Existing Conditions

Kansas City Regional Freight Study

CONNECTED FREIGHT KC 2050

A Plan in Action

Prepared for:

Mid-America Regional Council

In coordination with

Lawrence-Douglas County Metropolitan Planning Organization

And

Pioneer Trails Regional Planning Commission

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Acronyms and Abbreviations

ADT	Average Daily Traffic
BLS	United States Bureau of Labor Statistics
BNSF	Burlington Northern Santa Fe Railroad
BTS	Bureau of Transportation Statistics
CPKC	Canadian Pacific Kansas City Railroad
CRFC	Critical Rural Freight Corridor
CUFC	Critical Urban Freight Corridor
FAF	Freight Analysis Framework
FHWA	Federal Highway Administration
GIS	Geographic Information System
GPS	Global Positioning System
KAW	Kaw River Railroad
KCI	Kansas City International Airport
KCT	Kansas City Terminal Railway
LDCMPO	Lawrence-Douglas County Metropolitan Planning Organization
LQ	Location Quotient
LRTP	Long-Range Transportation Plan
MARC	Mid-America Regional Council
MNA	Missouri & Northern Arkansas Railroad
MoDOT	Missouri Department of Transportation
NAFTA	North American Free Trade Agreement
NAICS	North American Industry Classification System
NASS	National Agricultural Statistics Service
NGL	Natural Gas Liquid
NHFN	National Highway Freight System
NMFN	National Multimodal Freight Network
NS	Norfolk Southern Railway
PDO	Property Damage Only
PHFS	Primary Highway Freight System
PTRPC	Pioneer Trails Regional Planning Commission
RBA	Rentable Building Area

TAZ	Transportation Analysis Zone
UP	Union Pacific Railroad
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
VMT	Vehicle Miles Traveled

1. Executive Summary

The Mid-America Regional Council (MARC),[1] in coordination with Lawrence-Douglas County Metropolitan Planning Organization (LDCMPO) in Kansas and Pioneer Trails Regional Planning Commission (PTRPC) in Missouri, is developing a freight plan, Connected Freight KC 2050: A Plan in Action. The study region for this freight plan encompasses 14 counties – MARC's nine counties,[2] LDCMPO's one county,[3] and PTRPC's four counties,[4] as shown in **Figure 1**.

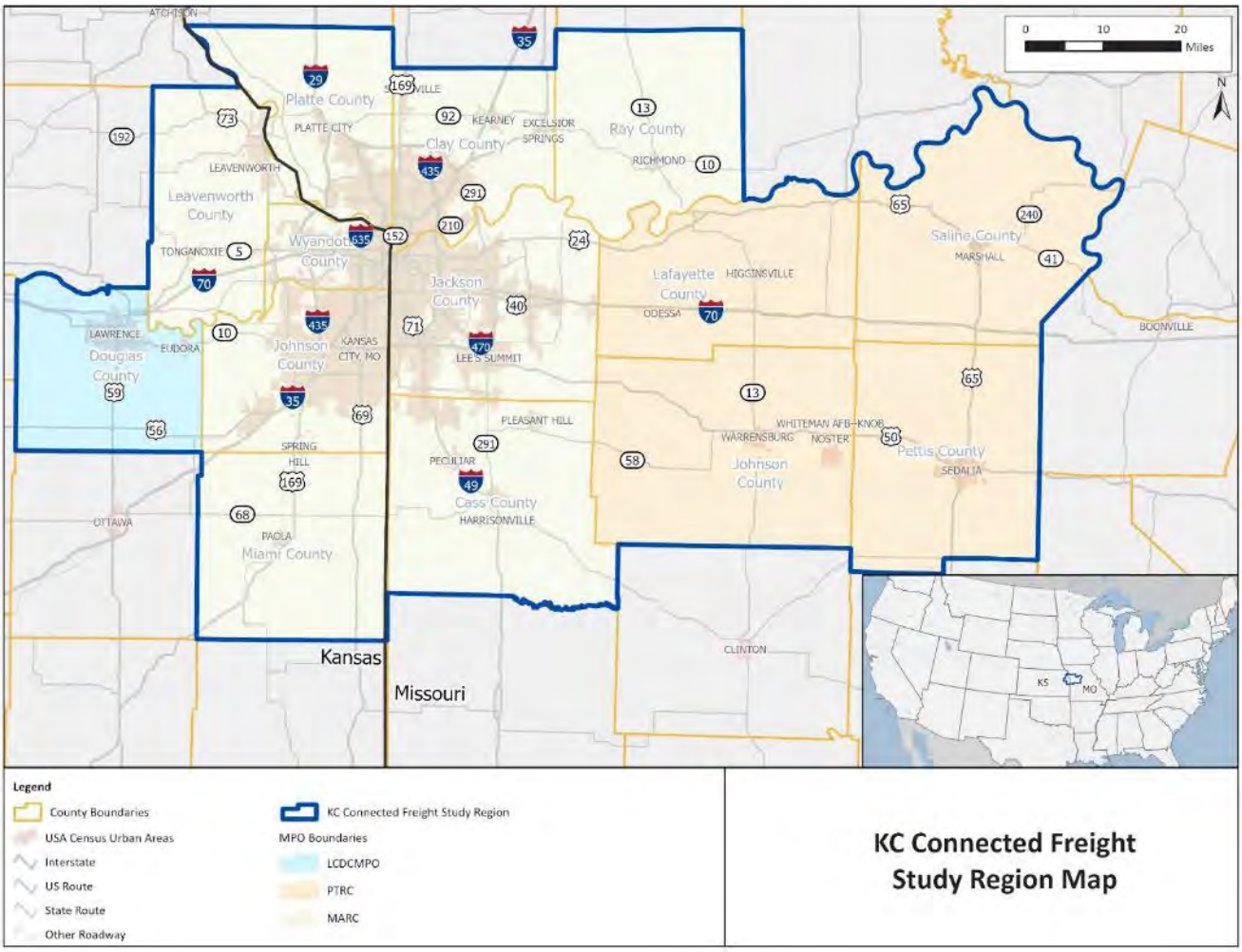


Figure 1. Study Region Map

[1] A nonprofit association of city and county governments and the metropolitan planning organization for the bi-state Kansas City region.

[2] Johnson, Leavenworth, Miami and Wyandotte counties in Kansas, and Cass, Clay, Jackson, Platte and Ray counties in Missouri.

[3] Douglas County in Kansas.

[4] Johnson, Lafayette, Pettis and Saline counties in Missouri.

This document includes a draft set of regional freight plan goals, and an inventory and existing conditions of the region's multimodal freight system for the 14-county and bi-state Kansas City region.

1.1. Draft Regional Freight Plan Goals

Based on the various policies and plans reviewed, similar and unique goal categories have been summarized in **Table 1**. Draft regional freight plan goals for consideration by regional stakeholders include:

- **Transportation Options and Economic Vitality:** Enhance transportation options and economic vitality with a greater focus on the regional industries/businesses that are reliant on freight transportation, create high-paying jobs, and enhance workforce skills.
- **Safety, Security and Resiliency:** Enhance safety, security, and resiliency of the freight transportation system for all users and under all weather conditions.
- **Maintenance and Service:** Maintain freight transportation system assets in good condition and improve connections to multi-customer and multimodal freight service facilities.
- **Mobility and Reliability:** Improve efficiency and reliability of freight operations for all users and for all seasons.
- **Public Health and Equity:** Address freight related public health and quality of life issues in an equitable manner.
- **Environment and Energy Conservation:** Reduce impacts of freight on the natural environment and support energy conservation by reducing engine idling, greenhouse gas emissions, and encouraging efficient freight operations.
- **Innovation:** Support state and national initiatives and partnerships for advancement in commercial vehicle technology and service innovation.

Table 1. Goals Summary for Reviewed Policy/Plans

Policy/Plan	Goal Category															
	Transportation Choices (Accessibility)	Service (Connectivity)	Mobility	Reliability	Safety	Security	Resiliency	Economic Vitality	Workforce	Infrastructure and Maintenance	Technology and Innovation	Partnerships	Health/Quality of Life	Environment	Equity	Energy/Resources Use
National Multimodal Freight Policy[1]		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		
National Freight Strategic Plan[2]					✓	✓	✓	✓		✓	✓		✓			
Kansas State Freight Plan[3]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		
Missouri State Freight and Rail Plan[4]		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓
MARC Connected Freight KC 2050 Plan[5]	✓	✓	✓		✓	✓	✓	✓	✓	✓			✓	✓		
LDCMPO Transportation 2050 Plan[6]	✓		✓	✓	✓	✓				✓			✓	✓	✓	✓
PTRPC Regional Transportation Plan[7]	✓	✓			✓			✓	✓	✓						

Sources:

[1] Fixing America's Surface Transportation Act – FAST Act § 8001; 49 U.S.C. 70101, National Multimodal Freight Policy, Effective Date: October 1, 2015, Available at: www.govinfo.gov/content/pkg/USCODE-2022-title49/pdf/USCODE-2022-title49-subtitleIX-chap701-sec70101.pdf (last accessed on August 9, 2024)

[2] www.transportation.gov/sites/dot.gov/files/2020-09/NFSP_fullplan_508_0.pdf (last accessed on August 9, 2024)

[3] www.ksdot.gov/Assets/wwwksdotorg/bureaus/burRail/Rail/Documents/2023/KansasStateFreightPlan_FHWA_Approved.pdf (last accessed on August 9, 2024)

[4] www.modot.org/sites/default/files/documents/SFRP%20Goals%2C%20Objectives%2C%20and%20Performance%20Measures%20FINAL.pdf (last accessed on August 9, 2024)

[5] https://connectedkc.org/ (last accessed on August 9, 2024)

[6] https://assets.lawrenceks.org/mpo/T2050/T2050-A1.pdf (last accessed on August 9, 2024)

[7] https://www.trailsrpc.org/wp-content/uploads/RTP-2024-Draft_Approved-5.29.24.pdf (last accessed on August 9, 2024)

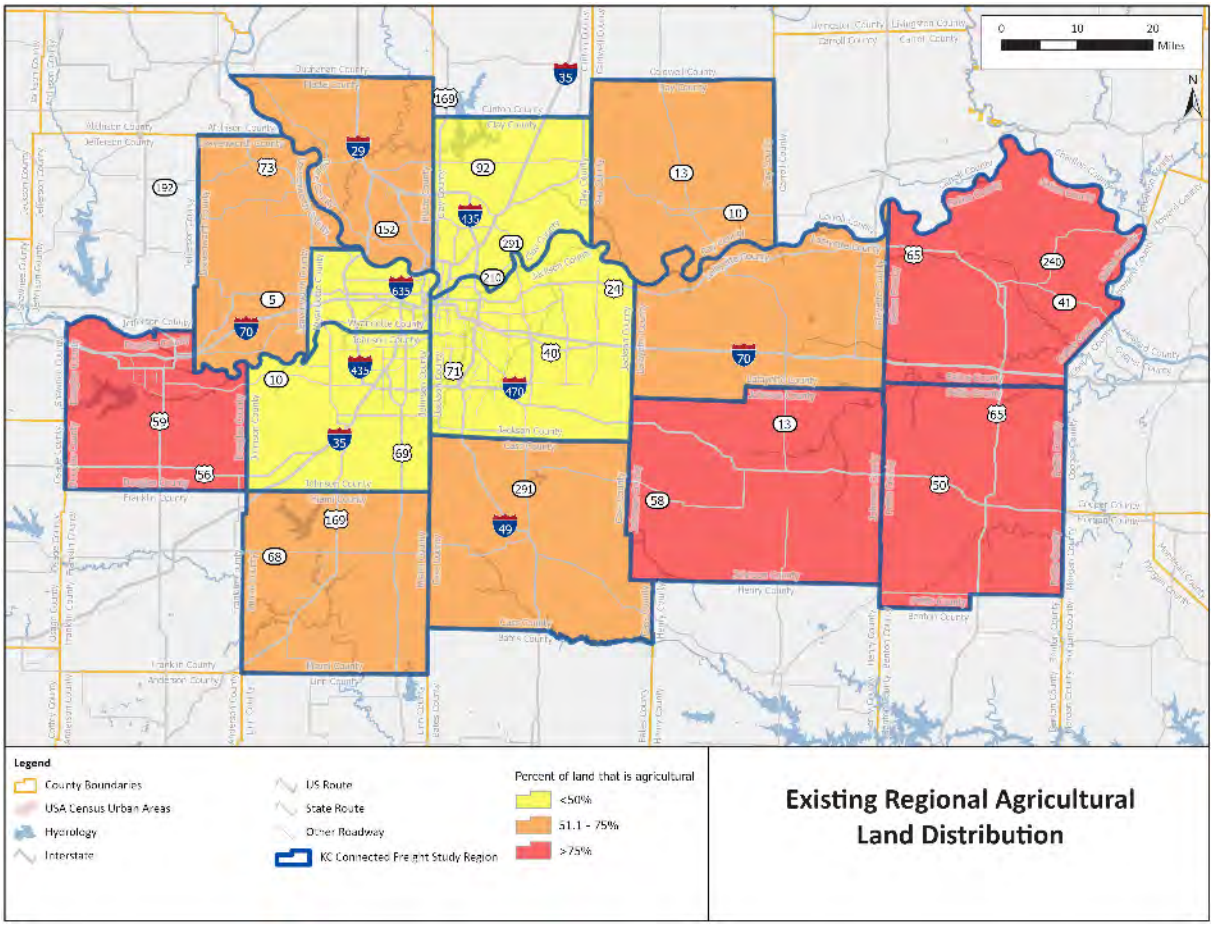
1.2. Regional Freight Picture

1.2.1. Land Uses and Industry Clusters

Counties in the MARC region specialize in industrial and commercial activities. Many of the counties outside the MARC region specialize in agricultural production—both crops and livestock related.

Agriculture Land Uses

In the region, about 4,800 square miles or 62 percent of the total land area is occupied by farms.[5] This averages 52 percent in the Kansas study area and 66 percent in the Missouri study area. Agriculture forms larger than 75 percent of the total land areas in the counties of Douglas County in Kansas and Johnson, Pettis, and Saline counties in Missouri (**Figure 2**).



Source: United States Department of Agriculture (USDA) National Agricultural Statistics Service (NASS), 2022 Census of Agriculture County Profiles, and U.S. Census Land Area Data

Figure 2. Existing Regional Agricultural Land Distribution Map

[5] As per USDA, a farm is any place from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the year. Land in farms consists of agricultural land used for crops, pasture, or grazing. In other words, this includes cropland for growing crops as well as ranches for raising livestock.

Soybeans and corn are the primary crops that support animal feed and consumer food (cereal, alcohol, sweeteners) production, fuel production (biodiesel and ethanol), and exports. In 2022, the region sold $1.9 billion in agricultural goods, which is 45 percent higher than 2017 (63 percent from crop sales and 37 percent comes from livestock, poultry, and other agricultural products sales). As of January 2023, the region also has 368,000 cattle and calves that support meat production.

An inventory of grain elevators was developed for the identification of farm-to-market routes. Regional data on the size or location of nodes of the supply chain for agriculture including grain processing plants, ethanol production plants, livestock/poultry producers, breeders, growers and feedlot farms, and meat and other food processing plants is not available. Due to the existence of better agricultural facilities data, the transportation demand of agricultural land uses can be understood more granularly. An interregional truck travel patterns analysis was conducted using Geotab data[6] that defined sub-areas of counties that have agriculture-heavy land uses. The analysis also highlighted truck movements to/from these sub-areas.

Industrial and Commercial Land Uses and Clusters

According to CoStar data,[7] the region has 7,356 industrial buildings[8] existing and under construction that contribute 373 million square feet of total rentable building area. Seventy-three percent of existing space is used as warehouses and distribution centers, and 21 percent is used for manufacturing and food processing. In addition, the region also has 17,910 commercial buildings[9] existing and under construction that contribute 278 million square feet of total rentable building area.

Based on an analysis of building age distribution, there has been a gradual shift of industrial and commercial buildings and rentable building area from Jackson County in Missouri to Johnson County in Kansas.

Industrial and commercial rentable building area totals over aggregated geographies[10] in the study region are shown as industry property clusters and commercial property clusters maps in **Figure 3** and **Figure 4**. Only 48 aggregated geographies have industrial rentable building areas

[6] https://www.geotab.com/vehicle-telematics/ (last accessed on August 9, 2024)

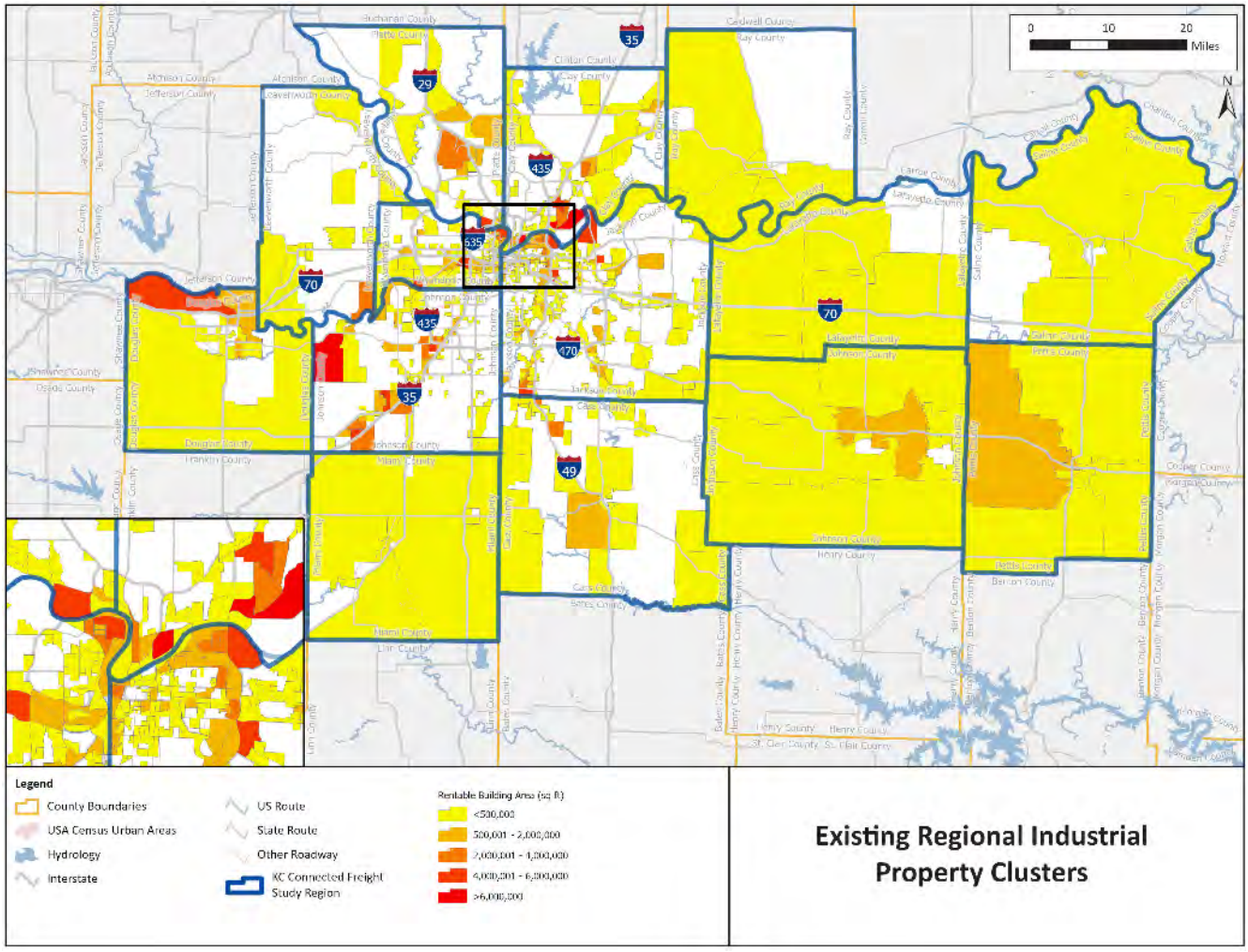
[7] https://www.costar.com/products/property-records (last accessed on August 9, 2024)

[8] As per CoStar, industrial property is a type of building adapted for a combination of uses such as assemblage, processing, and/or manufacturing products from raw materials or fabricated parts. Additional uses include warehousing, distribution, and maintenance facilities.

[9] This includes office and retail properties. As per CoStar, an office property's primary intended use is to house employees of companies that produce a product or service primarily for support services such as administration, accounting, marketing, information processing and dissemination, consulting, human resources management, financial and insurance services, educational and medical services, and other professional services. A retail property's primary intended use is to promote, distribute or sell products and services to the general public. They can be stand-alone (convenience stores to department stores), store fronts, strip centers (no anchors), neighborhood, community, regional, and super-regional malls, power centers, factory outlet centers, and fashion or specialty centers.

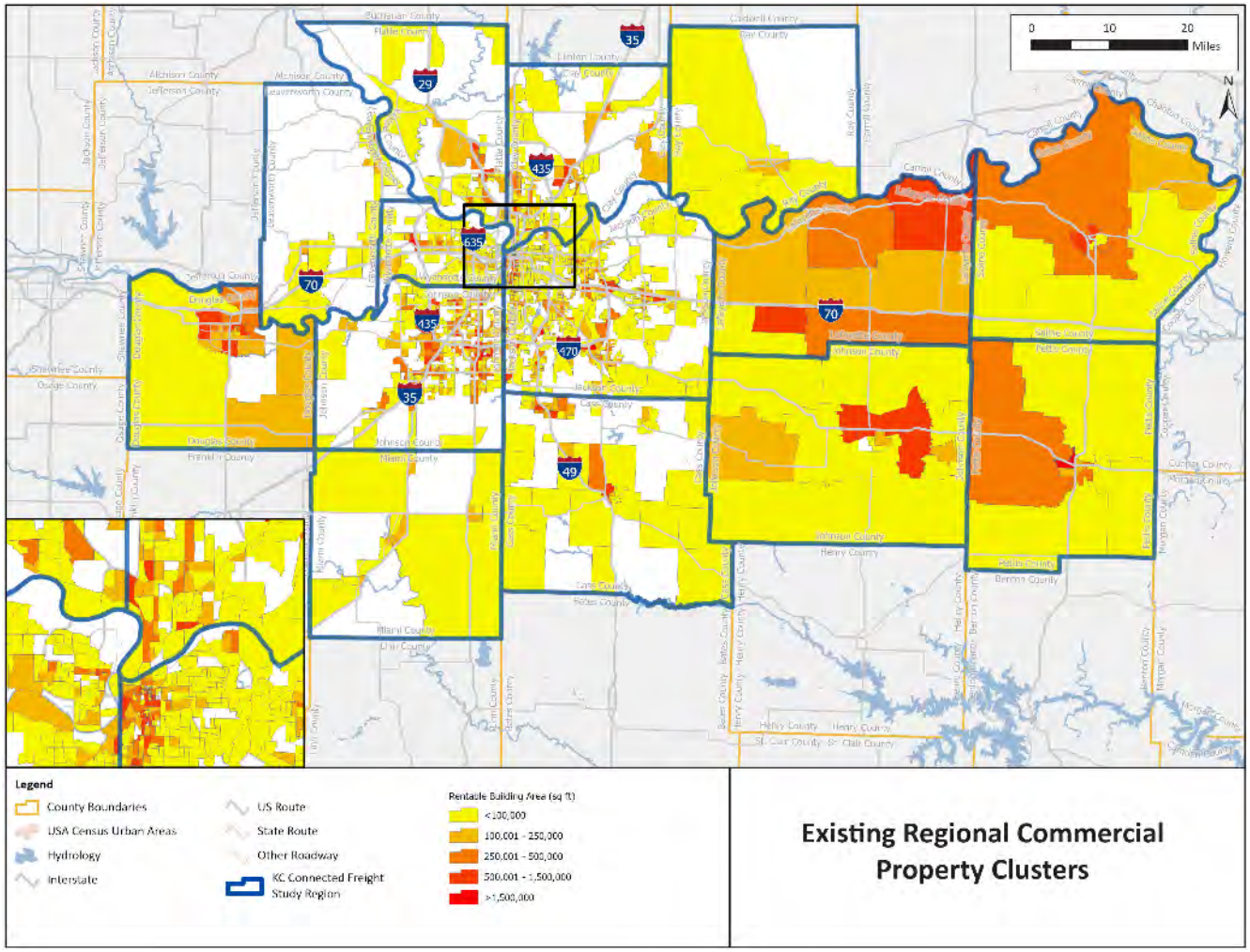
[10] Transportation analysis zones (TAZs) in MARC counties and census tracts in non-MARC counties

over 2 million square feet and together contribute 181 million square feet, or about 49 percent of the regional total industrial rentable building area. On the other hand, only 130 aggregated geographies have commercial rentable building areas over 500,000 square feet and together contribute 112 million square feet, or about 40 percent of the regional total commercial rentable building area.



Source: CoStar Real-Estate Properties Database, MARC's snapshot downloads in April and May 2024; MARC's Transportation Analysis Zones geographic information system (GIS) Data; ESRI's Census Tract Boundaries GIS Data

Figure 3. Existing Regional Industrial Property Clusters Map



Source: CoStar Real-Estate Properties Database, MARC's snapshot downloads in April and May 2024; MARC's Transportation Analysis Zones GIS Data; ESRI's Census Tract Boundaries GIS Data

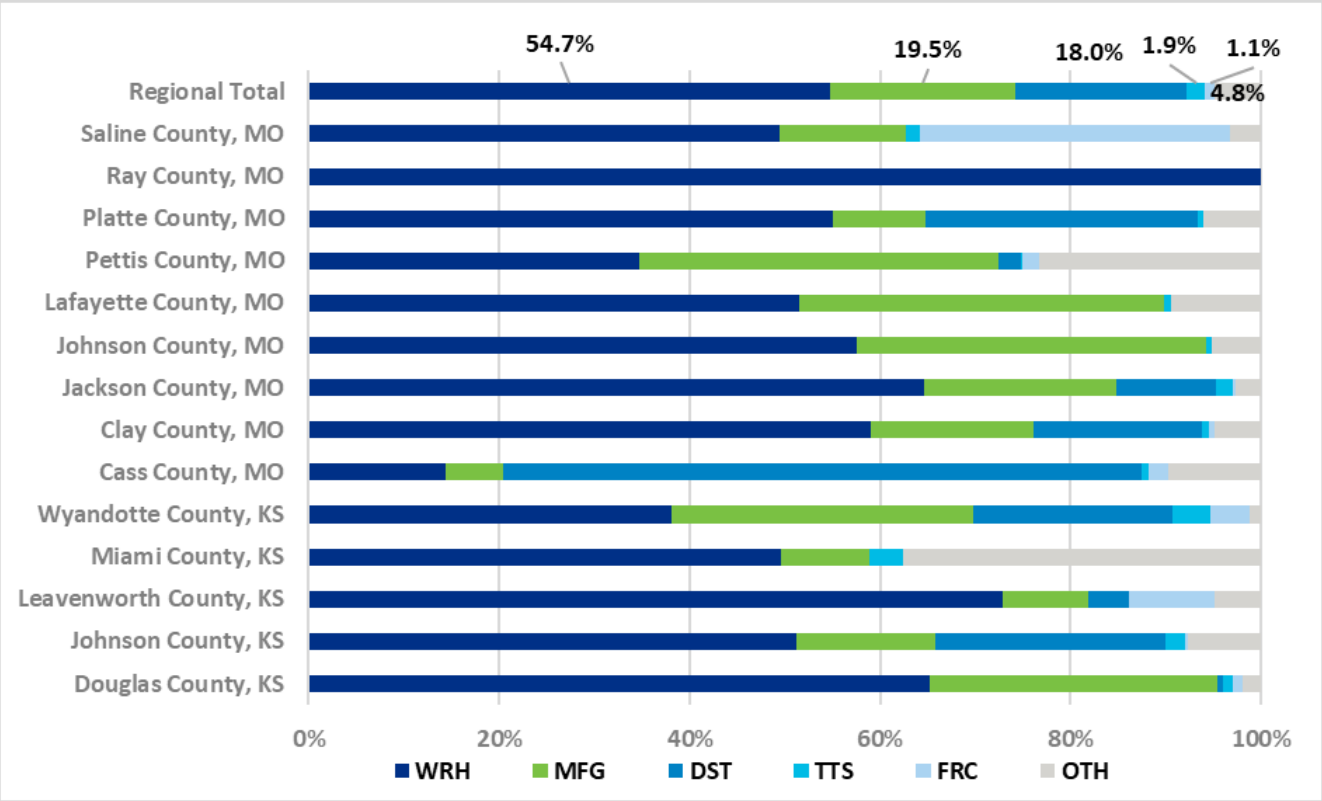
Figure 4. Existing Regional Commercial Property Clusters Map

The 48 top industrial land use geographies are located in CoStar defined cluster regions (and some constituent CoStar submarkets) of North of Missouri River (Claycomo, City of North Kansas City, Airport/North Platte County, Riverside/Parkville, and Liberty) and South Johnson County in Kansas (Olathe), East Jackson County (Independence, Executive Park, and East Bottoms Kansas City), Wyandotte County (Central Kansas City/Fairfax, Armourdale, Turner, and Bonner Springs), South Jackson County (Grandview), North Johnson County (Lenexa), Downtown Kansas City, parts of Lawrence County and Leavenworth County in Kansas and parts of Cass County in Missouri.

The 130 top commercial land use geographies are found in CoStar defined cluster regions (and some constituent CoStar submarkets) of South Johnson County in Kansas (College Blvd and other parts), several parts of Jackson County (East, Northeast, Northwest, and Southeast), North of Missouri River, Downtown Kansas City (central business district, Crown Center, Freight House

District, and West Bottoms), South Kansas City (Ward Parkway and other parts), Midtown (Country Club Plaza and other parts), parts of Lawrence, parts of Leavenworth County in Kansas and parts of Cass, Johnson, and Lafayette counties in Missouri.

Industrial properties including warehouses and distribution centers make up 262 million square feet or 73 percent of the regional total existing rentable building area (**Figure 5**). The leading counties in terms of rentable building area for warehouses and distributions centers are Johnson and Wyandotte counties in Kansas and Clay and Jackson counties in Missouri. Manufacturing use is concentrated in Johnson and Wyandotte counties in Kansas and Jackson County in Missouri. Food processing, refrigeration and cold storage use is concentrated in Leavenworth and Wyandotte counties in Kansas. Truck terminals and services are concentrated in Johnson and Wyandotte counties in Kansas and Jackson County in Missouri.



Source: CoStar Real-Estate Properties Database, MARC's snapshot downloads in April and May 2024
Note: WRH = Warehousing, MFG = Manufacturing, DST = Distribution, TTS = Truck Terminals and Services, FRC = Food Processing, Refrigeration

Figure 5. Existing Industrial Properties Secondary Use Type Distribution

Major Employers and Regional Specialization

There are 52 major employers in the study region with more than 500 employees specializing in manufacturing and distribution. Nineteen specialized goods movement dependent on private sector industries in the study region have a location quotient for employment greater than 1.0

(**Table 2**). Land use and transportation policies developed in this plan should support major regional employers and specialized industries.

Table 2. Specialized and Goods Movement Dependent Industries

Private Sector Industry with Location Quotient > 1.0	Jobs	Share of Regional Total Jobs	Location Quotient
NAICS 323 Printing and related support activities	5,444	0.47%	1.95
NAICS 334 Computer and electronic product manufacturing	11,993	1.04%	1.44
NAICS 493 Warehousing and storage	20,153	1.74%	1.43
NAICS 488 Support activities for transportation	8,579	0.74%	1.40
NAICS 492 Couriers and messengers	10,850	0.94%	1.34
NAICS 336 Transportation equipment manufacturing	17,502	1.51%	1.31
NAICS 484 Truck transportation	15,208	1.31%	1.30
NAICS 459 Sporting goods, hobby, musical instrument, book, and miscellaneous retailers	13,741	1.19%	1.20
NAICS 423 Merchant wholesalers, durable goods	29,741	2.57%	1.16
NAICS 444 Building material and garden equipment and supplies dealers	11,672	1.01%	1.10
NAICS 325 Chemical manufacturing	7,347	0.63%	1.08
NAICS 424 Merchant wholesalers, nondurable goods	18,019	1.56%	1.08
NAICS 456 Health and personal care retailers	8,990	0.78%	1.08
NAICS 238 Specialty trade contractors	40,826	3.52%	1.07
NAICS 425 Wholesale trade agents and brokers	4,113	0.36%	1.06
NAICS 455 General merchandise retailers	25,368	2.19%	1.04
NAICS 322 Paper manufacturing	2,793	0.24%	1.03
NAICS 441 Motor vehicle and parts dealers	15,706	1.36%	1.02
NAICS 449 Furniture, home furnishings, electronics, and appliance retailers	6,505	0.56%	1.02
TOTAL	**274,550**	**23.7%**	

Source: U.S. Bureau of Labor Statistics (BLS) - Quarterly Census of Employment and Wages – 2023 Annual Average Employment, All establishment sizes for 14-County Kansas City Study Region Counties and U.S.

Note: Location Quotient (LQ) for an industry was computed as an industry's share of the regional employment total divided by the industry's share of national total employment.

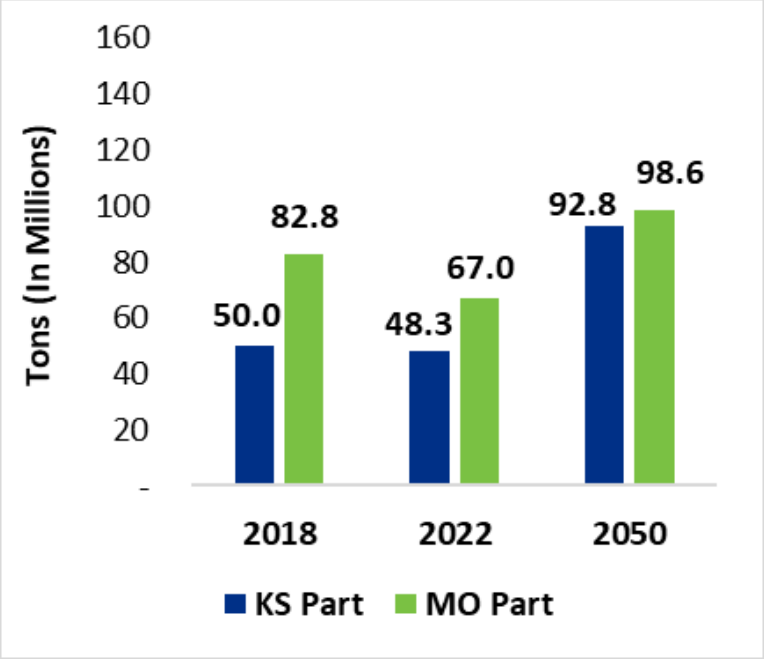
1.2.2. Multimodal Freight Flow Profiles

Multimodal freight flows in the study region were analyzed using origin-destination zones in the Freight Analysis Framework (FAF) database version 5.6 released in April 2024. The 2022 freight flows data in FAF 5.6 does not consider COVID-19 pandemic impacts. Long-term projections are also based on the 2017 benchmark. The FAF Kansas City study region was formed by two zones, one on the Kansas side (FAF zone 201 referred to as "Kansas Part") and another on the Missouri side (FAF zone 291 referred to as "Missouri Part"). Together these FAF zones include 12 of the 14 study region counties except Pettis County and Saline County. FAF zones include some counties that are peripheral to the study region. Due to peripheral counties having much lower populations and concentrations of freight generators than the core study region counties, the peripheral counties have minimal effects on understanding of the study region's freight flow patterns. Freight flow[11] summaries for the Kansas Part and the Missouri Part of the Kansas City study region were kept separate.

In terms of weight, the Kansas Part and the Missouri Part of the study region traded 50 million tons and 83 million tons of freight in 2018, respectively. Under a baseline scenario, the FAF projects freight tonnage to nearly double for the Kansas Part and by 50 percent for the Missouri Part by 2050 (**Figure 6**). The higher projected growth rate for the Kansas Part is largely due to a forecasted 190 percent increase in cereal grain tonnage, which is the top commodity by weight for the Kansas Part, but only a forecasted 80 percent increase in cereal grain tonnage for the Missouri Part, which is the third highest commodity by weight.

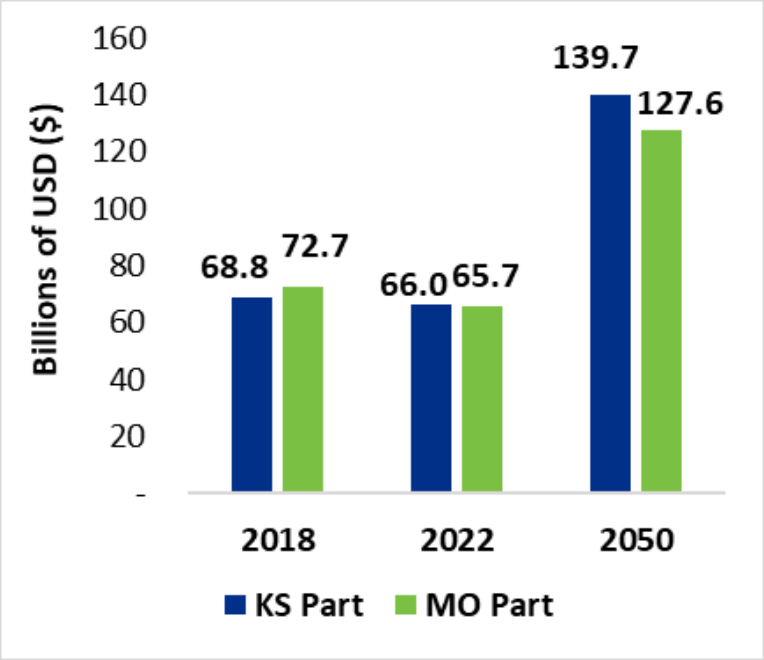
In terms of value, both the Kansas Part and Missouri Part of the study region independently traded about $70 billion in 2018. Under a baseline scenario, the FAF projects freight values to increase by 112 percent for the Kansas Part while increasing by 94 percent for the Missouri Part by 2050 (**Figure 7**).

[11] This plan uses freight flows for 2018 (FAF base year), 2022 (FAF estimate year) and 2050 (FAF projection year). This technical memorandum used the estimate/projection under a FAF baseline scenario.



