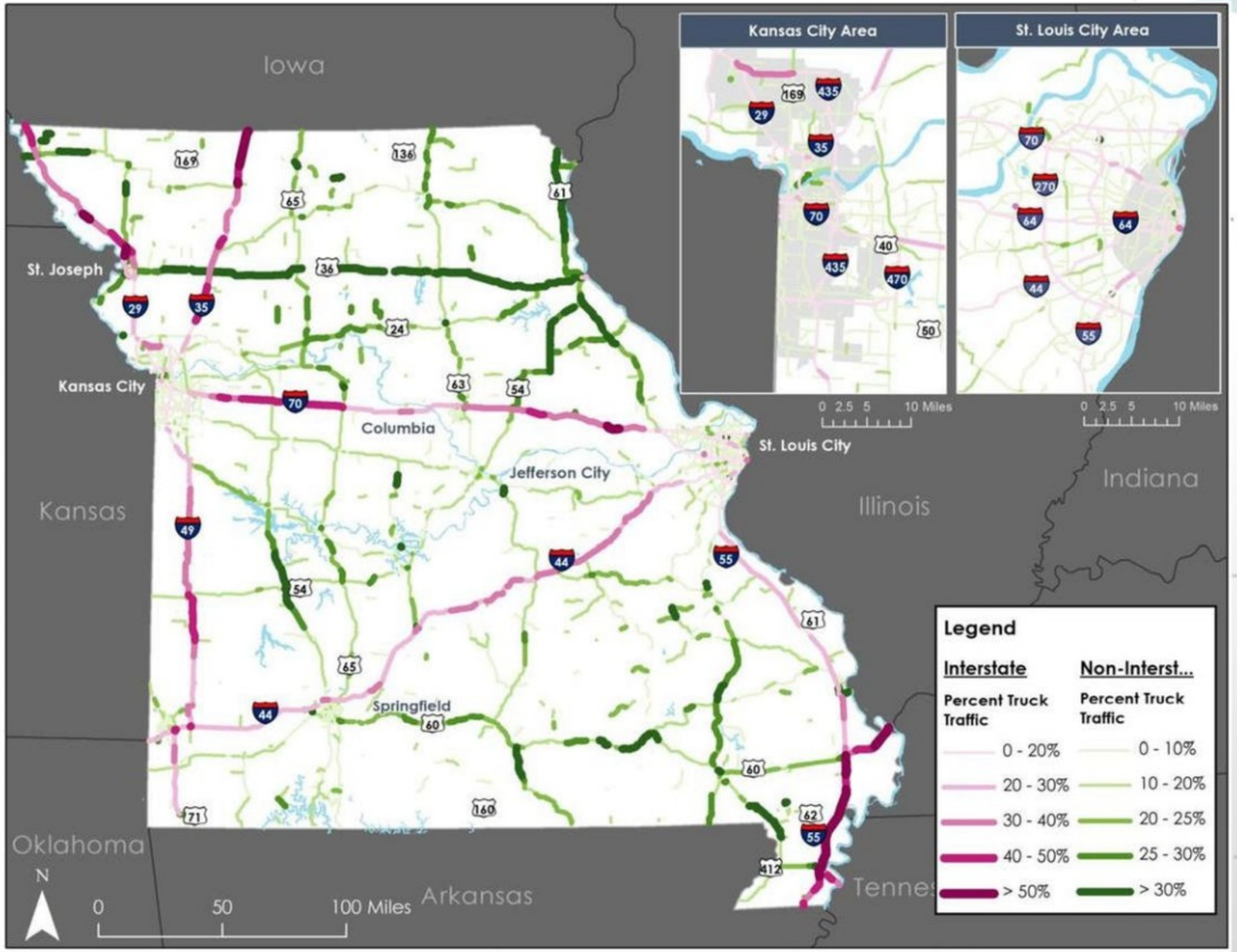
Average Annual Daily Truck Traffic



Source: Highway Performance Monitoring System, 2018

Truck Traffic

Truck Traffic As a Percent of Average Annual Daily Traffic



Source: Highway Performance Monitoring System, 2018

Highway Commodities

Summary of Freight on Missouri Highways in 2018

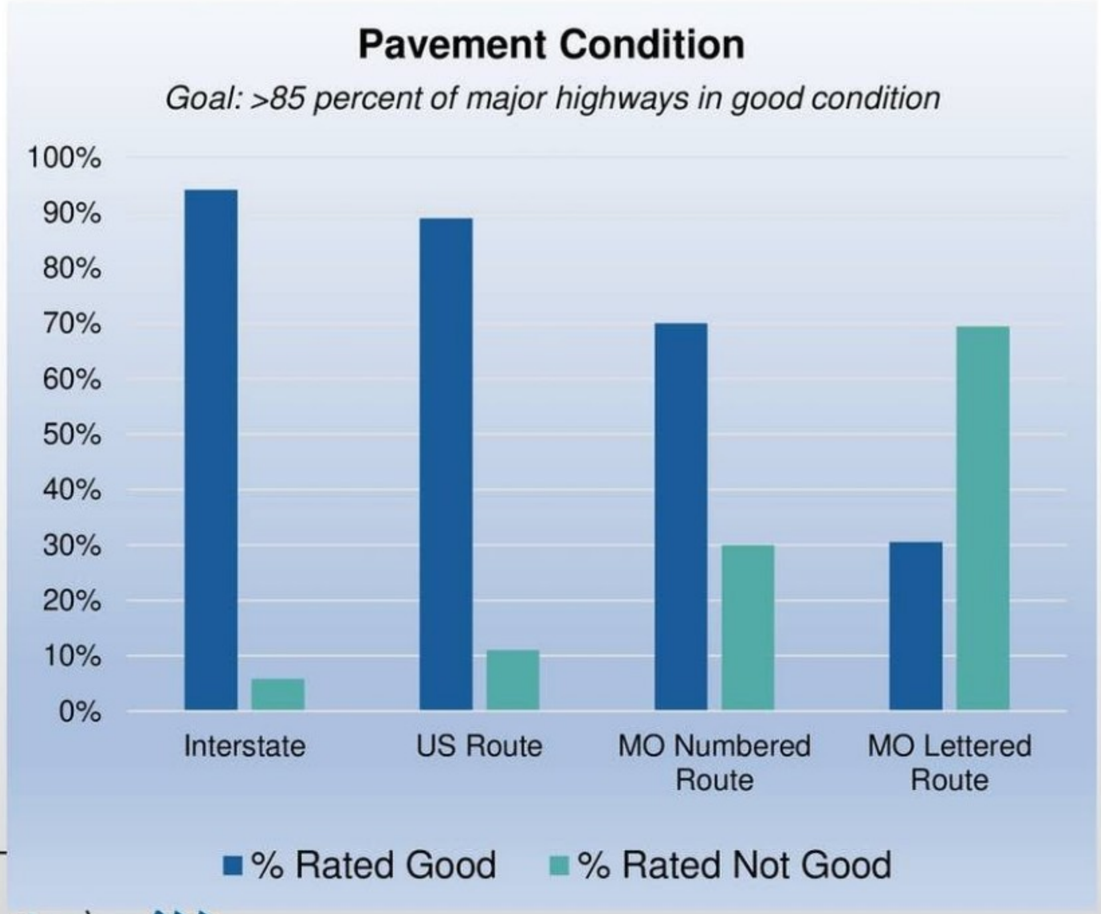
Direction	Tonnage *(millions)*	% of Total Tons	Value *(billions) ($)*	% of Total Value	Trucks *(millions)*	% of Total Trucks
Inbound	82.7	20%	81.1	16%	8.3	26%
Intrastate	62.4	15%	23.3	5%	6.9	21%
Outbound	113.0	28%	101.8	21%	8.9	27%
Through	148.5	37%	289.4	58%	8.4	26%
Total	**406.6**	**100%**	**495.6**	**100%**	**32.5**	**100%**

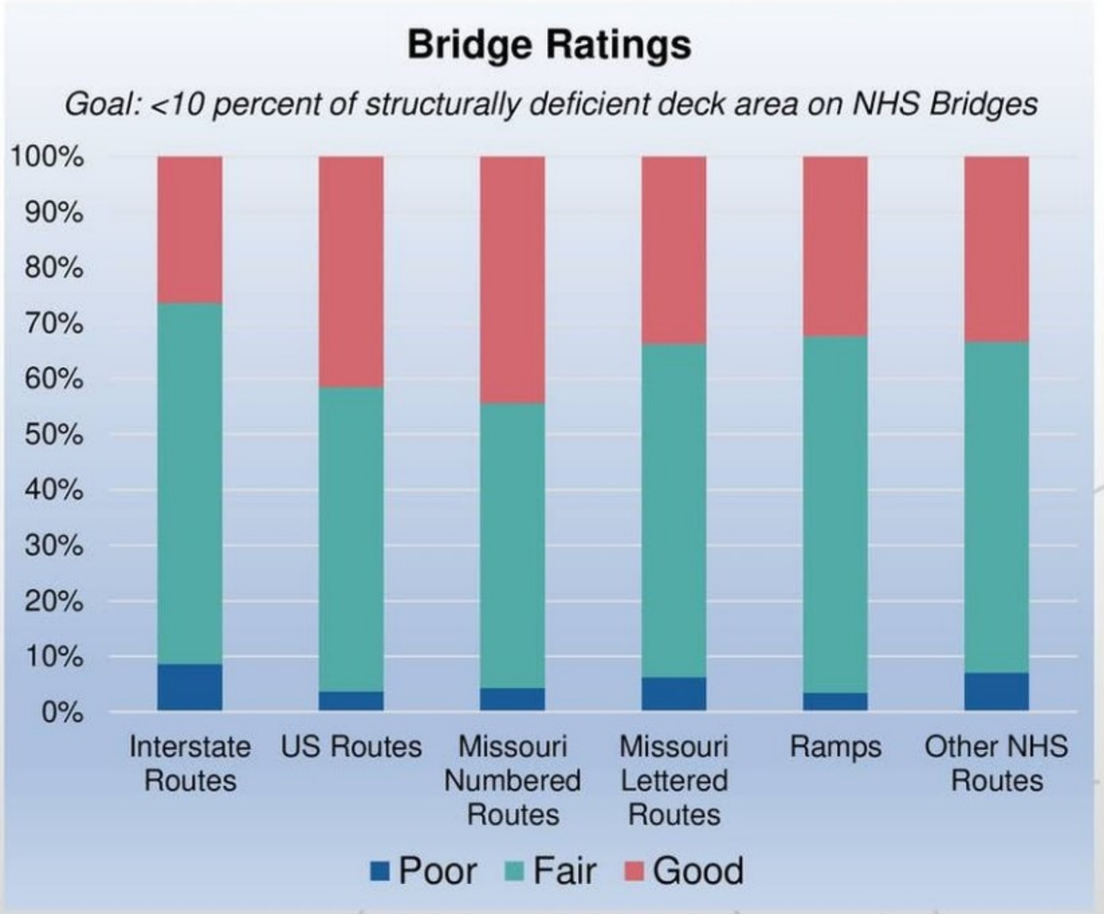
Source: IHS Transearch, 2018

- Top 10 Commodities (by Tonnage):
  1. Broken Stone or Riprap
  2. Grain
  3. Warehouse & Distribution Center
  4. Oil Kernels, Nuts, or Seeds
  5. Gravel or Sand
  6. Misc. Waste or Scrap
  7. Petroleum Refining Products
  8. Misc. Field Crops
  9. Asphalt Paving Blocks or Mix
  10. Dairy Farm Products

Highway – Condition

- In 2019, Missouri met the goals for pavement and bridge condition set in the 2017 Freight Plan