Source: FAF, 2022

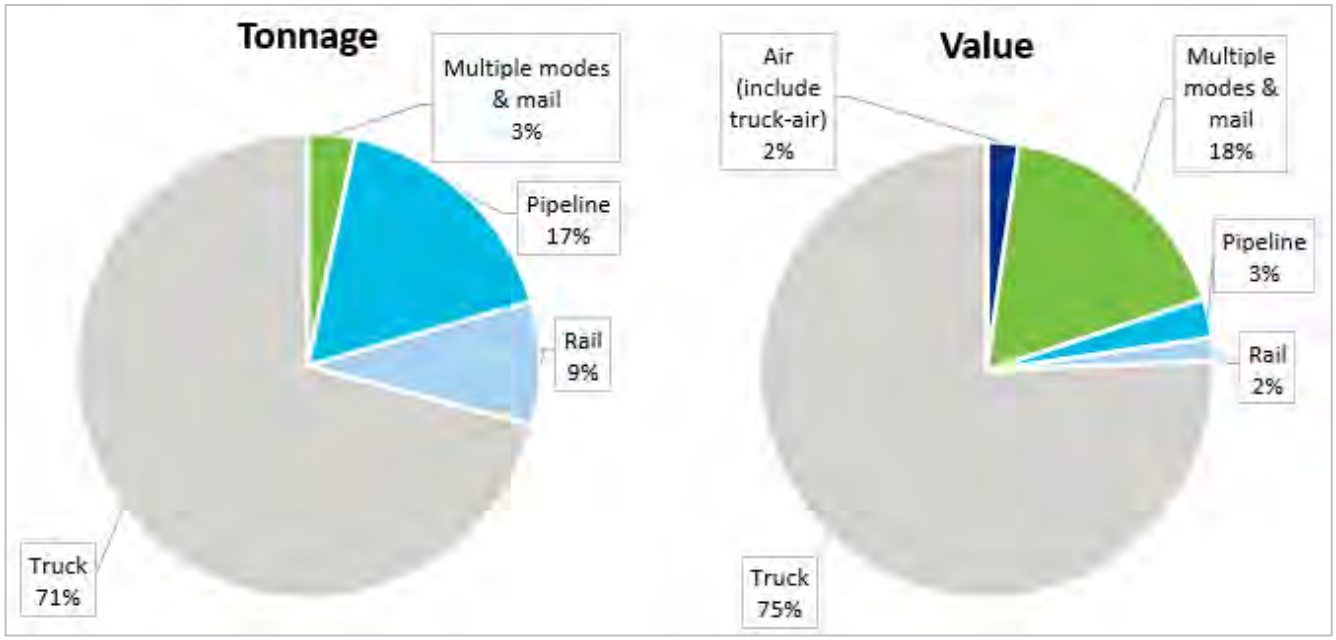
Figure 6. Projected Freight Tonnage, 2018–2050



Source: FAF, 2022

Figure 7. Projected Freight Value, 2018–2050

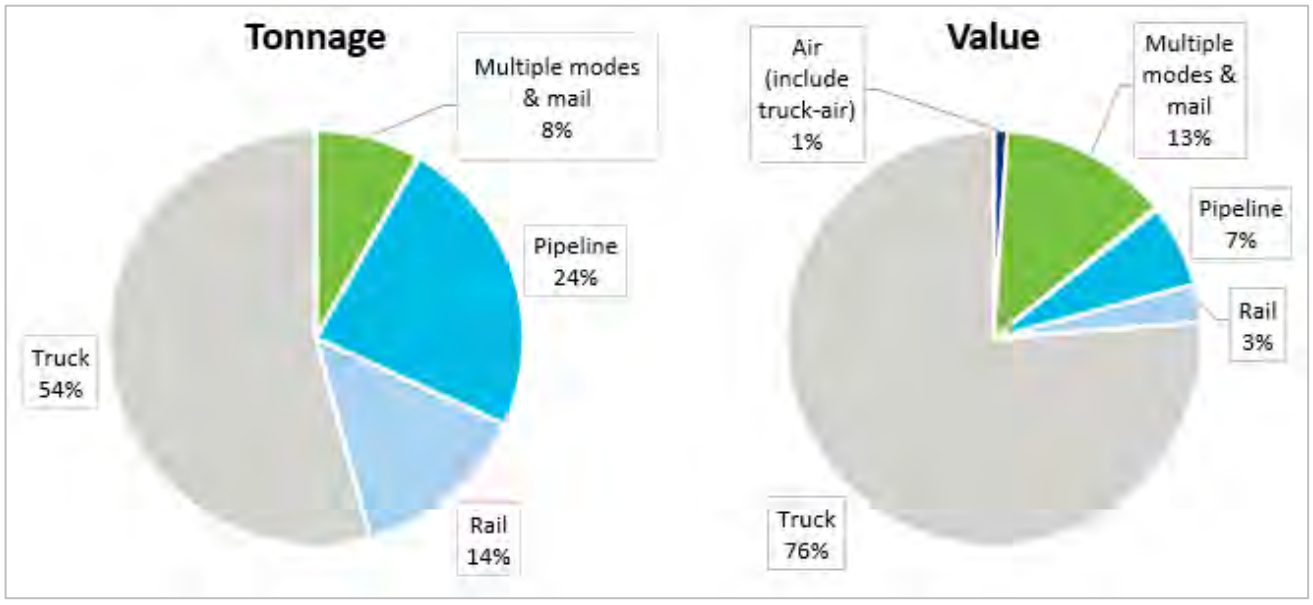
In the Kansas Part, trucks carry 71 percent of goods by tonnage and 75 percent of goods by value (**Figure 8**). Pipeline, rail, and multiple modes and mail are the other major modes in the Kansas Part of the study region.



Source: FAF, 2022

Figure 8. 2022 Mode Split by Tonnage and Value for Kansas Study Area

In the Missouri Part, trucks carry 54 percent of goods by tonnage and 76 percent of goods by value (**Figure 9**). Pipeline, rail and multiple modes and mail are the other major modes also in the Missouri Part of the study region.



Source: FAF, 2022

Figure 9. 2022 Mode Split by Tonnage and Value for Missouri Study Area

Based on the 2022 freight flows data in FAF, other key findings are as follows:

- Top commodities
  - **By Weight:** Almost 7,000 tons of cereal grains and over 6,500 tons of nonmetallic mineral products moved within and out of Kansas Part. Over 22,000 tons of natural gas and other fossil products and almost 7,000 tons of other prepared foodstuffs moved within and out of the Missouri Part.
  - **By Value:** Over $10 billion of mixed freight and over $8 billion of motorized vehicles moved within and out of the Kansas Part. Over $7.7 billion of motorized vehicles and over $6 billion of mixed freight moved within and out of the Missouri Part.
- Trade Type: Regardless of direction of freight movement, 95 percent of the Kansas Part freight flows and over 96 percent of the Missouri Part freight flows are domestic.
- Top Trading Partners
  - Most trade for each side of the Kansas City region is within the Kansas City region. For the Kansas Part, other top trading partners by weight include the rest of Kansas, the rest of Missouri, and Laredo, Texas (about 93 percent of the trade flows to Laredo, Texas are exports to Mexico). For the Missouri Part, top trading partners include the Chicagoland area, the rest of Missouri, and Iowa.
  - The top trading partners by value are like the top trading partners by weight. By value, the top trading partners for the Kansas Part include the rest of Kansas, the rest of Missouri, and Wichita, Kansas. The top trading partners by value for the Missouri Part are identical to the top trading partners by weight.

1.2.3. Intraregional Truck Travel Patterns

Interregional truck movements were analyzed using Geotab data. Trip origin and destination information was collected for medium- and heavy-duty trucks operating in the study region over the three-month period of September through November 2023, for which over 5.6 million sample records were provided representing an estimated 15 percent sampling rate for the study region, which seems reasonable and comparable to the sampling rates for other truck global positioning system (GPS) data vendors (ATRI, Streetlight) that the project team has used recently.

The highest truck activity occurs in the riverfront zones of Kansas City region where between 12 and 20 daily bi-directional truck flows per acre were observed. Less than one daily bi-directional truck flow per acre were observed outside the urbanized areas of Jackson County in Missouri, Douglas, Johnson, and Wyandotte counties in Kansas.

A heavy-duty truck share of over 60 percent is seen in the agricultural and heavy industrial land use locations within the study region. In high commercial activity and predominately light industrial land use locations, the medium-duty truck share is higher than heavy-duty truck share.

The analysis identified the top 20 origin-destination pairs for truck flows "internal" to the study region as shown in **Figure 10**. The riverfront industrial areas in Platte, Jackson, and Clay Counties in Missouri and Wyandotte County in Kansas, and the industrial/logistics complex along I-35 in Johnson County in Kansas act as freight hubs.

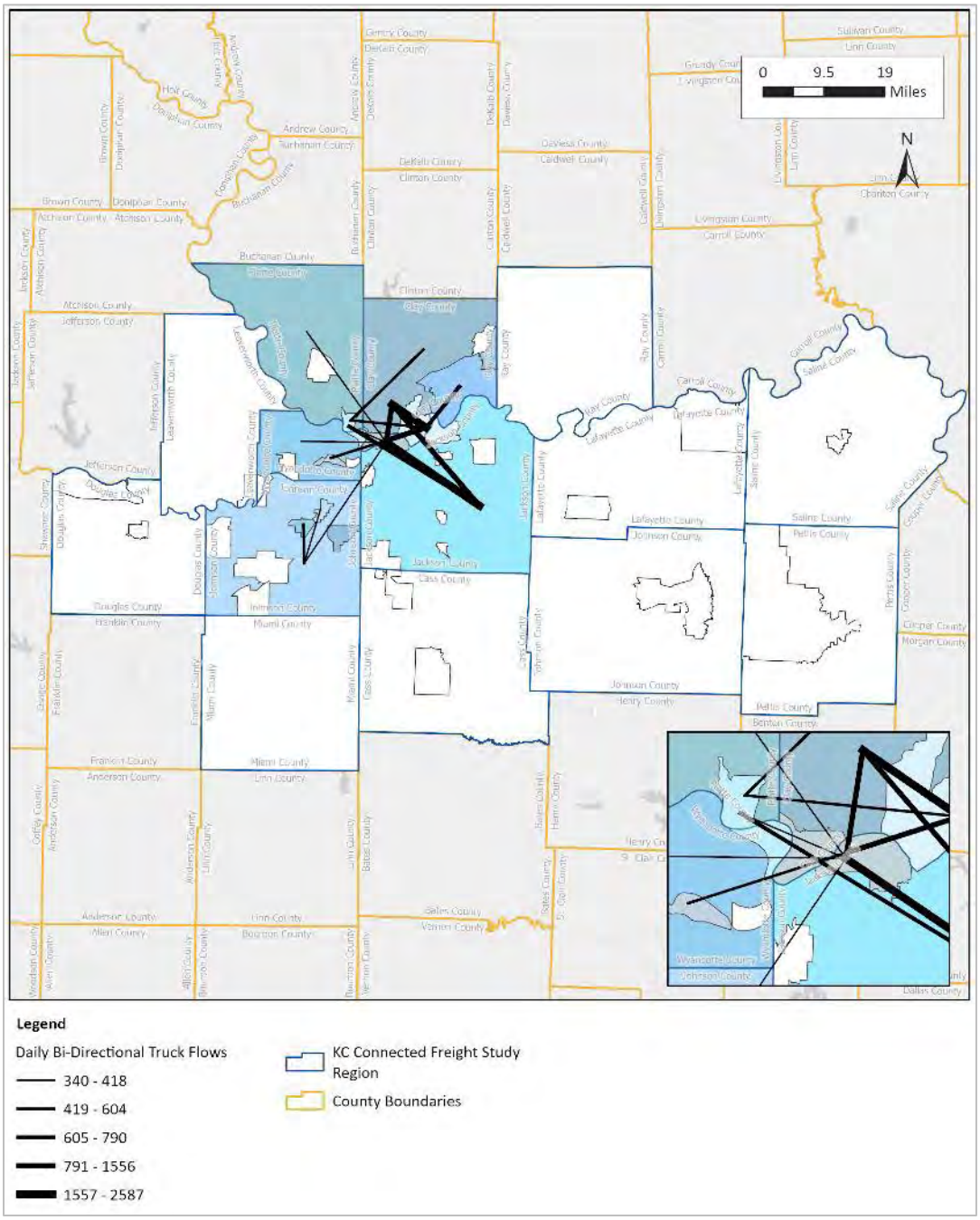


Figure 10. Top 20 Daily Bi-Directional "Internal" Origin-Destination Total Truck (Medium and Heavy) Flows

1.3. Existing Infrastructure Inventory and Assessment

Figure 11 shows the existing multimodal freight system serving the Kansas City study region. This includes the highway system, rail system, airports, ports, and truck parking facilities. Separately, this plan looked at the locations of pipelines and intermodal facilities.

Kansas City is the third largest trucking hub in the nation in terms of tonnage.[12] The region's highways have approximately 435 miles with a National Highway Freight Network (NHFN) designation, among which, 57.5 percent are Primary Highway Freight System (PHFS), 33.9 percent are Non-Primary Highway Freight System (Non-PHFS), 5.2 percent are Critical Urban Freight Corridors (CUFC) and 3.4 percent, are Critical Rural Freight Corridors (CRFC) type.

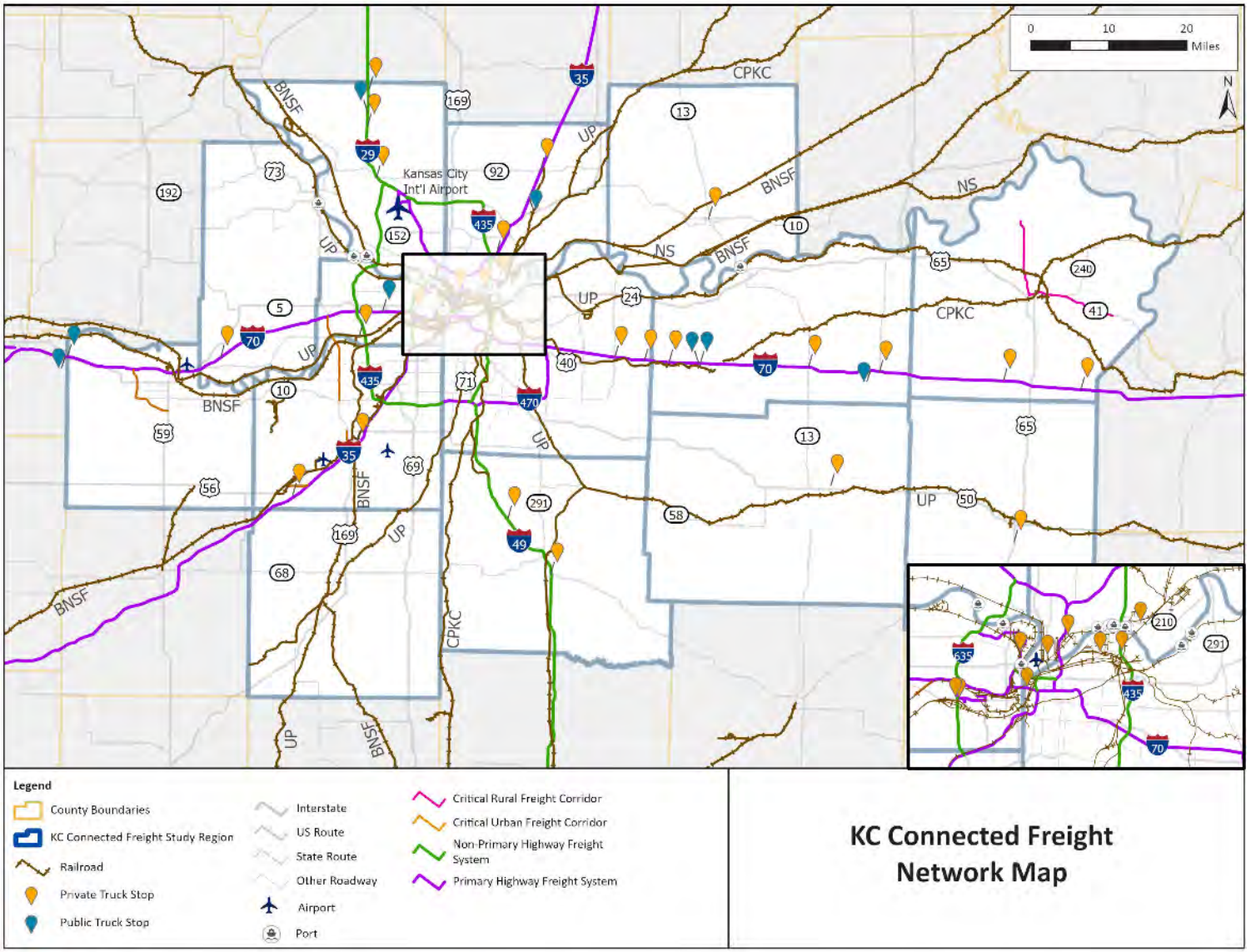
Kansas City is the largest rail hub in the nation in terms of tonnage.[13] The region is served by the Class I railroads of Burlington Northern Santa Fe (BNSF), Canadian Pacific Kansas City (CPKC), Norfolk Southern (NS), and Union Pacific (UP), regional short line railroads of Kaw River Railroad (KAW) and Missouri & Northern Arkansas (MNA), and a switching and terminal railroad of Kansas City Terminal Railway Company (KCT).

Kansas City International (KCI), the Port of Kansas City, and pipeline systems perform important freight functions in the region as well. The region is served by 33 private and 10 public, or a total of 43 truck parking facilities providing 1,614 parking spaces. Most truck parking facilities come with a wide range of trucker amenities.

Figure 12 shows the distribution of truck traffic in truck average daily traffic (ADT) within the study region. **Figure 13** shows national intermodal rail traffic flows in annual tons through the study region and **Figure 14** shows the rail traffic in daily freight train counts entering and/leaving the study region boundary.

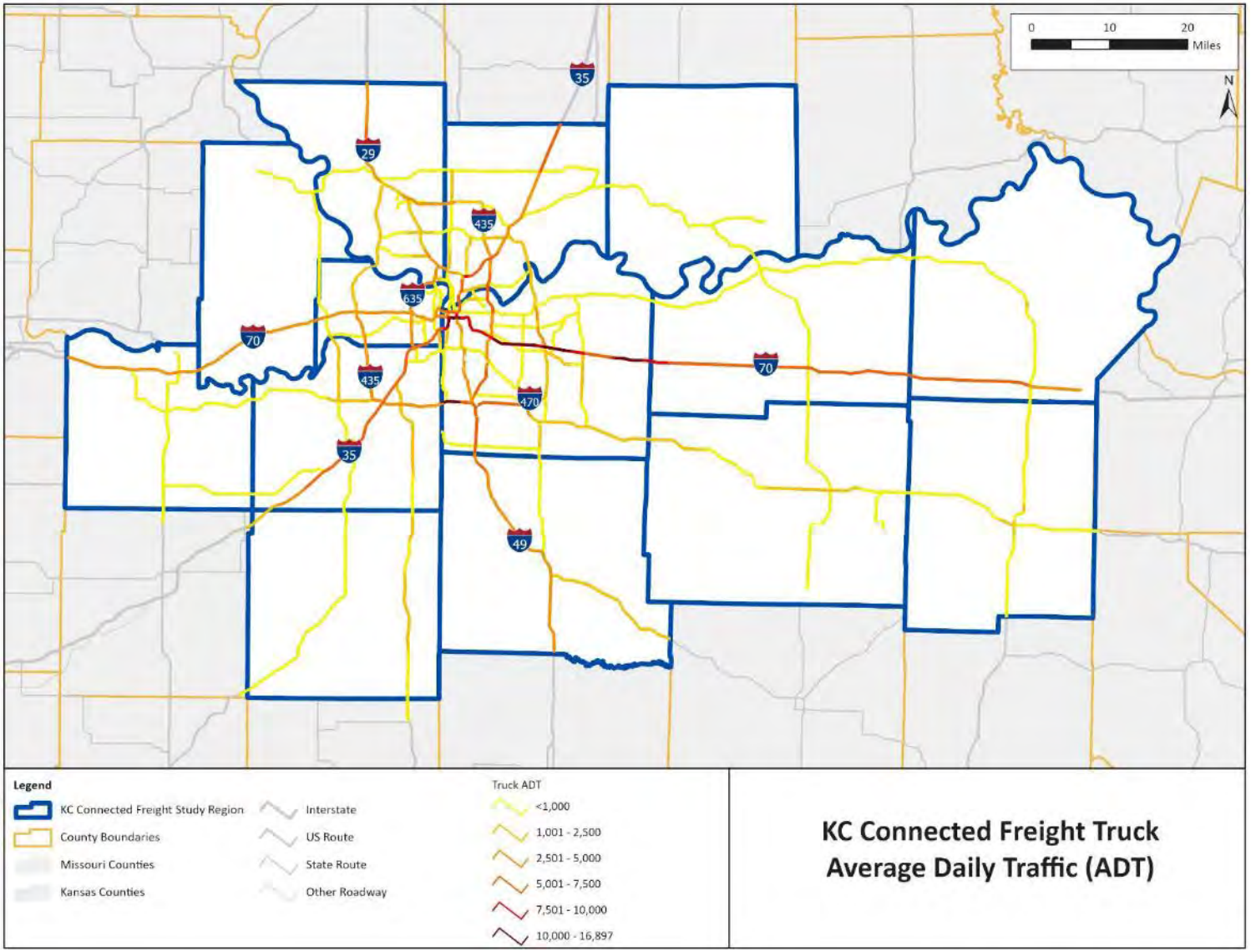
[12] City of Kansas City, MO – Smart City Vision Proposal, February 4, 2016, Available at: https://www.transportation.gov/sites/dot.gov/files/docs/Kansas%20City%20Vision%20Narrative.pdf (last accessed on August 9, 2024)

[13] City of Kansas City, MO – Smart City Vision Proposal, February 4, 2016, Available at: https://www.transportation.gov/sites/dot.gov/files/docs/Kansas%20City%20Vision%20Narrative.pdf (last accessed on August 9, 2024)



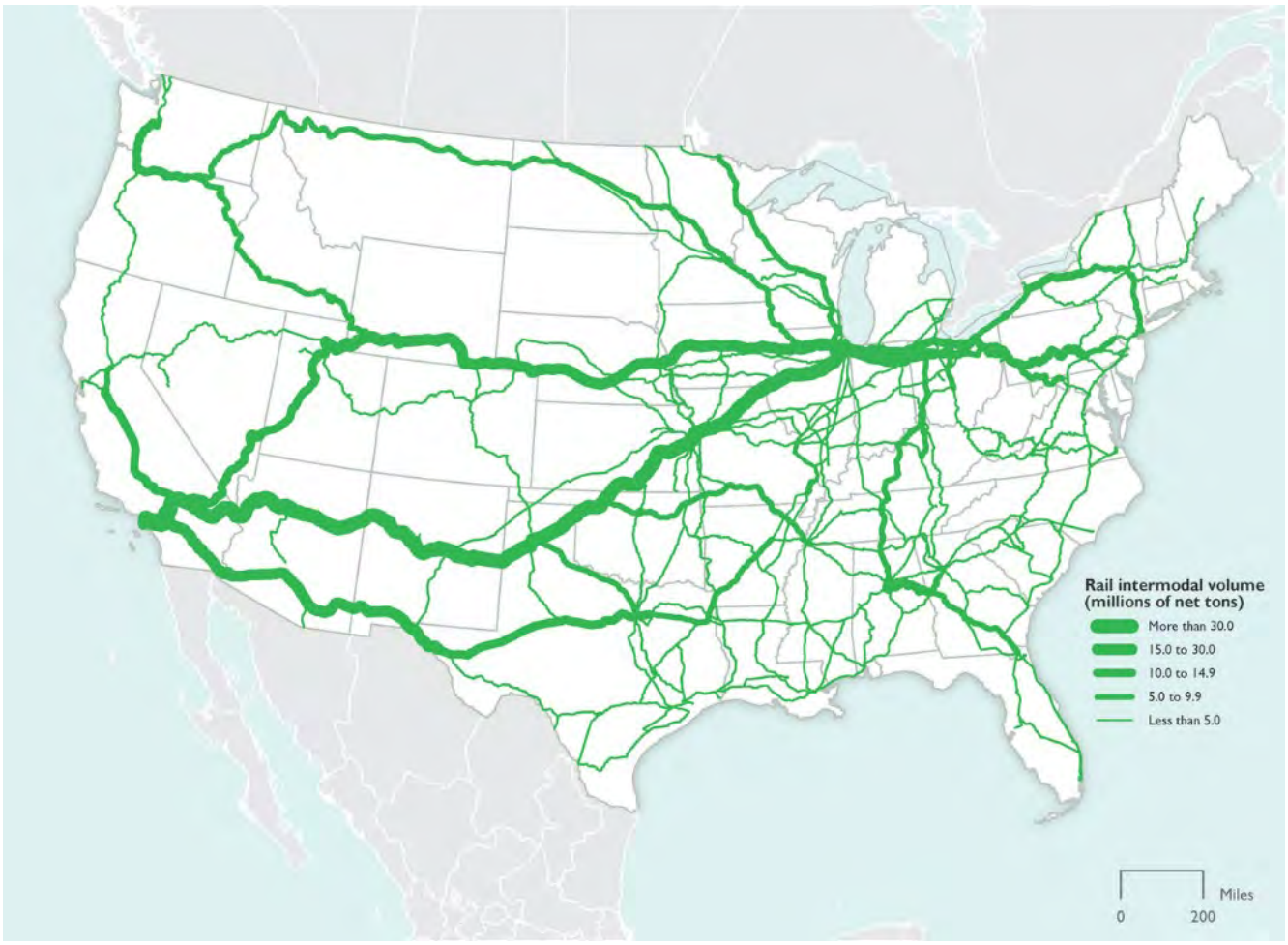
Source: MARC, MoDOT and KDOT Transportation System GIS Data; FHWA, National Highway Freight Network Visualization Tool; "All Stays" Truck Stops and Rest Areas Inventory; CDM Smith GIS Analysis

Figure 11. Multimodal Freight System Infrastructure



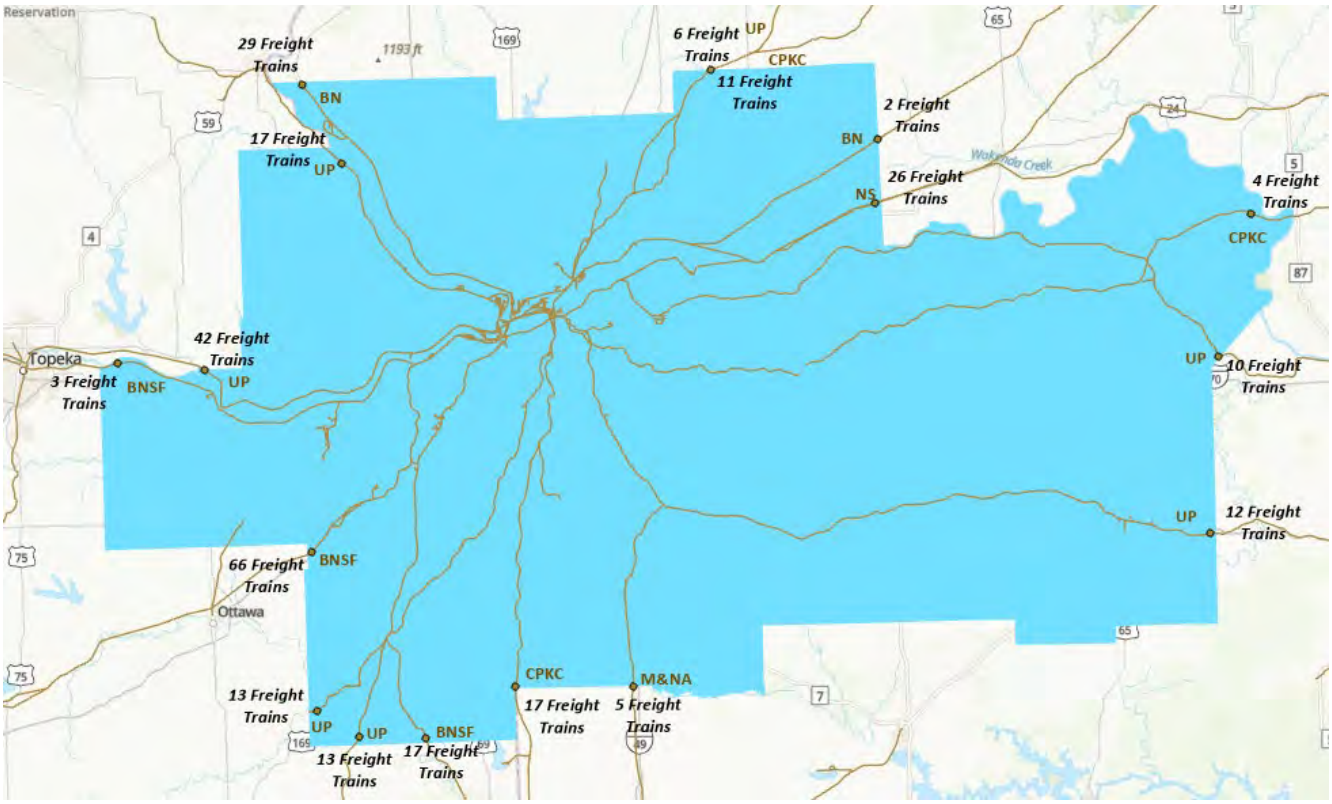
Source: MARC, 2024

Figure 12. Existing Truck Average Daily Traffic



Source: U.S. Department of Transportation, Federal Railroad Administration, special tabulation of 2018 rail intermodal flows, 2019, Available at: https://data.bts.gov/stories/s/Freight-Transportation-System-Extent-Use/r3vy-npqd (last accessed on August 9, 2024)

Figure 13. Rail Intermodal Flows through the Study Region and throughout the United States



Source: U.S. Department of Transportation, Federal Railroad Administration, Grade Crossings Inventory, Available at: https://safetydata.fra.dot.gov/OfficeofSafety/publicsite/DownloadCrossingInventoryData.aspx (last accessed on August 9, 2024)

Figure 14. Daily Non-Passenger (Freight) through Train Counts at Public Grade Crossings at the Study Region Boundary

Truck and rail transport face safety issues highlighted by crash data summaries in **Table 3** and **Table 4**. Truck-involved crashes between 2019 and 2022 consisted of 0.7 percent resulting in a fatality, 2.0 percent suspected serious injury crashes, 17.6 percent minor injury crashes, and 79.7 percent property damage only (PDO) type crashes. Rail incidents consist of train accidents and highway-rail incidents. Nearly two-thirds of train accidents involved derailment.

Table 3. Study Region's 2019–2022 Truck-Involved Crashes Summary

County	Fatal Crashes	Suspected Serious Injury Crashes	Minor Injury Crashes	Property Damage Only (PDO) Crashes	Total Crashes
Douglas	N/A	N/A	N/A	N/A	341
Johnson	16	33	405	1,939	2,393
Leavenworth	4	3	42	180	229
Miami	1	6	18	74	99
Wyandotte	9	19	195	732	955

County	Fatal Crashes	Suspected Serious Injury Crashes	Minor Injury Crashes	Property Damage Only (PDO) Crashes	Total Crashes
Kansas Counties Sub-Total	**30**	**61**	**660**	**2,925**	**4,017**
Cass	8	25	82	580	695
Clay	4	35	247	1,409	1,695
Jackson	31	107	1,252	4,743	6,133
Johnson	3	23	65	312	403
Lafayette	8	11	69	477	565
Pettis	3	7	101	364	475
Platte	9	12	97	577	695
Ray	1	2	8	75	86
Saline	0	15	34	367	416
Missouri Counties Sub-Total	**67**	**237**	**1,955**	**8,904**	**11,163**
Regional Total	**97**	**298**	**2,615**	**11,829**	**15,180**

Source: MARC and MoDOT 4-year Truck-Involved Crashes, 2019–2022; CDM Smith analysis

Table 4. Study Region's 5-Year Rail Incidents Summary, 2019–2023

County	Collisions	Derailments	Other	Train Accidents excl. Highway-Rail Incidents Sub-Total	Highway-Rail Incidents	Total Rail Incidents
Douglas	0	1	0	1	3	4
Johnson	0	4	2	6	13	19
Leavenworth	0	1	0	1	1	2
Miami	0	2	1	3	1	4
Wyandotte	12	73	26	111	21	132
Kansas Counties Sub-Total	**12**	**81**	**29**	**122**	**39**	**161**
Cass	0	2	0	2	8	10
Clay	1	29	5	35	8	43
Jackson	1	47	13	61	22	83
Johnson	0	1	0	1	0	1
Lafayette	0	1	0	1	8	9

County	Collisions	Derailments	Other	Train Accidents excl. Highway-Rail Incidents Sub-Total	Highway-Rail Incidents	Total Rail Incidents
Pettis	0	2	1	3	0	3
Platte	0	0	0	0	5	5
Ray	1	2	2	5	5	10
Saline	0	2	0	2	0	2
Missouri Counties Sub-Total	**3**	**86**	**21**	**110**	**56**	**166**
Regional Total	**15**	**167**	**50**	**232**	**95**	**327**

Source: FRA Safety Data - Accident Map with Table and Hwy/Rail Map with Table, 2019–2023

Congestion and reliability issues affect trucker productivity and increase business costs. Weekday AM and PM peak hour truck delay,[14] projected future changes to these bottlenecks, and locations of new and potential bottlenecks are shown in **Figure 15**, **Figure 16**, **Figure 17,** and **Figure 18**. The total delay and extents for bottlenecks in current year are expected to fall between the information shown in these figures.

An assessment of roadway pavement and bridge conditions in the study region found that 1.5 percent of the total road miles and 4.8 percent of the bridges regionally are in poor condition. There is a high percentage of unpaved roadways on the Kansas side, which was not evaluated. Jackson County in Missouri is leading in terms of total miles of paved roadways in poor condition at 46.8 miles, followed by Wyandotte County in Kansas and Johnson at 22.8 miles, Platte and Saline counties in Missouri at 15–16 miles.

For a similar total number of bridges (about 1,400) on Kansas and Missouri side, only 2.0 percent of the bridges on Kansas side are in poor condition, this is 6.5 percent on Missouri side. Jackson County in Missouri is leading in terms of total number of bridges in poor condition at 50 bridges, and Cass, Clay, Johnson, Pettis and Saline counties in Missouri each have over 20 bridges in poor condition.

[14] Average truck delay was analyzed using MARC's Travel Demand Model as the primary source and truck travel time reliability using Inrix data. MARC's model was built for the base year of 2015 and the forecast year of 2050, we did not attempt to interpolate truck volumes or truck delay between the model years. We used the model to develop travel time indices (ratio of peak period average travel time to free flow travel time) and identify the changes in bottleneck extents between 2015 and 2050. Inrix data provided travel time reliability information for the year 2023, which was used to develop travel time reliability indices (ratio of peak period 95th percentile travel time to peak period average travel time). We estimated the combined effects of the average delay (in 2015 and 2050) and variability in this delay (in 2023) to identify the total bottleneck delay.

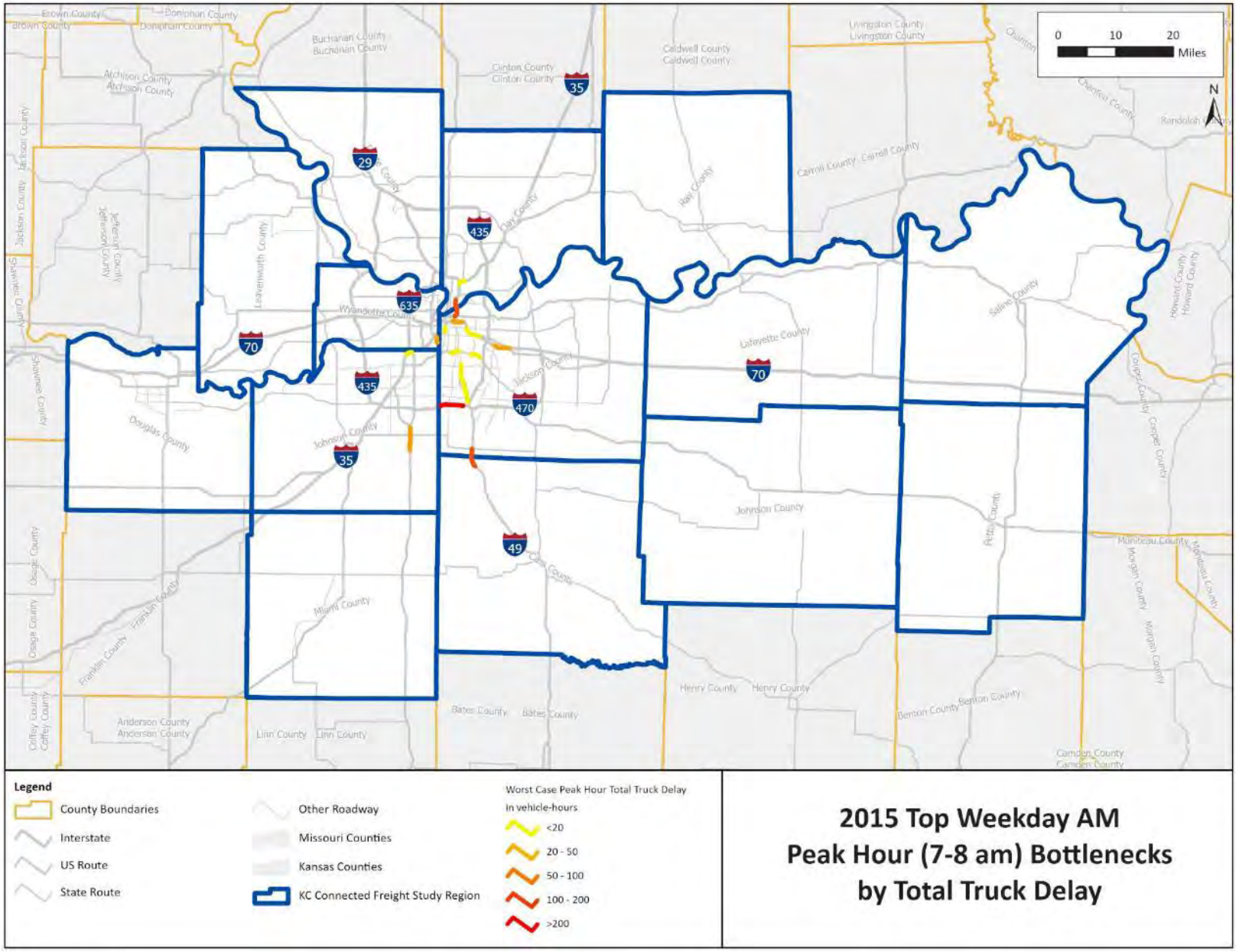


Figure 15. 2015 Top Weekday AM Peak Hour Truck Bottlenecks Map

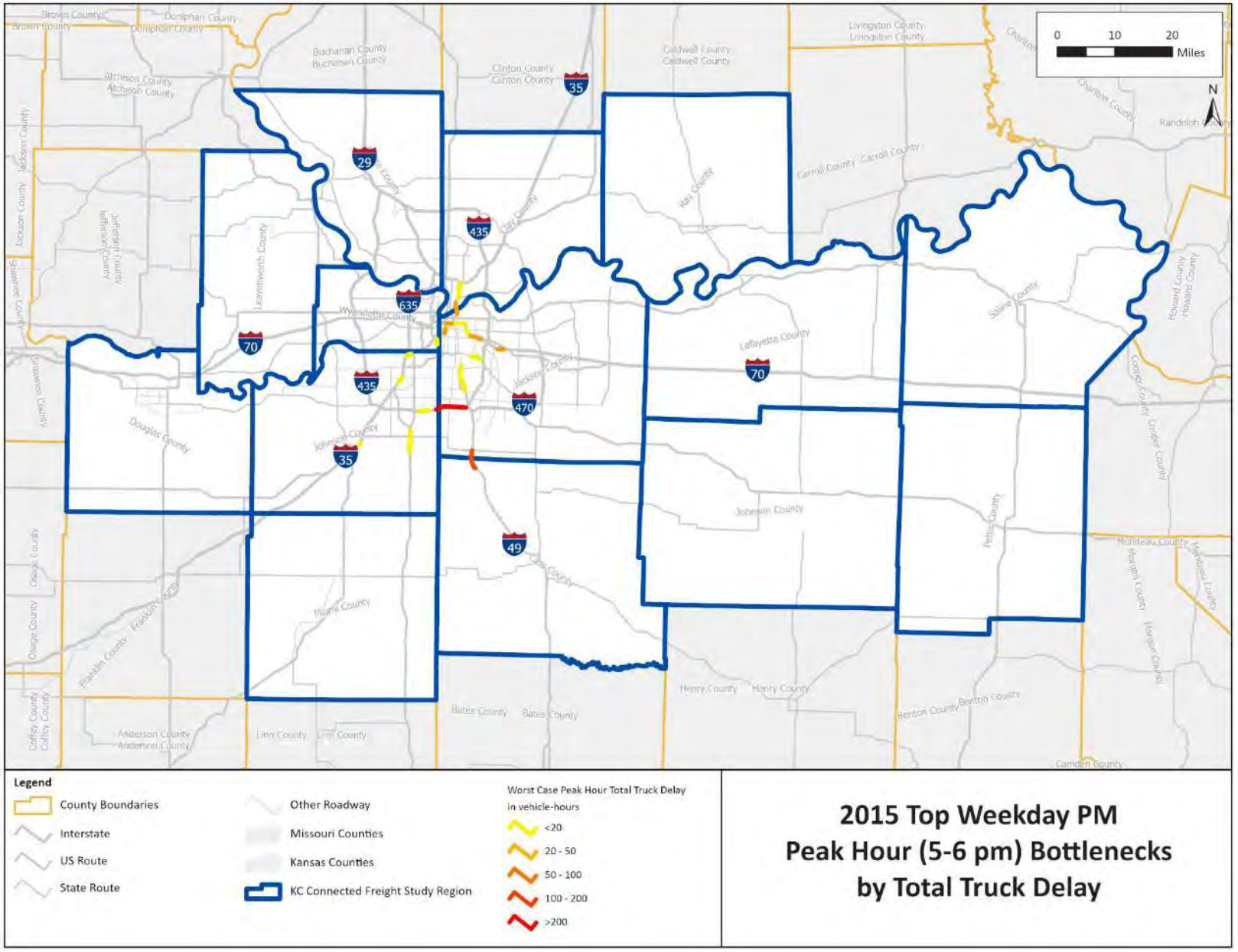


Figure 16. 2015 Top Weekday PM Peak Hour Truck Bottleneck Map

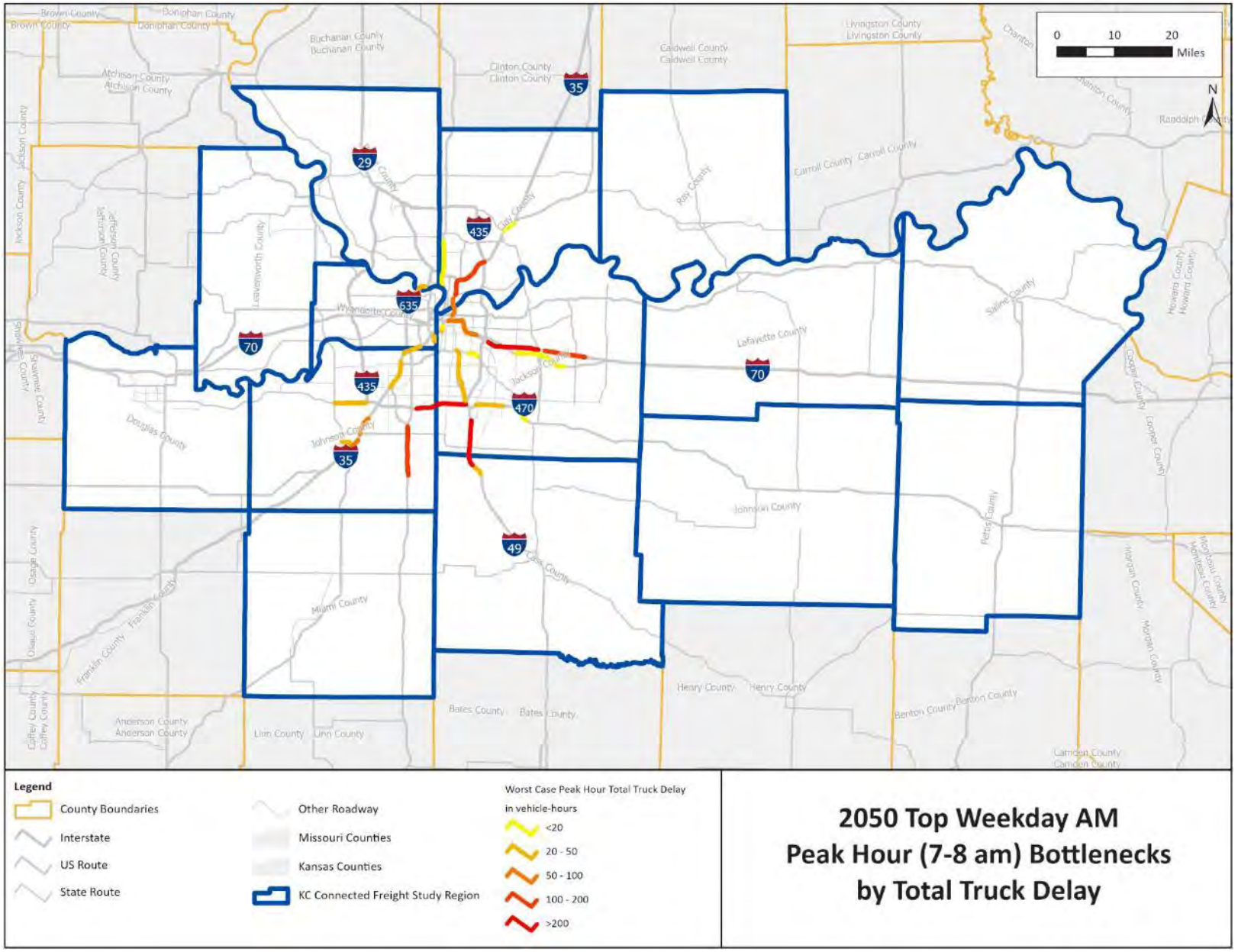


Figure 17. 2050 Top Weekday AM Peak Hour Truck Bottlenecks Map

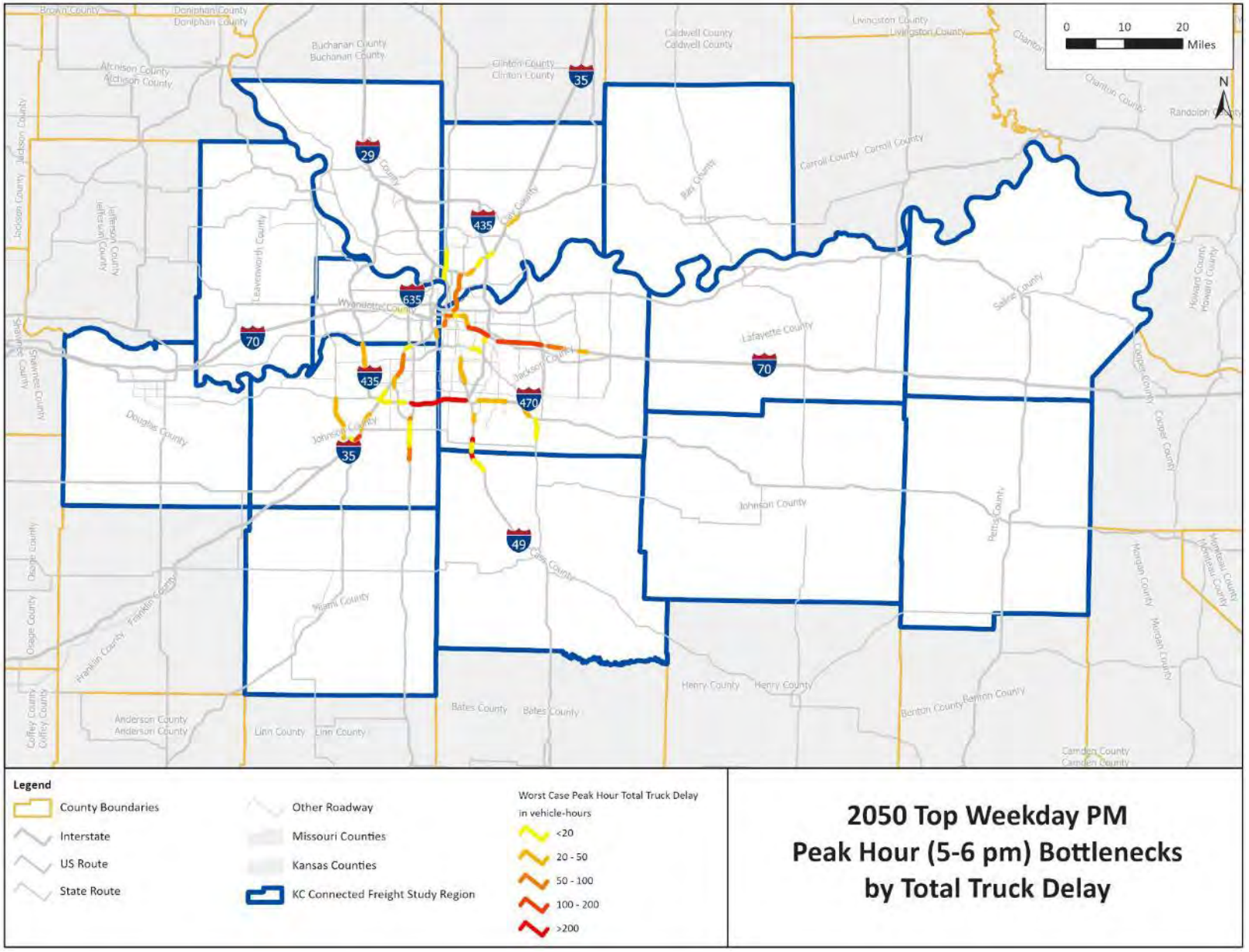
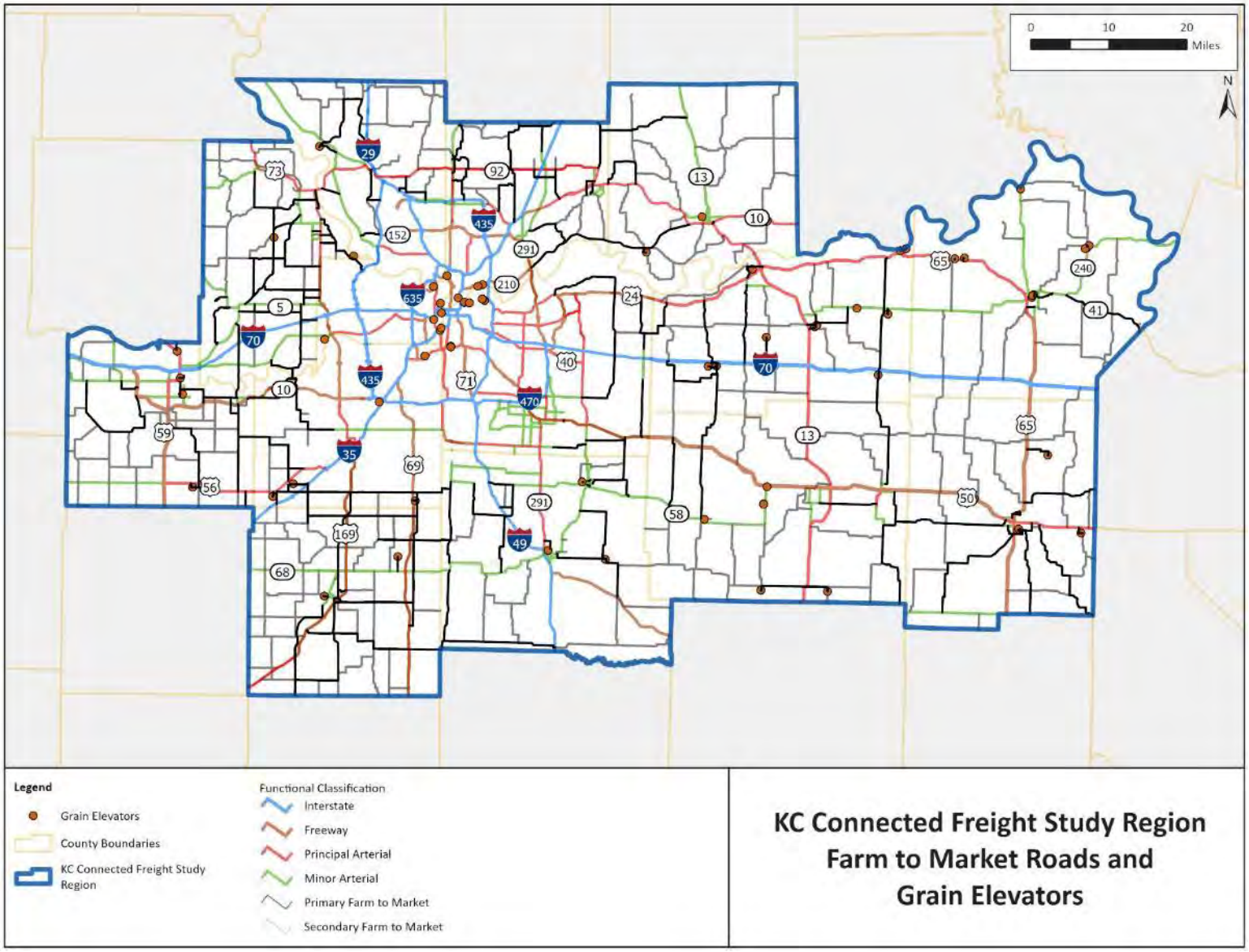


Figure 18. 2050 Top Weekday PM Peak Hour Truck Bottleneck Map

1.4. Farm-to-Market Routes Identification

Farm-to-market routes identification will assist with addressing the connectivity needs of rural areas, especially in the context of connecting agricultural land uses to markets. Applying the principles and logic of farm-to-market route designations in the states of Texas, Missouri, Iowa, Louisiana, and Ohio, and using locally available data on functional classes, ADT, grain elevator locations, Primary Farm-to-Market roads (in black), and Secondary Farm-to-Market roads (in grey) for the study region are identified and shown in **Figure 19**.



Source: MARC, MoDOT and L-DC MPO Road Network with Functional Classification and Average Daily Traffic (ADT) Data; Google Maps' Grain Elevator Facilities Data; Missouri Department of Agriculture Licensed Grain Dealer/Warehouse Database Listings; Kansas State University's Mapping of Cooperative and Non-cooperative Grain Locations in Kansas; CDM Smith's analysis

Figure 19. Identified Farm-to-Market Network Map

1.5. First-Mile and Last-Mile Concepts

This special type of policy discusses the access needs of urban and rural freight facilities. The characteristics and challenges of first-mile and last-mile access are discussed separately for urban and rural contexts. The concepts discussion identified the following types of strategies:

- Urbanized or densely developed geographies
  - Curb space management
  - Micro freight hubs
  - Off-peak deliveries
  - Autonomous vehicles (cars, vans, drones)
  - Vehicle size limits
  - Coordinate traffic signal timing and reduce engine idling and greenhouse gas emissions
  - Freight design requirement training
  - Safe freight parking plans and policies
- Rural or non-urbanized geographies
  - Increase signage and wayfinding
  - Increase truck parking capacity
  - Rural-focused freight vehicle design requirements
  - Environmental enhancements through policies and ordinances focused on reducing engine idling, greenhouse gas emissions, and engine braking
  - Manage conflicts at ports, airports, and intermodal hubs
  - Educate and train local and regional rural planning stakeholders
  - Coordinate freight plans and programs of municipalities
  - Prioritize freight focused projects
  - Encourage consolidation of freight focused land developments
  - Preserve deteriorating roads, rails, and bridges
  - Maintain a minimum vertical clearance on first-mile and last-mile designated routes
  - Locate value added services and employee housing close to new freight focused land developments

The principles discussed in this document were applied to a special use case of locating an intermodal freight facility in a developed or urbanized area.

1.6. Regional Summaries

Table 5 shows a regional summary of land use and economic information presented in this section.

Table 5. Land Use and Economic Summary

Element	Value
Agricultural Land Uses	
▪ Existing Farm Land Area	4,800 square miles
▪ Farm Land Area % of Total Land Area	62 percent
▪ Key Farming Counties (over 75% of total land area)	Douglas County, KS; Johnson, Pettis, and Saline Counties, MO
▪ Primary Crops	Soybeans and corn
▪ Agricultural Sales (2022)	$1.9 billion
▪ Crop Sales % of Total Agricultural Sales	67 percent
▪ Livestock Sales % of Total Agricultural Sales	33 percent
▪ Existing Number of Grain Elevators (mapped)	78
▪ Number of Livestock (2023)	368,000 cattle and calves; other animals
Industrial Land Uses	
▪ Number of Buildings (existing and under construction by 2025)	7,356
▪ Total Rentable Building Area (RBA) (existing and under construction by 2025)	373 million square feet
▪ Industrial cluster regions (constituent CoStar sub-markets)	North of Missouri River (Claycomo, City of North KC, Airport/North Platte County, Riverside/Parkville, Liberty) and South Johnson County in KS (Olathe), East Jackson County (Independence, Executive Park, East Bottoms Kansas City), Wyandotte County (Central Kansas City/Fairfax, Armourdale, Turner, Bonner Springs), South Jackson County (Grandview), North Johnson County (Lenexa), Downtown Kansas City, parts of Lawrence, parts of Leavenworth County in KS and parts of Cass County in MO
▪ Secondary Use Type RBA % of Total RBA	
– WRH = Warehousing	54.7 percent
– MFG = Manufacturing	19.5 percent
– DST = Distribution	18.0 percent
– TTS = Truck Terminals and Services	1.9 percent
– FRC = Food Processing, Refrigeration, Cold Storage	1.1 percent
– OTH = Other	4.8 percent
– TOT = Total	100 percent
Commercial Land Uses	
▪ Number of Buildings (existing and under construction by 2025)	17,910
▪ Total RBA (existing and under construction by 2025)	278 million square feet
▪ Commercial cluster regions (constituent CoStar sub-markets)	South Johnson County in KS (College Blvd and other parts), several parts of Jackson County (East, Northeast, Northwest and Southeast), North of Missouri River, Downtown Kansas City (central business district, Crown Center, Freight House District and West Bottoms), South Kansas City (Ward Parkway and other parts), Midtown (Country Club Plaza and other parts), parts of Lawrence, parts of Leavenworth County in KS and parts of Cass, Johnson and Lafayette counties in MO
Employers	
▪ Number of employers with over 500 employees	52
▪ Number of goods movement dependent industries (3-digit NAICS) with a location quotient for employment > 1.0	19 (includes NAICS 238, 322, 323, 324, 325, 336, 423, 424, 425, 441, 444, 449, 455, 456, 459, 484, 488, 492, 493)

Table 6 shows a regional summary of freight facilities and flows information presented in this section.

Table 6. Freight Facilities and Flows Summary

Element	Value
Freight Facilities	
▪ Miles of National Highway Freight Network (NHFN)	435 miles
▪ Miles of Highway Type % of Total NHFN Miles	
– Primary Highway Freight System (Non-PHFS)	57.5 percent
– Non-Primary Highway Freight System (Non-PHFS)	33.9 percent
– Critical Urban Freight Corridors (CUFC)	5.2 percent
– Critical Rural Freight Corridors (CRFC)	3.4 percent
– Total	100 percent
▪ Class I Railroads	Burlington Northern Santa Fe (BNSF), Canadian Pacific Kansas City (CPKC), Norfolk Southern (NS), Union Pacific (UP)
▪ Regional Shortline Railroads	Kaw River Railroad (KAW), Northern Arkansas (MNA)
▪ Switching and Terminal Railroad	Kansas City Terminal Railway Company (KCT)
▪ Primary Airport	Kansas City International (KCI)
▪ Other Airports	Lawrence Regional Airport (LWC), Charles B. Wheeler Downtown Airport (MKC), New Century AirCenter (IXD)
▪ Primary Port	Port KC
▪ Number of Other Private Industries with Water Access	16
▪ Pipelines	Carry fossil fuel products, crude petroleum, basic chemicals
▪ Truck Parking	
– Number of Public Facilities	10
– Number of Private Facilities	33
– Total Number of Facilities	43
– Total Number of Parking Spaces	1,614
Freight Flows	
▪ Annual Total Flows in 2022 (value in 2022)	
– Kansas study area	48.3 million tons ($66 billion)
– Missouri study area	67 million tons ($65.7 billion)
▪ Kansas Study Area Mode Share by Tons (by Value)	
– Truck	71 percent (75 percent)
– Rail	9 percent (2 percent)
– Multiple Modes & Mail	3 percent (18 percent)
– Air (including truck-air)	<1 percent (2 percent)
– Pipeline	17 percent (3 percent)
▪ Missouri Study Area Mode Share by Tons (by Value)	
– Truck	54 percent (76 percent)
– Rail	14 percent (3 percent)
– Multiple Modes & Mail	8 percent (13 percent)
– Air (including truck-air)	24 percent (7 percent)
– Pipeline	24 percent (7 percent)
▪ Maximum Truck ADT	16,897
▪ Maximum Freight Train Count by Class I Railroad	
– BNSF	66
– CPKC	42
– NS	17
– UP	26
▪ MCI	
– Number of Enplanements	5,195,871 passengers
– Enplaned Cargo Weight	126,556,000 pounds
▪ Port Authority of Kansas City (Port KC) Cargo Weight	1.15 million short tons

Table 7 shows a regional summary of freight system performance assessment.

Table 7. Freight System Performance Assessment

Element	Value
Freight Mobility	
▪ Number of Truck Bottlenecks with ≥ 20 Vehicle-Hours of Peak Hour Total Truck Delay	
– 2015 AM	7
– 2015 PM	7
– 2050 AM	23
– 2050 PM	22
Freight Safety	
▪ Total Number of Truck-Involved Crashes, 2019–2022	15,180
▪ Truck Involved Crashes by Severity as % of Total Crashes	
– Fatality	0.7 percent
– Serious Injury	2.0 percent
– Minor Injury	17.6 percent
– Property Damage Only (PDO)	79.7 percent
– Total	100 percent
▪ Total Number of Rail Incidents (including train accidents and highway-rail incidents), 2019–2022	327
▪ Rail Incident Type % of Total Rail Incidents	
– Derailments	51.1 percent
– Highway-Rail Incidents	29.1 percent
– Train Collisions	4.6 percent
– Other Train Accidents	15.2 percent
– Total	100 percent
Infrastructure Condition	
▪ Number of Miles of Pavement in Poor Condition	182.3 miles
▪ Number of Pavement Miles in Poor Condition % of Total Number of Pavement Miles	1.5 percent
▪ Number of Bridges in Poor Condition	259
▪ Number of Bridges in Poor Condition % of Total Number of Bridges	4.8 percent

2. Introduction

MARC,[15] in coordination with LDCMPO in Kansas and PTRPC in Missouri, is developing a freight plan, Connected Freight KC 2050: A Plan in Action. The study region for this freight plan encompasses 14 counties – MARC's nine counties,[16] LDCMPO's one county[17], and PTRPC's four counties,[18] as shown in **Figure 20**.

To support the region's current and future population, economy, and trade, an efficient, robust, and resilient goods transportation system is essential. The impacts of freight on local communities and environment (equitability and sustainability) also require due consideration. This regional freight plan is being developed to identify a planning process that can address the short-term and long-term needs of the Kansas City study region. This planning process will integrate local, regional, statewide, and national freight planning processes into an overall regional freight planning process, allowing agencies an opportunity to identify, select and prioritize local, regional, state, and national multimodal freight projects.

The purposes of the overall regional freight plan are to:

- Establish regional freight planning vision, goals, and objectives
- Perform an inventory and assess existing conditions on the region's multimodal freight transportation system
- Identify critical current and future needs and opportunities for freight and economic development in the region
- Identify and prioritize strategies including projects, programs, and policies for the future regional freight transportation system

This document includes a draft set of regional freight plan goals, an inventory and existing conditions of the region's multimodal freight system for a 14-county and bi-state Kansas City region.

[15] A nonprofit association of city and county governments and the metropolitan planning organization for the bistate Kansas City region.

[16] Johnson, Leavenworth, Miami and Wyandotte counties in Kansas, and Cass, Clay, Jackson, Platte and Ray counties in Missouri.

[17] Douglas County in Kansas.

[18] Johnson, Lafayette, Pettis and Saline counties in Missouri

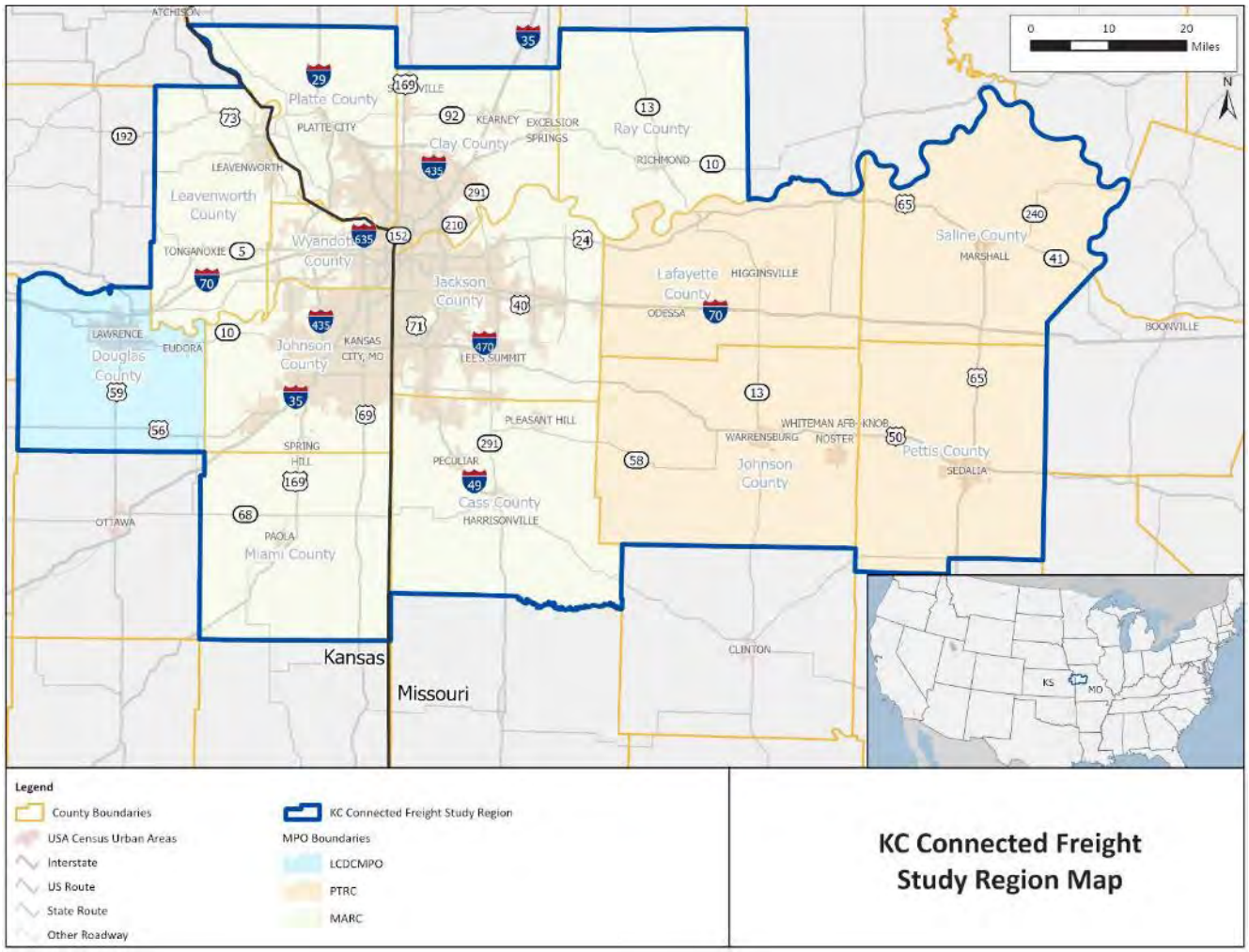


Figure 20. Study Region Map

2.1. Study Region Background

The study region is in the central part of the United States and at the crossroads of the nation's major transportation corridors providing connectivity to domestic markets and global trade gateways. Major road corridors include interstates 70, 35 and 29 (I-70, I-35, and I-29), four Class I rail lines (Burlington Northern Santa Fe [BNSF], Canadian Pacific Kansas City [CPKC], Norfolk Southern [NS] and Union Pacific [UP]), and Missouri River's barge lines.

The region's location advantage makes the Kansas City region a top tier freight and industrial hub in the nation.[19] Freight can be distributed from Kansas City's logistical hubs in two days or less[20] to half of the United States population and North American Free Trade Agreement (NAFTA)

[19] Kansas City Area Development Council, Article titled "Kansas City Region Continues as a Top U.S. Logistics Hub with Record Industrial Development" dated April 25, 2022, Available at: https://thinkkc.com/news/blog/thinkkc-blog/2022/04/15/kansas-city-region-continues-as-a-top-u.s.-logistics-hub-with-record-industrial-development (last accessed on August 9, 2024)

[20] Inferred based on: https://mochamber.com/wp-content/uploads/2022/07/Transportation2030-report-DIGITAL.pdf (last accessed on August 9, 2024)

trading partner countries of Canada in the north and Mexico in the south, and in four days or less[21] to all of the United States population—from the Pacific in the west to the Atlantic in the east. As of 2024 Quarter 2, the Kansas City market is ranked 21st in the nation in terms of industrial space inventory (266 million square feet).[22]

The study region also supports a vital part of the nation's food and agricultural production, by gathering, processing, and distributing farm products from the study region and surrounding areas. As per the 2022 Census of Agriculture, Missouri's Congressional District 6[23] is ranked 18th in the nation in terms of crop sales (valuing at $3.75 billion), while Missouri's Congressional District 4[24] is ranked 28th in the nation in terms of livestock, poultry and their products sales (valued at $2.02 billion). Kansas's Congressional District 2[25] is ranked 17th in the nation in terms of harvested cropland (3.79 million acres).

The freight transportation system of the study region supports 2.41 million residents,[26] 1.27 million civilians in the labor force,[27] and nearly 59,000 establishments[28] by providing first-mile and last-mile access and regional connectivity for value-adding supply chains and e-commerce. Nearly 75 percent of the population is in the four counties of Johnson and Wyandotte in Kansas, and Jackson and Clay in Missouri.[29] A little over one-third (35 percent) of the study region's labor force is employed in goods producing/handling sectors of agriculture, forestry, fishing and hunting, mining, manufacturing, construction, wholesale trade, retail trade, transportation, and warehousing.[30] On July 31, 2023, United States Department of Agriculture (USDA) announced designation of Kansas City as a new "Urban Agricultural Hub" service center for communities in Kansas City and surrounding suburbs due to provision of urban farming and gardening resources,

[21] https://www.kansascommerce.gov/industry/logistics/ (last accessed on August 9, 2024)

[22] Cushman and Wakefield's National Industrial Market Report for Q2 2024, Available at: https://cw-gbl-gws-prod.azureedge.net/-/media/cw/marketbeat-pdfs/2024/q2/us-reports/industrial/us_industrial_marketbeat_q2_2024.pdf (last accessed on August 9, 2024)

[23] Missouri Counties of Adair, Andrew, Atchison, Audrain, Buchanan, Caldwell, Carroll, Chariton, Clark, Clay (pt.), Clinton, Daviess, DeKalb, Gentry, Grundy, Harrison, Holt, Jackson (pt.), Knox, Lewis, Lincoln, Linn, Livingston, Macon, Marion, Mercer, Monroe, Nodaway, Pike, Platte, Putnam, Ralls, Randolph, Ray, Schuyler, Scotland, Shelby, Sullivan, Worth

[24] Missouri Counties of Barton, Bates, Benton, Boone (pt.), Camden (pt.), Cass, Cedar, Dade, Dallas, Henry, Hickory, Howard, Jackson (pt.), Johnson, Laclede, Lafayette, Morgan, Pettis, Polk, Pulaski, Saline, St. Clair, Vernon, Webster (pt.)

[25] Allen, Atchison, Bourbon, Brown, Chase, Cherokee, Coffey, Crawford, Doniphan, Douglas (pt.), Geary, Jackson (pt.), Labette, Leavenworth, Linn, Lyon, Marion, Montgomery, Morris, Nemaha, Neosho, Osage, Shawnee, Wabaunsee, Wilson, Woodson, Wyandotte (pt.)

[26] US Census, July 1, 2023 County Population Estimates, Available: https://www.census.gov/data/tables/time-series/demo/popest/2020s-counties-total.html (last accessed on August 9, 2024)

[27] US Census, 2022 American Community Survey (ACS) 5-Year Estimate, DP03 - Selected Economic Characteristics, Available at: https://data.census.gov/table/ACSDP1Y2022.DP03?q=County%20Employment&g=010XX00US_040XX00US20,29_050XX00US20045,20091,20103,20121,20209,29037,29047,29095,29101,29107,29159,29165,29177,29195 (last accessed on August 9, 2024)

[28] US Census, County Business Patterns, 2022, Available at: https://www.census.gov/programs-surveys/cbp.html (last accessed on August 9, 2024)

[29] US Census, July 1, 2023 County Population Estimates, Available: https://www.census.gov/data/tables/time-series/demo/popest/2020s-counties-total.html (last accessed on August 9, 2024)

[30] US Census, 2022 American Community Survey (ACS) 5-Year Estimate, DP03 - Selected Economic Characteristics, Available at: https://data.census.gov/table/ACSDP1Y2022.DP03?q=County%20Employment&g=010XX00US_040XX00US20,29_050XX00US20045,20091,20103,20121,20209,29037,29047,29095,29101,29107,29159,29165,29177,29195 (last accessed on August 9, 2024)

healthy food supply and green spaces.[31] The region's freight transportation system will continue to evolve with growth in population and jobs, transformations in supply chains and goods transportation/logistics management practices, emerging freight technologies and services, land use policies, and climate change.

2.2. Purpose

This document presents a draft set of regional freight plan goals. Future regional freight plan tasks will refine the draft goals further using stakeholder engagement, leading to identification of objectives, and performance measures that align with each goal.

This document also presents an inventory and existing conditions of the region's multimodal freight system. This was done by painting a regional freight picture, assessing infrastructure within the study region, identifying farm-to-market connectivity routes and developing "first-mile/last-mile" freight access management strategies. The results of the various analyses are summarized in this document. For a few of the data elements presented, future conditions are also summarized. The follow-on tasks for this regional freight plan will leverage the inventory and existing conditions information to identify short-term and long-term needs, and develop projects and/or policies, where and when needed.

2.3. Organization

This document is organized into the following sections:

- **Section 1. Executive Summary:** This component summarizes all sections of this technical memorandum highlighting the key outcomes and findings in each of them.
- **Section 2. Introduction:** This section includes the purpose of the plan, study region background, purpose, and organization of this document.
- **Section 3. Draft Goals:** This section includes a draft set of regional freight plan goals that are consistent with the regional transportation plan vision and goals, goals in the national freight plan, and state freight plans (for Kansas and Missouri).
- **Section 4. Regional Freight Picture:** This section includes an inventory of agricultural, industrial, and commercial land uses and characteristics that drive freight demand for the study region. This section describes the study region's freight demand and linkages to national and global supply chains by presenting regional multimodal freight flow profiles under existing and future conditions. This section also provides intraregional truck travel patterns that provide insights into the relative levels of demand at freight facilities, sub-areas and peripheral areas, truck size distribution, and top origin-destination pairs within the study region.

[31] https://content.govdelivery.com/accounts/USDARD/bulletins/3680a60/ (last accessed on August 9, 2024)

- **Section 5. Existing Infrastructure Inventory and Assessment:** This section includes an inventory and condition assessment of multimodal freight network and facilities in the study region. The network includes the road, rail, barge, and pipeline systems. Facilities include grain elevators, at-grade crossings, truck stops, and rail yards. This document evaluated existing conditions of the regional freight system in terms of access/connectivity/use, congestion/reliability, safety, state of repair, and identified deficient parts of the system. Truck congestion under future conditions was also assessed in this document.
- **Section 6. Farm to Market Routes Identification:** This section describes the process and results of identifying a farm to market routes system for the study region.
- **Section 7. First-Mile/Last-Mile Access Discussion:** This section summarizes "White Paper" research on the best practices for first-mile/last-mile access management for use by regional/local planning agencies. This section also summarizes local case study findings that show the state of practice on first-mile/last-mile access management within the study region.