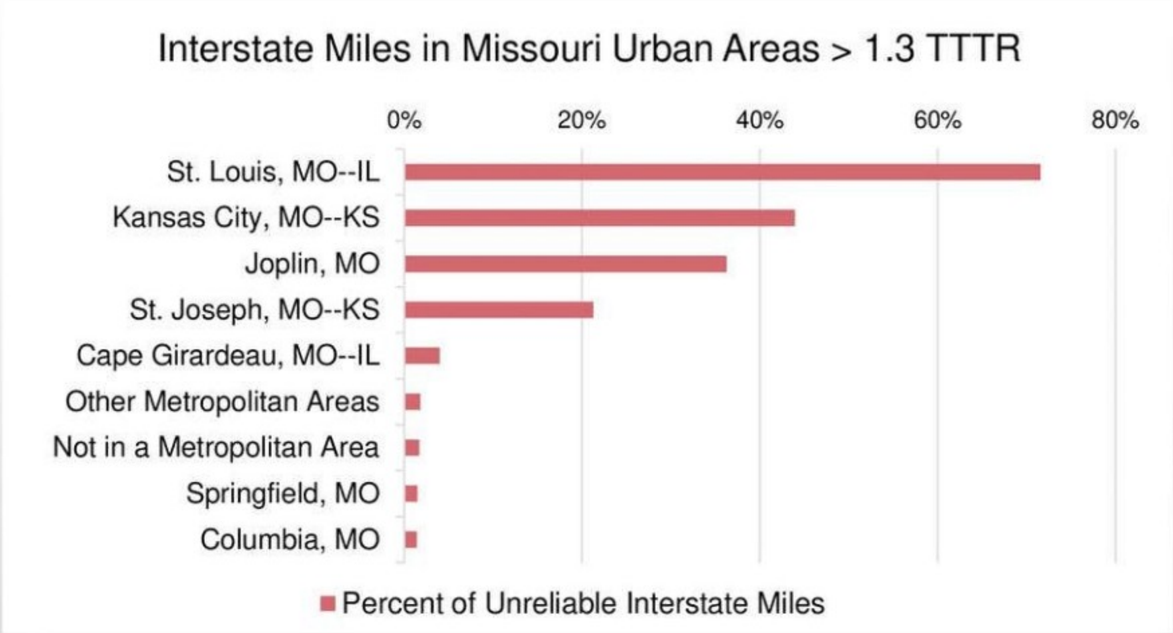




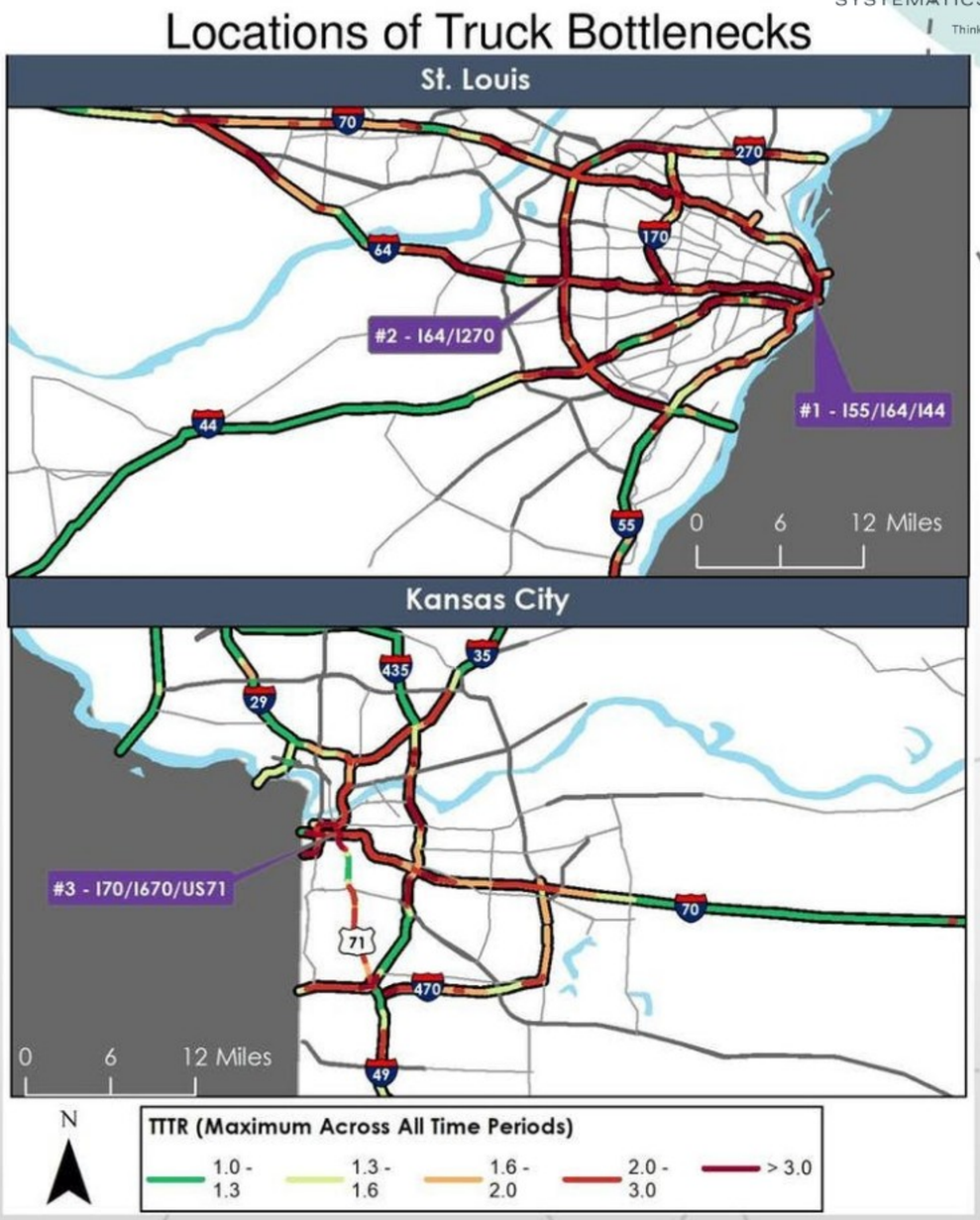
Source: MoDOT

Highway – Performance

- In 2018, Missouri's Truck Travel Time Reliability (TTTR) Index was **1.27**
  - Achieved the goal of less than 1.3
  - Higher than 1.25 in 2017

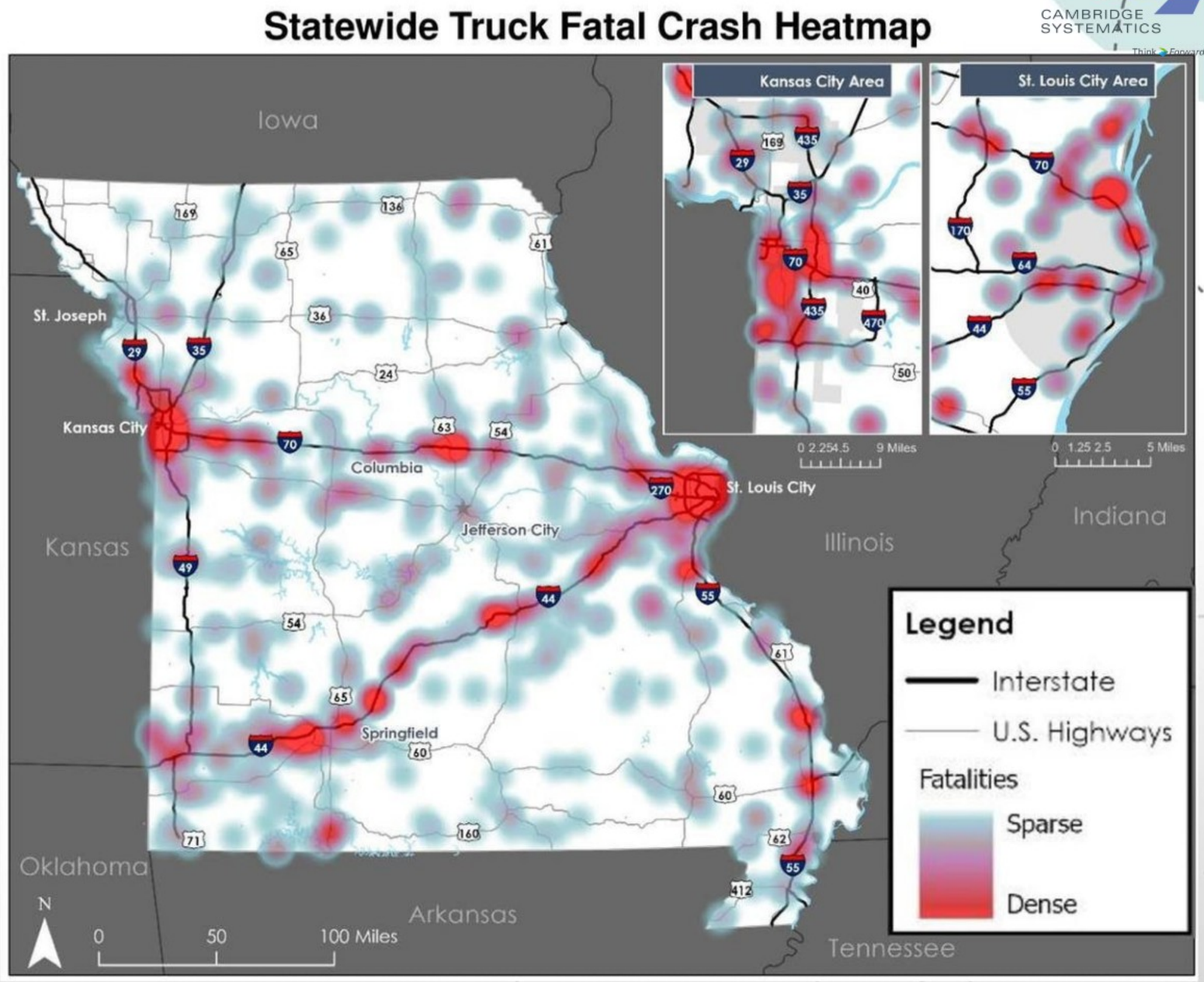


Source: National Performance Management Research Dataset, 2019



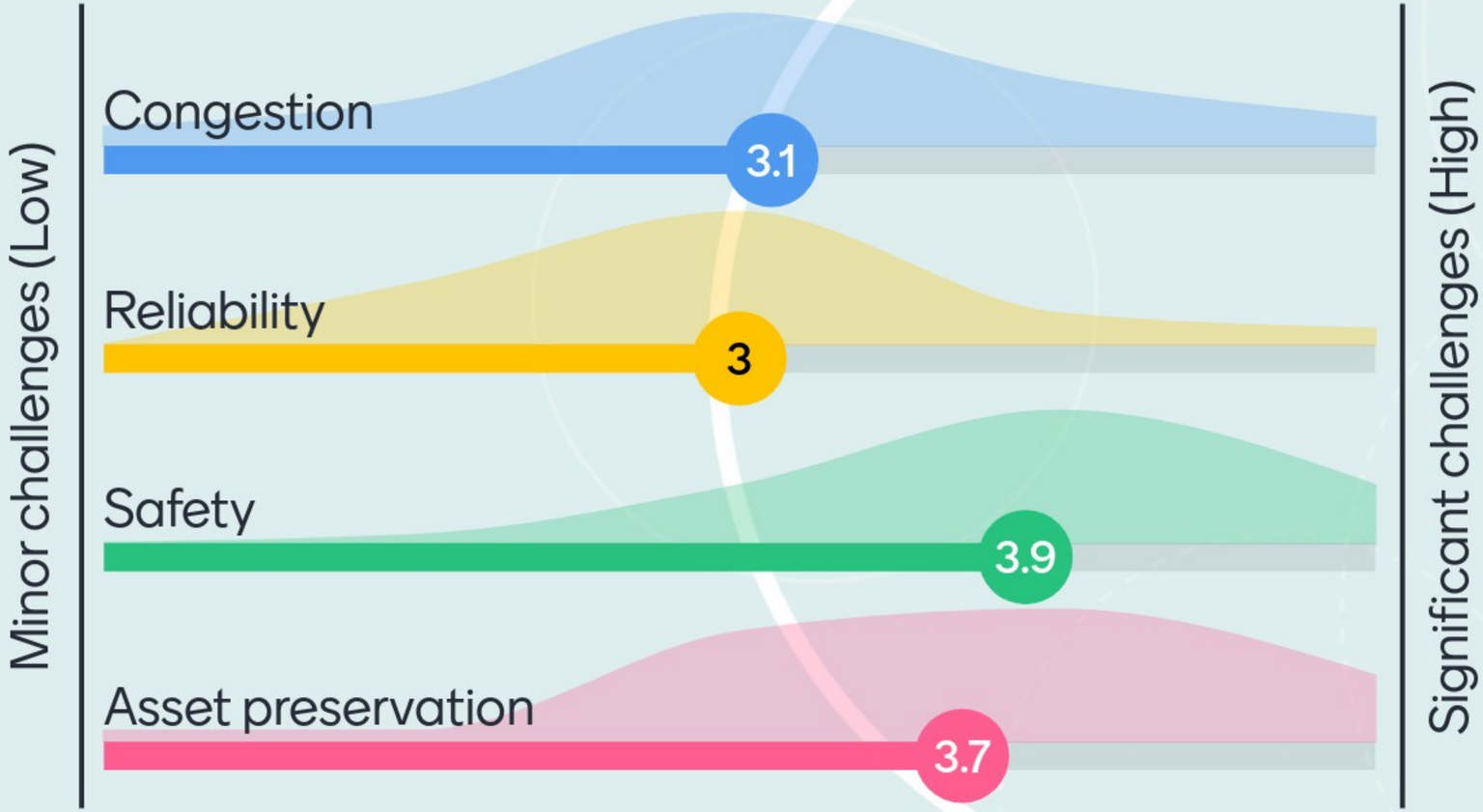
Safety

- Between 2015 and 2019, there were 72,014 truck-involved crashes
- Trucks comprised 10.8% of all vehicle involved in crashes



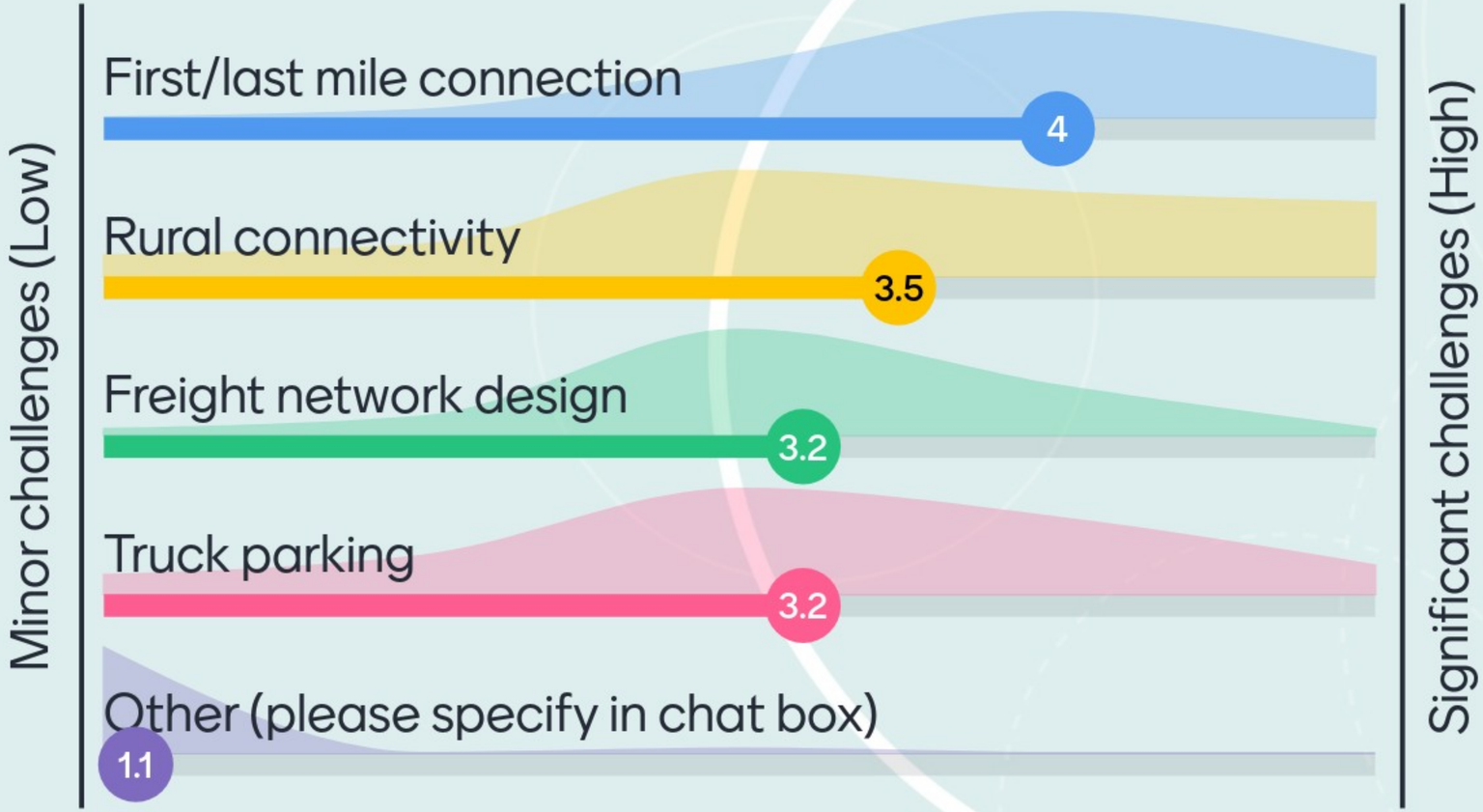
Source: MoDOT

Please rate the extent if the following freight highway challenges:



31

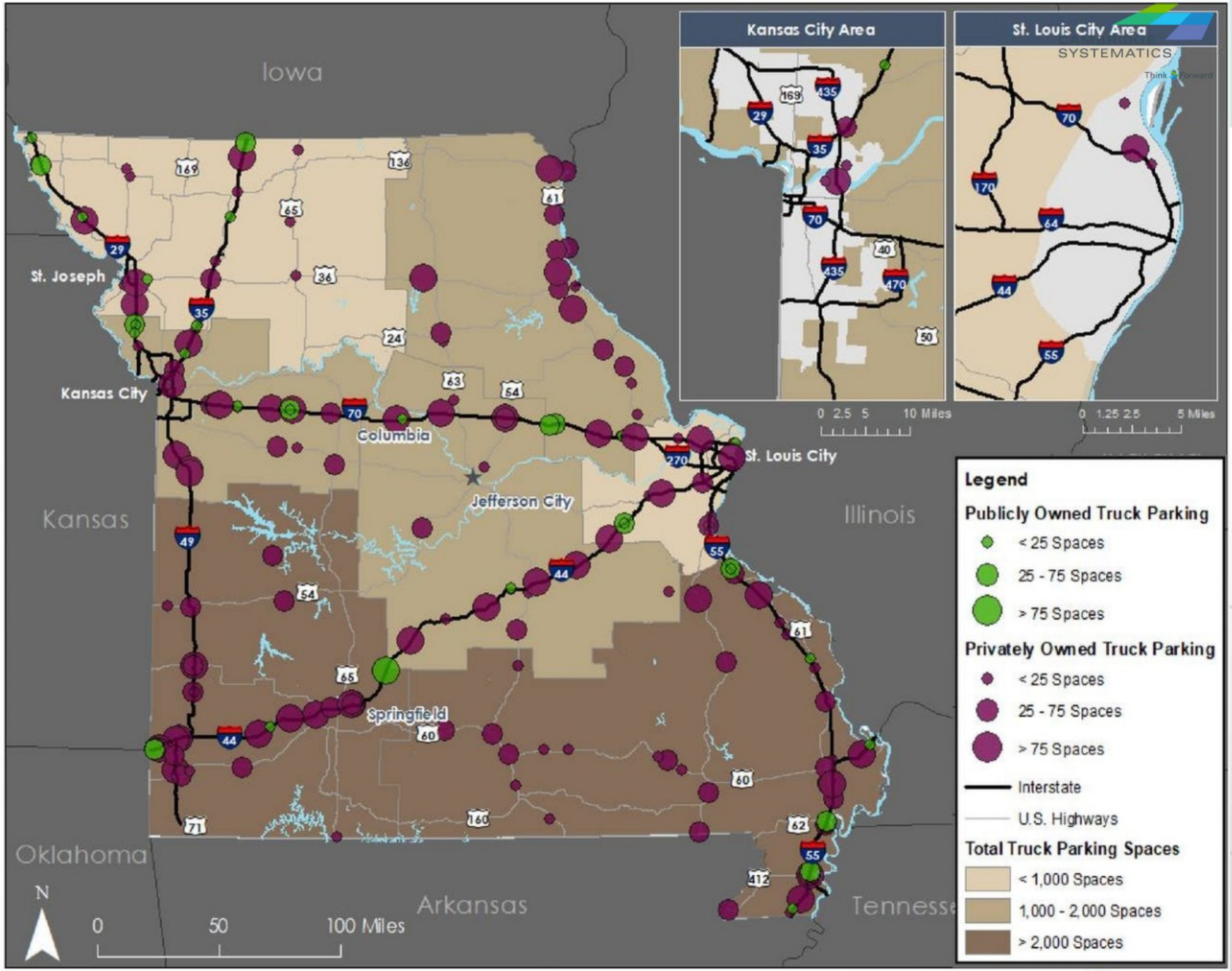
Please rate the extent if the following freight highway challenges:



30

Truck Parking

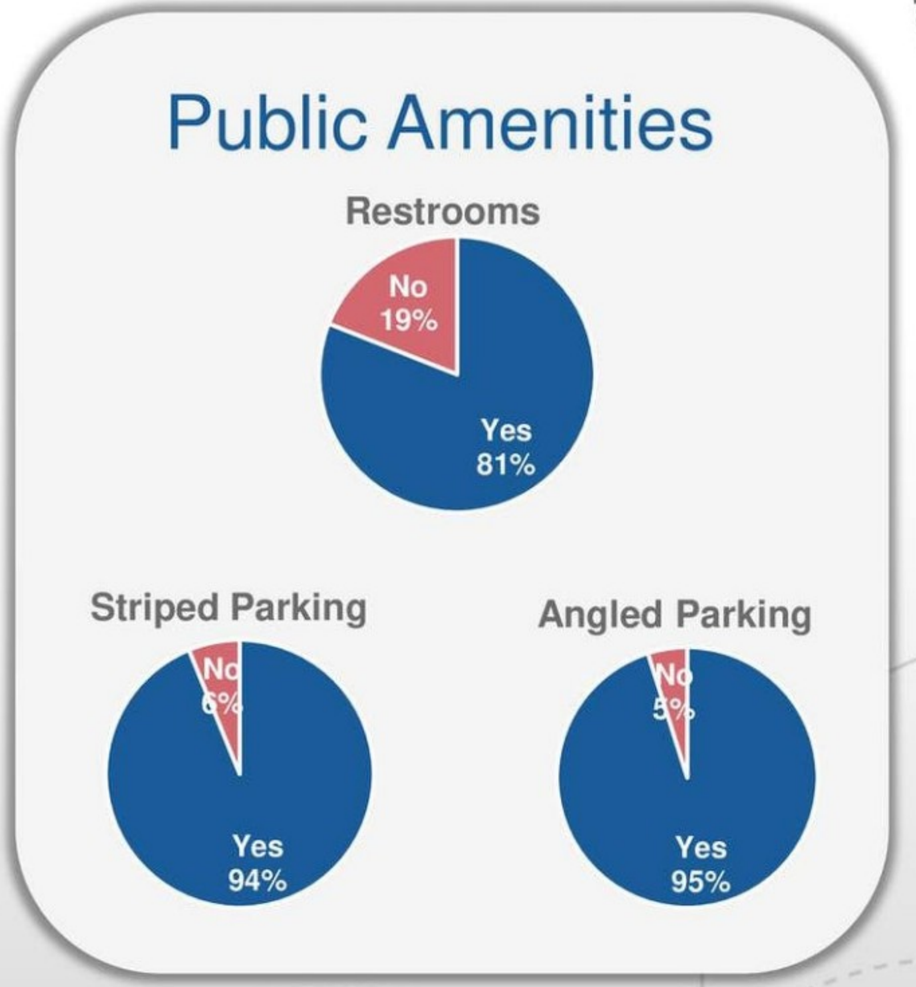
Truck Parking Inventory



Truck Parking Inventory

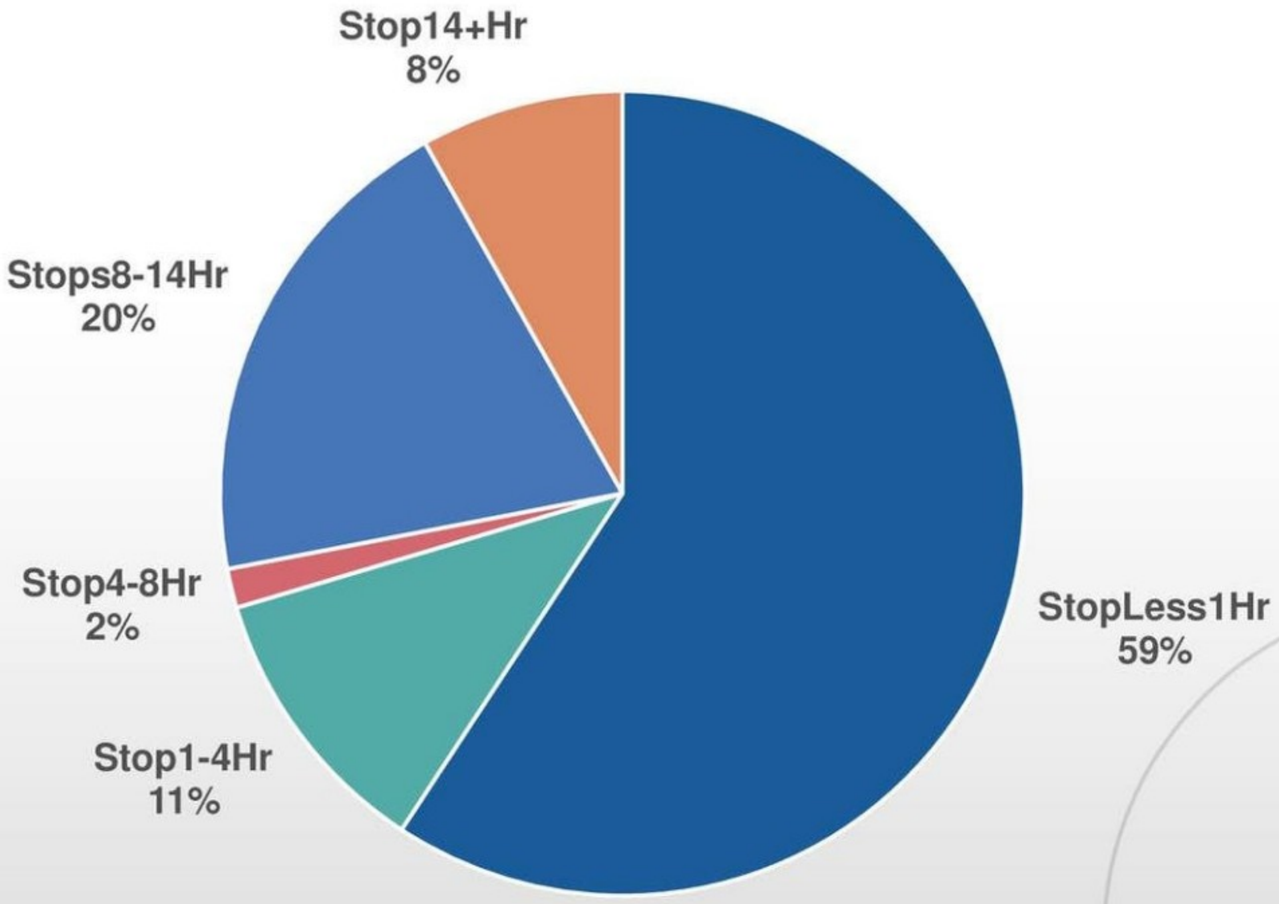
- There are 47 publicly owned locations with 1,147 spaces (11%)

District	Number of Truck Parking Facilities	Number of Truck Parking Spaces	Percent Truck Parking Inventory
Central	22	1,333	12.6%
Kansas City	28	1,690	15.9%
Northeast	22	1,159	10.9%
Northwest	32	944	8.9%
Southeast	48	2,227	21.0%
Southwest	36	2,436	23.0%
St. Louis	19	817	7.7%
Grand Total	**207**	**10,606**	**100.0%**



Truck Parking Demand - Preliminary

- Types of Truck parking
  - Overnight or Long stops
  - Staging
  - 30-minute regulated break
  - Emergency
  - Off-duty time
  - Misc.



Truck Parking Demand - Preliminary

- Highest total demand at designated sites is from 12-1 AM. The most common peak hour is between 2-3 AM
  - Approximate gap of 1,560 spaces at peak hour
  - 26/46 public locations at/over capacity at peak hour
  - 61/97 private locations at/over capacity at peak hour

Truck Parking Demand- Preliminary

- Wright City (I-70) and Doolittle (I-44) have largest deficit of spaces (public)
- Mineola (I-70) and Marston (I-55) have largest surplus (public)
- Parking on Interstate Right of Way
  - I-70 in Callaway County – Highest number of stops on ROW (~60/day)
  - I-44 in Franklin and I-44 in Laclede are next highest (~55/day)
  - Majority of stops (64%) are less than an hour

What and where are truck parking challenges?

Real-time information on parking space availability

Parking on shoulders at interchange ramps=> Maintenance and Safety. Also, confusion of drivers using GPS and getting on low volume outer roads

Overnight parking along I-70 seems to be overflowing. I would assume this is the same along I-44.

Min and Max usage volume (i.e. Holiday Parking)

poor utilization because parking location is not near the parking need

Passenger service to SW Missouri

North St. Louis and Hazelwood along the I-70 corridor.

Quantity and location - are there enough spots within an hour or two of high volume locations?

Truck Parking Gap Analysis – Next Steps

- Compare locations with deficit to areas with parking on ROW
- Conduct analysis of crashes involving stopped/parked trucks
- Administer stakeholder survey and conduct trucking roundtables
- Develop technical report

Rail

Freight Rail: Overview

- Six Class I Railroads
- Six Local Railroads
- Ten Switching & Terminal Railroads
- Three Excursion Railroads
- Over 400 million tons of freight in 2018 (to, from, within and through)
  - Coal: 32.7%
  - FAK* Shipments: 9.5%
- $100 billion value of freight in Missouri (2018)
  - FAK* Shipments: 36.4%
  - Motor Vehicles: 21.1%

Missouri Freight Rankings compared to rest of the United States (2017)

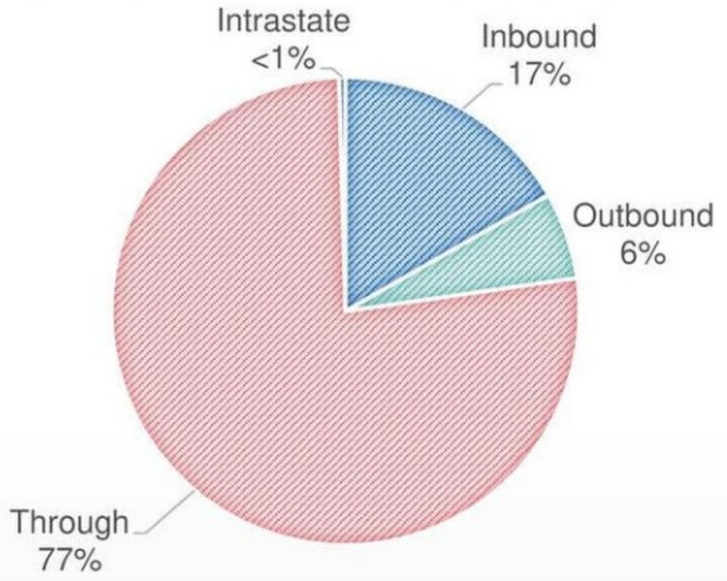
AAR Metric	US Rank
Rail Carloads Carried	3rd
Rail Tons Carried	5th
Freight Rail Employment	5th
Freight Rail Wages	5th
Total Rail Miles	9th
Terminated Rail Tons	10th
Terminated Rail Carloads	11th

* FAK: Freight of all Kinds

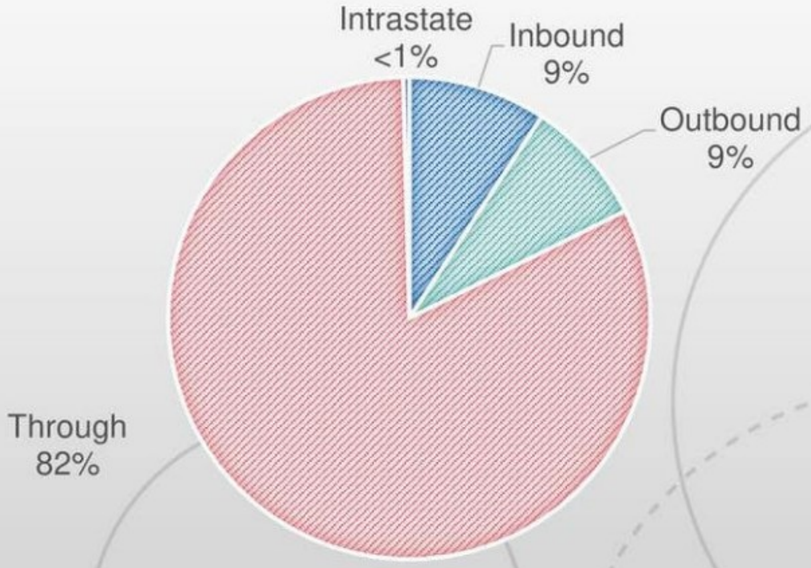
Freight Rail Movements (2018)

- Tonnage by Rail
  - Total: 414 million tons
  - 318.11 million tons (through)
  - Coal:
    - 46.94 million tons (inbound)
    - 88.50 million tons (through)
- Value by Rail
  - Total: $552.32 billion
  - $452.48 billion (through)
  - Motor Vehicles:
    - $14.06 billion (inbound)
    - $22.89 billion (outbound)