3. Draft Regional Freight Plan Goals

This study reviewed several plans, as listed below, to identify and align goals across the plans, and inform the draft goals of this regional freight plan (Connected Freight KC 2050):

- National Freight Policy and Plans
  - *National Multimodal Freight Policy*[32] – U.S. Department of Transportation (2015)
  - *National Freight Strategic Plan*[33] – U.S. Department of Transportation (2020)
- State Freight Plans
  - *Kansas State Freight Plan*[34] – Kansas Department of Transportation (2023)
  - *Missouri State Freight & Rail Plan*[35] – Missouri Department of Transportation (2023)
- Regional Transportation Plans
  - *Connected KC 2050 - Regional Transportation Plan*[36] – MARC (2020)

[32] Fixing America's Surface Transportation Act – FAST Act § 8001; 49 U.S.C. 70101, National Multimodal Freight Policy, Effective Date: October 1, 2015, Available at: https://www.govinfo.gov/content/pkg/USCODE-2022-title49/pdf/USCODE-2022-title49-subtitleIX-chap701-sec70101.pdf (last accessed on August 9, 2024)

[33] https://www.transportation.gov/sites/dot.gov/files/2020-09/NFSP_fullplan_508_0.pdf (last accessed on August 9, 2024)

[34] https://www.ksdot.gov/Assets/wwwksdotorg/bureaus/burRail/Rail/Documents/2023/KansasStateFreightPlan_FHWA_Approved.pdf (last accessed on August 9, 2024)

[35] https://www.modot.org/sites/default/files/documents/SFRP%20Goals%2C%20Objectives%2C%20and%20Performance%20Measures%20FINAL.pdf (last accessed on August 9, 2024)

[36] https://connectedkc.org/ (last accessed on August 9, 2024)

- *Transportation 2050 - Lawrence – Douglas County Metropolitan Transportation Plan*[37] – LDCMPO (2023)
- *Regional Transportation Plan*[38] – PTRPC (2023)

The following sections describe the purpose (vision, mission, core values) and goals identified in the policies and plans. Similar and unique goal categories from the policies and plans were summarized and used to develop draft regional freight plan goals for consideration by regional stakeholders.

3.1. National Freight Policy and Plans

3.1.1. National Multimodal Freight Policy

It is the policy of the United States to maintain and improve the condition and performance of the National Multimodal Freight Network (NMFN) to ensure the network provides a foundation for the United States to compete in the global economy and achieve the goals[39] as described as follows:

- **Mobility, Reliability and Economic Vitality**
  - Identify infrastructure improvements, policies, and operational innovations that strengthen contribution of the NMFN to the economic competitiveness of the United States; reduce congestion and eliminate bottlenecks on the NMFN; and increase productivity, particularly for domestic industries/businesses that create high-value jobs.
  - Improve the economic efficiency and productivity of the NMFN.
  - Improve the reliability of freight transportation.
- **Safety, Security and Resiliency:** Improve the safety, security, efficiency, and resiliency of multimodal freight transportation.
- **Maintenance:** Achieve and maintain a state of good repair on the NMFN.
- **Service:** Improve the short- and long-distance movement of goods that travel across rural areas between population centers; between rural areas and population centers; and from the nation's ports, airports, and gateways to the NMFN.
- **Innovation:** Use innovation and advanced technology to improve the safety, efficiency, and reliability of the NMFN.

[37] https://assets.lawrenceks.org/mpo/T2050/T2050-A1.pdf (last accessed on August 9, 2024)

[38] https://www.trailsrpc.org/wp-content/uploads/RTP-2024-Draft_Approved-5.29.24.pdf (last accessed on August 9, 2024)

[39] Note: This document added a goal category in **bold** to the goal descriptions. The goal category was not part of the National Multimodal Freight Policy

- **Environmental Impacts:** Reduce the adverse environmental impacts of freight movement on the NMFN. Improve the flexibility of states to support multi-state corridor planning and the creation of multi-state organizations to address freight connectivity.
- **Other:** Pursue goals described above in a manner that is not burdensome to state and local governments.

3.1.2. National Freight Strategic Plan

According to this plan, the freight transportation system of the United States will strengthen our economic competitiveness with safe and reliable supply chains that efficiently and seamlessly connect producers, shippers, and consumers in domestic and foreign markets. This plan has identified the following goals:

- **Safety:** Improve the safety, security, and resilience of the national freight system.
- **Infrastructure:** Modernize freight infrastructure and operations to grow the economy, increase competitiveness, and improve quality of life.
- **Innovation:** Prepare for the future by supporting the development of data, technologies, and workforce capabilities that improve freight system performance.

3.2. State Freight Plans

3.2.1. Kansas State Freight Plan

The vision and goals in the Kansas State Freight Plan were entirely based on the Kansas 2045 Long Range Transportation Plan (LRTP).[40] It is the vision of Kansas to become a national transportation leader with a modern, efficient, and resilient system that serves all users, businesses, and partners. The goals identified in the LRTP were as follows:

- **Safety and Security:** Enhance the safety and security of the transportation system for all users and workers.
- **Transportation System Management:** Maximize performance of the existing system by investing in transportation choices and intelligent transportation systems.
- **Asset Preservation:** Address risks and maintain assets through investments that provide high value returns and make the best use of limited funds.
- **Freight and Economic Vitality:** Improve reliability and increase flexibility for cost-efficient movement of people, goods, and information to strengthen the Kansas economy.
- **Stewardship:** Continuously improve the quality of the transportation system and surrounding communities and the natural and historic environment through strong

[40] https://www.ksdot.gov/Assets/wwwksdotorg/bureaus/burTransPlan/Documents/KDOT_LRTP.pdf (last accessed on August 9, 2024)

partnerships and focused, lower cost, and higher value improvements that avoid or minimize adverse impacts.

- **Workforce:** Get the best from our workforce by attracting and retaining talent, modeling diversity, supporting professional development, and inspiring action.

3.2.2. Missouri State Freight and Rail Plan

It is Missouri Department of Transportation (MoDOT) mission to provide a world-class transportation system that is safe, innovative, reliable, and dedicated to a prosperous Missouri.[41] MoDOT relies on its three core values as follows:

- **Safety:** Move Missourians safely.
- **Service:** Provide outstanding customer service, deliver efficient and innovative transportation projects, and operate a reliable transportation system.
- **Stability:** Manage our assets, stabilize resources and engage our workforce, and build a prosperous economy for all Missourians.

MoDOT's Missouri State Freight and Rail Plan is driving the MoDOT mission values above and 25-year vision for Missourians forward with support from the following goals:

- **Safety:** Improve safety and security of the multimodal freight and passenger rail system by supporting efforts to decrease the number and severity of freight vehicle crashes, increase truck parking options, and improve safety throughout the multimodal freight system and the passenger rail network.
- **Connectivity & Mobility:** Improve the connectivity and mobility of the multimodal freight and passenger rail system by reducing congestion on the roadways; increasing reliability of the roadways and passenger rail network; supporting improved efficiency of rails, waterways, and airports; and improving connections between freight modes and between passenger rail and other passenger travel modes.
- **Equity & Environmental Resiliency:** Support equity and environmental resiliency of the multimodal freight and passenger rail system.
- **Customers & Partnership:** Improve coordination and collaboration with regional planning partners and multimodal freight and passenger rail stakeholders.
- **Maintenance:** Maintain the multimodal freight and passenger rail system in good condition by keeping highways and bridges in good condition and supporting the maintenance of railways, waterways, airports, and multimodal connections.

[41] https://www.modot.org/sites/default/files/documents/ExecutiveSummary_052918_0_0_0_0_0_0.pdf

- **Economy:** Support economic growth and competitiveness in Missouri through strategic improvements to the multimodal freight network and passenger rail system.
- **Process & Innovation:** Institute policies and practices that support the multimodal freight and passenger rail systems, encourage innovation, and promote an efficient use of resources.

3.3. Regional Transportation Plans

3.3.1. MARC Connected Freight KC 2050 Plan

MARC's regional vision is as follows: Greater Kansas City is a region of opportunity. Its robust economy, healthy environment, and social capacity support the creativity, diversity, and resilience of its people, places, and communities.

The goals of this plan are as follows:

- **Access to Opportunity:** Support a connected system that enables access to all activities, allowing people to succeed by removing transportation barriers.
- **Transportation Choices:** Provide a range of transportation choices for communities across the region to allow for ease of travel as well as public health and environmental benefits.
- **Economic Vitality:** Maintain a multimodal transportation system that supports the efficient movement of people and goods and promotes economic development.
- **Healthy Environment:** Prioritize and support investments that reduce pollution and greenhouse gas emissions and preserve and restore ecosystem health.
- **Public Health and Safety:** Foster healthy communities and individuals by providing safe and secure places to live, walk, bike, roll, ride the bus, and drive with clean air to breathe.

3.3.2. LDCMPO Transportation 2050 Plan

The vision statement in this metropolitan transportation plan is as follows: Develop a multimodal transportation system that safely, efficiently, and equitably serves all people with a focus on prosperity for all and environmental sustainability.

The goals identified in this plan are as follows:

- **Transportation Options:** People have a variety of transportation options that provide safe, accessible, convenient, healthy, and affordable travel that connect them to their destinations.
- **Shared Prosperity:** The transportation system supports prosperity for all by connecting people and places in an equitable, reliable, affordable, and efficient manner.

- **Safety & Security:** People's lives are saved, crashes are avoided, and people and goods are safe and secure.
- **Sustainability:** Protect and enhance the natural environment and support energy conservation.
- **Operations & Maintenance:** Existing infrastructure is prioritized through maintenance, operations, and strategic improvements to provide for the best return on public investments.

3.3.3. PTRPC Regional Transportation Plan

The leadership of Pioneer Trails identified the following mission/vision statement: The Pioneer Trails Regional Planning Commission serves as a cooperative of the local governments of our four-county region to coordinate and prioritize the community development needs of the region.

The goals identified in the regional transportation plan are as follows:

- **Maintenance and Service:** Take care of the transportation system and services we enjoy today.
- **Safety:** Keep all travelers safe, no matter the mode of transportation.
- **Economic Vitality:** Invest in projects that spur economic growth and create jobs.
- **Transportation Choices:** Give Missourians better transportation choices.

3.4. Summary of Reviewed Plans

Based on the various policies and plans reviewed, this plan identified 16 goal categories that are included in each of them. Safety and maintenance are goal categories found in all policies and plans. Safety is typically combined with security and resiliency. Maintenance is typically combined with service (connectivity). Economic vitality is also a common goal category, which is typically combined with energy/resources use and workforce. The regional transportation plans emphasize transportation choices, mobility, public health, and the natural environment. Some of the state freight plans and regional transportation plans are concerned with reliability, resiliency, and equity. Technology, innovation and partnerships are mainly present in the national and state freight plans.

Table 8. Goals Summary for Reviewed Policy/Plans

Policy/Plan	Goal Category															
	Transportation Choices (Accessibility)	Service (Connectivity)	Mobility	Reliability	Safety	Security	Resiliency	Economic Vitality	Workforce	Infrastructure and Maintenance	Technology and Innovation	Partnerships	Health/Quality of Life	Environment	Equity	Energy/Resources Use
National Multimodal Freight Policy[1]		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		
National Freight Strategic Plan[2]					✓	✓	✓	✓		✓	✓		✓			
Kansas State Freight Plan[3]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		
Missouri State Freight and Rail Plan[4]		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓
MARC Connected Freight KC 2050 Plan[5]	✓	✓	✓		✓	✓	✓	✓	✓	✓			✓	✓		
LDCMPO Transportation 2050 Plan[6]	✓		✓	✓	✓	✓				✓			✓	✓	✓	✓
PTRPC Regional Transportation Plan[7]	✓	✓			✓			✓	✓	✓						

Source: CDM Smith analysis

3.5. Draft Regional Freight Plan Goals

This plan aligns the regional freight plan goals to the regional transportation goals and enhances them slightly to align also with the state and national freight plan goals. The draft regional freight plan goals identified are as follows:

- **Transportation Options and Economic Vitality:** Enhance transportation options and economic vitality with a greater focus on the regional industries/businesses that are reliant on freight transportation, create high-paying jobs, and enhance workforce skills.
- **Safety, Security and Resiliency:** Enhance safety, security, and resiliency of freight transportation system for all users and under all weather conditions.
- **Maintenance and Service:** Maintain freight transportation system assets in good condition and improve connections to multi-customer and multimodal freight service facilities.
- **Mobility and Reliability:** Improve efficiency and reliability of freight operations for all users and in all seasons.
- **Public Health and Equity:** Address freight related public health and quality of life issues in an equitable manner.
- **Environment and Energy Conservation:** Reduce impacts of freight on the natural environment and support energy conservation by reducing idling, greenhouse gas emissions, and encouraging efficient freight operations.
- **Innovation:** Support state and national initiatives and partnerships for advancement in commercial vehicle technology and service innovation.

The above draft goals are provided for consideration by regional stakeholders of this plan.

4. Regional Freight Picture

This section provides an overview of the region's freight generating land uses, multimodal freight demand, and intraregional truck travel patterns developed using various sources of regional data. This section includes an inventory of agricultural, industrial, and commercial land uses and characteristics that drive freight demand for the study region. This section describes the study region's freight demand and linkages to national and global supply chains by presenting regional multimodal freight flow profiles under existing and future conditions. This section also provides intraregional truck travel patterns that provide insights into the relative levels of demand at freight facilities, sub-areas and peripheral areas, truck size distribution, and top origin-destination pairs within the study region.

4.1. Land Uses and Industry Clusters

The region's freight transportation demand and service needs in and around the Kansas City metropolitan area can be understood based on the location, size/production, and specialization characteristics of its farms and industries. This section discusses a few key characteristics of the farms at a county level and industries at defined geographies that are smaller than the county level.

4.1.1. Agricultural Land Distribution and Characteristics

This document used the USDA National Agricultural Statistics Service (NASS) Census 2022. Other statistics were used to compile agricultural land distribution and characteristics. **Table 9** and **Figure 21** show the existing agricultural land distribution across the 14 counties in the study region. In the region, about 4,800 square miles or 62 percent of the total land area is occupied by farms.[42] This averages 52 percent on the Kansas side and 66 percent on the Missouri side. Agriculture occupies more than 75 percent of the total land area in the counties of Douglas County in Kansas and Johnson, Pettis, and Saline in Missouri. The counties of Leavenworth and Miami in Kansas and Cass, Lafayette, Platte, and Ray have 50 to 75 percent of their total land area covered by farms. The agricultural land share in the remaining counties ranged between 10 and 34 percent (below 50 percent).

The region had an overall 9 percent loss in agricultural land area since 2017, with the highest percentage reduction of 17 percent in Jackson County, Missouri. As exceptions, Johnson and Wyandotte Counties in Kansas had 9 percent and 1 percent gains in agricultural land area since 2017.

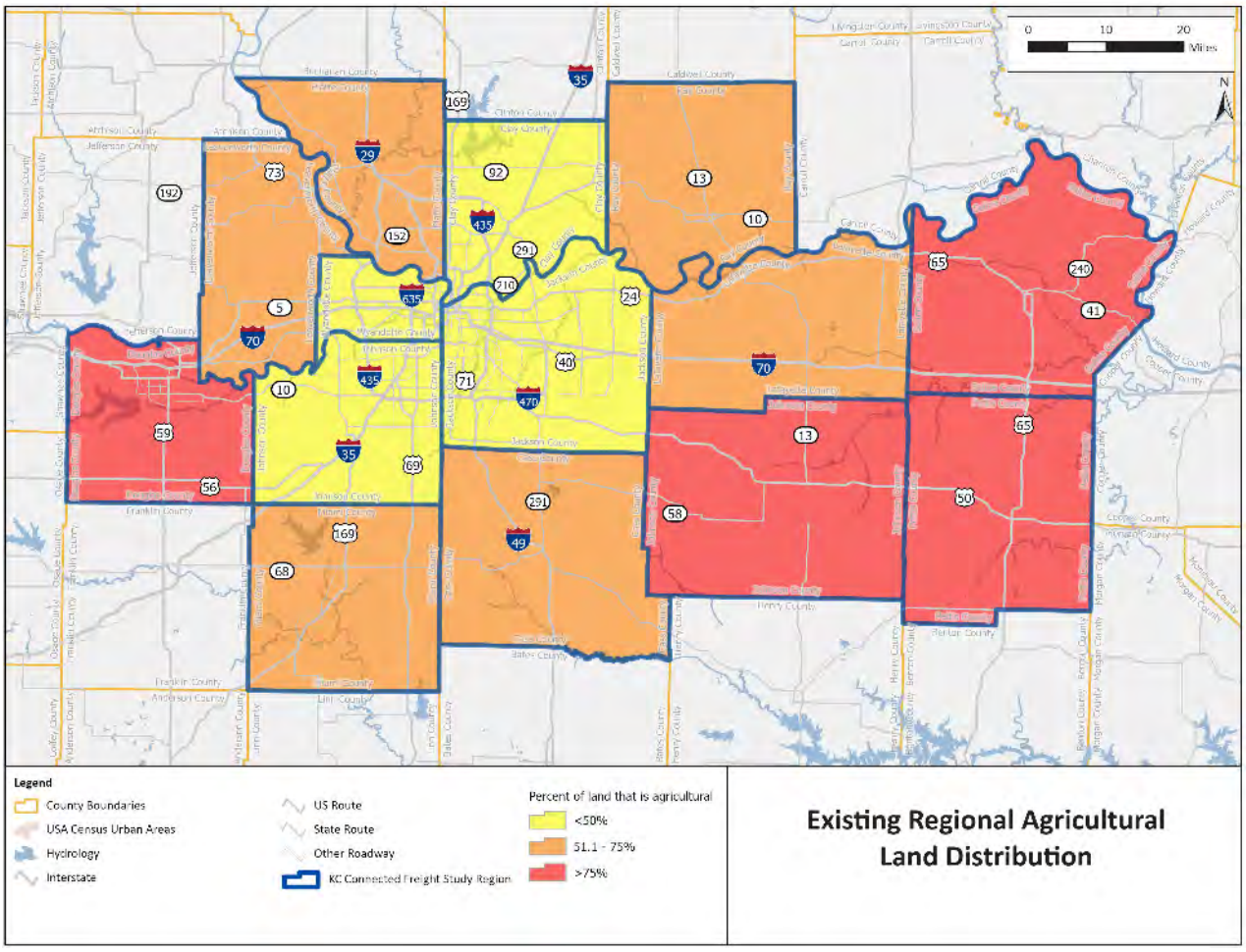
Table 9. Existing Regional Agricultural Lands Summary

County	Land Area in Farms (in sq. mi.)		Total Land Area (in sq. mi.)	% Land Area in Farms
	2022 Value	% Change since 2017		
Douglas	342.1	-8%	455.8	75.1%
Johnson	83.2	9%	473.6	17.6%
Leavenworth	234.4	-16%	463.4	50.6%
Miami	427.1	-10%	575.9	74.2%
Wyandotte	14.6	1%	151.6	9.6%
Kansas Counties Sub-Total	**1,101.3**	**-8%**	**2,120.3**	**51.9%**
Cass	471.2	-11%	696.6	67.6%
Clay	134.5	-5%	397.7	33.8%

[42] As per USDA, a farm is any place from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the year. Land in farms consists of agricultural land used for crops, pasture, or grazing. In other words, this includes cropland for growing crops as well as ranches for raising livestock.

County	Land Area in Farms (in sq. mi.)		Total Land Area (in sq. mi.)	% Land Area in Farms
	2022 Value	% Change since 2017		
Jackson	126.0	-17%	604.5	20.8%
Johnson	649.8	-6%	829.3	78.4%
Lafayette	447.2	-8%	628.3	71.2%
Pettis	562.9	-15%	682.2	82.5%
Platte	231.2	-1%	419.8	55.1%
Ray	404.9	-10%	569.0	71.2%
Saline	665.7	-6%	755.5	88.1%
Missouri Counties Sub-Total	**3,693.4**	**-9%**	**5,582.9**	**66.2%**
Regional Total	**4,794.7**	**-9%**	**7,703.2**	**62.2%**

Source: USDA National Agricultural Statistics Service (NASS), 2022 Census of Agriculture County Profiles, and U.S. Census Land Area Data



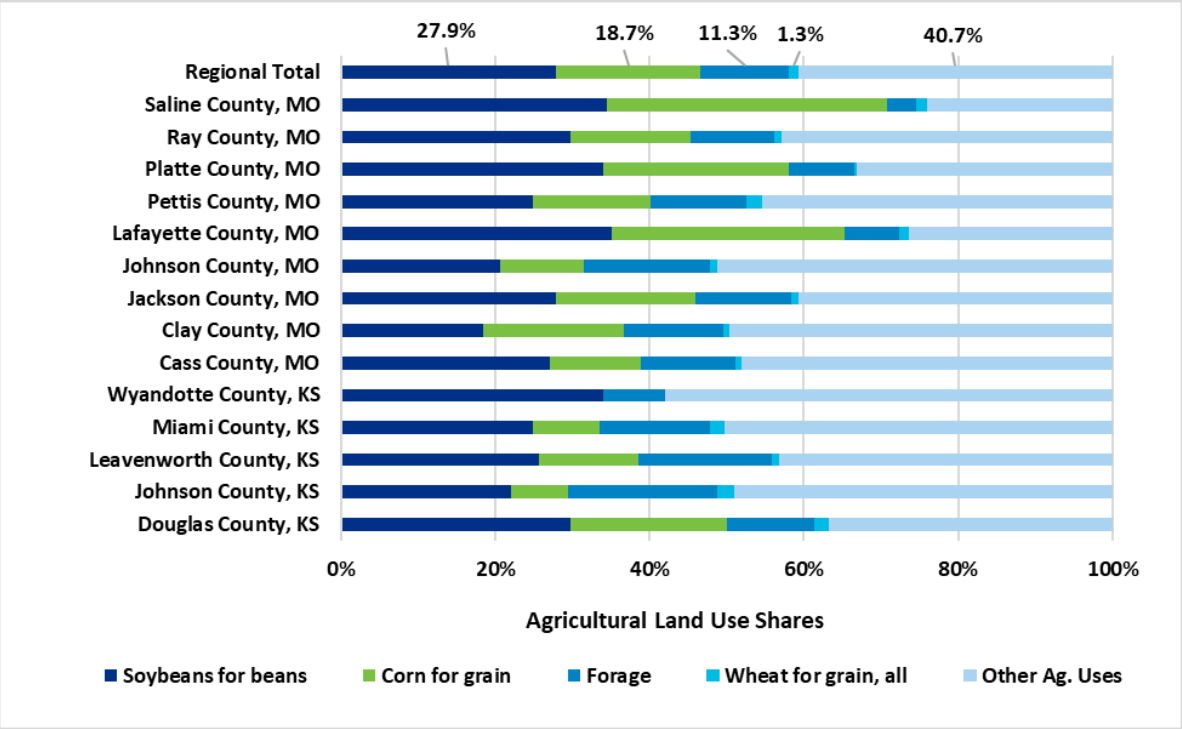
Source: USDA National Agricultural Statistics Service (NASS), 2022 Census of Agriculture County Profiles, and US Census' Land Area Data

Figure 21. Existing Regional Agricultural Land Distribution

Figure 22 shows the distribution of agricultural lands across the study region counties. Soybeans and corn are the top crops in the region, which together make up 47 percent of the total agricultural land use. The share of agricultural land used for soybeans production is around 20 percent or higher across all counties. The share of agricultural land used for corn production is the highest (more than 30 percent) in Lafayette and Saline counties in Missouri and averages around 15 percent in the remaining counties. The uses and transportation need of these top crops are discussed as follows:

- **Soybeans**: Soybeans are typically planted in April and May and harvested in September and October. They are usually transported from farms by trucks to nearby crushing facilities. Soybean crush is transported mostly by trucks to animal feed producers to produce a high-protein soybean meal, which is then shipped by truck, rail and barge to domestic and foreign livestock and poultry industries. Alternately, the soybean crush is transported to food and biodiesel manufacturers mostly by trucks to produce cooking oil and biodiesel feedstock oil, which are shipped to domestic retail markets mostly by trucks. Export movements primarily use Mississippi River, Gulf of Mexico, and Pacific Northwest ports. Biodiesel production facilities, unlike ethanol biorefineries, are not concentrated in one region, making transportation of feedstocks more complex.[43]
- **Corn**: Corn, also typically planted in April and May and harvested in September and October, is transported from farms to grain elevators as corn kernels. A part of the corn kernels is kept at farms as seeds or direct animal feed. Other parts of the corn kernels are sent to millers and distillers mostly by trucks to separate corn starch from the corn kernels. Corn starch is used by ethanol manufacturers and food manufacturers (cereals, sweeteners, alcohol) and their products are shipped to domestic retail markets mostly by trucks. The byproducts of milling and distillation, such as steepwater, germ meal, gluten feed, and gluten meal are shipped as animal feed by truck, rail, and barge to domestic and foreign livestock and poultry industries. Export movements primarily use Mississippi River, Gulf of Mexico, and Pacific Northwest ports. Most ethanol plants are located within 50 miles of corn-producing areas, making trucks a cost-effective mode of transportation.[44]

[43] https://www.ams.usda.gov/sites/default/files/media/Soybean%20Transportation%20Profile.pdf *(last accessed on June 10, 2024)*
[44] https://www.ams.usda.gov/sites/default/files/media/Corn%20Transportation%20Profile.pdf *(last accessed on June 10, 2024)*



Source: USDA NASS, 2022 Census of Agriculture County Profiles

Figure 22. Agricultural Land Uses Distribution and Top Crops

Based on the United States Department of Energy's Alternative Fuels Data Center,[45,46] there are 52 ethanol fueling stations and 40 biodiesel fueling stations within 100 miles of Kansas City, Missouri, which may be relying on biodiesel and ethanol production facilities for their fuel. The identification of locations and the capacity of biodiesel and ethanol production facilities is likely critical to planning transportation of grain for fuels.

Table 10 and **Figure 23** show the breakdown of existing agricultural product sales in the region. The region's overall sales are valued at $1.9 billion, which is a 45 percent increase since 2017. Livestock, poultry, and agricultural products other than crops in the region form an overall 37 percent of the total agricultural product sales. Clay, Johnson, and Pettis counties in Missouri have the highest sales shares for livestock, poultry, and agricultural products other than crops, ranging between 47 percent and 73 percent.

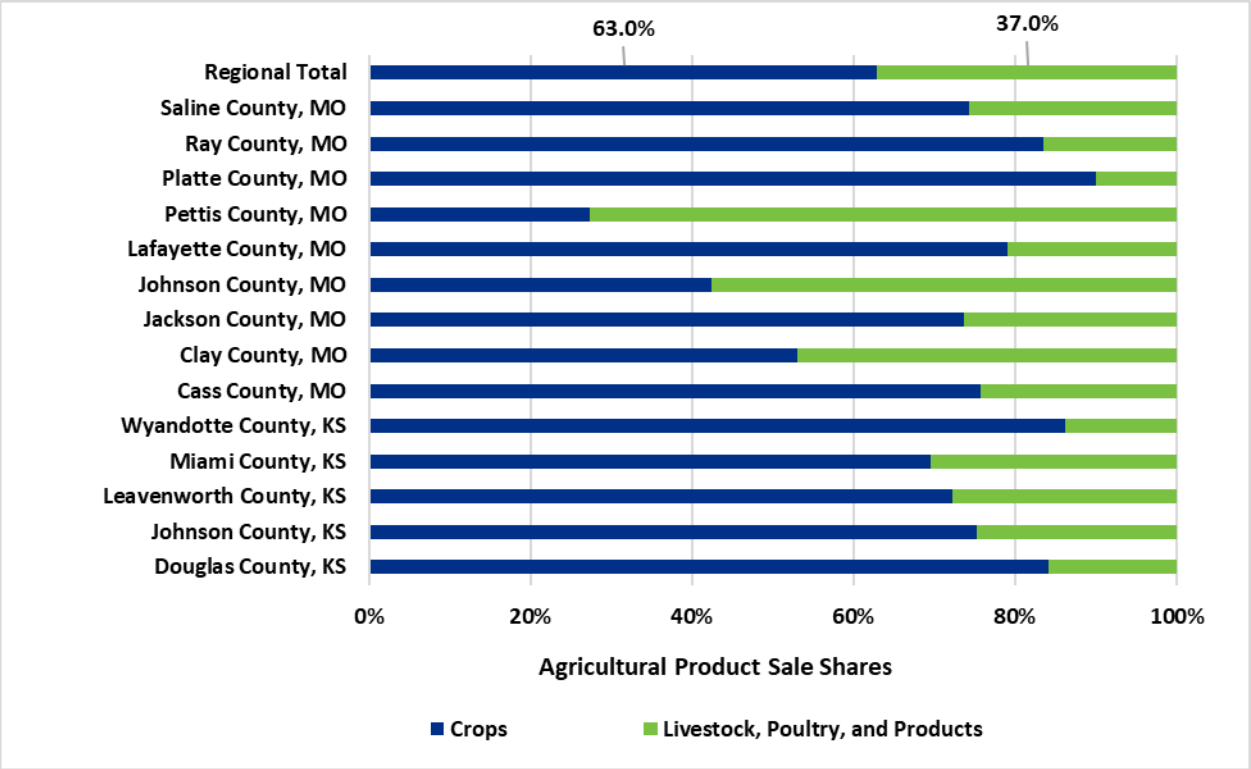
[45] https://afdc.energy.gov/stations#/analyze?region=US-MO&show_map=true&country=US&access=public&access=private&fuel=BD&lpg_secondary=true&hy_nonretail=true&ev_levels=all&location_mode=address&radius=100&location=Kansas%20City,%20MO (last accessed on June 10, 2024)

[46] https://afdc.energy.gov/stations#/analyze?region=US-MO&show_map=true&country=US&access=public&access=private&fuel=E85&lpg_secondary=true&hy_nonretail=true&ev_levels=all&location_mode=address&radius=100&location=Kansas%20City,%20MO (last accessed on June 10, 2024)

Table 10. Existing Regional Agricultural Product Sales Summary

County	Agricultural Products Sold (000s of $)			
	2022 Market Values			% Change since 2017
	Crops	Livestock, Poultry, and Products	Total	
Douglas	72,753	13,689	86,442	31%
Johnson	14,406	4,736	19,142	-37%
Leavenworth	44,885	17,228	62,113	41%
Miami	55,171	24,187	79,358	11%
Wyandotte	4,893	779	5,672	8%
Kansas Counties Sub-Total	**192,108**	**60,619**	**252,727**	**22%**
Cass	106,191	34,107	140,298	16%
Clay	28,416	25,072	53,488	54%
Jackson	29,838	10,624	40,462	8%
Johnson	99,648	135,043	234,691	68%
Lafayette	182,446	48,193	230,639	41%
Pettis	99,321	263,326	362,647	52%
Platte	68,820	7,595	76,415	27%
Ray	98,395	19,453	117,848	49%
Saline	296,704	102,819	399,523	55%
Missouri Counties Sub-Total	**1,009,779**	**646,232**	**1,656,011**	**48%**
Regional Total	**1,201,887**	**706,851**	**1,908,738**	**45%**

Source: USDA National Agricultural Statistics Service (NASS), 2022 Census of Agriculture County Profiles



Source: USDA NASS, 2022 Census of Agriculture County Profiles

Figure 23. Agricultural Product Sales Distribution

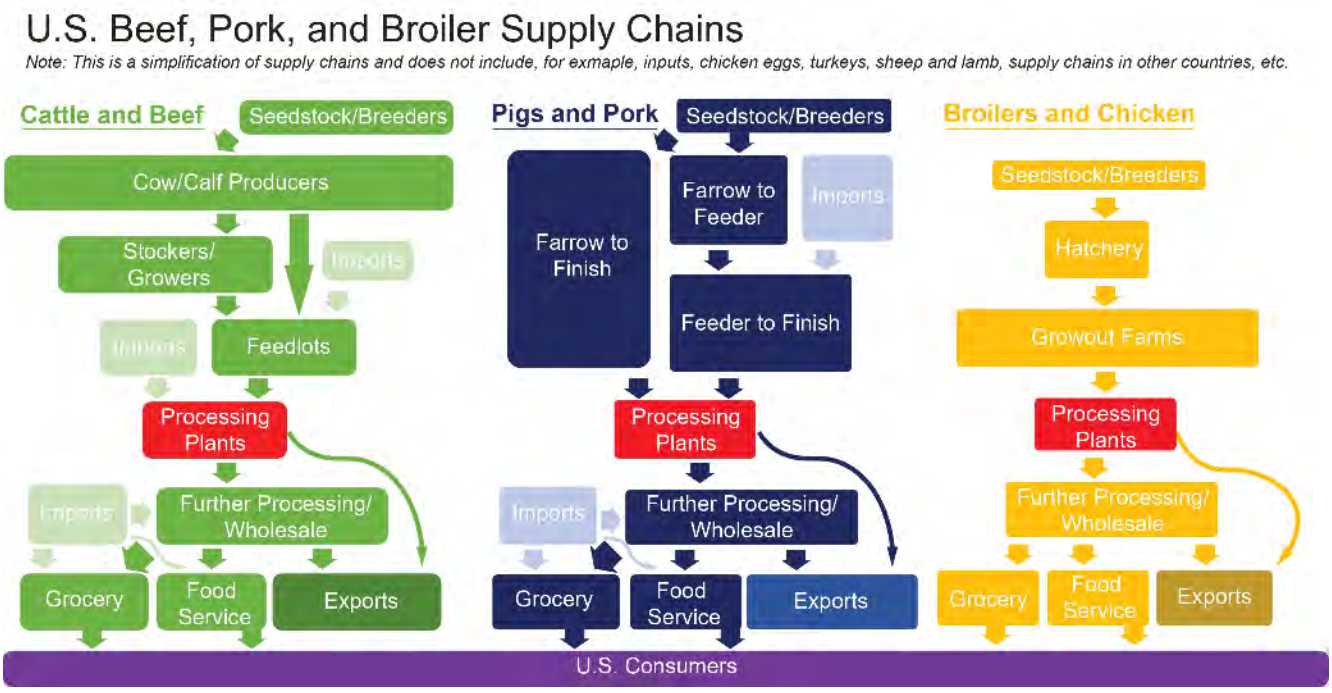
Table 11 shows the region in total has a cattle inventory of 368,000 cattle and calves. The leading counties in terms of cattle inventory in the region are Cass, Johnson, Lafayette and Pettis Counties. Calf and meat production appear to be the primary use of livestock within the study region. Based on the supply chain shown in **Figure 24**, the identification of location and capacity of cow/calf producers, animal feedlots and processing plants are likely critical to planning transportation of livestock for meat production. A similar approach can be taken for other live animals such as hogs, pigs and chickens using their supply chains.

Table 11. Existing Regional Livestock Inventory

County	January 2023 Cattle Inventory			% of Regional Total All Cattle and Calves
	Beef Cows	Milk Cows	All Cattle and Calves	
Douglas	8,000	1,200	17,100	4.7%
Johnson	300	0	600	0.2%
Leavenworth	7,900	100	18,100	4.9%
Miami	(D)	(D)	5,600	1.5%
Wyandotte	18,800	(D)	34,500	9.4%
Kansas Counties Sub-Total			**75,900**	**20.6%**

County	January 2023 Cattle Inventory			% of Regional Total All Cattle and Calves
	Beef Cows	Milk Cows	All Cattle and Calves	
Cass	20,500	200	40,500	11.0%
Clay	6,400	(D)	21,000	5.7%
Jackson	4,400	(D)	11,400	3.1%
Johnson	34,000	400	69,000	18.8%
Lafayette	(D)	(D)	37,000	10.1%
Pettis	27,500	200	53,000	14.4%
Platte	5,500	(1)	10,400	2.8%
Ray	12,700	(D)	26,500	7.2%
Saline	(D)	(D)	23,000	6.3%
Missouri Counties Sub-Total			**291,800**	**79.4%**
Regional Total			**367,700**	**100.0%**

Source: USDA NASS, Kansas and Missouri Field Offices - Cattle Inventory as of January 1, 2023



Source: The White House Briefing Report, Addressing Concentration in the Meat-Processing Industry to Lower Food Prices for American Families, September 8, 2021, Available at: https://www.whitehouse.gov/briefing-room/blog/2021/09/08/addressing-concentration-in-the-meat-processing-industry-to-lower-food-prices-for-american-families/ (last accessed on June 10, 2024); CDM Smith's Analysis to Improve Graphic Resolution

Figure 24. Typical Meat Processing Supply Chains in the United States

4.1.2. Industrial Property Clusters and Characteristics

The CoStar real-estate properties database (MARC's snapshot downloads in April and May 2024) was used to develop an industrial properties inventory for the 14-county study region. Industrial property is a type of building adapted for a combination of uses such as assemblage, processing, and/or manufacturing products from raw materials or fabricated parts. Additional uses include warehousing, distribution, and maintenance facilities.[47]

This document summarizes geographically aggregated data on industrial type properties to maintain confidentiality of individual property locations. Geographical aggregation was completed using transportation analysis zones (TAZ) in the 9-county MARC region and census tract boundaries in the remaining five extended peripheral study region counties. The inventory is restricted to properties with "Existing," "Under Construction," and "Under Renovation" building status type. "Planned," "Abandoned," or "Demolished" building status type properties are excluded. The inventory includes characteristics for number of properties, RBA,[48] percent vacancy, derived floor area ratio (estimated using typical floor area and land area, when available), built/renovated year, and secondary use type. There are other data elements such as rental rate, number of parking spaces, number of loading docks, etc. in the CoStar database; however, due to the inconsistent availability of these data across the properties, these were not used.

Table 12 and **Table 13** show the regional and county level summary of the industrial properties inventory. The region has 7,328 existing and 28 under construction or renovation buildings, which together contribute 373 million square feet of total rentable building area. On average, 3.7 percent of the region's existing industrial properties are vacant. Johnson and Wyandotte counties in Kansas and Clay and Jackson counties in Missouri jointly have 86 percent of the region's total number of buildings and 86 percent of the region's total rentable building area. For existing properties among these top counties, the vacancy rates vary from 1.0 to 5.6 percent and average building size varies from 39,000 square feet to 71,000 square feet.

The RBA is anticipated to increase by 3.5 percent by 2025 due to new construction or renovation. About 82 percent of buildings and 83 percent of rentable building area are being constructed or renovated in Johnson County, Kansas and Jackson County, Missouri. The average building size of industrial properties under construction or being renovated is close to half-million square feet, nearly 10 times higher than the existing average. The median floor area ratio for existing properties is around 0.23 on average, while that of the properties being constructed or renovated is around 0.18 on average.

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[47] www.costar.com/about/costar-glossary (last accessed on June 10, 2024)

[48] As per CoStar's Glossary available at www.costar.com/about/costar-glossary (last accessed on June 10, 2024): RBA, expressed in square feet, includes the usable area and its associated share of the common areas. Typically, rents are based on this area. It is the space the tenant will occupy in addition to the associated common areas of the building such as the lobby, hallways, bathrooms, equipment rooms, etc.