TONNAGE BY DIRECTION, RAIL

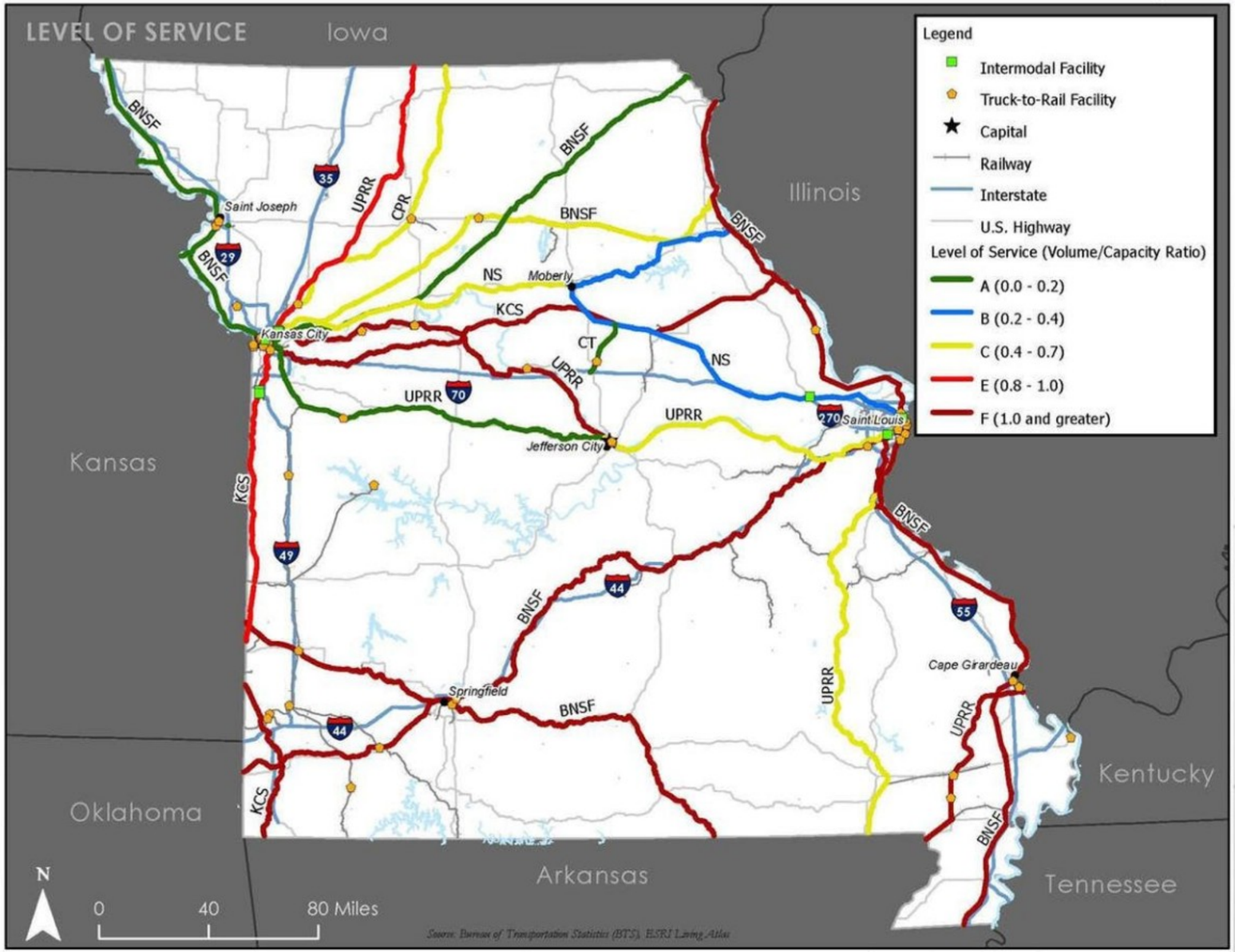


VALUE BY DIRECTION, RAIL



Freight Rail: Service, Constraints and Bottlenecks

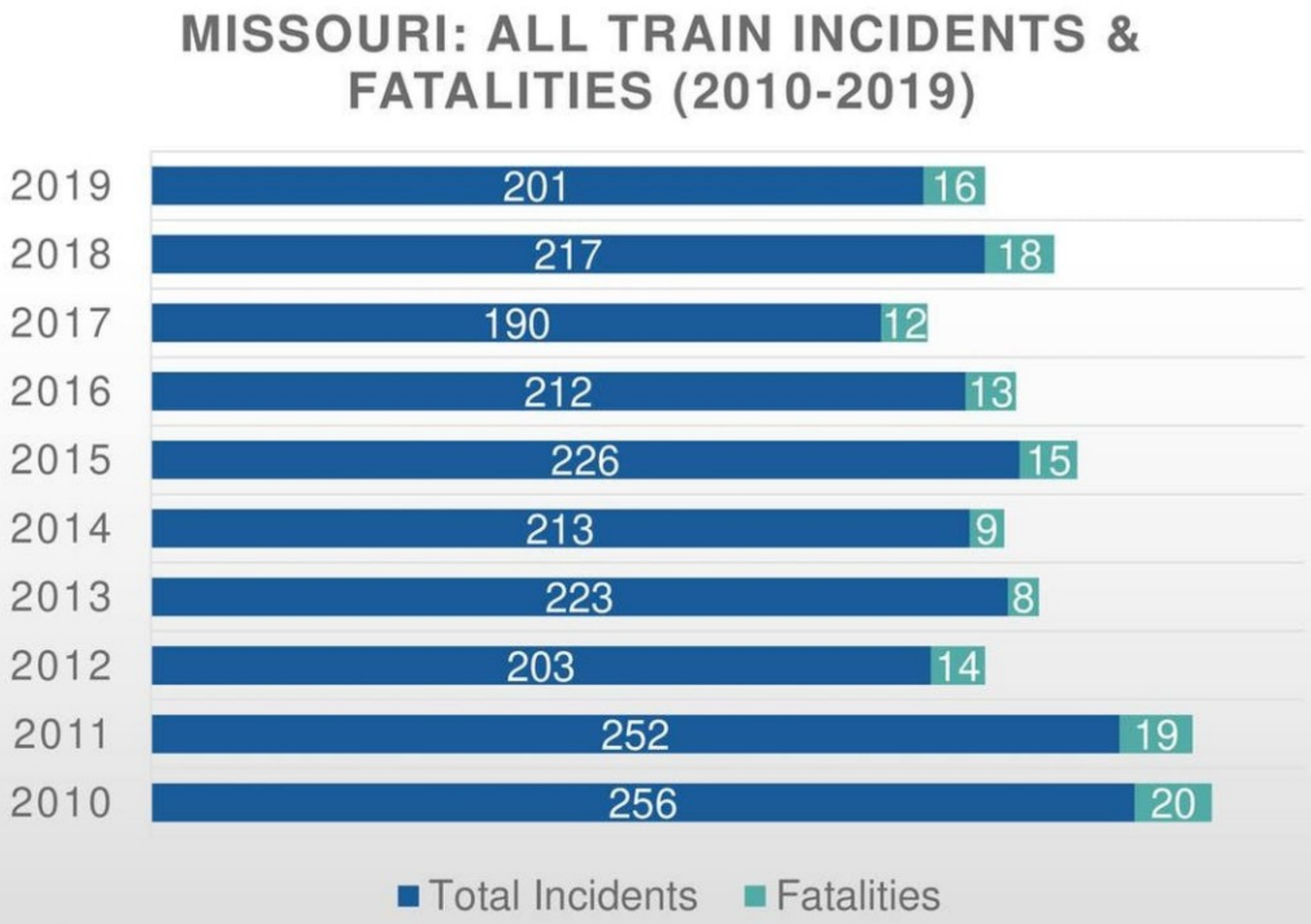
- Stakeholder and Analysis Findings:
  - Capacity constraints on Tulsa-Springfield-Memphis route
  - Coal volumes down 33% since 2012
  - PSR operation changes have been on-going



Passenger Rail

- 62% of Missourians live within 25 mi. of an Amtrak station, 79% live within 50 mi. (2019)
- 2018 Boardings & Alightings (*Southwest Chief, Texas Eagle,* and *Missouri River Runner*)
  - Total: 724,488
  - Highest: St. Louis, 362,172
  - Lowest: Arcadia Valley, 1,018
- FY 2018 On-time Performance:
  - *River Runner*: 82.4%
  - *Southwest Chief*: 47.0%
  - *Texas Eagle*: 39.7%

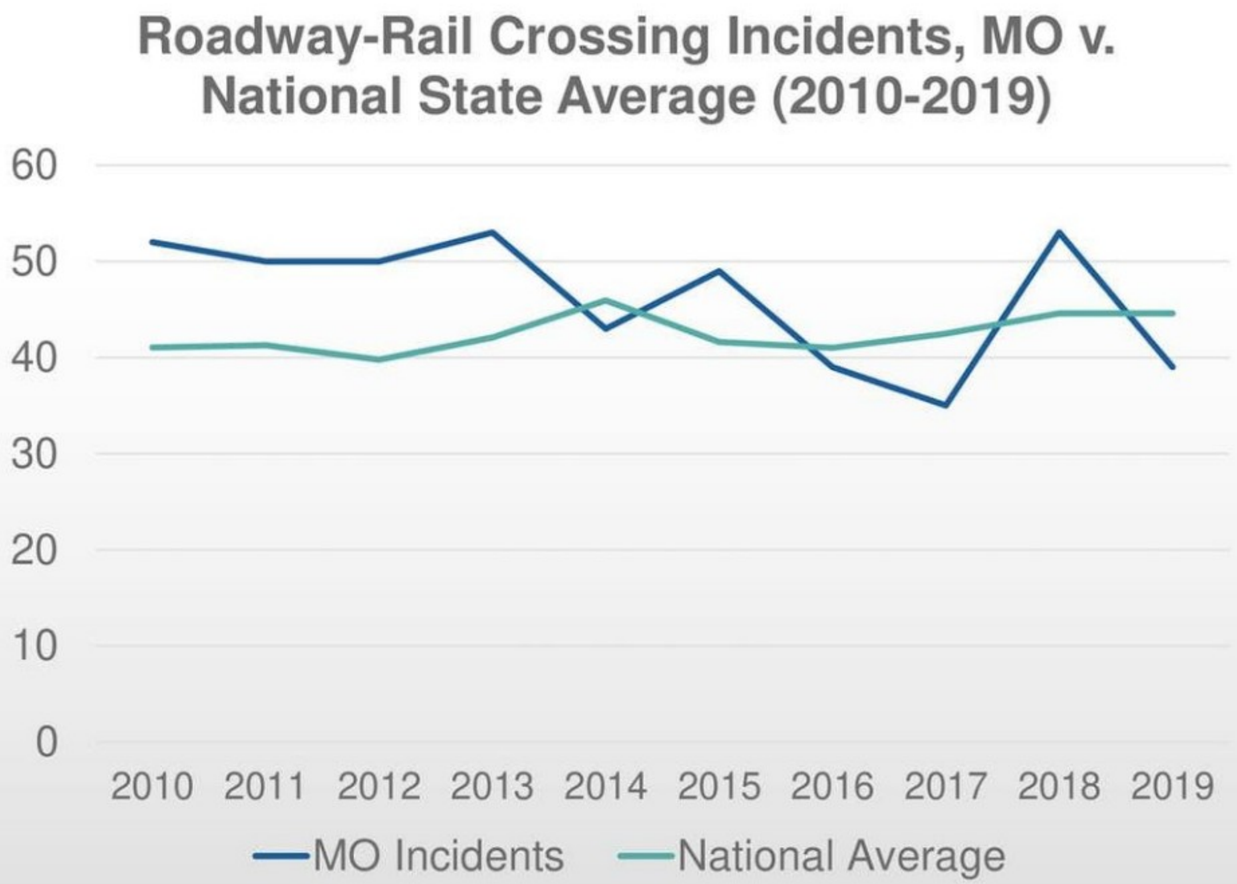
Rail Safety: Train Incidents and Fatalities



- Total incidents (2010-2019): **2,054**
- Total fatalities (2010-2019): **144**
- Rate of fatalities per total train incidents (2010-2018): **6.4%**
- Rate of fatalities per total train incidents (2019): **8.0%**

Source: FRA Office of Safety Analysis

Rail Safety: At-Grade Crossings



- Total incidents (2010-2019): **463**
- Total fatalities (2010-2019): **70**
- Rate of fatalities per at-grade train crossing incidents (2010-2018): **15.3%**
- Rate of fatalities per at-grade train crossing incidents (2019): **12.8%**

Source: FRA Office of Safety Analysis

Rail: Key Findings

- Freight
  - Missouri is a key national freight network component
    - MO primarily a “through” freight state
    - 74% of total volume originates and terminates outside of MO
  - Coal volume decline as energy generation is switching over to natural gas
  - Low concern with LOS from each Class I’s interviewed
- Passenger
  - Wide distribution of stations/services with 79% living within 50 mi of a station
  - River Runner Intercity service OTP > 80%
- Safety
  - Consistent with national averages
  - Identify strategies to further increase safety of rail and crossings

What are freight rail challenges and needs?

Slow interchange flooding causing diversion

Support existing and new Missouri businesses to build rail infrastructure to connect to shortline railroads.

rail siding program, rail project funding program for urban and rural areas

Funding for abandoned rail spur/lead tracks that support manufacturing growth. At grade crossing safety and at grade crossing truck delays negatively impacting freight costs.

Supporting existing and new Missouri businesses to build rail infrastructure to connect to Class 1 railroads. This will make Missouri more than a "through" state.

Grain Shuttle loading facilities are somewhat dependent upon on grain grown with good weather.

What are passenger rail challenges and needs?

Reliability and frequency of trains

Ease of useFacilities (Rental car & transit)

Lack of passenger rail service to Southwest Missouri

More interconnection with local public transit

Coordination with FRA Midwest Passenger Rail Plan?