Table 12. Existing Regional Industrial Properties Summary

County	Number of Buildings	% Share of Regional Total Buildings	Rentable Building Area (RBA) (Square Feet)	% Share of Regional Total Rentable Building Area	Vacant Space (Square Feet)	% Vacant Space	% Share of Regional Total Vacant Space	Average Building Size (Square Feet)	% of All Properties used in Floor Area Ratio (FAR) Calculation	Median Floor Area Ratio (FAR)*
Douglas	273	3.7%	8,830,240	2.5%	232,573	2.6%	1.7%	32,345	98.2%	0.19
Johnson	1,607	21.9%	89,261,932	24.8%	5,037,506	5.6%	37.7%	55,546	90.4%	0.23
Leavenworth	91	1.2%	5,065,931	1.4%	0	0.0%	0.0%	55,670	74.7%	0.12
Miami	56	0.8%	739,050	0.2%	0	0.0%	0.0%	13,197	55.4%	0.10
Wyandotte	983	13.4%	49,898,292	13.9%	498,127	1.0%	3.7%	50,761	84.4%	0.24
Kansas Counties Sub-Total	**3,010**	**41.1%**	**153,795,445**	**42.7%**	**5,768,206**	**3.8%**	**43.2%**	**51,095**		**0.22**
Cass	166	2.3%	8,366,581	2.3%	472,952	5.7%	3.5%	50,401	78.9%	0.13
Clay	781	10.7%	55,199,222	15.3%	1,459,187	2.6%	10.9%	70,678	85.1%	0.30
Jackson	2,915	39.8%	114,919,599	31.9%	5,056,479	4.4%	37.8%	39,424	86.7%	0.24
Johnson	41	0.6%	2,238,283	0.6%	0	0.0%	0.0%	54,592	75.6%	0.05
Lafayette	59	0.8%	1,179,873	0.3%	0	0.0%	0.0%	19,998	49.2%	0.09
Pettis	115	1.6%	5,362,607	1.5%	14,200	0.3%	0.1%	46,631	90.4%	0.14
Platte	218	3.0%	18,139,142	5.0%	594,636	3.3%	4.4%	83,207	85.8%	0.22
Ray	9	0.1%	453,885	0.1%	0	0.0%	0.0%	50,432	55.6%	0.09
Saline	14	0.2%	586,040	0.2%	0	0.0%	0.0%	41,860	92.9%	0.09
Missouri Counties Sub-Total	**4,318**	**58.9%**	**206,445,232**	**57.3%**	**7,597,454**	**3.7%**	**56.8%**	**47,810**		**0.24**
Regional Total	**7,328**	**100.0%**	**360,240,677**	**100.0%**	**13,365,660**	**3.7%**	**100.0%**	**49,159**		**0.23**

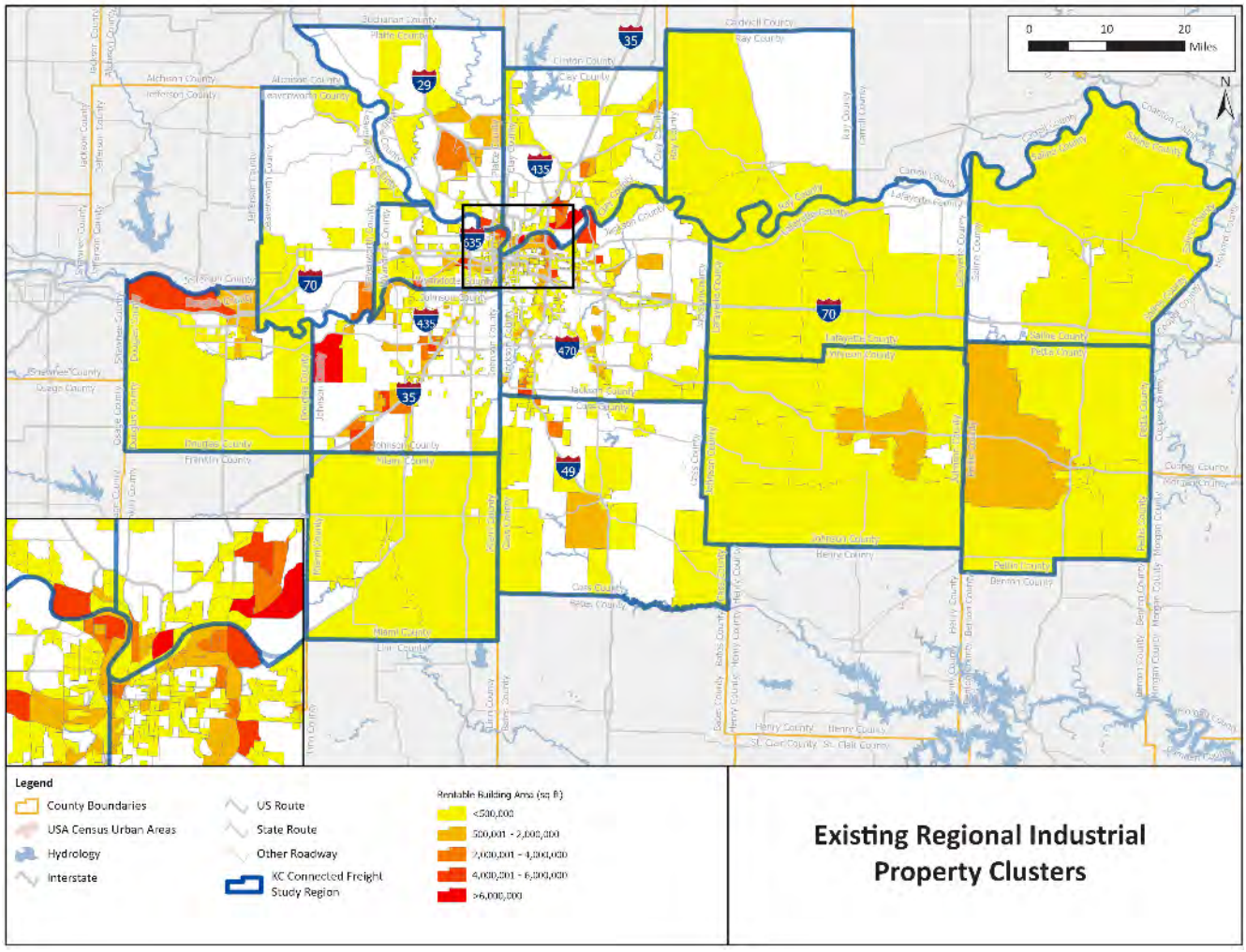
Source: CoStar Real-Estate Properties Database, MARC's snapshot downloads in April and May 2024
Note:* Calculated approximately using individual property FARs where average building footprint and land area data is available

Table 13. Under Construction or Renovation Industrial Properties

County	Number of Buildings	% Share of Regional Total Buildings	Rentable Building Area (RBA) (Square Feet)	% Share of Regional Total Rentable Building Area	Average Building Size (Square Feet)	% of All Properties used in Floor Area Ratio(FAR) Calculation	Median Floor Area Ratio (FAR)*	Total Number of Buildings (Existing + Under Construction or Renovation)	Total RBA (Existing + Under Construction or Renovation)
Douglas	1	3.6%	4,500	0.0%	4,500	100.0%	0.05	274	8,834,740
Johnson	13	46.4%	9,231,773	72.6%	710,136	64.3%	0.18	1,620	98,493,705
Leavenworth	0	0.0%	0	0.0%	N/A	N/A	N/A	91	5,065,931
Miami	0	0.0%	0	0.0%	N/A	N/A	N/A	56	739,050
Wyandotte	1	3.6%	150,000	1.2%	150,000	0.0%	N/A	984	50,048,292
Kansas Counties Sub-Total	**15**	**53.6%**	**9,386,273**	**73.8%**	**625,752**		**0.17**	**3,025**	**163,181,718**
Cass	0	0.0%	0	0.0%	N/A	N/A	N/A	166	8,366,581
Clay	1	3.6%	203,899	1.6%	203,899	100.0%	0.27	782	55,403,121
Jackson	10	35.7%	1,376,982	10.8%	137,698	60.0%	0.15	2,925	116,296,581
Johnson	0	0.0%	0	0.0%	N/A	N/A	N/A	41	2,238,283
Lafayette	0	0.0%	0	0.0%	N/A	N/A	N/A	59	1,179,873
Pettis	0	0.0%	0	0.0%	N/A	N/A	N/A	115	5,362,607
Platte	2	7.1%	1,748,833	13.8%	874,417	100.0%	0.49	220	19,887,975
Ray	0	0.0%	0	0.0%	N/A	N/A	N/A	9	453,885
Saline	0	0.0%	0	0.0%	N/A	N/A	N/A	14	586,040
Missouri Counties Sub-Total	**13**	**46.4%**	**3,329,714**	**26.2%**	**256,132**		**0.18**	**4,331**	**209,774,946**
Regional Total	**28**	**100.0%**	**12,715,987**	**100.0%**	**454,142**		**0.18**	**7,356**	**372,956,664**
Regional % Increase over Existing	**0.4%**		**3.5%**						

Source: CoStar Real-Estate Properties Database, MARC's snapshot downloads in April and May 2024
Note: * Calculated approximately using individual property FARs where average building footprint and land area data is available
N/A = not applicable

RBA totals by aggregated geography are shown as an industry property clusters map in **Figure 25**. Out of 916 aggregated geographies, 48 have rentable building areas over 2 million square feet. These 48 aggregated geographies are located in CoStar defined cluster regions (and some constituent CoStar submarkets) of: North of Missouri River (Claycomo, City of North KC, Airport/North Platte County, Riverside/Parkville and Liberty) and South Johnson County in Kansas (Olathe), East Jackson County (Independence, Executive Park and East Bottoms Kansas City), Wyandotte County (Central Kansas City/Fairfax, Armourdale, Turner and Bonner Springs), South Jackson County (Grandview), North Johnson County (Lenexa), Downtown Kansas City, parts of Lawrence, parts of Leavenworth County in Kansas and parts of Cass County in Missouri. Together these cluster regions contribute to 181 million square feet of rentable building area of existing and under construction or renovation properties (about 49 percent of the regional total of 373 million square feet).



Source: CoStar Real-Estate Properties Database, MARC's snapshot downloads in April and May 2024; MARC's Transportation Analysis Zones GIS Data; ESRI's Census Tract Boundaries GIS Data

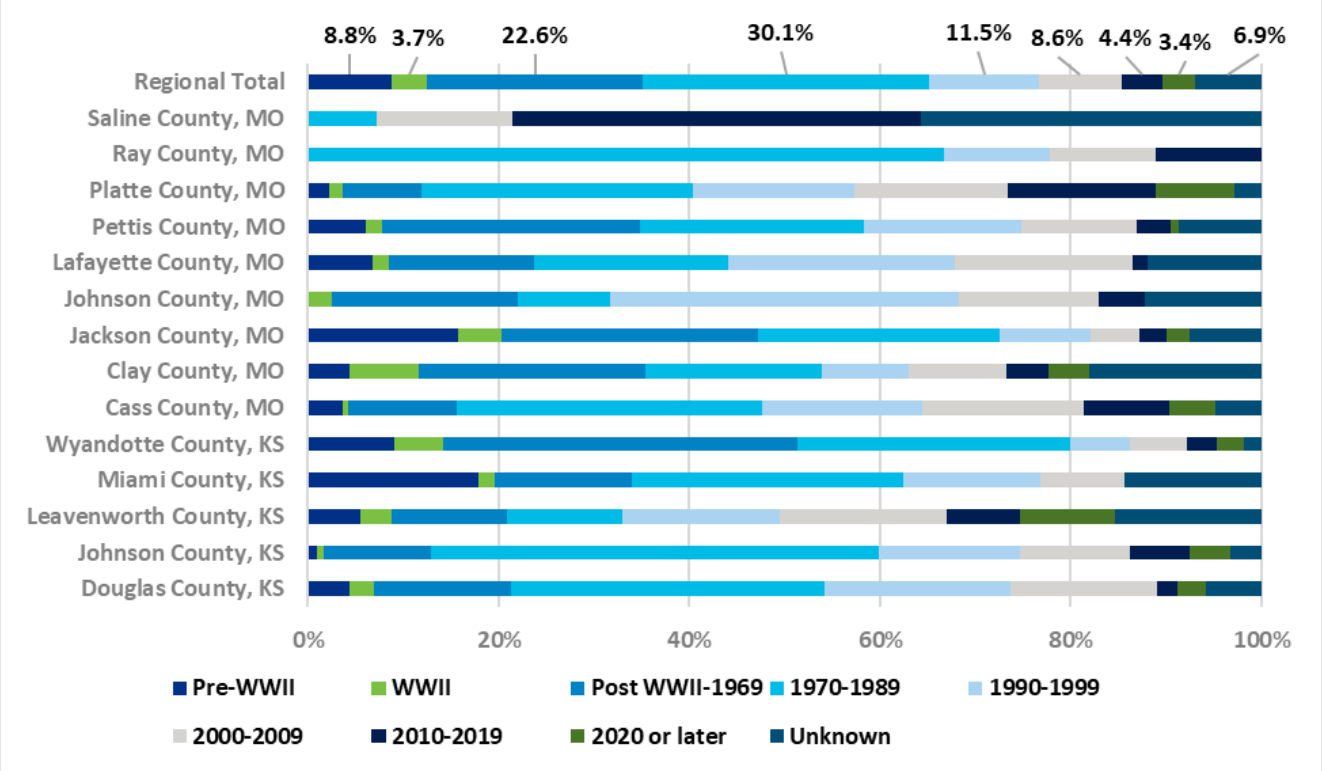
Figure 25. Existing Regional Industrial Property Clusters

Figure 26 shows the age distribution of the industrial properties using the built year or last renovated year, whichever is later. The region's industrial properties built or renovated on or after 1990 (newer building stock) make up just 28 percent of the total building stock. Newer building stock is likely to support modern freight transportation operations and technologies. About 36 percent of the industrial building stock in Saline County in Missouri has an unknown age in the CoStar database. Among the other counties, Miami and Wyandotte counties in Kansas and Jackson County in Missouri, are below the regional average in terms of newer building stock share.

For comparison, Jackson County, Missouri formed 44 percent of the regional total number of industrial buildings built or renovated prior to 1990; while only 29 percent of those were built or renovated on or after 1990. These shares for Johnson County, Kansas are 20 percent (prior to 1990 stock) and 29 percent (on or after 1990 stock), respectively. In terms of the RBA, Jackson County, Missouri's share changed from 39 percent (prior to 1990 stock) to 24 percent (on or after 1990 stock). At the same time, Johnson County, Kansas's share of regional total RBA changed from 17 percent (prior to 1990 stock) to 35 percent (on or after 1990 stock). Smaller changes are seen in the remaining counties in the study region.

Aside from the spatial shifts, the average building size has been changing. For regional industrial building stock built or renovated prior to 1990, the average building size is 37,000 square feet, while for those built or renovated on or after 1990, the average building size is 81,000 square feet (a little over twice the size).

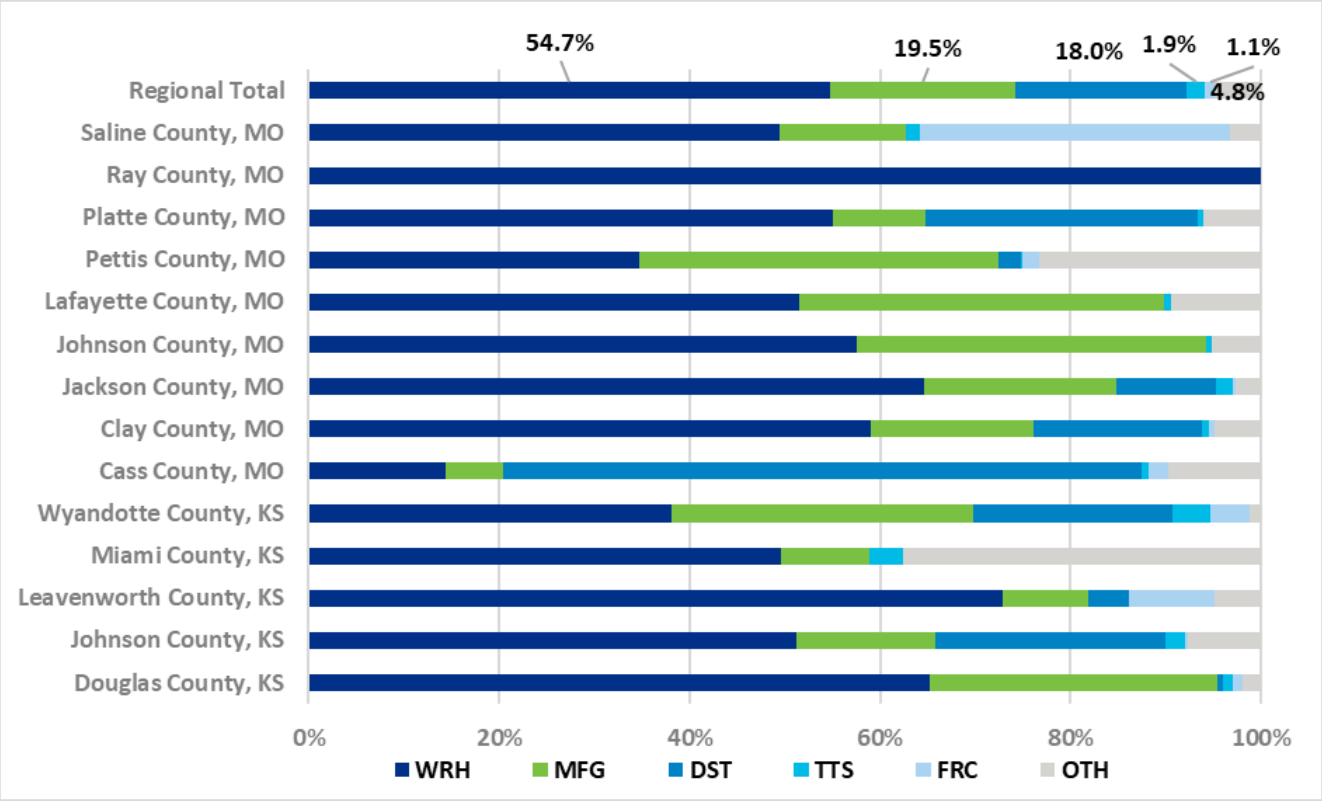
Overall, the spatial distribution of industrial buildings and sizes are changing with time. With this, freight transportation needs are also changing.



Source: CoStar Real-Estate Properties Database, MARC snapshot downloads in April and May 2024

Figure 26. Existing Industrial Properties Age Distribution

Figure 27 shows the secondary use type distribution of the industrial RBA as identified in the CoStar database. The region's warehouses and distribution centers building stock makes up 262 million square feet or 73 percent of the regional total existing rentable building area. Compared to warehouses, distribution centers are likely to have larger average building areas with less frequent but larger shipments. The leading counties in terms of rentable building area for warehouses and distributions centers are Johnson and Wyandotte counties in Kansas and Clay and Jackson counties in Missouri. Manufacturing building stock makes up 70 million square feet or 20 percent of the regional total existing rentable building area and is concentrated in Johnson and Wyandotte counties in Kansas and Jackson County in Missouri. Food processing, refrigeration and cold storage building stock that is likely to support farm and animal products makes up just 4 million square feet or 1 percent of the regional total existing rentable building area and is concentrated in Leavenworth and Wyandotte counties in Kansas. Lastly, truck terminals and services building stock that is likely to directly support freight transportation makes up 7 million square feet or 2 percent of the regional total existing rentable building area and is concentrated in Johnson and Wyandotte counties in Kansas and Jackson County in Missouri.



Source: CoStar Real-Estate Properties Database, MARC's snapshot downloads in April and May 2024
Note: WRH = Warehousing, MFG = Manufacturing, DST = Distribution, TTS = Truck Terminals and Services, FRC = Food Processing, Refrigeration and Cold Storage, OTH = Other, TOT = Total

Figure 27. Existing Industrial Properties Secondary Use Type Distribution

4.1.3. Commercial Property Clusters and Characteristics

The inventory for commercial properties was developed using the CoStar real-estate properties database for the 14-county study region, in the same manner as the industrial properties. Commercial properties include office and retail use spaces. As per the database, an office property's primary intended use is to house employees of companies that produce a product or service primarily for support services such as administration, accounting, marketing, information processing and dissemination, consulting, human resources management, financial and insurance services, educational and medical services, and other professional services. Also, per the database, a retail property's primary intended use is to promote, distribute or sell products and services to the public. They can be stand-alone (convenience stores to department stores), store fronts, strip centers (no anchors), neighborhood, community, regional, and super-regional malls, power centers, factory outlet centers, and fashion or specialty centers.[49]

Table 14 and **Table 15** show the regional and county level summary of the commercial properties inventory. The region has 17,844 existing and 66 under construction or renovation buildings,

[49] https://www.costar.com/about/costar-glossary (last accessed on June 10, 2024)

which together contribute 278 million square feet of total rentable building area. On average, 5.9 percent of the region's existing commercial properties are vacant.

Johnson and Wyandotte counties in Kansas and Clay and Jackson Counties in Missouri jointly have 78 percent of the region's total number of buildings and 85 percent of the region's total rentable building area. For existing properties among these top counties, the vacancy rates vary in the range of 3.1 to 7.8 percent and average building size varies in the range of 11,500 square feet to 20,800 square feet.

The rentable building area is anticipated to increase by just 0.7 percent by 2025 due to new construction or renovation. About 79 percent of buildings and 86 percent of rentable building area are being constructed or renovated in Johnson County in Kansas and Jackson County in Missouri. The average building size of commercial properties under construction or renovation is 28,000 square feet, which is slightly higher than the existing average of 15,500 square feet. The median floor area ratio for existing properties is around 0.17 on average, while the ratio of the properties being constructed or renovated is around 0.10 on average.

When compared to industrial properties and clusters, commercial properties are smaller in size on average and commercial clusters are more uniformly distributed across the region. Some of the reasons for this may be as follows: (a) office and retail space are an essential and integral part of all communities and support a wider skilled employment base; (b) natural resources and supply chains needed to support industrial activity are not ubiquitous; (c) zoning and permitting for the development of industrial uses may be more restrictive than the development of commercial uses.

Table 14. Existing Regional Commercial Properties Summary

County	Number of Buildings	% Share of Regional Total Buildings	Rentable Building Area (RBA) (Square Feet)	% Share of Regional Total Rentable Building Area	Vacant Space (Square Feet)	% Vacant Space	% Share of Regional Total Vacant Space	Average Building Size (Square Feet)	% of All Properties used in Floor Area Ratio (FAR) Calculation	Median Floor Area Ratio (FAR)*
Douglas	976	5.5%	10,094,613	3.7%	433,128	4.3%	73.1%	10,343	94.8%	0.19
Johnson	4,101	23.0%	85,223,141	30.9%	6,635,264	7.8%	132.7%	20,781	93.4%	0.15
Leavenworth	400	2.2%	3,880,667	1.4%	181,089	4.7%	79.5%	9,702	88.3%	0.19
Miami	237	1.3%	1,812,178	0.7%	12,495	0.7%	11.8%	7,646	84.8%	0.17
Wyandotte	1,344	7.5%	15,469,866	5.6%	506,087	3.3%	55.8%	11,510	90.6%	0.18
Kansas Counties Sub-Total	**7,058**	**39.6%**	**116,480,465**	**42.2%**	**7,768,063**	**6.7%**	**113.7%**	**16,503**		**0.16**
Cass	698	3.9%	6,652,001	2.4%	128,378	1.9%	32.9%	9,530	93.8%	0.15
Clay	1,571	8.8%	22,200,313	8.0%	689,512	3.1%	52.9%	14,131	89.9%	0.14
Jackson	6,941	38.9%	111,040,080	40.3%	6,815,974	6.1%	104.6%	15,998	92.2%	0.19
Johnson	252	1.4%	2,197,960	0.8%	69,361	3.2%	53.8%	8,722	88.1%	0.15
Lafayette	227	1.3%	1,668,137	0.6%	13,516	0.8%	13.8%	7,349	87.7%	0.17
Pettis	311	1.7%	3,570,451	1.3%	15,100	0.4%	7.2%	11,481	91.3%	0.16
Platte	583	3.3%	10,284,753	3.7%	620,498	6.0%	102.8%	17,641	91.1%	0.14
Ray	92	0.5%	762,045	0.3%	10,125	1.3%	22.6%	8,283	76.1%	0.16
Saline	111	0.6%	1,016,862	0.4%	55,840	5.5%	93.6%	9,161	83.8%	0.16
Missouri Counties Sub-Total	**10,786**	**60.4%**	**159,392,602**	**57.8%**	**8,418,304**	**5.3%**	**90.0%**	**14,778**		**0.17**
Regional Total	**17,844**	**100.0%**	**275,873,067**	**100.0%**	**16,186,367**	**5.9%**	**100.0%**	**15,460**		**0.17**

Source: CoStar Real-Estate Properties Database, MARC's snapshot downloads in April and May 2024
Note:* Calculated approximately using individual property FARs where average building footprint and land area data is available

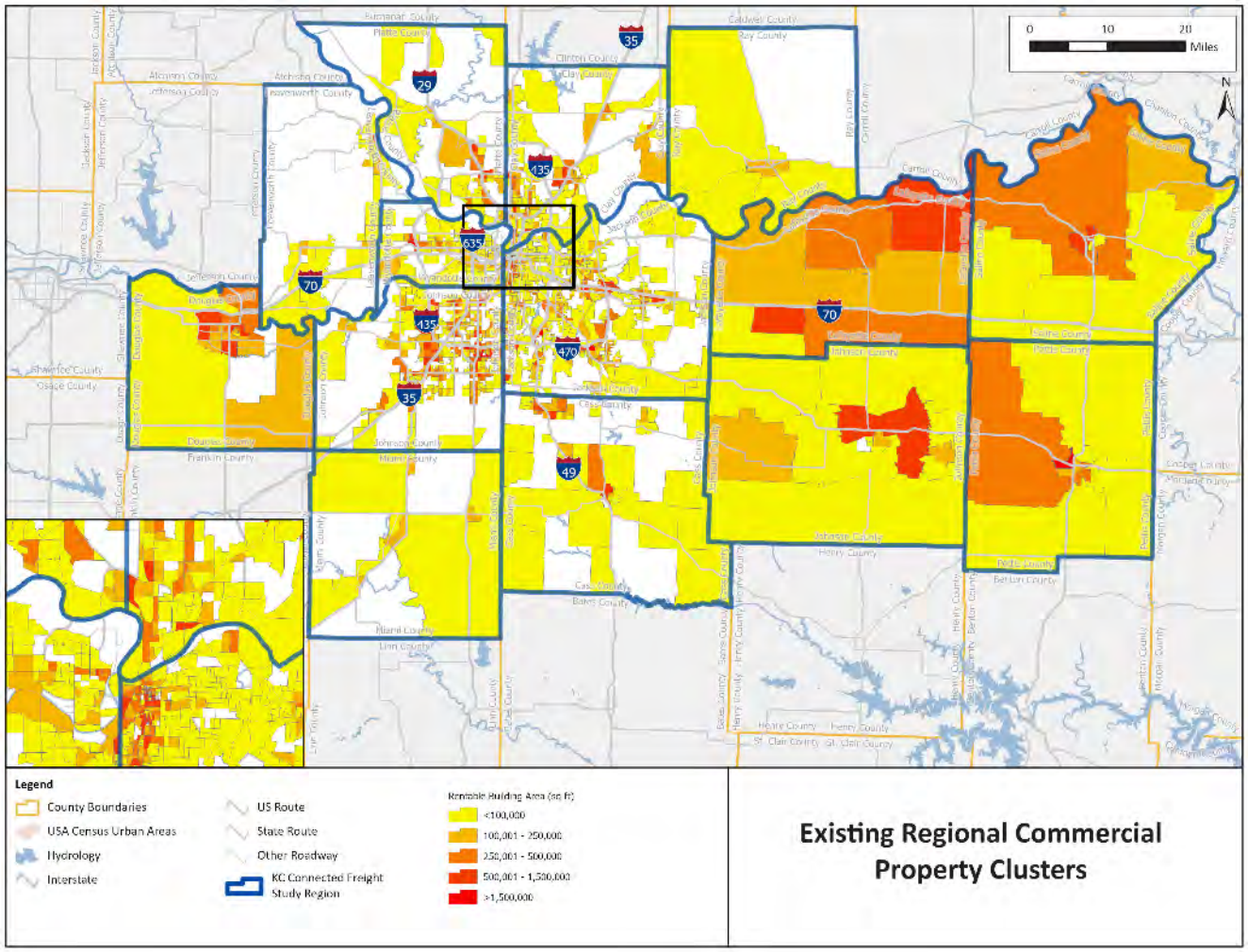
Table 15. Under Construction or Renovation Commercial Properties Summary

County	Number of Buildings	% Share of Regional Total Buildings	Rentable Building Area (RBA) (Square Feet)	% Share of Regional Total Rentable Building Area	Average Building Size (Square Feet)	% of All Properties used in Floor Area Ratio (FAR) Calculation	Median Floor Area Ratio (FAR)*	Total Number of Buildings (Existing + Under Construction or Renovation)	Total RBA (Existing + Under Construction or Renovation)
Douglas	0	0.0%	0	0.0%	N/A	N/A	N/A	976	10,094,613
Johnson	19	28.8%	758,143	40.7%	39,902	68.4%	0.10	4,120	85,981,284
Leavenworth	0	0.0%	0	0.0%	N/A	N/A	N/A	400	3,880,667
Miami	0	0.0%	0	0.0%	N/A	N/A	N/A	237	1,812,178
Wyandotte	2	3.0%	8,499	0.5%	4,250	100.0%	0.12	1,346	15,478,365
Kansas Counties Sub-Total	**21**	**31.8%**	**766,642**	**41.1%**	**36,507**		**0.10**	**7,079**	**117,247,107**
Cass	1	1.5%	2,356	0.1%	2,356	100.0%	0.05	699	6,654,357
Clay	5	7.6%	40,198	2.2%	8,040	80.0%	0.03	1,576	22,240,511
Jackson	33	50.0%	844,632	45.3%	25,595	63.6%	0.24	6,974	111,884,712
Johnson	0	0.0%	0	0.0%	N/A	N/A	N/A	252	2,197,960
Lafayette	0	0.0%	0	0.0%	N/A	N/A	N/A	227	1,668,137
Pettis	0	0.0%	0	0.0%	N/A	N/A	N/A	311	3,570,451
Platte	6	9.1%	211,000	11.3%	35,167	83.3%	0.03	589	10,495,753
Ray	0	0.0%	0	0.0%	N/A	N/A	N/A	92	762,045
Saline	0	0.0%	0	0.0%	N/A	N/A	N/A	111	1,016,862
Missouri Counties Sub-Total	**45**	**68.2%**	**1,098,186**	**58.9%**	**24,404**		**0.10**	**10,831**	**160,490,788**
Regional Total	**66**	**100.0%**	**1,864,828**	**100.0%**	**28,255**		**0.10**	**17,910**	**277,737,895**
Regional % Increase over Existing	**0.4%**		**0.7%**						

Source: CoStar Real-Estate Properties Database, MARC's snapshot downloads in April and May 2024

Note: * Calculated approximately using individual property FARs where average building footprint and land area data is available

RBA totals by aggregated geography are shown as a commercial property clusters map in **Figure 28**. Out of a total of 1,743 aggregated geographies, 130 of them have an RBA over 500,000 square feet. These 130 aggregated geographies are found in CoStar defined cluster regions (and some constituent CoStar submarkets) of South Johnson County in Kansas (College Blvd and other parts), several parts of Jackson County (East, Northeast, Northwest and Southeast), North of Missouri River, Downtown Kansas City (central business district, Crown Center, Freight House District and West Bottoms), South Kansas City (Ward Parkway and other parts), Midtown (Country Club Plaza and other parts), parts of Lawrence, parts of Leavenworth County in Kansas and parts of Cass, Johnson and Lafayette counties in Missouri. Together these cluster regions contribute to 112 million square feet of rentable building area of existing and under construction or renovation properties (i.e., about 40 percent of the regional total of 278 million square feet).



Source: CoStar Real-Estate Properties Database, MARC's snapshot downloads in April and May 2024; MARC's Transportation Analysis Zones GIS Data; ESRI's Census Tract Boundaries GIS Data

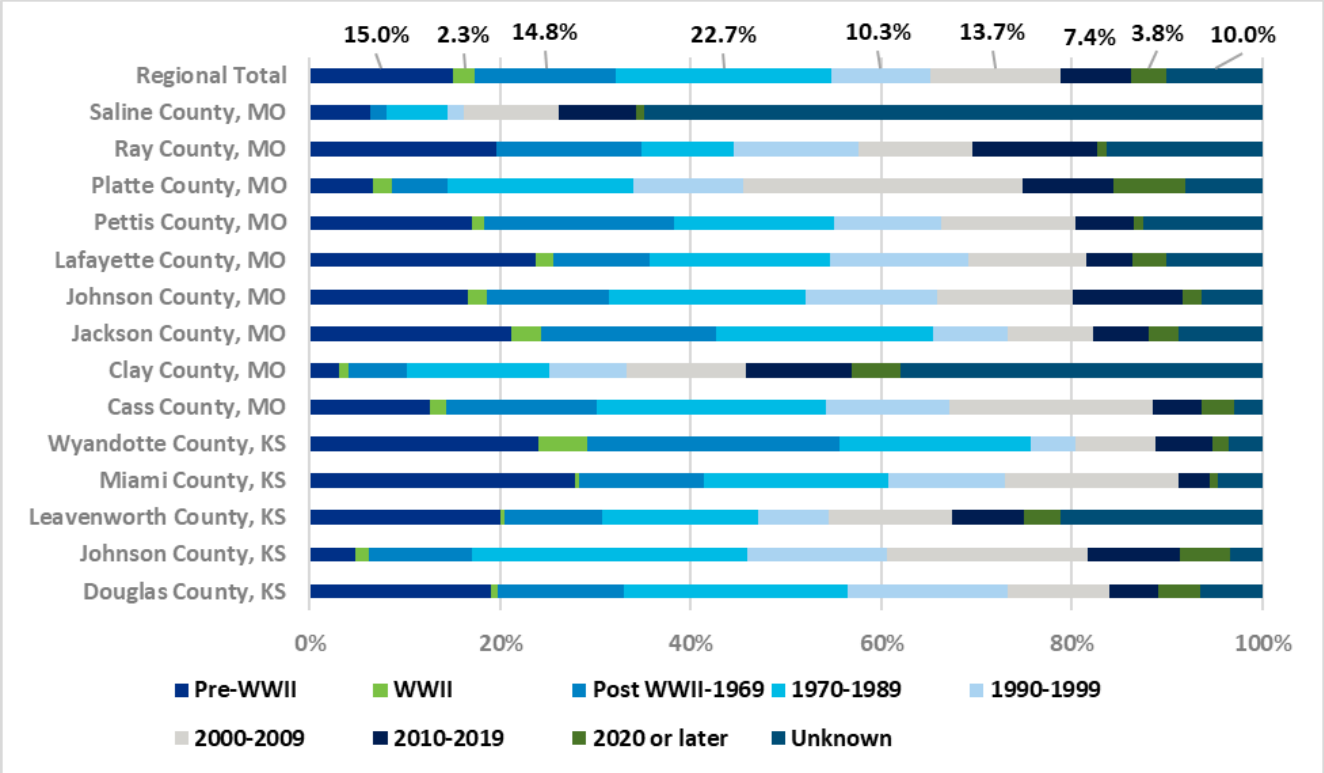
Figure 28. Existing Regional Commercial Property Clusters

Figure 29 shows the age distribution of the commercial properties using the built year or last renovated year, whichever is later. The region's commercial properties built or renovated on or after 1990 (newer building stock) make up just 35 percent of the total building stock. In the case of industrial properties, newer commercial building stock is likely to support modern freight transportation operations and technologies. About 65 percent of the commercial building stock in Saline County,n Missouri and about 38 percent of that in Clay County,n Missouri have an unknown age in the CoStar database. Among the other counties, Leavenworth, Miami and Wyandotte counties in Kansas and Jackson and Pettis counties in Missouri, are below the regional average in terms of newer building stock share.

For comparison, Jackson County in Missouri formed 46 percent of the regional total number of commercial buildings built or renovated prior to 1990; while only 29 percent were built or renovated on or after 1990. These shares for Johnson County in Kansas are 19 percent (prior to 1990 stock) and 33 percent (on or after 1990 stock), respectively. In terms of the rentable building area, Jackson County in Missouri's share changed from 49 percent (prior to 1990 stock) to 34 percent (on or after 1990 stock). At the same time, Johnson County in Kansas's share of regional total rentable building area changed from 25 percent (prior to 1990 stock) to 38 percent (on or after 1990 stock). Smaller changes are seen in the remaining counties in the study region.

Aside from spatial shifts, the average building size has been changing. For regional commercial building stock built or renovated prior to 1990, the average building size is 11,500 square feet, while for those built or renovated on or after 1990, the average building size is 23,000 square feet (about two times higher).

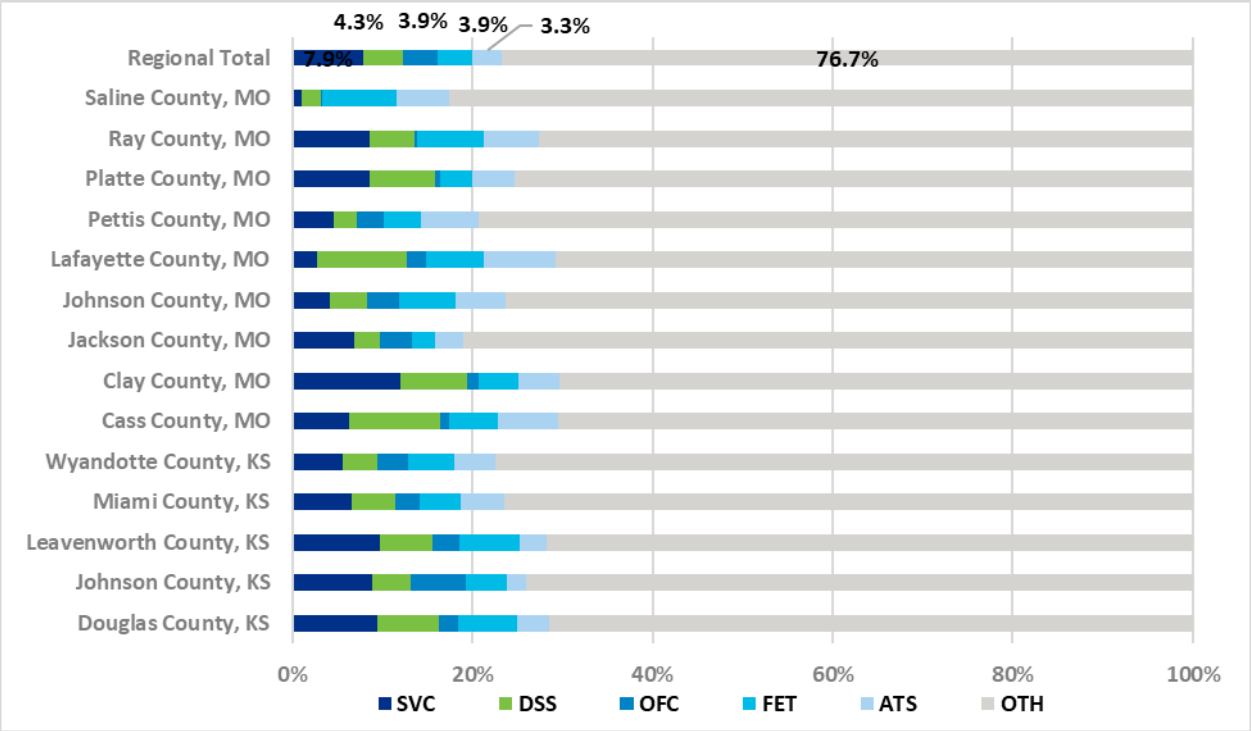
Like industrial buildings, the spatial distribution of commercial buildings and sizes are changing with time. Freight transportation needs are also changing.



Source: CoStar Real-Estate Properties Database, MARC snapshot downloads in April and May 2024

Figure 29. Existing Commercial Properties Age Distribution

Figure 30 shows the secondary use type distribution of the commercial rentable building area as identified in the CoStar database. The region's other retail and office building stock makes up 212 million square feet or 77 percent of the regional total existing rentable building area, indicating the highly fragmented nature of retail sales centers and office space. Due to the large unclassified secondary use type, there is limited insight to be gained on the secondary use types from the CoStar commercial properties database.



Source: CoStar Real-Estate Properties Database, MARC's snapshot downloads in April and May 2024
Note: SVC = Services (including Bank and Medical), DSS = Department Store, Drug Stores, Supermarkets and Showrooms, OFC = Office Building or Space, FET = Food and Entertainment, ATS = Auto/Truck Store and Services, OTH = Other Retail or Office, TOT = Total

Figure 30. Existing Commercial Properties Secondary Use Type Distribution

4.1.4. Major Employers

The Kansas City study region is home to several major employers,[50] some of which specialize in manufacturing and distribution centers, and few among these are also headquartered in the study region. Fifty-two (52) manufacturing and/or distribution firms with over 500 employees each categorized by area of specialization are summarized in **Table 16**. Vehicle manufacturing and distribution, electronic and electrical products manufacturing, food and beverage manufacturing, meat processing and packaging, pharmaceutical manufacturing, and consumer goods stores and distribution are the areas of specialization for these major employers.

[50] Kansas City Area Development Council, Regional Employers, Available at: https://thinkkc.com/business/regional-employers/Employers (last accessed on August 9, 2024)

Table 16. Major Manufacturing and/or Distribution Employers

Area of Specialization	Firm Name	Firm Emp.
Motor vehicle mfg.	Ford Motor Company	7,310
	General Motors Corp.	2,385
Electronic & mech. weapons components mfg.	Kansas City National Security Campus, managed by Honeywell FM&T	7,800
Fulfillment center, post office	Amazon	6,500
Global positioning system mfg. (Hdq.)	Garmin International, Inc.	4,744
Greeting card mfg. (Hdq.)	Hallmark Cards, Inc.	4,480
Retailer distribution center	Walmart	2,960
	Target	1,052
Delivery services	United Parcel Service	3,888
Delivery services call center	FedEx	2,891
Pork processing (Hdq.)	Triumph Foods, LLC	2,800
Ammunition mfg.	Olin Winchester, Lake City Ammunition Plant	1,550
Tire mfg.	Goodyear	1,500
Industrial equipment mfg.	Altec Industries, Inc.	1,500

Area of Specialization	Firm Name	Firm Emp.
Animal pharmaceuticals mfg.	Boehringer Ingelheim	800
Chocolate mfg.	Mars Wrigley	800
Meat processing (Hdq.)	National Beef Packing Company	795
Pet food mfg. (Hdq.)	Hill's Pet Nutrition, Inc.	762
Automotive welded body assembly parts mfg.	LMV Automotive	700
Microbiology media products mfg.	Thermo Fisher Scientific	687
Clothing retailer distribution center	American Eagle Outfitters	673
Catalog fulfillment & store distribution center	JCPenney Logistics Center	662
Plumbing specialty products mfg. (Hdq.)	Sioux Chief Manufacturing Co.	650
Electronic garage door components mfg.	Amarr Entrematic Garage Doors	650
Beverage mfg. & distribution (Hdq.)	Heartland Coca-Cola	637
Meat products mfg. (Hdq.)	Smithfield Farmland Foods, Inc.	635
Pre-engineered buildings (Hdq.)	BlueScope Properties Group	630
Food products mfg.	Kellogg Company	622

Area of Specialization	Firm Name	Firm Emp.
Snack food mfg. & distribution	Frito-Lay Inc.	1,406
Clothing distribution and fulfillment center	Urban Outfitters	1,400
Food mfg. & distribution	Reser's Fine Foods	1,354
Automotive storage battery mfg. & distribution	Clarios	1,342
Meat products mfg. & distribution	Tyson Foods, Inc.	1,299
Pharmaceutical services	CVS Health	1,274
Grocery distributor (Hdq.)	Associated Wholesale Grocers	1,194
Pharmaceutical call center & fulfillment center	OptumRx	1,100
Plastic products mfg.	Berry Global	1,000
Truck and equipment mfg. (Hdq.)	Custom Truck One Source	986
Pet supply distributor	Chewy, Inc.	891
Building products sales & service	DH Pace Company, Inc.	834
Batteries mfg.	Enersys, Inc.	619
Vehicle safety lighting and wiring harness mfg. (Hdq.)	Peterson Manufacturing Co.	617
Auto parts mfg.	Challenge Manufacturing Company	600
Apparel distribution (Hdq.)	GEAR for Sports, a Division of HanesBrands, Inc.	560
Electric motors distribution center	Grainger	560
Automotive parts distribution (Hdq.)	TVH Parts Company	550
Fiberglass insulation mfg.	CertainTeed Insulation	550
Crop protection products mfg.	Bayer CropScience	548
Food service marketing & distribution	Sysco Food Services, Inc.	534
Fulfillment center	Jet.com	510
Pet food mfg.	J.M. Smucker Co.	510
Commercial goods mgmt. and disposition (Hdq.)	Recovery Management Corporation	506

Source: Kansas City Area Development Council, Regional Employers, Available at: https://thinkkc.com/business/regional-employers/Employers (last accessed on August 9, 2024)
Note: Emp. = Employment in persons, Hdq. = Headquarters

4.1.5. Specialized Private Sector Industries

Using BLS data, among the goods movement dependent private sectors,[51] this plan identified a list of 19 "specialized" industries with a location quotient for employment[52] greater than 1.0 (**Table 17**). Printing and related support activities, computer and electronic product manufacturing and a range of transportation and warehousing services lead the list based on the location quotient. These specialized industries contributed to nearly 24 percent of the regional total jobs in 2023.

Table 17. Study Region's Specialized and Goods Movement Dependent Industries

Private Sector Industry with Location Quotient > 1.0	Jobs	Share of Regional Total Jobs	Location Quotient
NAICS 323 Printing and related support activities	5,444	0.47%	1.95
NAICS 334 Computer and electronic product manufacturing	11,993	1.04%	1.44
NAICS 493 Warehousing and storage	20,153	1.74%	1.43
NAICS 488 Support activities for transportation	8,579	0.74%	1.40
NAICS 492 Couriers and messengers	10,850	0.94%	1.34
NAICS 336 Transportation equipment manufacturing	17,502	1.51%	1.31
NAICS 484 Truck transportation	15,208	1.31%	1.30
NAICS 459 Sporting goods, hobby, musical instrument, book, and miscellaneous retailers	13,741	1.19%	1.20
NAICS 423 Merchant wholesalers, durable goods	29,741	2.57%	1.16
NAICS 444 Building material and garden equipment and supplies dealers	11,672	1.01%	1.10
NAICS 325 Chemical manufacturing	7,347	0.63%	1.08
NAICS 424 Merchant wholesalers, nondurable goods	18,019	1.56%	1.08
NAICS 456 Health and personal care retailers	8,990	0.78%	1.08
NAICS 238 Specialty trade contractors	40,826	3.52%	1.07
NAICS 425 Wholesale trade agents and brokers	4,113	0.36%	1.06
NAICS 455 General merchandise retailers	25,368	2.19%	1.04

[51] Includes the NAICS industry sectors of 11 – Agriculture, Forestry, Fishing and Hunting, 21 – Mining, Quarrying, and Oil and Gas Extraction, 22 – Utilities, 23 – Construction, 31-33 – Manufacturing, 42 – Wholesale Trade, 44-45 – Retail Trade, and 48-49 – Transportation and Warehousing.

[52] Location quotient (LQ) is an analytical statistic that measures a region's industrial specialization relative to the US. The LQ for employment for an industry is computed as an industry's share of a regional total for employment divided by the industry's share of the national total employment. Other economic statistics such as earnings, gross domestic product (GDP), etc. can also be used to compute a LQ for an industry.

Private Sector Industry with Location Quotient > 1.0	Jobs	Share of Regional Total Jobs	Location Quotient
NAICS 322 Paper manufacturing	2,793	0.24%	1.03
NAICS 441 Motor vehicle and parts dealers	15,706	1.36%	1.02
NAICS 449 Furniture, home furnishings, electronics, and appliance retailers	6,505	0.56%	1.02
TOTAL	**274,550**	**23.7%**	

Source: US Bureau of Labor Statistics (BLS) - Quarterly Census of Employment and Wages - 2023 Annual Average Employment, all establishment sizes for 14-County Kansas City Study Region Counties and US

Note: Location Quotient (LQ) for an industry shown in the table was computed as an industry's share of regional total for employment divided by the industry's share of national total employment.

4.2. Multimodal Freight Flow Profiles

To understand the study region's freight demand and linkages to national and global supply chains, regional multimodal freight flow profiles were developed for existing and future conditions. The FAF database was primarily used to gather multimodal freight flows by tonnage and value. The FAF database is developed through a partnership between the Bureau of Transportation Statistics (BTS) and the Federal Highway Administration (FHWA), which integrates data from a variety of sources to create a comprehensive picture of freight movement among states and major metropolitan areas by all modes of transportation, including truck, rail, and air cargo. FAF incorporates data from agriculture, extraction, utility, construction, service, and other sectors. This study utilizes FAF version 5.6, which was released in April 2024. The 2022 freight flows data in FAF 5.6 does not consider COVID-19 pandemic impacts. Long-term projections are also based on the 2017 benchmark.

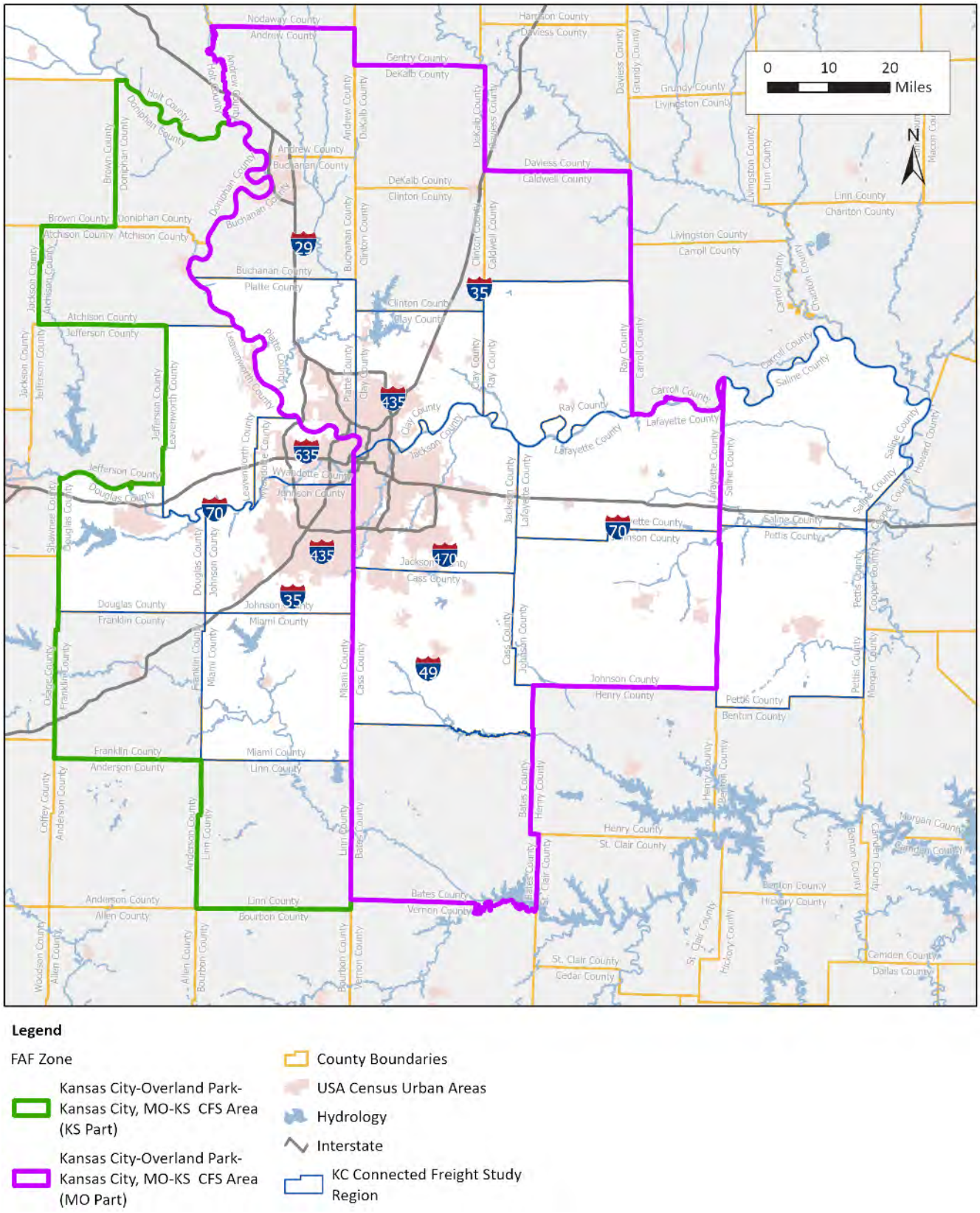
FAF provides a valuable database to understand existing inflows, outflows, and internal flows of goods within FAF zones. Two FAF zones were used to define the Connected Freight KC 2050 Plan region as shown in **Figure 31**. FAF zone 201 generally represents the Kansas part of the Kansas City study region.[53] FAF zone 291 generally represents the Missouri part of the Kansas City study region.[54] The Kansas City study region FAF zones include 12 out of the 14 counties in the study region including all counties except Pettis County and Saline County. Throughout this section,

[53] FAF zone 201 includes not only the five study region counties on Kansas side, but also four other counties of Atchison, Doniphan, Franklin and Linn in Kansas, which are mostly rural and have a combined population of around 60,000 as per US Census July 1, 2023 population estimates. This is an add-on of 2.5 percent of the study region population and associated freight demand.

[54] FAF zone 291 includes all except Pettis and Saline counties of the nine study region counties on Missouri side. It also includes six other counties of Andrew, Bates, Buchanan, Caldwell, Clinton and DeKalb counties in Missouri, which are mostly rural and have a combined population of around 158,000 as per US Census July 1, 2023 population estimates. This is a net add-on of 3.8 percent of the study region population and associated freight demand.

where data is used from FAF, the study region is split into two parts: the “Kansas Part” (FAF zone 201) and the “Missouri Part” (FAF zone 291).

A limitation of FAF data is that it only provides commodity flows for goods originating and terminating in FAF zones and does not provide information for goods passing through FAF zones, nor does FAF provide specific origin, destination, or routing information below the FAF zone level. Due to this, FAF commodity flow data for the Kansas City region was thus supplemented with Geotab’s location-based services data, which is discussed in more detail in Section 4.3.



Source: FAF, 2022

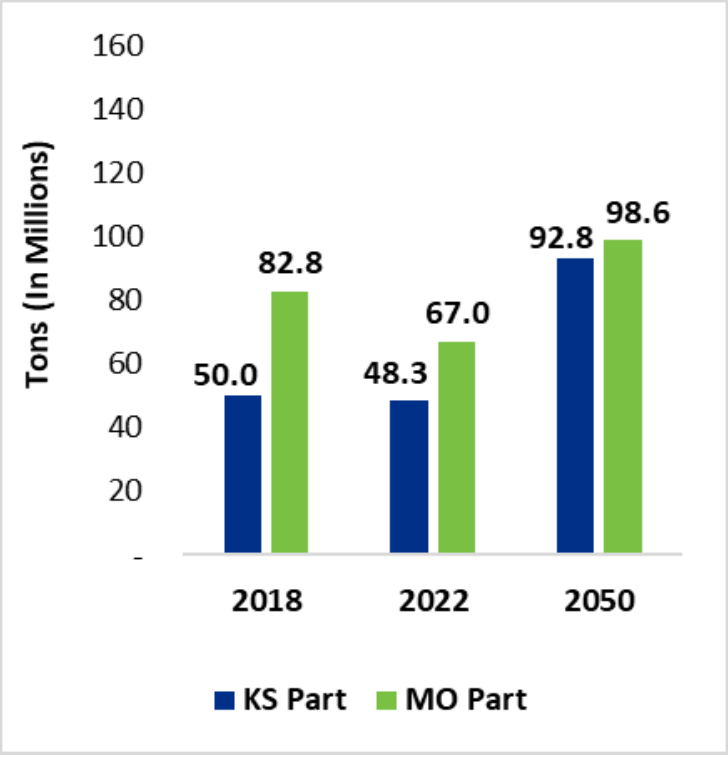
Figure 31. FAF Zones Approximation for the Kansas City Study Region

4.2.1. Total Freight Demand

Freight trade for the Kansas City study region primarily occurs within and between the Kansas Part (FAF Zone 201) and the Missouri Part (FAF Zone 291) of the study region.

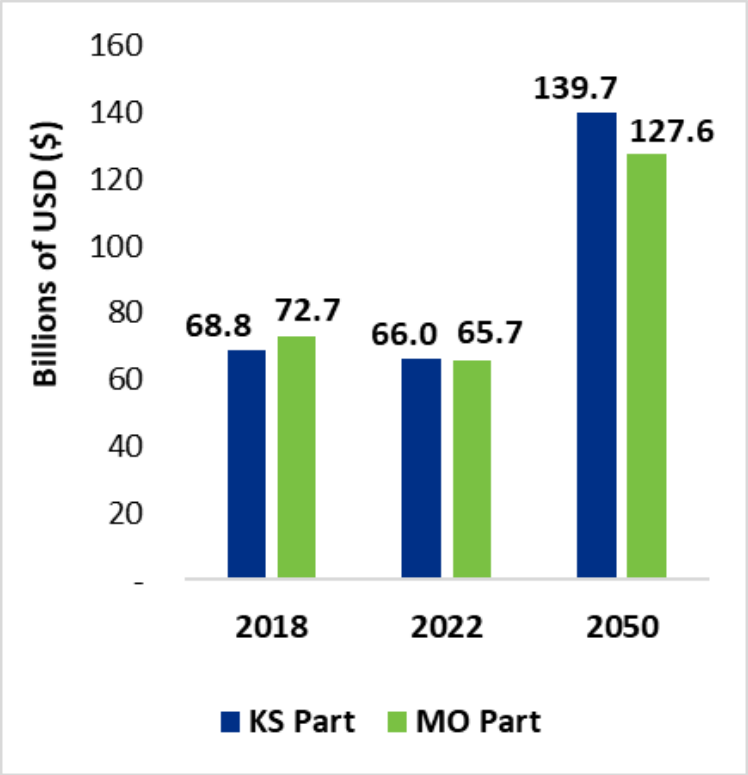
As shown in **Figure 32**, the Kansas Part had over 50 million tons of freight movement in 2018, which remained approximately the same in 2022, and is expected to nearly double by 2050 to almost 93 million tons, according to the FAF baseline forecast which represents a mid-level growth scenario. The Missouri Part had almost 83 million tons of freight movement in 2018, which decreased to below 70 million tons in 2022, and is forecasted to increase by nearly 50 percent to over 98 million tons in 2050, which also represents a mid-level growth scenario. The higher projected growth rate for the Kansas Part is largely due to a forecasted 190 percent increase in cereal grain tonnage, which is the top commodity by weight for the Kansas Part, but there is only a forecasted 80 percent increase in cereal grain tonnage for the Missouri Part, which is the third highest commodity by weight.

In terms of value, the Kansas and Missouri Parts traded a similar amount: around $70 billion in 2018, which dropped slightly in 2022 to roughly $66 billion. The value of Kansas Part exports is forecasted to increase by 112 percent to almost $140 billion in 2050, while the value of Missouri Part exports is forecasted to increase by 94 percent to almost $128 billion in 2050, as shown in **Figure 33**.



Source: FAF, 2022

Figure 32. Projected Freight Tonnage, 2018–2050



Source: FAF, 2022

Figure 33. Projected Freight Value, 2018–2050

4.2.2. Top Commodities

Overall, in 2022 the top commodities by weight that moved within and out of the Kansas City region included cereal grains, nonmetallic mineral products, gravel, natural gas and other fossil products, and other prepared foodstuffs. The top commodities by weight that moved into the Kansas City region included natural gas and other fossil products, gravel, coal, and cereal grains. This section will detail the top commodities which flow inbound, outbound, and within the Kansas City region by weight and value for each part.

Kansas Study Area

The top commodities by weight that moved within and out of the Kansas Part included almost 7,000 tons of cereal grains and over 6,500 tons of non-metallic mineral products, as shown in **Figure 34**. Cereal manufacturers in the Kansas City Region include Lifeline Foods, Brock Grain Systems, and Bartlett.[55] Nonmetallic mineral shippers include Compass Minerals, Husqvarna

[55] Kansas City Area Development Council, Regional Employers, Available at: https://thinkkc.com/business/regional-employers/Employers (last accessed on August 9, 2024)

Construction Products, and Penny's Concrete.[56] The top commodity movements by weight in the Kansas Part are broken down by direction of trade in **Table 18**.

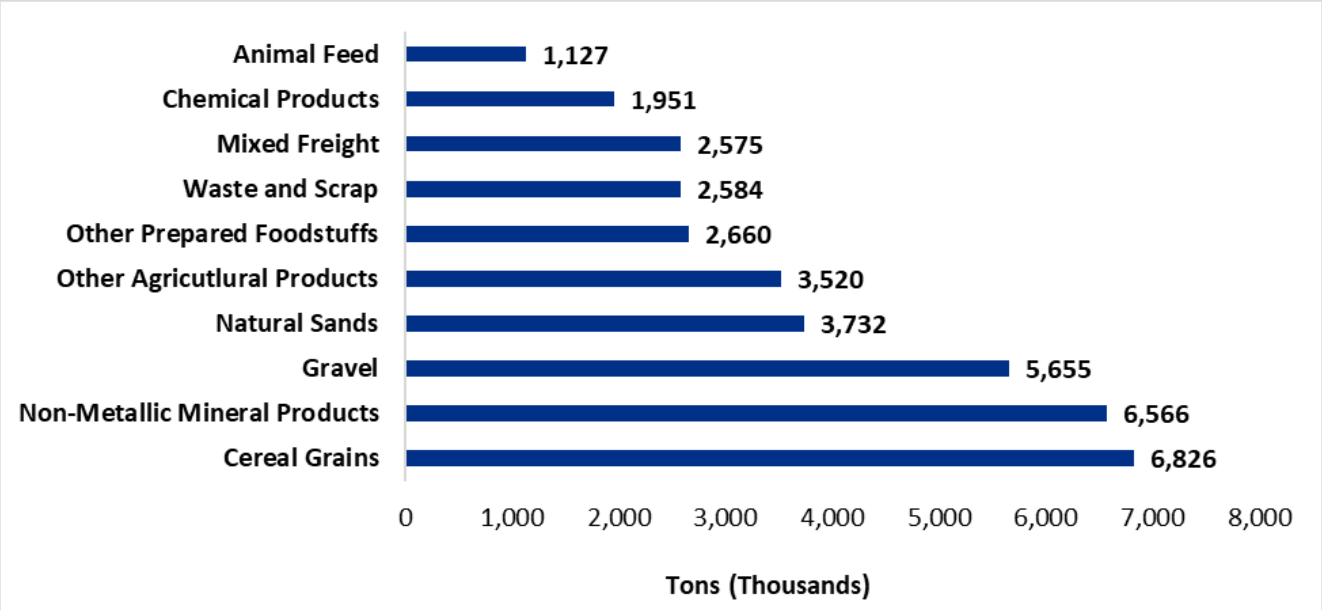


Figure 34. 2022 Top Commodities by Weight for Kansas Study Area in Tons (thousands)

Table 18. 2022 Top Commodities by Weight and by Direction of Movement for Kansas Part in Tons (thousands)

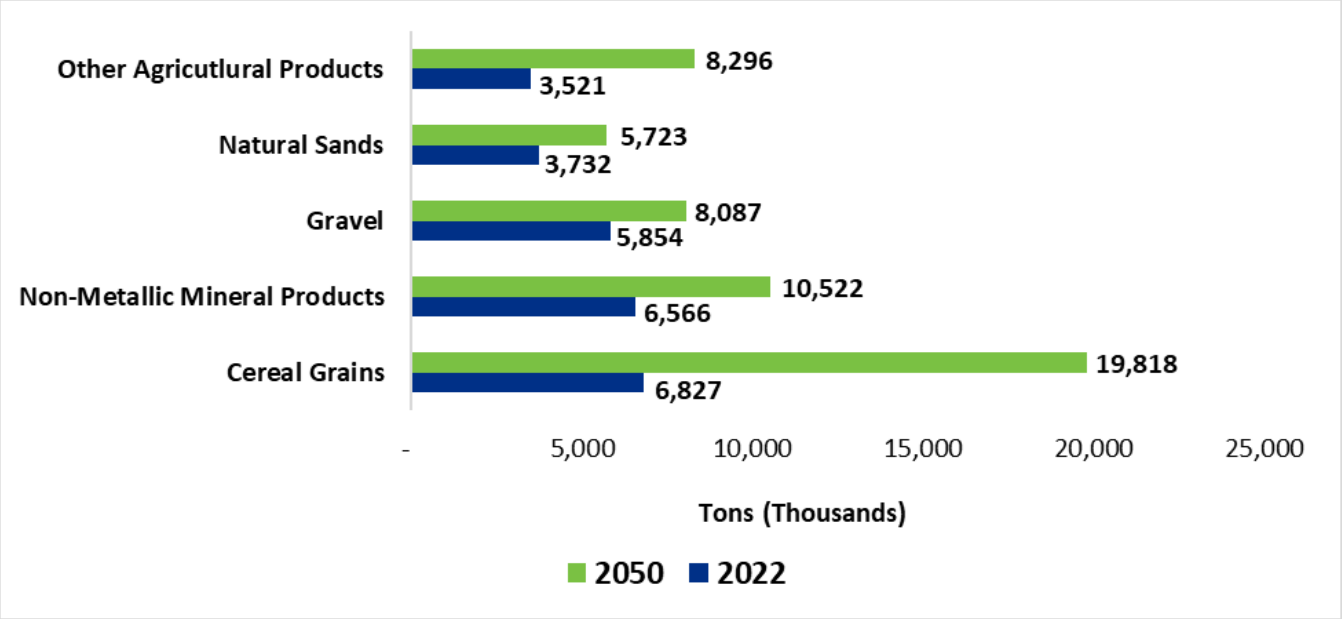
Within		Outbound		Inbound	
Commodity	**Tons**	**Commodity**	**Tons**	**Commodity**	**Tons**
Gravel	5,655.4	Cereal grains	5,676.7	Natural gas and other fossil products	16,138.1
Nonmetal min. prods.	5,605.6	Other ag prods.	3,032.4	Gravel	3,816.9
Natural sands	2,143.2	Mixed freight	2,574.8	Coal	3,659.7
Waste/scrap	1,595.2	Chemical prods.	1,951.5	Other foodstuffs	2,154.0
Other foodstuffs	1,218.7	Natural sands	1,589.3	Cereal grains	2,075.9
Cereal grains	1,149.8	Other foodstuffs	1,441.8	Nonmetal min. prods.	1,904.3
Gasoline	724.7	Animal feed	1,127.3	Mixed freight	1,407.7
Fuel oils	689.8	Waste/scrap	988.4	Animal feed	1,173.5

[56] Dun & Bradstreet, 2024 Business Directory, Available at: https://www.dnb.com/business-directory/company-information.nonmetallic_mineral_product_manufacturing.us.kansas.html (last accessed on August 9, 2024)

Within		Outbound		Inbound	
Commodity	**Tons**	**Commodity**	**Tons**	**Commodity**	**Tons**
Wood prods.	518.0	Nonmetal min. prods.	960.1	Waste/scrap	1,128.1
Other ag prods.	488.0	Nonmetallic minerals	826.4	Meat/seafood	1,063.8
Total of All Commodities	**21,754.8**		**26,515.9**		**43,773.3**

Source: FAF, 2022

Figure 35 shows the forecasted growth for the top five commodities moving within and out of the Kansas Part in 2050 as compared to 2022. The forecast shows the top 5 commodities will grow in terms of movement by weight, and that cereal grains and agricultural products are forecasted to more than double in volume moved.

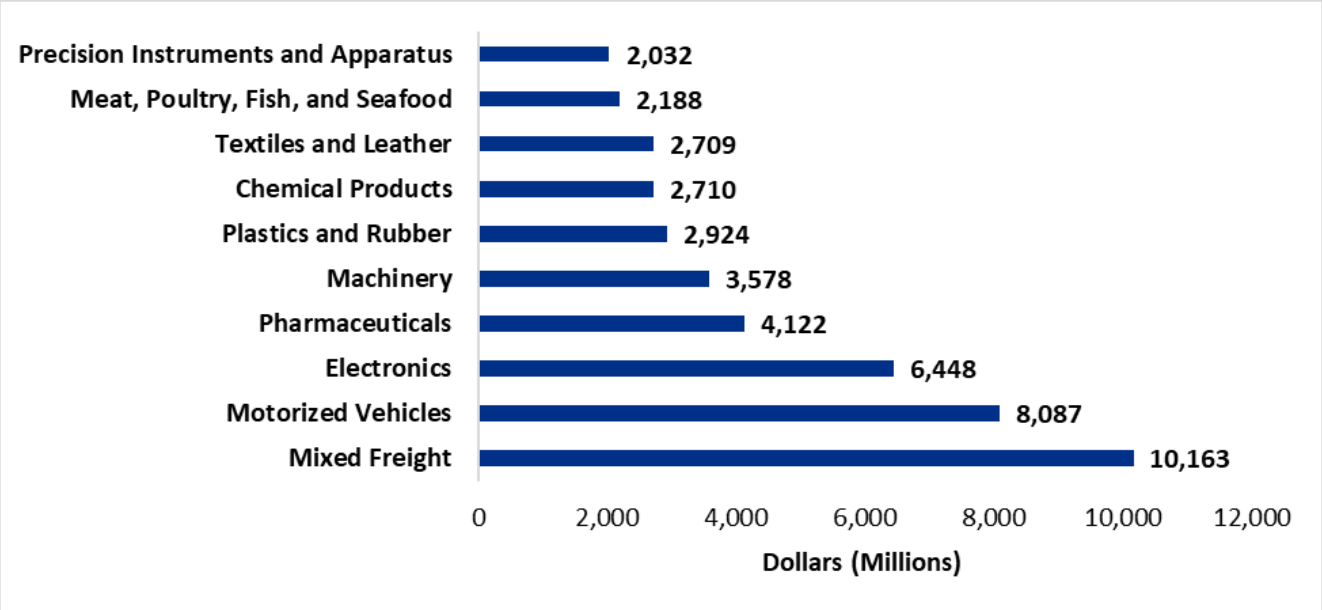


Source: FAF, 2022

Figure 35. 2022 and 2050 Forecast Top Commodities by Weight for Kansas Study Area in Tons (thousands)

The top commodities by value moved within and out of the Kansas Part include over $10 billion of mixed freight and over $8 billion of motorized vehicles, as shown in **Figure 36**. Motor vehicle manufacturers include Ford Motor Company, which employs over 7,000 employees in the

Kansas City area, General Motors, and Grainger.[57] The top commodities by value in the Kansas Part are broken down by direction of trade in **Table 19**.



Source; FAF, 2022

Figure 36. 2022 Top Commodities by Value for Kansas Study Area in Dollars (millions)

Table 19. 2022 Top Commodities by Value and by Direction of Movement for Kansas Part in Dollars (millions)

Within		Outbound		Inbound	
Commodity	Value	Commodity	Value	Commodity	Value
Gasoline	1,534.5	Mixed freight	8,757.6	Mixed freight	5,416.3
Mixed freight	1,405.8	Motorized vehicles	8,087.2	Motorized vehicles	4,421.0
Other foodstuffs	904.8	Electronics	5,686.0	Electronics	3,973.3
Electronics	762.2	Pharmaceuticals	3,753.0	Natural gas and other fossil products	3,555.6
Nonmetal min. prods.	559.8	Machinery	3,033.4	Meat/seafood	3,533.5
Machinery	544.5	Chemical prods.	2,709.7	Machinery	2,928.7
Plastics/rubber	538.7	Plastics/rubber	2,385.4	Pharmaceuticals	2,705.0
Textiles/leather	401.8	Textiles/leather	2,307.6	Misc. mfg. prods.	2,504.1

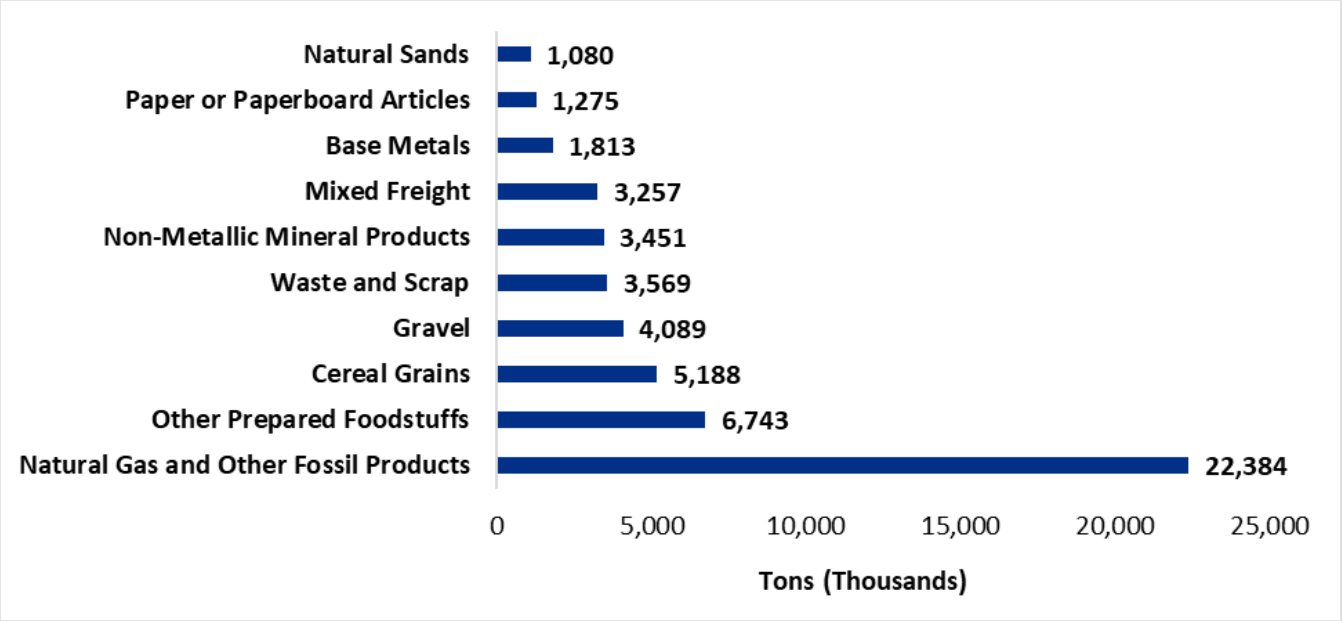
[57] Kansas City Area Development Council, Regional Employers, Available at: https://thinkkc.com/business/regional-employers/Employers (last accessed on August 9, 2024)

Within		Outbound		Inbound	
Commodity	Value	Commodity	Value	Commodity	Value
Furniture	371.0	Meat/seafood	2,188.0	Textiles/leather	2,060.7
Pharmaceuticals	368.7	Precision instruments	2,031.6	Other foodstuffs	2,024.4
Total of All Commodities	**10,824.4**		**55,126.3**		**46,697.7**

Source: FAF, 2022

Missouri Study Area

The top commodities by weight moved within and out of the Missouri Part included over 22,000 tons of natural gas and other fossil products and almost 7,000 tons of other prepared foodstuffs, as shown in **Figure 37**. The top gas provider in Kansas is Kansas Gas Service, which has 384 employees in Kansas City. Frito-Lay manufactures and distributes snack foods and has 1,406 employees in Kansas City; and Tyson Foods manufactures and distributes meat products and has 1,299 employees in Kansas City.[58] The top commodities movements by weight in the Missouri Part are broken down by direction of trade in **Table 20**.