Extension of service to include Springfield

on time %

Covid impacting all travel

Air

Top Air Commodities in Missouri, (Exported)

Commodity by Tonnage	Tons (Thousands)	Percent of all Commodities
Small Packaged Freight Shipments	43.40	43%
Electrical Equipment	9.82	10%
Printed Matter	7.25	7%
Transportation Equipment	5.97	6%
Instrum, Phot Equipment, Optical EQ	4.60	5%
Commodity by Value	**Value (Millions)**	**Percent of all Commodities**
Misc. Manufacturing Products	$3,555	32%
Electrical Equipment	$2,277	21%
Transport Equipment	$1,814	17%
Instrum, Phot Equipment, Optical EQ	$1,006	9%
Drugs	$669	6%

Top Air Commodities in Missouri, (Imported)

Commodity by Tonnage	Tons (Thousands)	Percent of all Commodities
Small Packaged Freight Shipments	37.70	38%
Transportation Equipment	10.11	10%
Meat or Poultry, Fresh or Chilled	6.07	6%
Machinery	5.75	6%
Instrum, Photo Equipment, Optical EQ	5.71	6%
Commodity by Value	**Value (Millions)**	**Percent of all Commodities**
Transportation Equipment	$3,071	29%
Misc. Manufacturing Products	$2,526	24%
Instrum, Photo Equipment, Optical EQ	$1,249	12%
Electrical Equipment	$1,220	11%
Machinery	$731	7%

Statewide Cargo Origins & Destinations

TABLE 3.7 STATEWIDE TOP 10 FREIGHT + MAIL DESTINATION AIRPORTS IN 2019

Destination	Freight	Mail	Total (Tons)
Memphis, TN	33,183	-	33,183
Louisville, KY	18,706	-	18,706
Indianapolis, IN	9,381	-	9,381
Rockford, IL	7,500	-	7,500
Dallas/Fort Worth, TX	2,482	83	2,564
Cincinnati, OH	2,081	-	2,081
Cedar Rapids/ Iowa City, IA	1,738	-	1,738
Charlotte, NC	1,127	355	1,482
Ontario, CA	1,458	-	1,458
Omaha, NE	1,411	-	1,411

Source: BTS T-100 Market, 2019

TABLE 3.8 STATEWIDE TOP 10 FREIGHT + MAIL ORIGIN AIRPORTS IN 2019

Origin	Freight	Mail	Total (Tons)
Memphis, TN	31,459	-	31,459
Louisville, KY	20,780	40	20,820
Indianapolis, IN	8,087	-	8,087
Rockford, IL	6,300	-	6,300
Cincinnati, OH	3,876	-	3,876
Dallas/Fort Worth, TX	2,638	197	2,835
Cedar Rapids/ Iowa City, IA	1,954	-	1,954
Los Angeles, CA	906	536	1,442
Houston, TX	1,210	31	1,241
Boston, MA	1,204	-	1,204

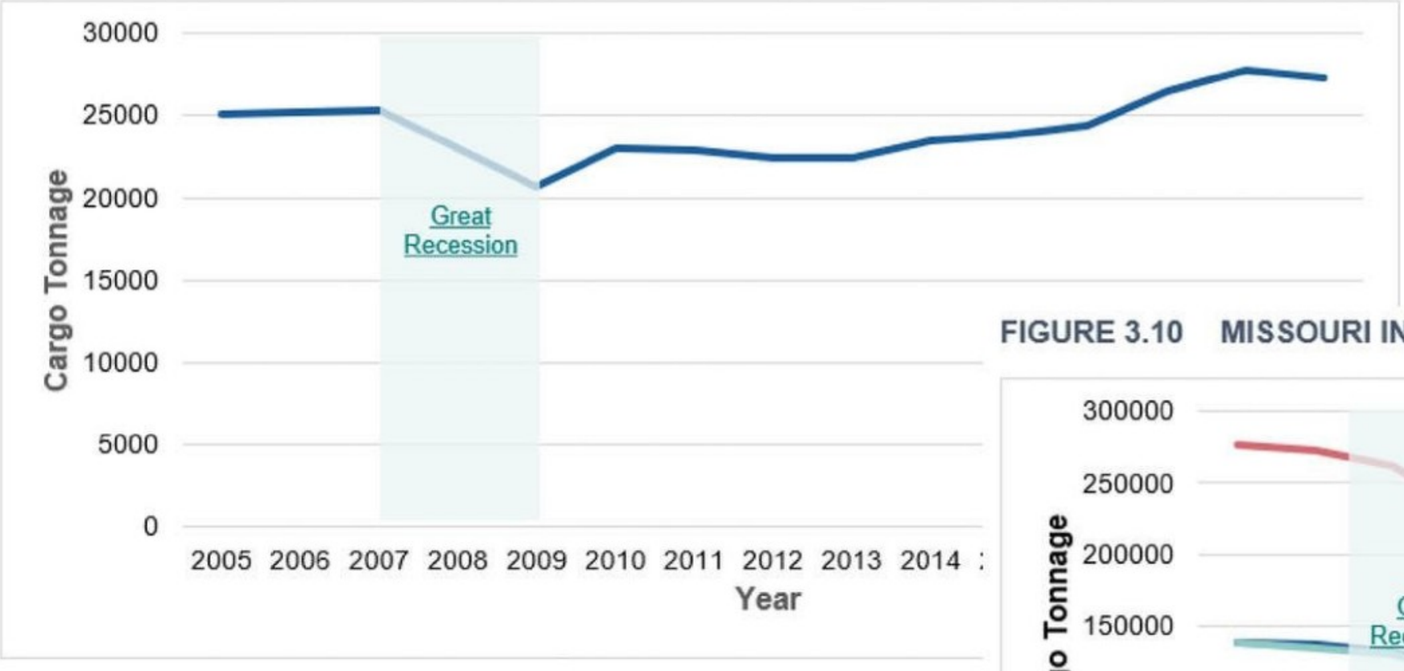
Source: BTS T-100 Market, 2019

Missouri Air Cargo Trends and 2045 Outlook

	2018	2030	2045	Projected Annual Growth 2018 - 2030	Projected Annual Growth 2030 - 2045
Import					
Tons (Thousands)	98.02	124.56	179.35	2.3%	2.9%
Value (Millions)	$10,726	$13,929	$20,043	2.5%	2.9%
Export					
Tons (Thousands)	101.87	120.76	161.46	1.5%	2.2%
Value (Millions)	$10,992	$14,270	$21,253	2.5%	3.3%
Intra					
Tons (Thousands)	1.90	2.67	3.82	3.4%	2.8%
Value (Millions)	$210	$292	$426	3.3%	3.1%
Overall					
Tons (Thousands)	201.79	248.00	344.63	2.9%	2.6%
Value (Millions)	$21,927	$28,492	$41,722	2.5%	3.1%

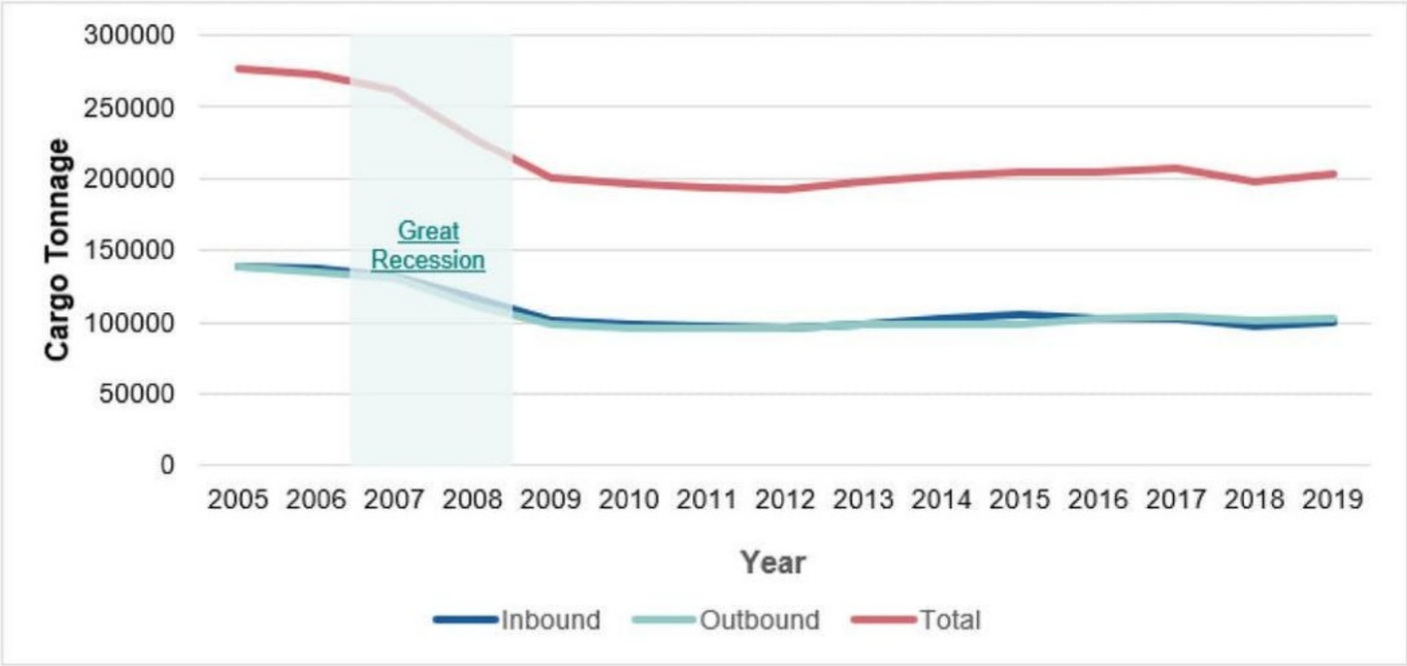
Trends affecting Missouri Air Cargo

FIGURE 3.11 US CARGO REVENUE TONS ENPLANED, IN THOUSAND (2005 - 2019)



Source: BTS T-100 Market

FIGURE 3.10 MISSOURI INBOUND AND OUTBOUND CARGO, IN TONS (2005 - 2019)



Source: BTS T-100 Market

Initial Stakeholder Feedback

- Kansas City
  - Supplying electrical power
  - Direct access to I-435
- St. Louis
  - 2021 cargo development agreement
  - Airport rail access
  - I-70 corridor study
- Springfield
  - MoDOT freight enhancement program for improvements for truck travel
  - Specialized loading conditions

What are air cargo challenges and needs?

Value of STL vs ORD

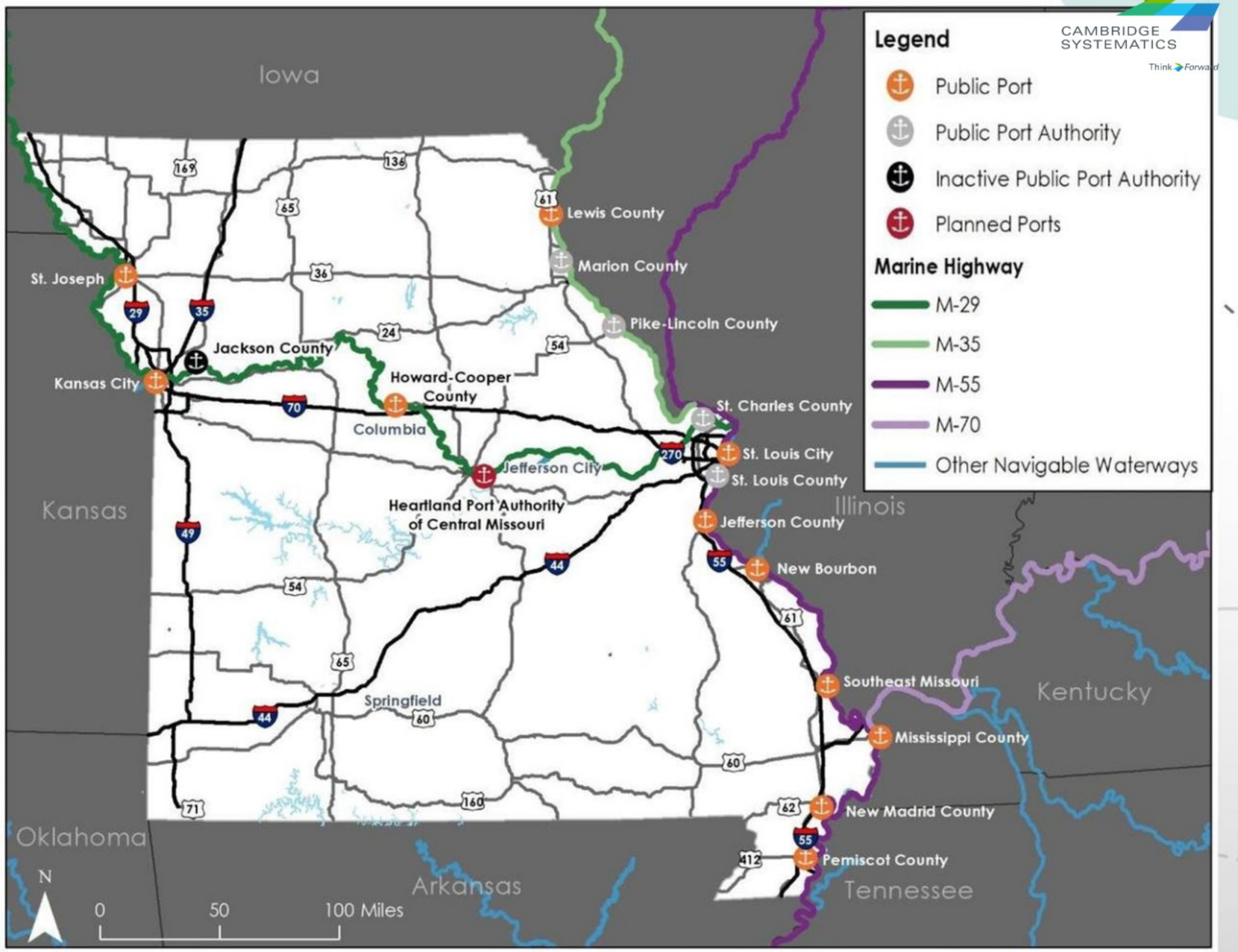
more cargo with additional direct flights