Source: FAF, 2022

Figure 37. 2022 Top Commodities by Weight for Missouri Study Area in Tons (thousands)

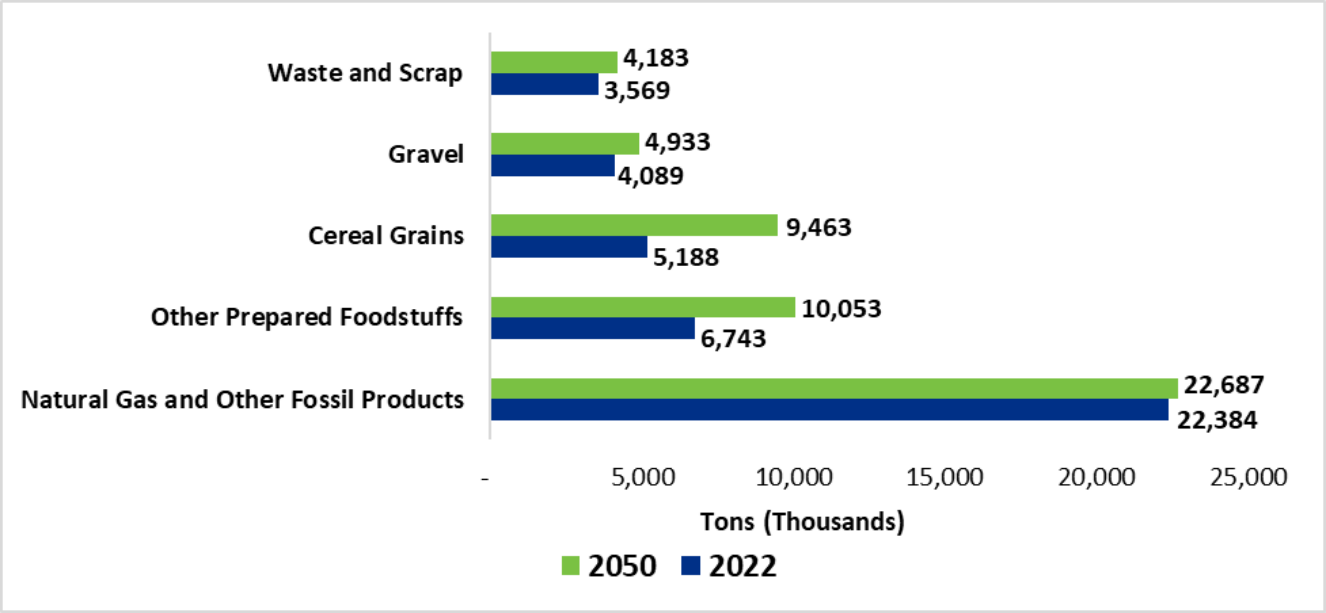
[58] Kansas City Area Development Council, Regional Employers, Available at: https://thinkkc.com/business/regional-employers/Employers (last accessed on August 9, 2024)

Table 20. 2022 Top Commodities by Weight and by Direction of Movement for Missouri Part in Tons (thousands)

Within		Outbound		Inbound	
Commodity	**Tons**	**Commodity**	**Tons**	**Commodity**	**Tons**
Gravel	4,089.3	Natural gas and other fossil products	19,386.9	Coal	6,113.5
Natural gas and other fossil products	2,997.0	Other foodstuffs	5,647.2	Natural gas and other fossil products	5,422.9
Nonmetal min. prods.	2,170.5	Cereal grains	4,204.6	Cereal grains	3,253.6
Waste/scrap	1,298.6	Mixed freight	2,339.0	Gravel	2,919.2
Other foodstuffs	1,095.6	Waste/scrap	2,270.3	Other ag prods.	2,500.0
Natural sands	1,079.7	Base metals	1,812.7	Animal feed	1,784.8
Cereal grains	983.8	Nonmetal min. prods.	1,280.2	Other foodstuffs	1,508.3
Mixed freight	918.5	Chemical prods.	794.8	Nonmetal min. prods.	1,468.4
Logs	615.4	Coal	741.2	Mixed freight	1,404.6
Paper articles	543.1	Paper articles	732.2	Wood prods.	1,381.8
Total of All Commodities	**20,476.6**		**46,552.0**		**40,580.0**

Source: FAF, 2022

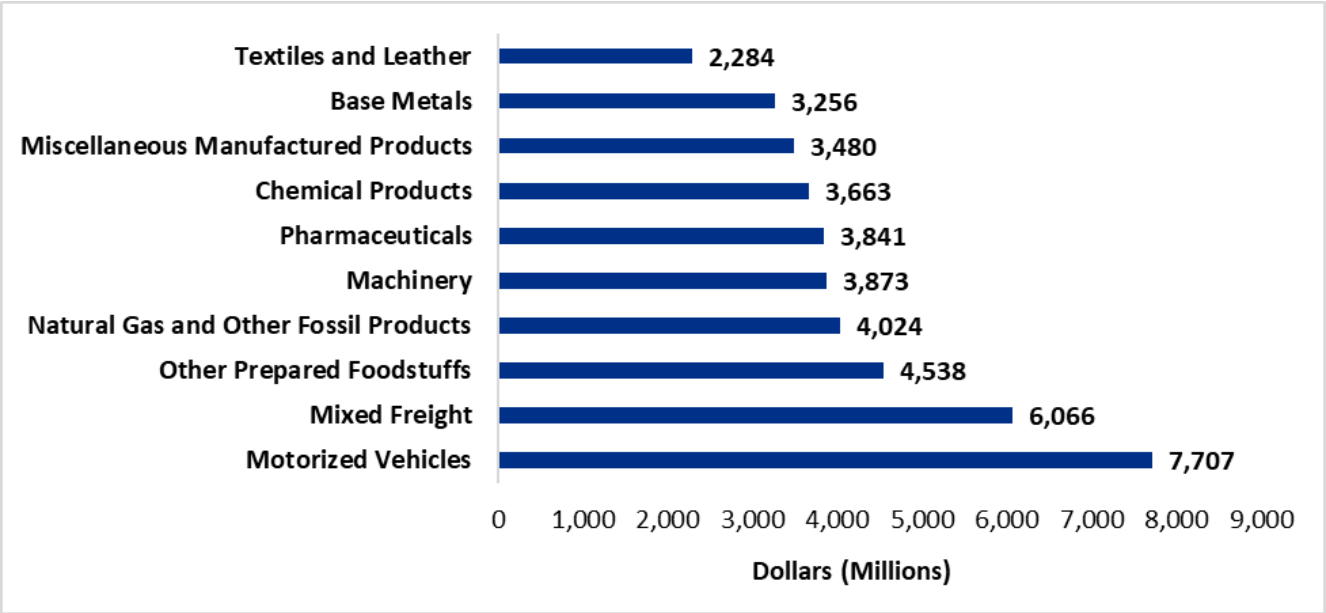
Figure 38 shows the forecasted growth for the top five commodities that will move within and out of the Missouri Part in 2050 as compared to 2022. The forecast shows the top 5 commodities will grow in terms of movement by weight, and that cereal grains are forecasted to grow by 82 percent while other prepared foodstuffs are forecasted to grow by roughly 50 percent in volume moved.



Source: FAF, 2022

Figure 38. 2022 and 2050 Forecasted Top Commodities by Weight for Missouri Study Area in Tons (thousands)

The top commodities by value moved within and out of the Missouri Part include over $7.7 billion of motorized vehicles and over $6 billion of mixed freight, as shown in **Figure 39**. The top commodities movements by value in the Missouri Part are broken down by direction of trade in **Table 21**.



Source: FAF, 2022

Figure 39. 2022 Top Commodities by Value for Missouri Study Area in Dollars (millions)

Table 21. 2022 Top Commodities by Value and by Direction of Movement for Missouri Part in Dollars (millions)

Within		Outbound		Inbound	
Commodity	**Value**	**Commodity**	**Value**	**Commodity**	**Value**
Mixed freight	1,688.8	Motorized vehicles	6,082.8	Motorized vehicles	8,564.7
Motorized vehicles	1,624.0	Mixed freight	4,377.4	Mixed freight	5,384.2
Pharmaceuticals	1,586.2	Natural gas and other fossil products	4,024.5	Machinery	4,828.2
Machinery	1,288.4	Other foodstuffs	3,601.9	Electronics	4,569.6
Chemical prods.	943.8	Misc. mfg. prods.	3,480.5	Pharmaceuticals	3,308.3
Other foodstuffs	935.7	Base metals	3,256.1	Misc. mfg. prods.	3,069.9
Plastics/rubber	911.2	Chemical prods.	2,719.6	Meat/seafood	2,081.3
Electronics	753.3	Machinery	2,584.3	Plastics/rubber	2,045.4
Paper articles	714.0	Textiles/leather	2,283.9	Other foodstuffs	1,678.2
Alcoholic beverages	596.4	Pharmaceuticals	2,254.5	Textiles/leather	1,388.4
Total of All Commodities	**16,341.4**		**49,323.6**		**53,990.7**

Source: FAF, 2022

4.2.3. Trade Type

Overall trade type by weight for all commodities regardless of direction is over 95 percent domestic for the Kansas Part as shown in **Table 22**, and over 96 percent domestic for the Missouri Part as shown in **Table 23**. Trade type by value for the Kansas Part and the Missouri Part are shown in **Table 24** and **Table 25**.

Table 22. Trade Type Distribution by Weight for Kansas Part

Trade Type	Within	Outbound	Inbound	Total
Domestic	100.0%	88.4%	97.7%	95.5%
Export	0.0%	11.6%	0.0%	3.4%
Import	0.0%	0.0%	2.3%	1.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: FAF, 2022

Table 23. Trade Type Distribution by Weight for Missouri Part

Trade Type	Within	Outbound	Inbound	Total
Domestic	99.8%	95.2%	96.3%	96.5%
Export	0.2%	4.8%	0.0%	2.1%
Import	0.0%	0.0%	3.6%	1.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: FAF, 2022

Table 24. Trade Type Distribution by Value for Kansas Part

Trade Type	Within	Outbound	Inbound	Total
Domestic	100.0%	93.0%	92.6%	93.5%
Export	0.0%	7.0%	0.0%	3.4%
Import	0.0%	0.0%	7.4%	3.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: FAF, 2022

Table 25. Trade Type Distribution by Value for Missouri Part

Trade Type	Within	Outbound	Inbound	Total
Domestic	99.1%	93.1%	92.0%	93.4%
Export	0.7%	6.2%	0.1%	2.9%
Import	0.2%	0.7%	7.9%	4.2%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: FAF, 2022

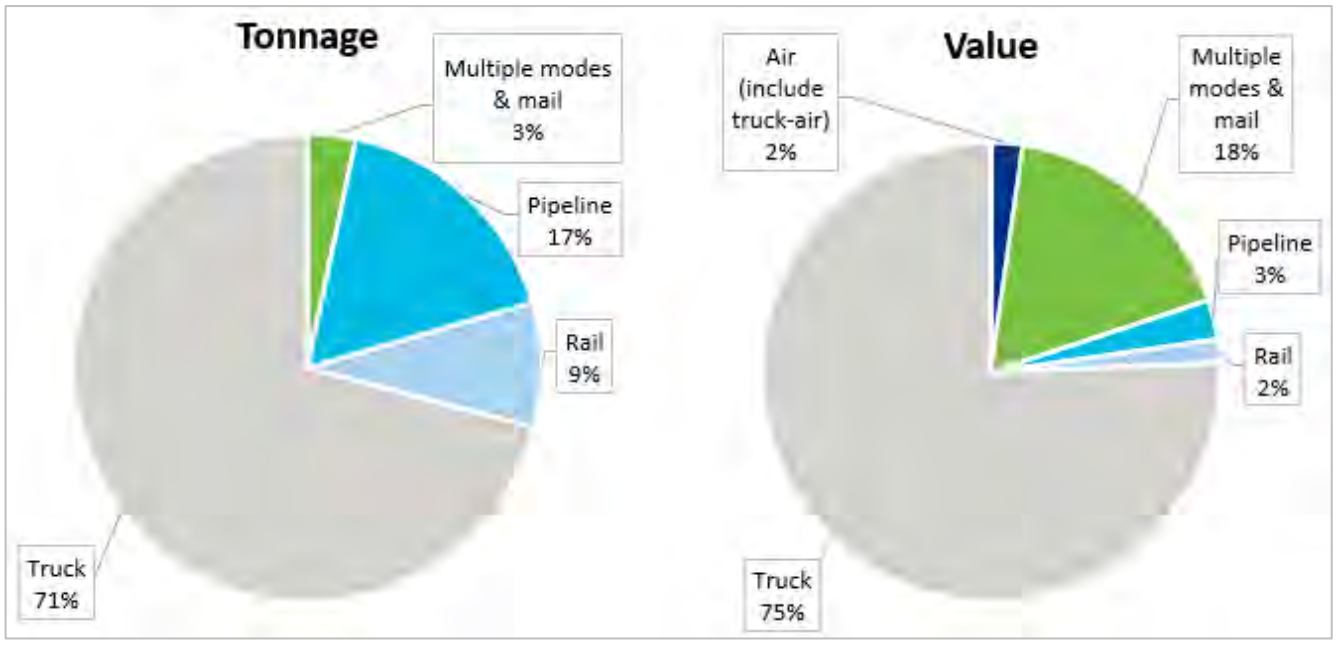
4.2.4. Mode Split

Trucks make up the largest share of goods movement by both volume and value for both parts of Kansas City. Pipelines, rail, and multiple modes and mail carry move the next largest shares of goods. Water and air carry the smallest shares of goods.

Kansas Study Area

Trucks carry 71 percent of goods by tonnage and 75 percent of goods by value in the Kansas Part, as shown in **Figure 40**. This represents over 65 million tons and 85 billion dollars of freight moved, as shown in **Table 26**. By tonnage, the next largest mode is pipeline, which carries 17 percent of goods. By value, the second largest mode is multiple modes & mail, which carries 18 percent of goods. FAF uses “Multiple Modes and Mail” to represent movements of commodities that utilize more than one mode, and the “Mail” component recognizes that parcel delivery

services may not identify modes used after a shipment is picked up. This indicates a greater volume of goods is carried by pipeline, but those goods are of lower value than what is carried by multiple modes & mail.



Source: FAF, 2022

Figure 40. 2022 Mode Split by Tonnage and Value for Kansas Study Area

Table 26. 2022 Mode Split by Tonnage and Value for Kansas Study Area

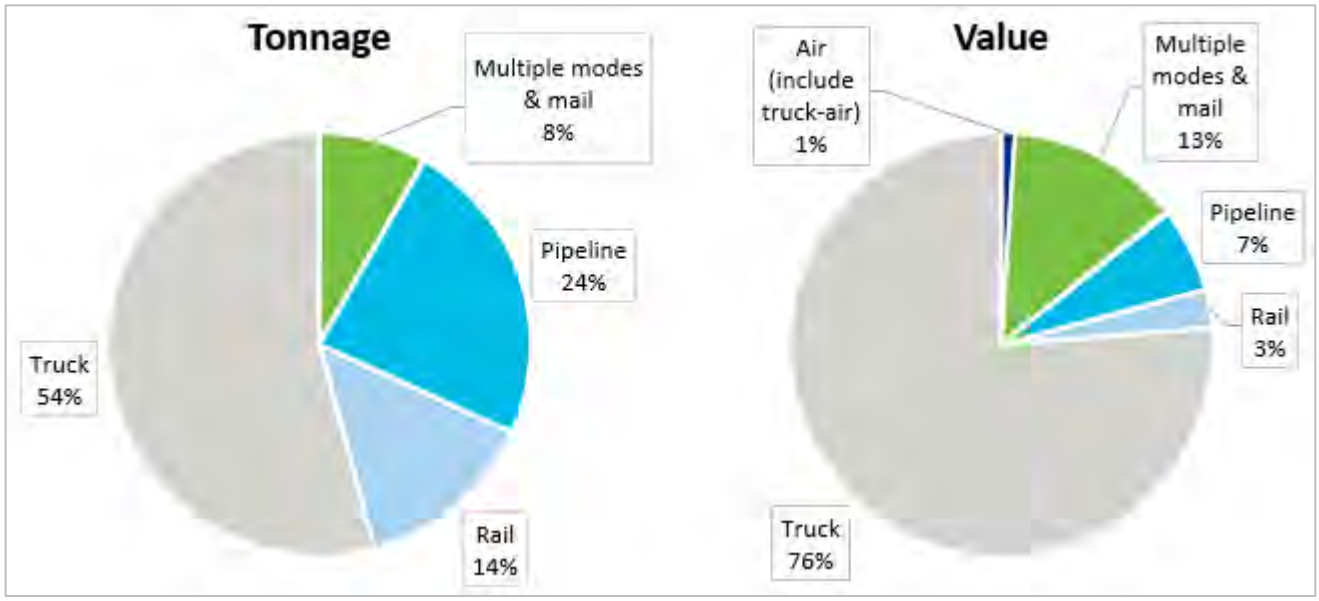
Mode	Tons (thousands)	Percent (tons)	Dollars (millions)	Percent (dollars)
Air (include truck-air)	18.29	0.02%	2,528.80	2.24%
Multiple modes & mail	3,042.32	3.31%	19,927.33	17.69%
Other and unknown	0.05	0.00%	0.34	0.00%
Pipeline	15,823.49	17.19%	3,114.54	2.76%
Rail	7,906.04	8.59%	1,861.25	1.65%
Truck	65,234.90	70.87%	85,210.15	75.64%
Water	18.95	0.02%	5.97	0.01%

Source: FAF, 2022

Missouri Study Area

Trucks carry 54 percent of goods by tonnage and 76 percent of goods by value in the Missouri Part, as shown in **Figure 41**. This represents over 58 million tons and 91 billion dollars of freight moved, as shown in **Table 27**. By tonnage, the next largest mode is pipeline, which comprises 24

percent of the mode share. By value, the second largest mode is multiple modes and mail, which comprises 13 percent of the mode share. Overall, the Missouri Part has a similar mode split by value compared to the Kansas Part, but more tons of goods are carried by modes other than truck.



Source: FAF, 2022

Figure 41. 2022 Mode Split by Tonnage and Value for Missouri Study Area

Table 27. 2022 Mode Split by Tonnage and Value for Missouri Study Area

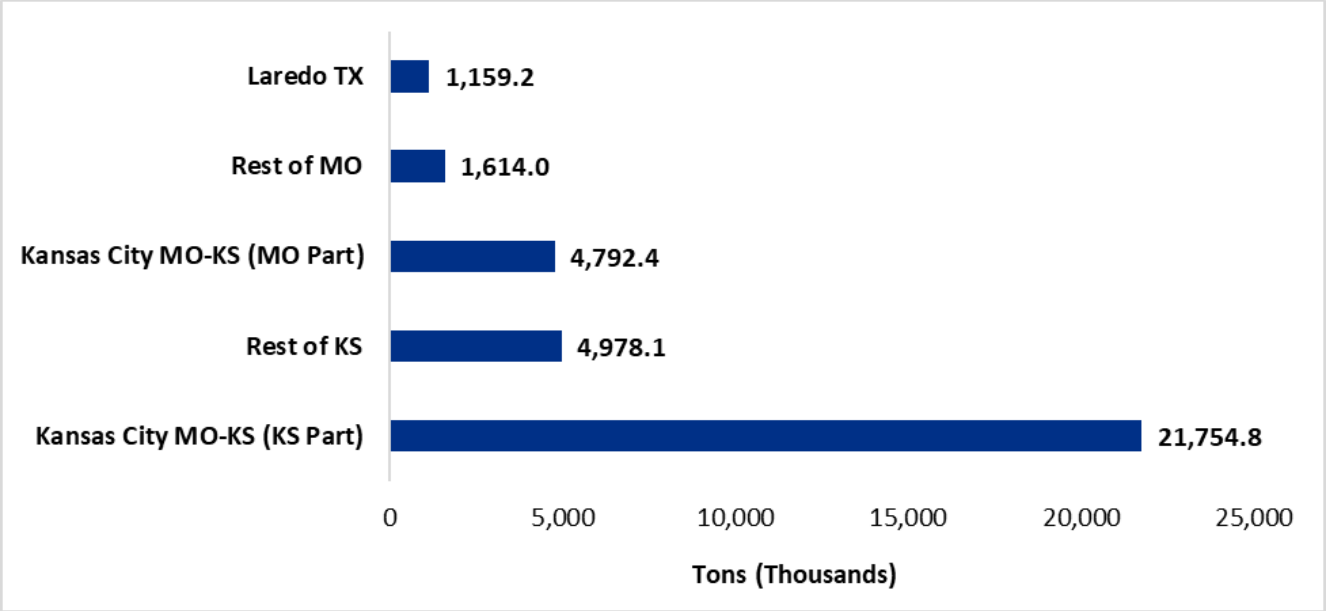
Mode	Tons (thousands)	Percent (tons)	Dollars (millions)	Percent (dollars)
Air (include truck-air)	39.40	0.04%	1,514.98	1.27%
Multiple modes & mail	8,818.34	8.19%	18,509.97	15.47%
Other and unknown	88.84	0.08%	122.30	0.10%
Pipeline	25,302.89	23.51%	5,153.00	4.31%
Rail	15,013.43	13.95%	3,017.80	2.52%
Truck	58,345.73	54.22%	91,337.63	76.33%
Water	0.01	0.00%	0.00	0.00%

Source: FAF, 2022

4.2.5. Trading Partners

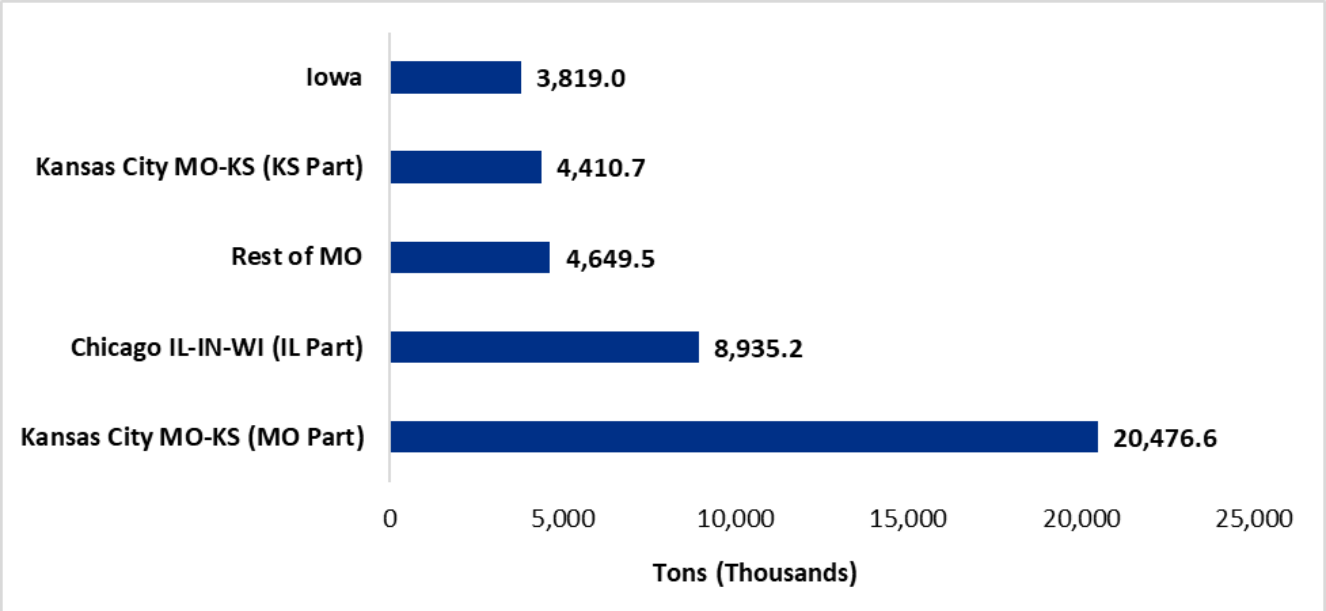
Most trade for each side of the Kansas City region is destined for locations within the Kansas City region. For the Kansas Part, other top trading partners by weight include the rest of Kansas, the

rest of Missouri, and Laredo, Texas (about 93 percent of the trade flows to Laredo, Texas are exports to Mexico), as shown in **Figure 42**. For the Missouri Part, top trading partners include the Chicagoland area, the rest of Missouri, and Iowa, as shown in **Figure 43**.



Source: FAF, 2022

Figure 42. 2022 Top 5 Trading Partners by Weight for Kansas Study Area

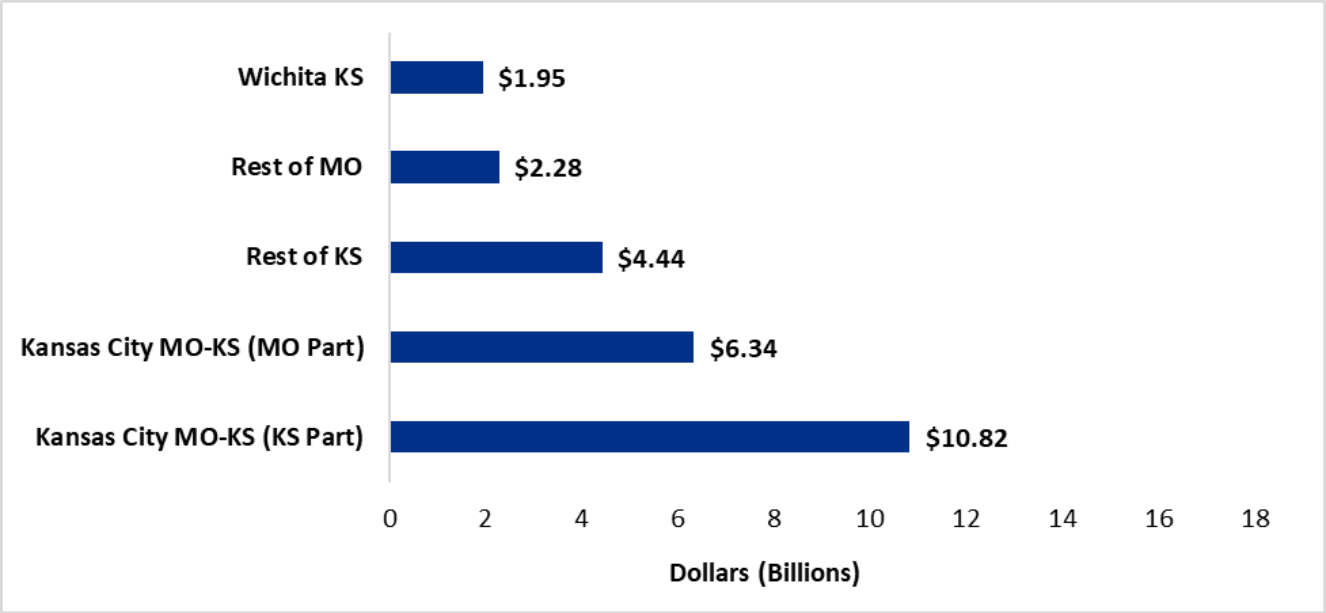


Source: FAF, 2022

Figure 43. 2022 Top 5 Trading Partners by Weight for Missouri Study Area

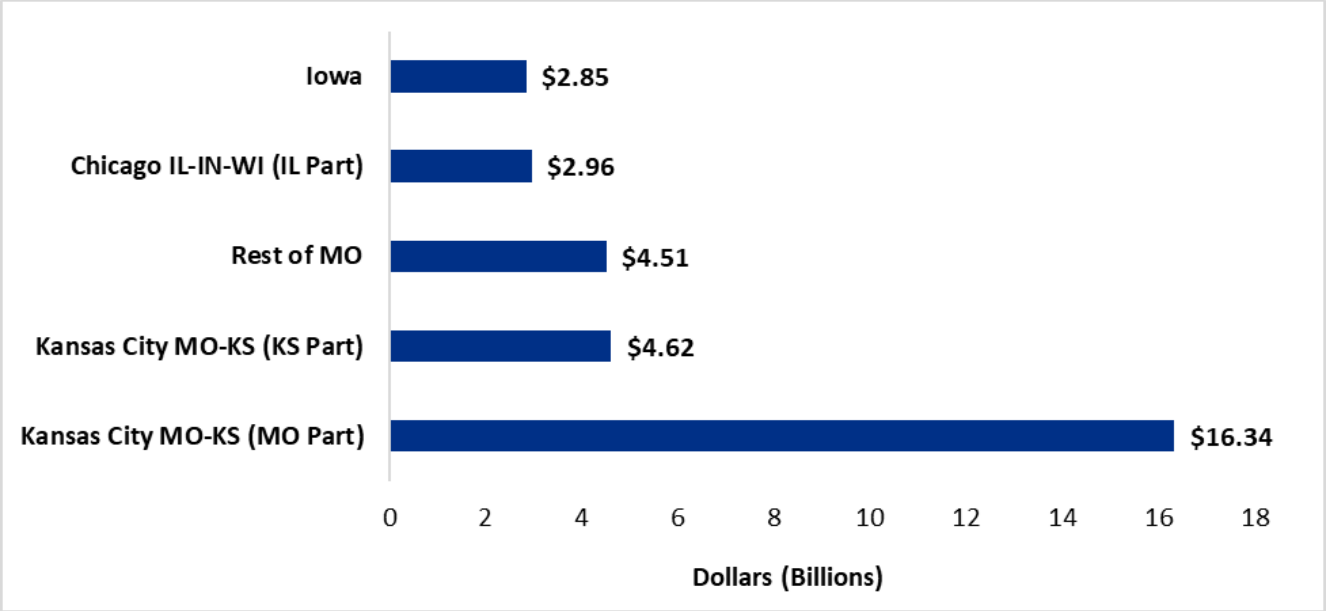
The top trading partners by value are like the top trading partners by weight. By value, the top trading partners for the Kansas Part include the rest of Kansas, the rest of Missouri, and Wichita,

Kansas (about 6 percent of the trade flows to Wichita, Kansas are exports to Europe), as shown in **Figure 44**. The top trading partners by value for the Missouri Part are identical to the top trading partners by weight, as shown in **Figure 45**. About 9 percent of the trade flows by value to Chicago IL-IN-WI (IL Part) are exports to Europe and parts of Asia.



Source: FAF, 2022

Figure 44. 2022 Top 5 Trading Partners by Value for Kansas Study Area

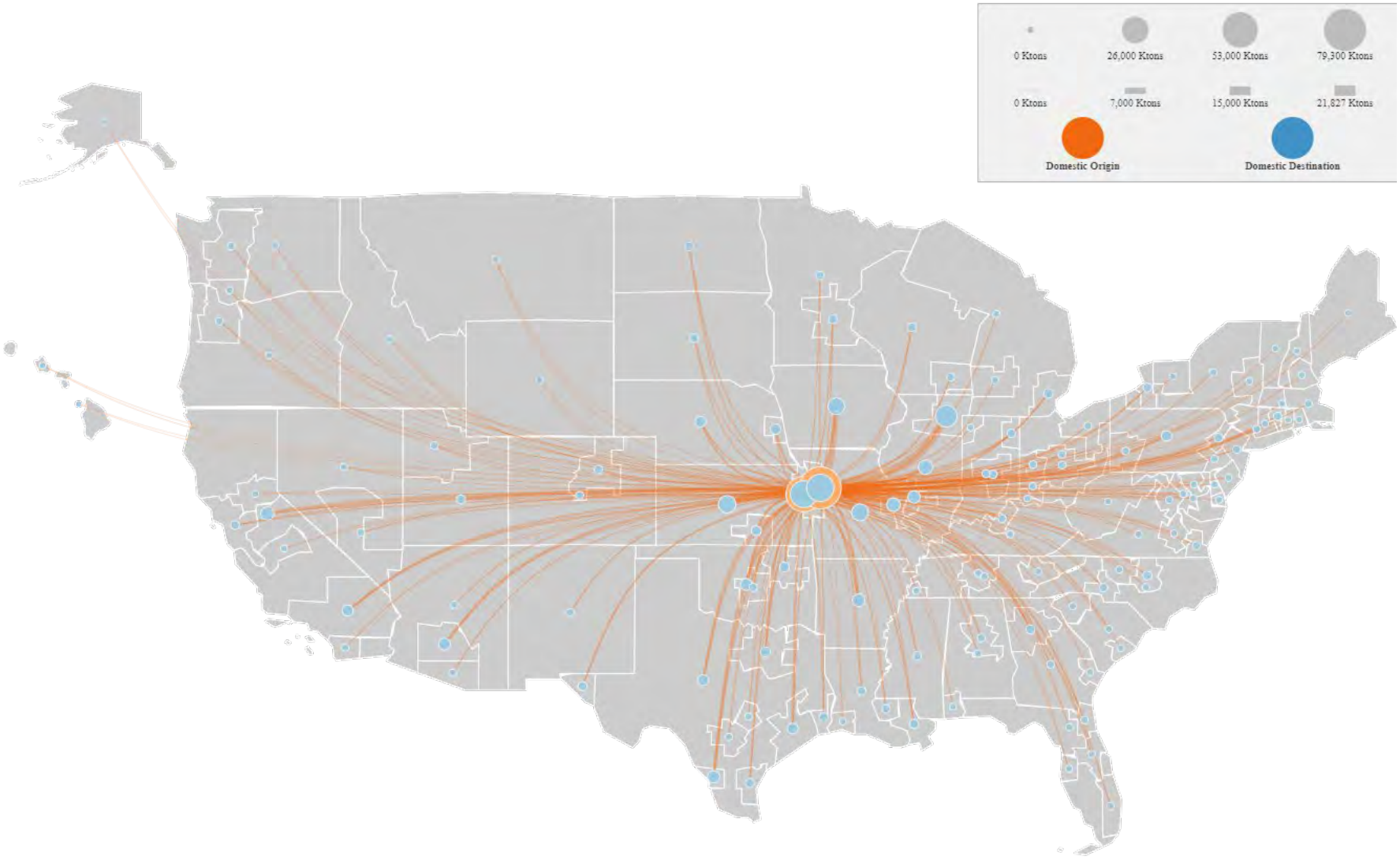


Source: FAF, 2022

Figure 45. 2022 Top 5 Trading Partners by Value for Missouri Study Area

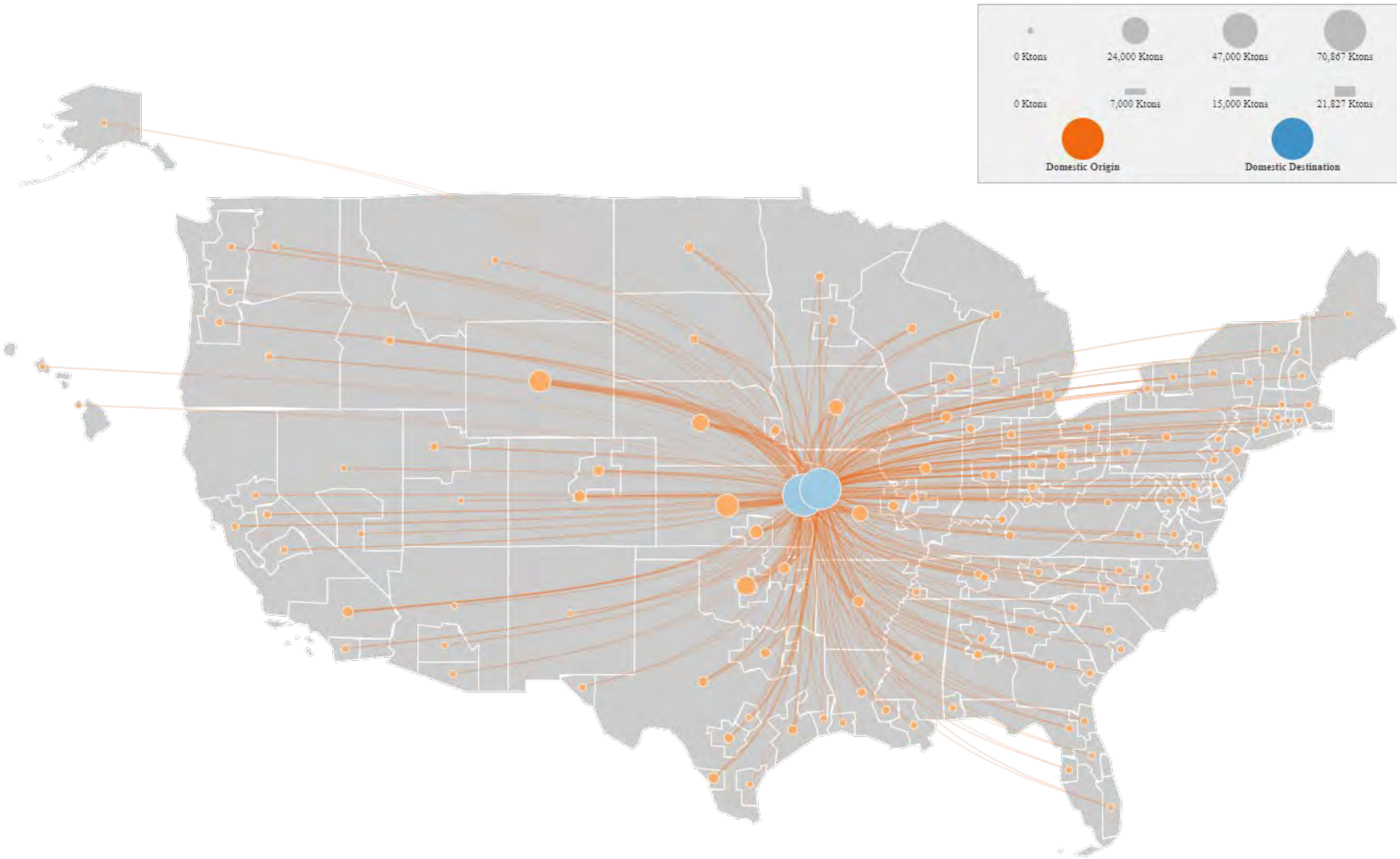
4.2.6. Commodity Flow Maps

The commodity flow maps below illustrate the top origins and destinations of freight which moves through the Kansas City region. **Figure 46** shows commodity flows as a combination of all flows originating from the Kansas Part or the Missouri Part, and **Figure 47** shows commodity flows as a combination of all flows where the Kansas Part or the Missouri Part is the destination.



Source: FAF, 2022

Figure 46. 2022 Commodity Origin Flows Map for Kansas City FAF Zones



Source: FAF, 2022

Figure 47. 2022 Commodity Destination Flows Map for Kansas City FAF Zones

4.3. Intraregional Truck Travel Patterns

Interregional truck movements were analyzed using Geotab data. Geotab telematics devices are installed in over 4 million connected vehicles from over 50,000 companies in the U.S., providing powerful data insights to manage and improve fleet operations. They have direct access to data from telematics devices including vehicle position, vehicle speed, trip distance/time, idling time, and other on-board diagnostics information. The information collected for medium and heavy trucks[59,60] operating in the study region over the three-month period of September through November 2023 ran into several million records. Therefore, coding and data analysis were performed to summarize the "big data" to origin-destination patterns including information about freight pass-through after defining a Geotab data zone system.

Based on a comparison of the available daily truck counts with Geotab "journeys" estimated on an average daily basis over the data period, a sampling rate for the Geotab data was estimated as 15 percent (**Table 28**). This was used to expand the truck flows from the sample to population. The estimated population truck flows are analyzed for travel patterns.