More assistance to airports for specilized air cargo equipment

3

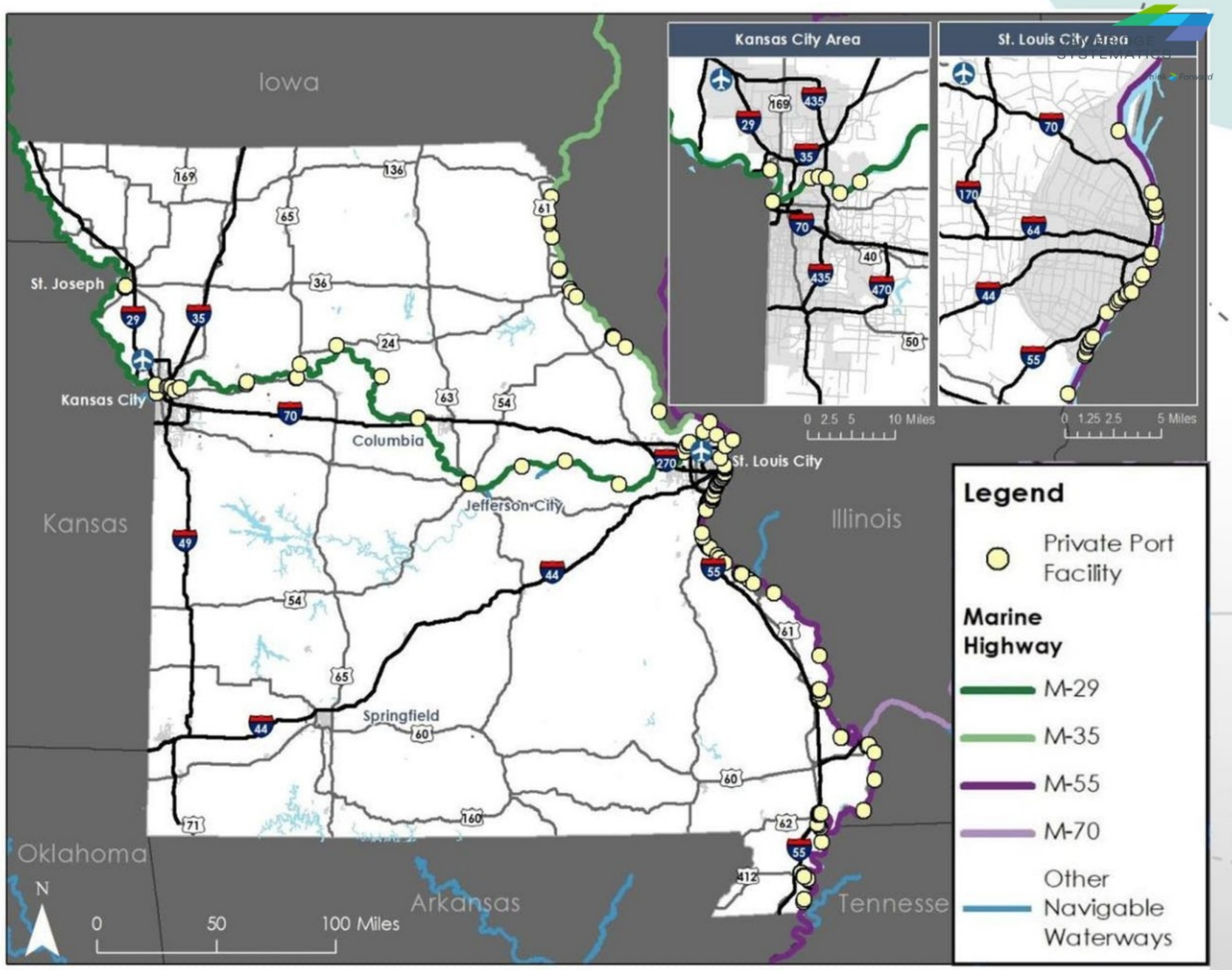
Waterways

Ports & Waterways Inventory – Missouri Public Ports



Source: MoDOT

Ports & Waterways Inventory – Private Port Facilities



Source: MoDOT

Ports & Waterways – Volumes & Users

Port Support Activity	2018 Volumes *(Tons, All Directions)*	2018 Top 5 Commodities
Metropolitan St. Louis	37,426,710	Corn, Soybeans, Cement & Concrete, Coal & Lignite, Crude Petroleum
Kansas City	1,374,284	Sand & Gravel, Cement & Concrete, Asphalt, Tar & Pitch, Soybeans, Other Fertilizer
Southeast MO (SEMO)	1,054,128	Sand & Gravel, Wood Chips, Soybeans, Corn, Wheat
New Madrid County	2,259,548	Nitrogenous Fertilizer, Soybeans, Corn, Rice, Aluminum Ore
Pemiscot County	519,956	Soybeans, Distillate Fuel Oil, Nitrogenous Fertilizer, Corn, Potassic Fertilizer

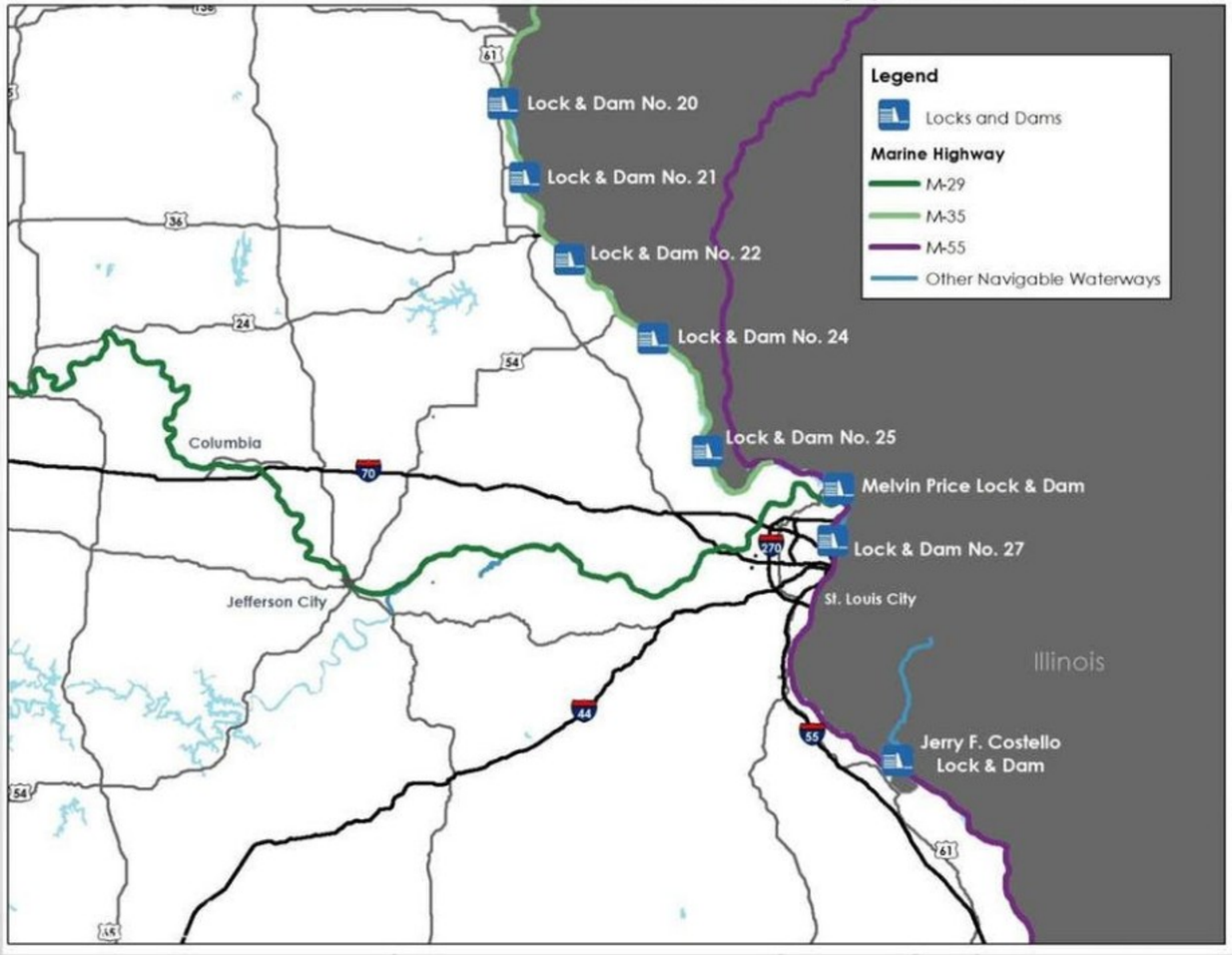
Source: U.S. Army Corps of Engineers; 2018 Economic Impact Study for Public Ports

- Port-Dependent Industries:
  - Chemical Manufacturing
  - Fabricated metal product manufacturing
  - Crop production
  - Mining (except oil & gas)
  - Nonmetallic mineral product manufacturing
  - Transportation equipment manufacturing
  - Primary metal manufacturing
- Top Port-Benefitting Businesses:
  - Construction of Buildings
  - Heavy and Civil Engineering Construction
  - Plastics and Rubber Products Manufacturing
  - Machinery Manufacturing
  - Computer and Electronic Product Manufacturing

Ports & Waterways – Condition

- Longstanding issue: size and age of lock and dam infrastructure
  - Smaller locks mean tows need to be broken up
  - Older locks mean more repairs
- Issues magnified by flooding in 2019. In Missouri, this affected 95 counties, closed 470 state highways, and suspended rail and Amtrak service

Locks & Dams on the Mississippi River



What are ports and waterways challenges and needs?

New sources of customers

Funding

Infrastructure funding

On the Missouri River getting the navigation structures repaired so that there is a dependable 9' river channel, so barges are not required to be short loaded.

the clearance on bridges - require special types of freight containers

container on barge, MO river channel dredging

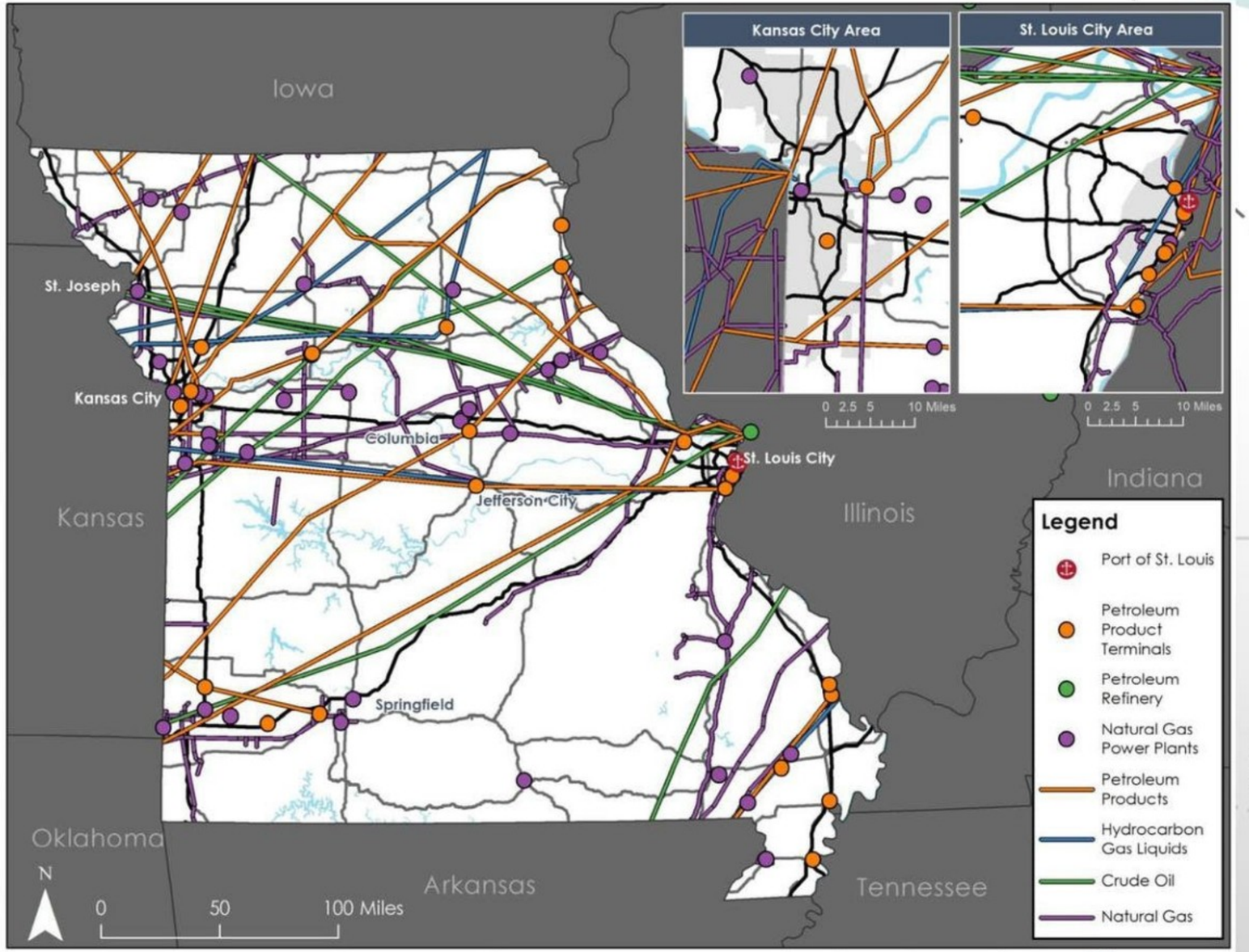
Climate resilience and flood control

Pipeline

Pipelines Infrastructure - Missouri sits in the middle of a vast pipeline network

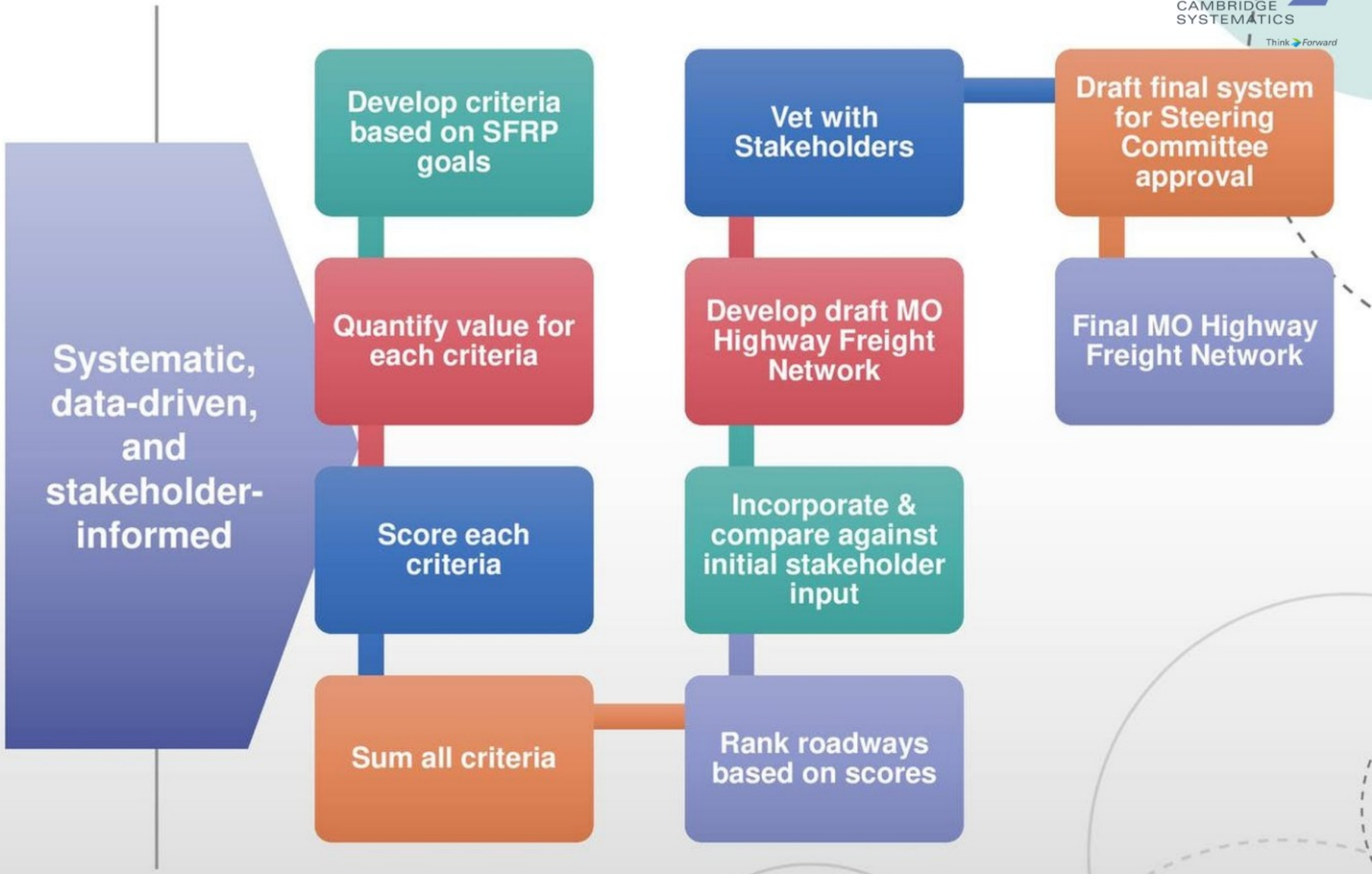
Pipelines – Terminals

- Pipeline terminals are where liquids are loaded or unloaded
- Major terminals include:
  - Petroleum product terminals – store > 50,000 barrels
  - Petroleum refineries
  - Natural Gas Power Plants



MO Freight Network Designation

MO Highway Freight Network Designation Process



Freight System Designation Criteria

Economic Factors

Examines demographic preparedness, freight intensity, and supporting industries.

- *Population Growth*
- *Workforce Size*
- *Educational Attainment*
- *Freight Employment Intensity*
- *Key Military Facilities*

Strategic Supply Chain Factors

Provides understanding of how businesses move goods between suppliers, producers, distributors, and final consumers.

- *Support of Targeted Industries*
- *Support for Targeted Industries businesses*
- *Employment Size for Targeted Industries businesses*
- *Support for Commodities Associated with Targeted Industries (Tonnage)*
- *Support for Commodities Associated with Targeted Industries (Value)*

= Rail Freight System Factors

Freight System Designation Criteria

Goods Movement Factors

Metrics covering tonnage, value, and volume of goods moving across the state.

- *Daily Truck Volumes*
- *Absolute Vehicle Miles Traveled (VMT)*
- *VMT by Lane Mile*
- *Percent Truck*
- *Total Tonnage*
- *Total Value*
- *Tonnage Growth*
- *Value Growth*

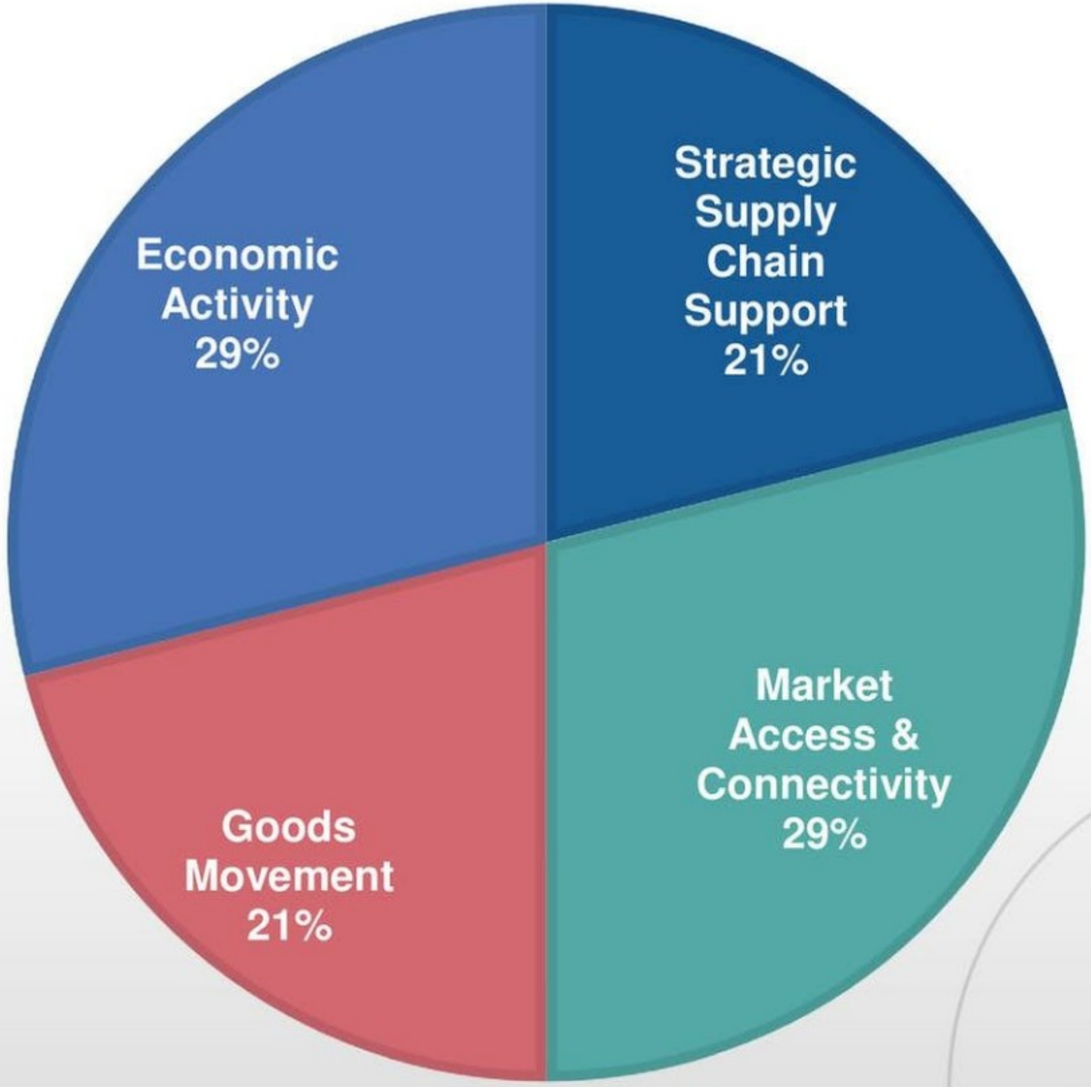
Market Access & Connectivity Factors

Evaluates intermodal connectivity, connectivity (connections to rail, pipeline, airport, etc.) to trading partners and international gateways.

- *Intermodal Connectivity*
- *High-Diversity Market Gateway Access*
- *Market Gateway Access*

= Rail Freight System Factors

Freight System Designation Criteria: Final Weighting



Next Steps

- Develop draft network based on quantitative analysis
- Distribute to Steering Committee for input (week of November 30)
  - Web-based map that will allow for comments to be added directly
  - Electronic file of map and comment form to scan and submit

Next Steps

Schedule and Key Milestones

Next 90 days

- Finalize Missouri Freight Profile
- Finalize designation of Missouri Priority Freight Network
- Develop MoFAS tool
- Complete economic assessments
- Draft needs assessment
- Stakeholder survey, forums and 3rd Steering Committee Meeting

Discussion

Thank you!

Cheryl Ball, IMPM
MoDOT Project Manager
Waterways and Freight Administrator
o: 573.526.5578
e: Cheryl.Ball@MoDOT.MO.gov

Liz Prestwood
MoDOT Deputy Project Manager
Policy and Innovation Program Manager
o: 417.829.8016
e: Elizabeth.prestwood@modot.mo.gov