Table 28. Comparisons of Truck Counts versus Geotab Sample Truck Flows

Zone ID	Zone Name	Daily Truck Count	Sep–Oct 2023 Geotab Journeys	Daily Factor	Average Daily Geotab Journeys	Geotab Sample Rate
301	I-35 and Rte 269	14,965	48,780	0.31	1,251	8%
302	I-435 and MO 152	1,394	8,880	0.16	228	16%
303	I-29 and MO 152	4,840	36,882	0.13	946	20%
304	MO 92	587	1,064	0.55	27	5%
305	I-35 DT KC Jackson County	12,204	38,571	0.32	989	8%
306	I-70 between I-435 and I-470	22,317	114,748	0.19	2,942	13%
307	I-70 Lafayette	11,122	67,787	0.16	1,738	16%
308	US 50	1,320	11,789	0.11	302	23%
309	I-49 in Cass County	5,679	67,137	0.08	1,721	30%
310	I-69	4,057	27,764	0.15	712	18%

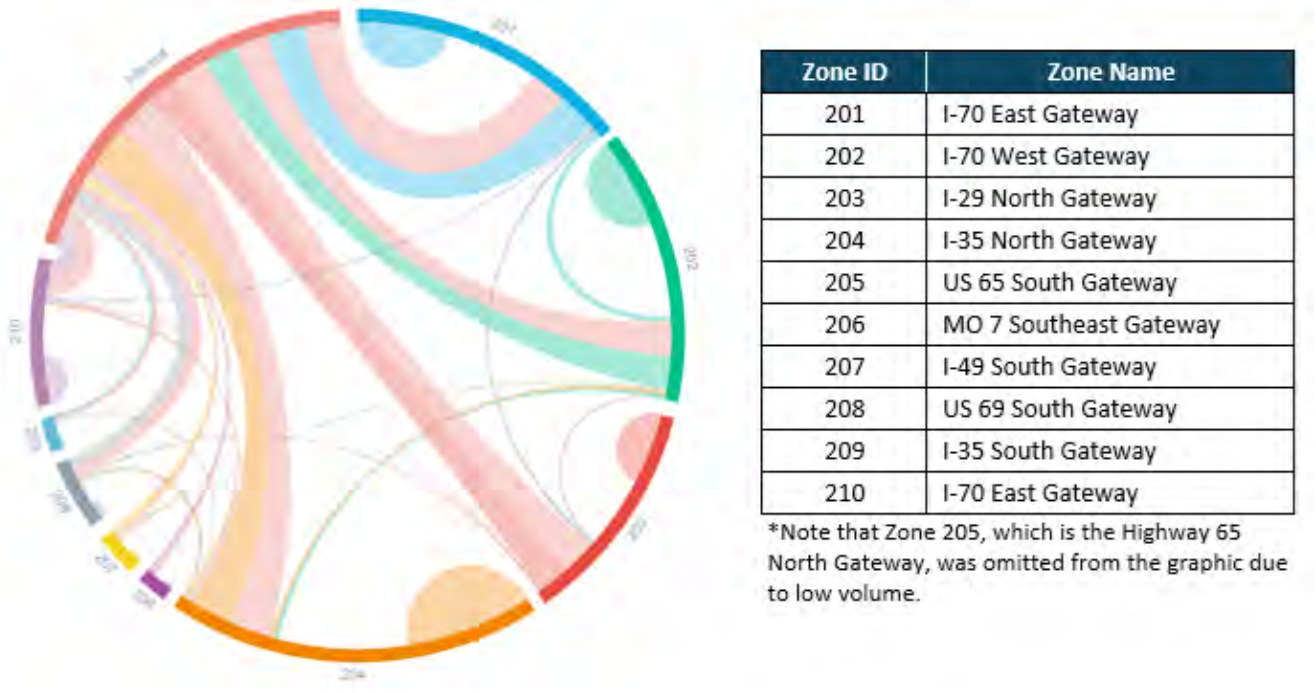
[59] Medium Trucks – These are medium-duty trucks (Classes 4-6 vehicles) that bridge the gap between light-duty and heavy-duty trucks with a GVWR of 10,001 - 26,000 pounds. Common types of medium-duty trucks include box trucks, refrigerated trucks, and flatbed trucks.

[60] Heavy Trucks – These are heavy-duty trucks (Classes 6-8 vehicles) that are often referred to under the umbrella term of semi-trucks, heavy-duty trucks. They can handle the heaviest loads, with a GVWR of over 26,000 pounds. Common examples of heavy-duty trucks are dump trucks, tanker trucks and, of course, semi-trucks.

Zone ID	Zone Name	Daily Truck Count	Sep–Oct 2023 Geotab Journeys	Daily Factor	Average Daily Geotab Journeys	Geotab Sample Rate
311	I-435 near I-70	5,695	57,595	0.10	1,477	26%
312	KS 10	1,961	30,415	0.06	780	40%
313	I-635 DT KC	7,796	13,404	0.58	344	4%
315	I-70 near 670 and 35 DT KC	20,376	114,772	0.18	2,943	14%
316	I-49 in Harrisonville	6,555	61,335	0.11	1,573	24%
317	US 65	1,645	6,646	0.25	170	10%
	Total	**122,513**	**707,569**	**0.17**	**18,143**	**15%**

Source: Geotab Data, September–November 2023

Figure 48 shows how the study region (represented as "Internal" zone) truck movements flow to/from external stations located on the gateway trunk roads of I-29, I-35, I-49, I-70, US 65, US 69 and MO 7. The figure also shows the major pass-through truck flows.



Zone ID	Zone Name
201	I-70 East Gateway
202	I-70 West Gateway
203	I-29 North Gateway
204	I-35 North Gateway
205	US 65 South Gateway
206	MO 7 Southeast Gateway
207	I-49 South Gateway
208	US 69 South Gateway
209	I-35 South Gateway
210	I-70 East Gateway

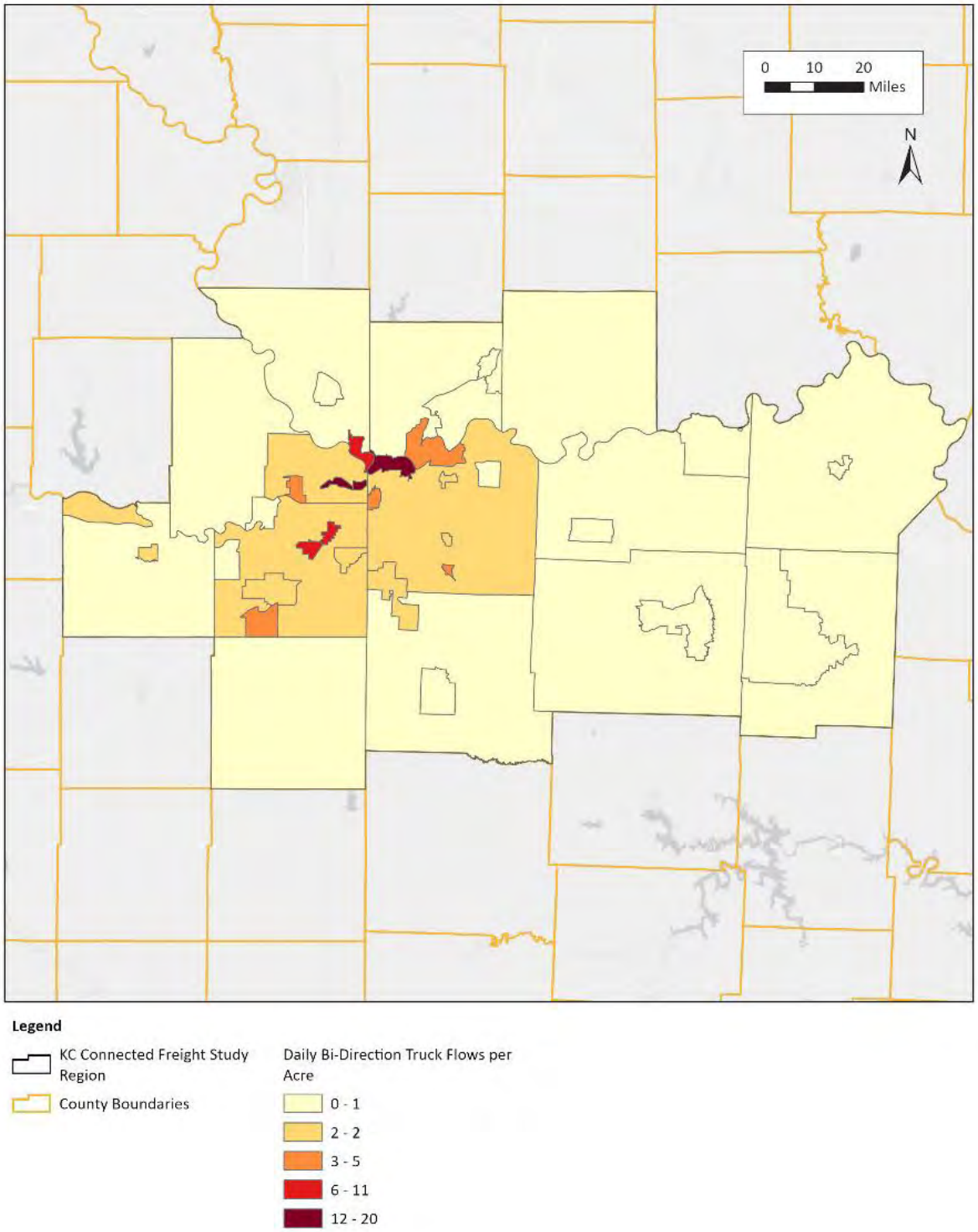
*Note that Zone 205, which is the Highway 65 North Gateway, was omitted from the graphic due to low volume.

Source: Geotab Data, September–November 2023

Figure 48. Regional Truck Origin-Destination Flow Patterns

Geotab data was used to understand the intensity of truck activity in various parts of the Kansas City region (Figure 49). The highest truck activity (between 12 to 20 daily bi-directional truck

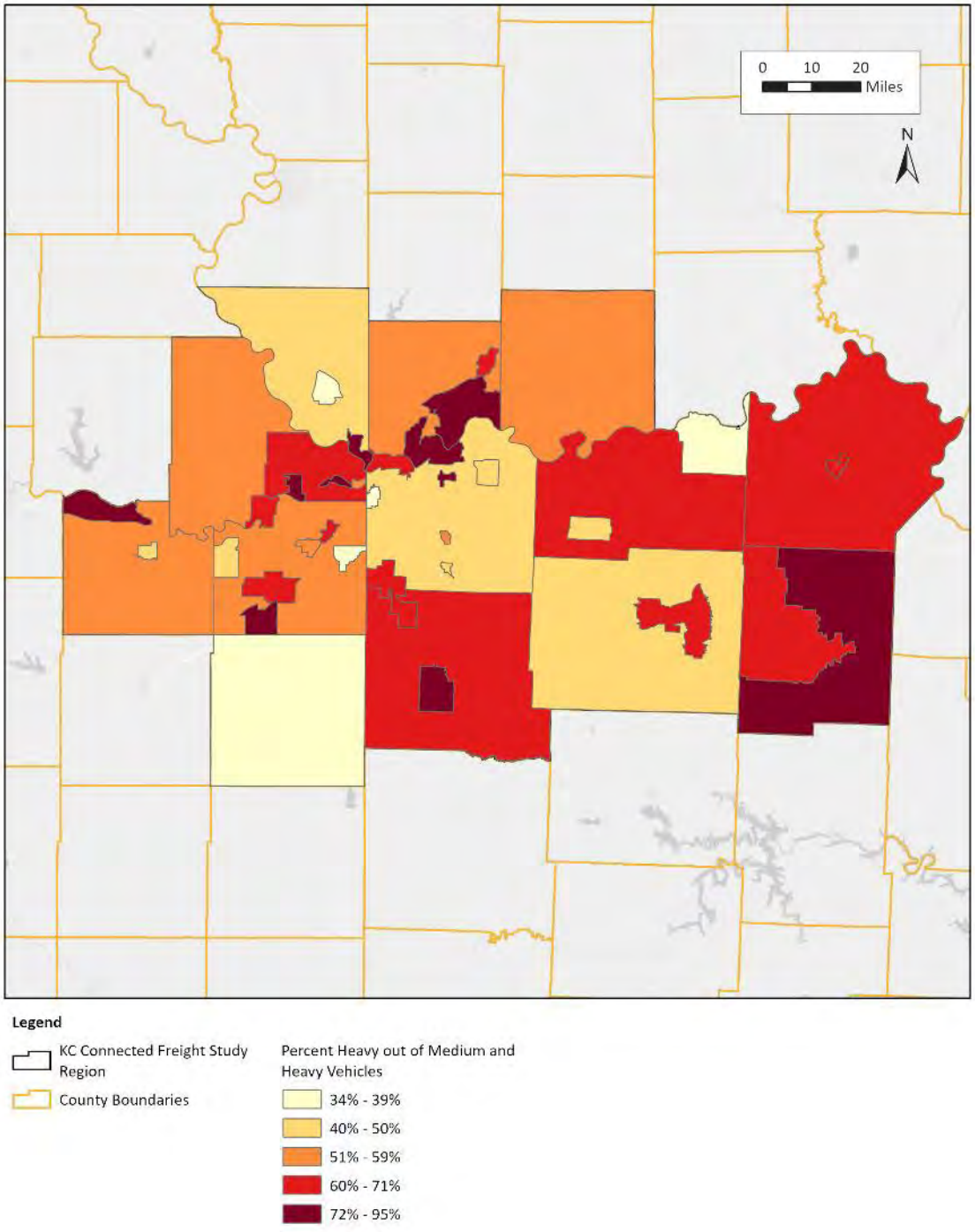
flows per acre) occurs in the riverfront zones of Kansas City region. Less than 1 daily bi-directional truck flow per acre are produced outside the urbanized areas of Jackson County in Missouri, Douglas, Johnson and Wyandotte Counties in Kansas.



Source: Geotab Data, September–November 2023

Figure 49. Daily Bi-Directional Truck Flows per Acre

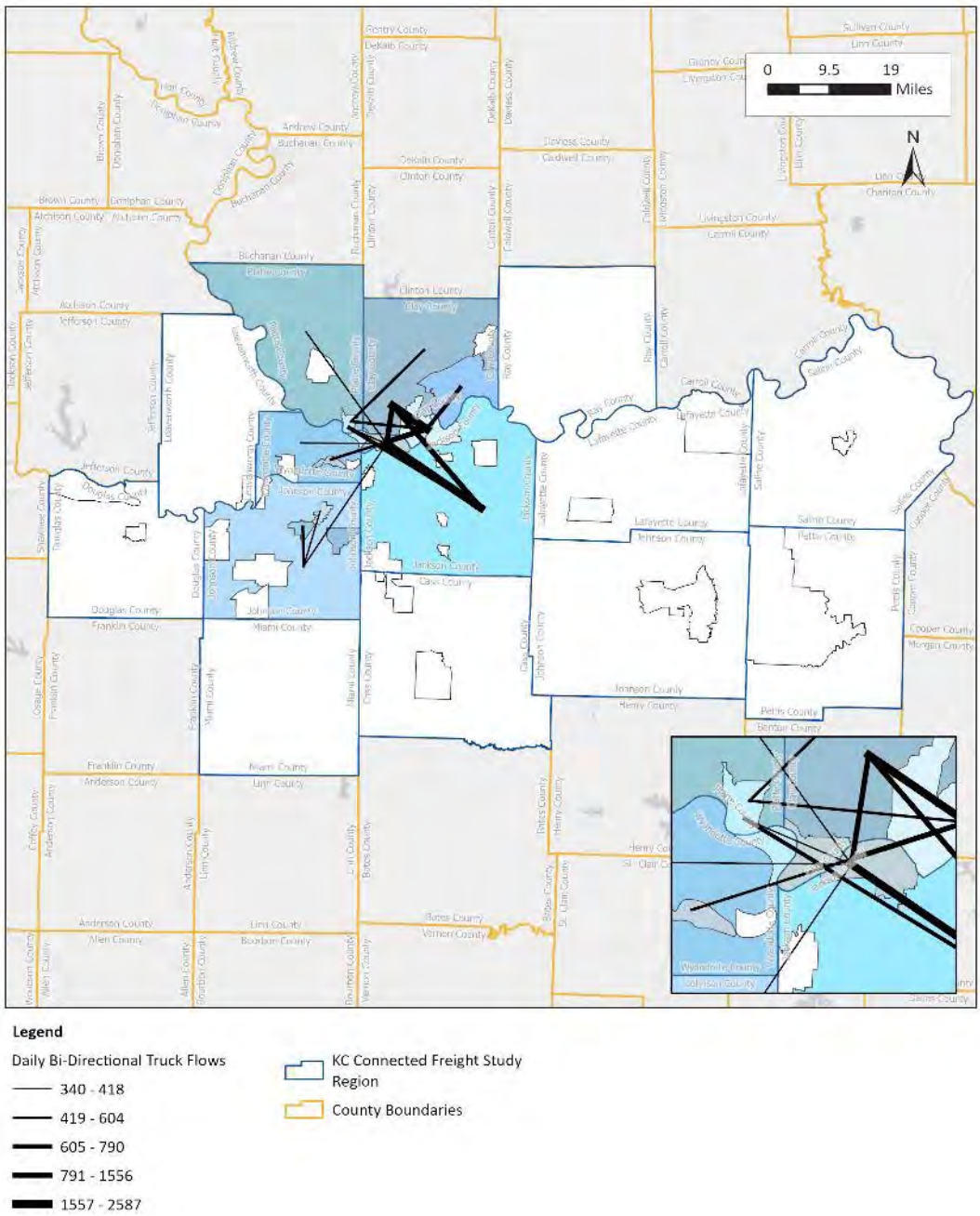
Among the Geotab zones, the use of medium and heavy trucks varies (**Figure 50**). Above 60 percent of heavy trucks are seen in the agricultural and industrial heavy land use locations. In locations with high commercial activity and limited large industrial facilities, medium truck share starts to become higher than heavy truck share.



Source: Geotab Data, September–November 2023

Figure 50. Percent Heavy Trucks Out of Total Trucks (Medium and Heavy)

The analysis identified the top 20 origin-destination pairs for truck flows "internal" to the study region (**Figure 51**). The mapped flows make up about 6 percent of all internal truck flows. The highest origin-destination flow is 2,500 daily bi-directional trucks. The riverfront industrial areas in Platte, Jackson, and Clay Counties in Missouri and Wyandotte County in Kansas, and the industrial/logistics complex along I-35 in Johnson County in Kansas act as freight hubs. The unmapped origin-destination flows have lower than 340 daily bi-directional truck flows.



Source: Geotab Data, September–November 2023

Figure 51. Top 20 Daily Bi-Directional "Internal" Origin-Destination Total Truck Flows (Medium and Heavy)

5. Existing Infrastructure Inventory and Assessment

5.1. Multimodal Freight System Infrastructure

Figure 52 shows the Kansas City study region existing multimodal freight system. This includes various parts as discussed below. The system elements and their performance information were identified using several resources listed as follows:

- Existing freight plans
  - 2022 Missouri State Freight and Rail Plan[61]
  - 2023 Kansas State Freight Plan[62]
- National, state and regional information datasets[63]
  - National highway freight network (NHFN)[64]
  - State and regional roads by functional classification, rail, airports and ports
  - National intermodal freight facilities pipeline terminals[65]
  - Regional and "All Stays"[66] truck stops
  - Kansas City International comprehensive annual financial report for airport tonnage
  - United States Army Corp of Engineers (USACE) for Port of Kansas City tonnage
  - National bridge conditions[67]
  - National pavement conditions[68]
  - Regional INRIX truck speeds
  - State and regional truck-involved crashes

[61] https://www.modot.org/2022-state-freight-and-rail-plan-documents (last accessed on August 9, 2024)

[62] https://www.ksdot.gov/Assets/wwwksdotorg/bureaus/burRail/Rail/Documents/2023/KansasStateFreightPlan_FHWA_Approved.pdf (last accessed on August 9, 2024)

[63] While most of the information datasets were geographical information system (GIS) type, CDM Smith developed some new GIS data using latitude / longitude and address locations or transforming existing GIS data.

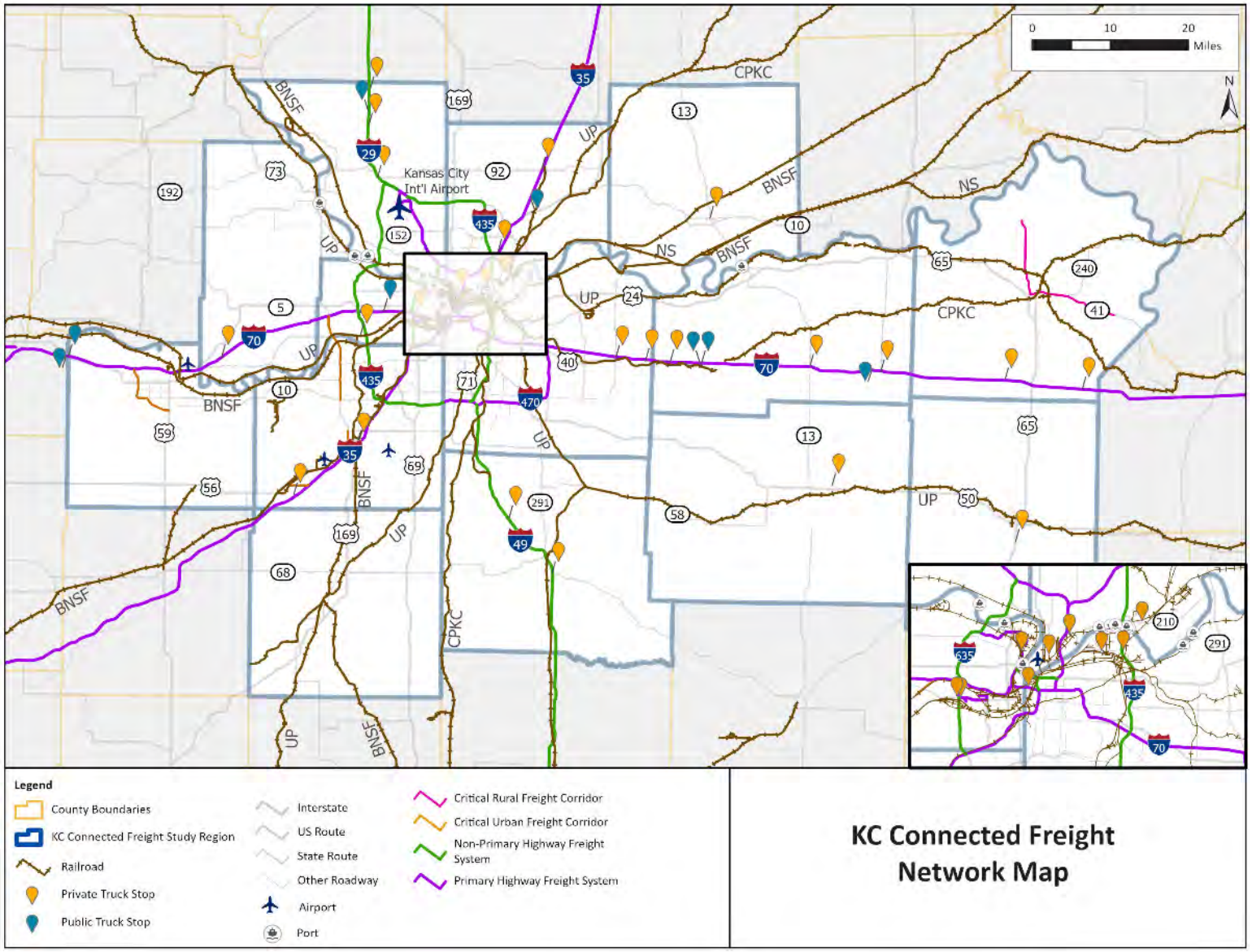
[64] https://ops.fhwa.dot.gov/freight/fpcb/tools_nhfn.aspx (last accessed on August 9, 2024)

[65] https://data-usdot.opendata.arcgis.com/datasets/usdot::intermodal-freight-facilities-pipeline-terminals/explore?location=39.257131%2C-94.445809%2C10.00 (last accessed on August 9, 2024)

[66] https://www.allstays.com/apps/truckstops.htm (last accessed on August 9, 2024)

[67] https://hub.arcgis.com/datasets/usdot::national-bridge-inventory/about (last accessed on August 9, 2024)

[68] https://www.arcgis.com/home/item.html?id=c199f2799b724ffbacf4cafe3ee03e55 (last accessed on August 9, 2024)



Source: MARC, MoDOT and KDOT Transportation System GIS Data; FHWA, National Highway Freight Network Visualization Tool; "All Stays" Truck Stops and Rest Areas Inventory; CDM Smith GIS Analysis

Figure 52. Study Region Multimodal Freight System Infrastructure Map

5.1.1. Highway System

Kansas City is the third largest trucking hub in the nation in terms of tonnage.[69] Major freight access highways for the region include I-70 as the main east-west corridor and I-35 as the main north-south corridor. The region's highways have a total of about 435 miles with a NHFN designation, which in turn fall under one of the following four categories:

- **Primary Highway Freight System (PHFS):** This is a network of highways identified as the most critical highway portions of the U.S. freight transportation system determined by measurable and objective national data.
- **Non-Primary Highway Freight System (Non-PHFS):** These highways consist of the remaining portion of Interstate roads not included in the PHFS. These routes provide important continuity and access to freight transportation facilities.
- **Critical Urban Freight Corridors (CUFC):** These are public roads in urbanized areas which provide access and connection to the PHFS and the Interstates with other ports, public transportation facilities, or other intermodal transportation facilities.
- **Critical Rural Freight Corridors (CRFC):** These are public roads not in an urbanized area which provide access and connection to the PHFS and the Interstates with other important ports, public transportation facilities, or other intermodal freight facilities.

Table 29 breaks down the NFHN miles under the above four categories and by county in the study region. Among the total NHFN miles, 57.5 percent are PHFS, 33.9 percent are Non-PHFS, 5.2 percent are CUFC, and 3.4 percent are CRFC type.

Table 29. Study Region's NHFN Designated Highway System Mileage Summary

County	PHFS Miles	Non-PHFS Miles	CUFC Miles	CRFC Miles	Total Miles
Douglas	16.41	0	8.35	0	24.76
Johnson	30.03	16.18	9.94	0	56.15
Leavenworth	15.95	0	0	0	15.95
Miami	2.80	0	0	0	2.80
Wyandotte	31.26	20.83	4.14	0	56.23
Kansas Counties Sub-Total	**96.45**	**37.01**	**22.43**	**0.00**	**155.89**
Cass	0	30.82	0	0	30.82
Clay	31.50	16.26	0	0	47.76

[69] City of Kansas City, MO – Smart City Vision Proposal, February 4, 2016, Available at: https://www.transportation.gov/sites/dot.gov/files/docs/Kansas%20City%20Vision%20Narrative.pdf (last accessed on August 9, 2024)

County	PHFS Miles	Non-PHFS Miles	CUFC Miles	CRFC Miles	Total Miles
Jackson	51.39	26.13	0	0	77.52
Johnson	0	0	0	0	0.00
Lafayette	31.55	0	0	0	31.55
Pettis	0	0	0	0	0.00
Platte	16.27	36.92	0	0	53.19
Ray	0	0	0	0	0.00
Saline	22.82	0	0	15.08	37.90
Missouri Counties Sub-Total	**153.53**	**110.13**	**0.00**	**15.08**	**278.74**
Regional Total	**249.98**	**147.14**	**22.43**	**15.08**	**434.63**

Source: FHWA, National Highway Freight Network Visualization Tool, Available at: https://usdot.maps.arcgis.com/apps/webappviewer/index.html?id=c4c0fdef029a4093b169e493e1883988 (last accessed on August 9, 2024); CDM Smith's GIS analysis

5.1.2. Rail System

Kansas City is the largest rail hub in the nation in terms of tonnage.[70] Major rail access is provided by the Class I railroads (carriers earning revenue greater than $1.05 billion[71]) of Burlington Northern Santa Fe (BNSF), Canadian Pacific Kansas City (CPKC), Norfolk Southern (NS) and Union Pacific (UP). Minor rail access is also available through the regional short line railroads of Kaw River Railroad (KAW)[72] and Missouri & Northern Arkansas (MNA)[73] and a switching and terminal railroad of Kansas City Terminal Railway Company (KCT).[74] All active rail lines are included in the mileage by county summarized in **Table 30**.

Table 30. Study Region's Freight Rail Mileage Summary

County	Rail Miles
Douglas	40.96
Johnson	151.55
Leavenworth	36.92
Miami	88.50

[70] City of Kansas City, MO – Smart City Vision Proposal, February 4, 2016, Available at: https://www.transportation.gov/sites/dot.gov/files/docs/Kansas%20City%20Vision%20Narrative.pdf (last accessed on August 9, 2024)

[71] https://www.stb.gov/reports-data/economic-data/ (last accessed on August 9, 2024)

[72] https://www.watco.com/service/rail/kaw-river-railroad-kaw/ (last accessed on August 9, 2024)

[73] https://www.gwrr.com/mna/ (last accessed on August 9, 2024)

[74] https://kctrailway.com/ (last accessed on August 9, 2024)

County	Rail Miles
Wyandotte	143.68
Kansas Counties Sub-Total	**461.61**
Cass	72.73
Clay	114.52
Jackson	272.48
Johnson	37.59
Lafayette	77.39
Pettis	33.19
Platte	48.29
Ray	90.52
Saline	77.76
Missouri Counties Sub-Total	**824.47**
Regional Total	**1,286.08**

Source: Kansas and Missouri Active Rail Network GIS Data; CDM Smith's GIS Analysis

5.1.3. Airports

Kansas City International (KCI) is the busiest airport in the study region and has a Class B airspace.[75] Other support airports in the region that have a Class D or E airspace include Lawrence Regional Airport (LWC), Charles B. Wheeler Downtown Airport (MKC), New Century AirCenter (IXD)[76] and Johnson County Executive Airport (OJC). These serve general and corporate aviation communities and some military purposes.

5.1.4. Ports

The Port of Kansas City is an inland port on the Missouri River in Kansas City, Missouri at river mile 367.1, near the confluence with the Kansas River. The Missouri inland waterway allows for barge traffic as far upriver as Sioux City, Iowa; however, most of the commercial traffic on the Missouri is concentrated between Kansas City and St. Louis.

The intermodal facility has approximately 160,000 square feet of storage space, a loading system consisting of three 25-ton cranes, one 100-ton crane, eight front-end loaders, portable conveyor

[75] https://aspm.faa.gov/aspmhelp/index/Airspace_Classification.html (last accessed on August 9, 2024)

[76] https://www.faa.gov/ixd (last accessed on August 9, 2024)

systems, and a truck scale. The terminal is served by the Union Pacific Railroad, with extensive rail track at the facility for loading and unloading containers.

The plan also identified additional sixteen active private industries in the study region with waterway access along the Missouri River (**Table 31**).

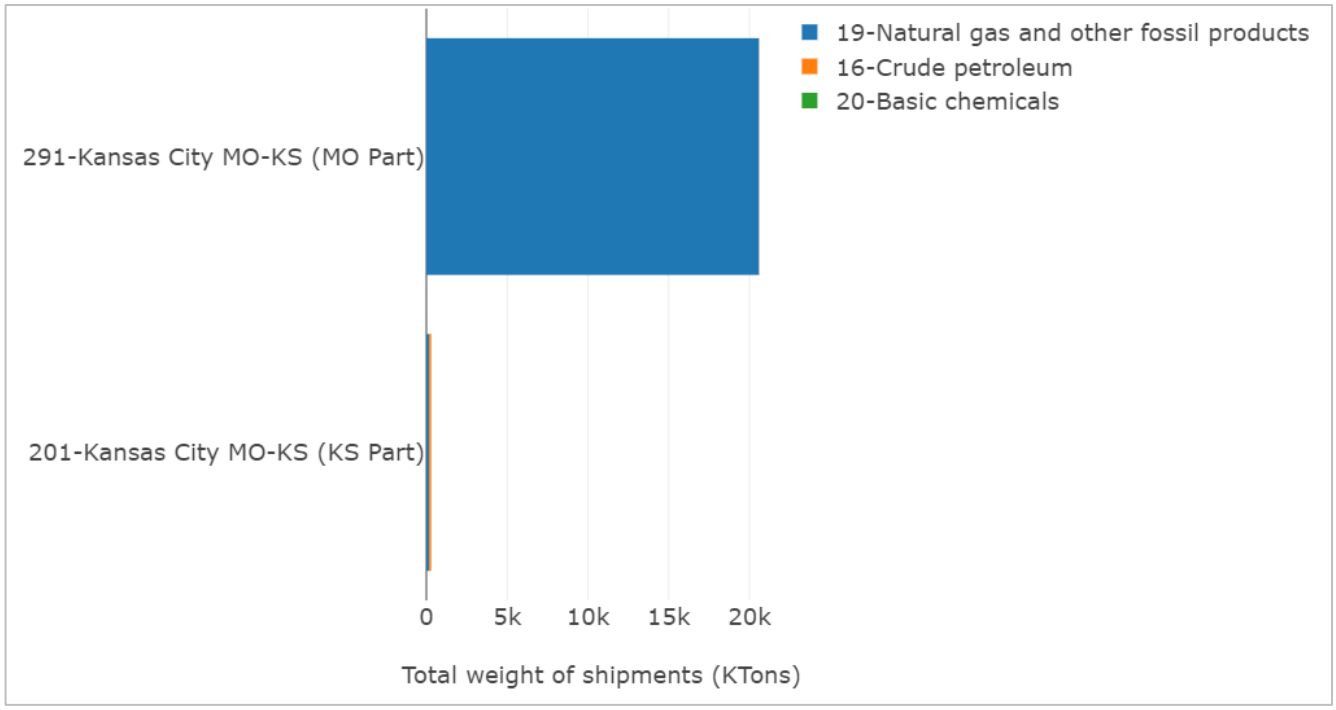
Table 31. Study Region's Ports along Missouri River Waterway Summary

Waterway Mile	Name of Port	Operator	Riverbank Location	County	State
367	Mid-West	Mid-West	Right	Jackson	MO
368	Kansas City – River Rail	Bartlett	Right	Wyandotte	KS
356	Sugar Creek	Farmland	Right	Jackson	MO
355	LaFarge Concrete	LaFarge Concrete	Right	Jackson	MO
362	Cargill Inc	Cargill Inc	Left	Clay	MO
360	Holliday	Holliday	Left	Clay	MO
372	Holliday	Holliday	Left	Platte	MO
361	Harvest S	Harvest S	Left	Clay	MO
361	HCI Chemtech	HCI Chemtech	Left	Clay	MO
373	Farmland	Farmland	Right	Wyandotte	KS
377	Intercontinental Engineering	Intercontinental Engineering	Left	Platte	KS
317	Lexington	Lexington	Left	Ray	MO
386	Westway Terminal	Westway Terminal	Right	Leavenworth	KS
387	ADM/Growmark	ADM/Growmark	Right	Leavenworth	KS
385	Massman Construction	Massman Construction	Left	Platte	MO
396	Chemtronics	Chemtronics	Right	Leavenworth	KS

Source: MARC's Water Ports GIS Data

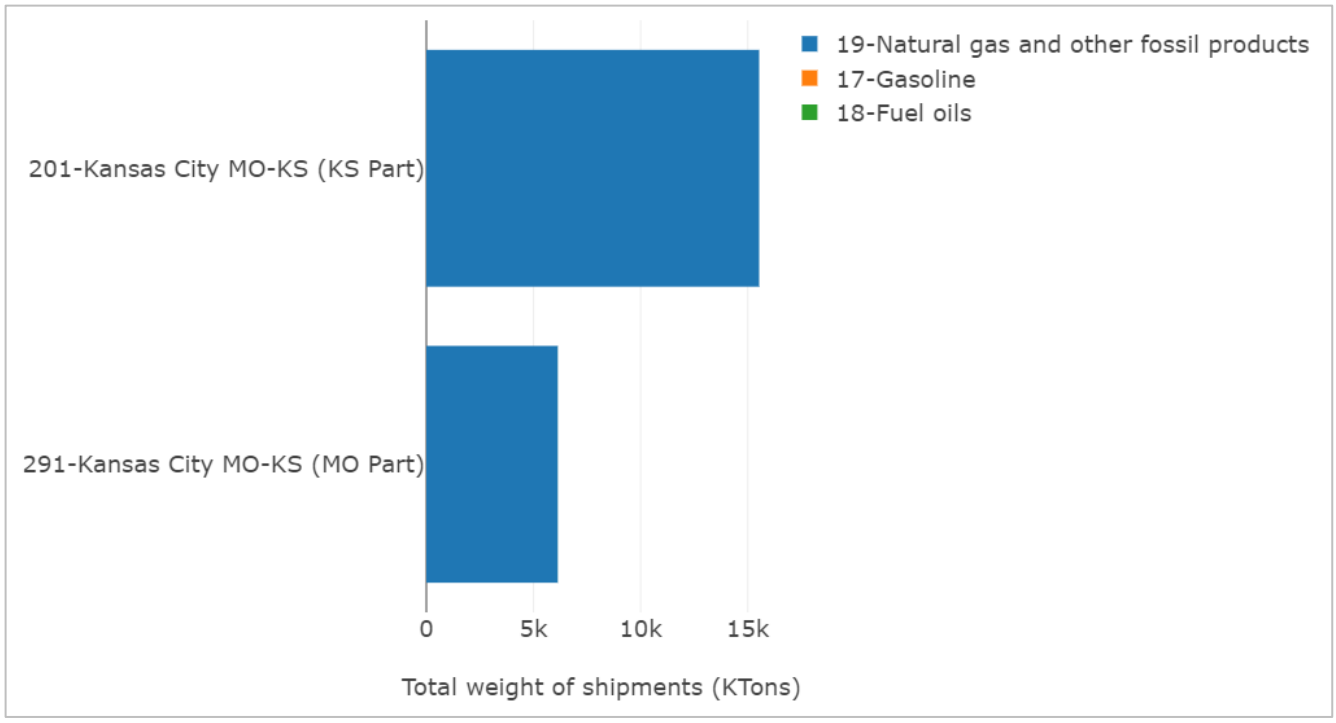
5.1.5. Pipelines

Pipelines carry the second largest share of freight by weight in the region. Commodities moved by pipeline include natural gas and other fossil fuel products, crude petroleum, and basic chemicals. Pipeline movements by total weight are shown in **Figure 53** by movement origin, and in **Figure 54** by movement destination. These charts show the Kansas City FAF Zones only move natural gas and other fossil fuels by pipeline, and the Kansas part only receives natural gas and does not ship it out.



Source: FAF, 2022

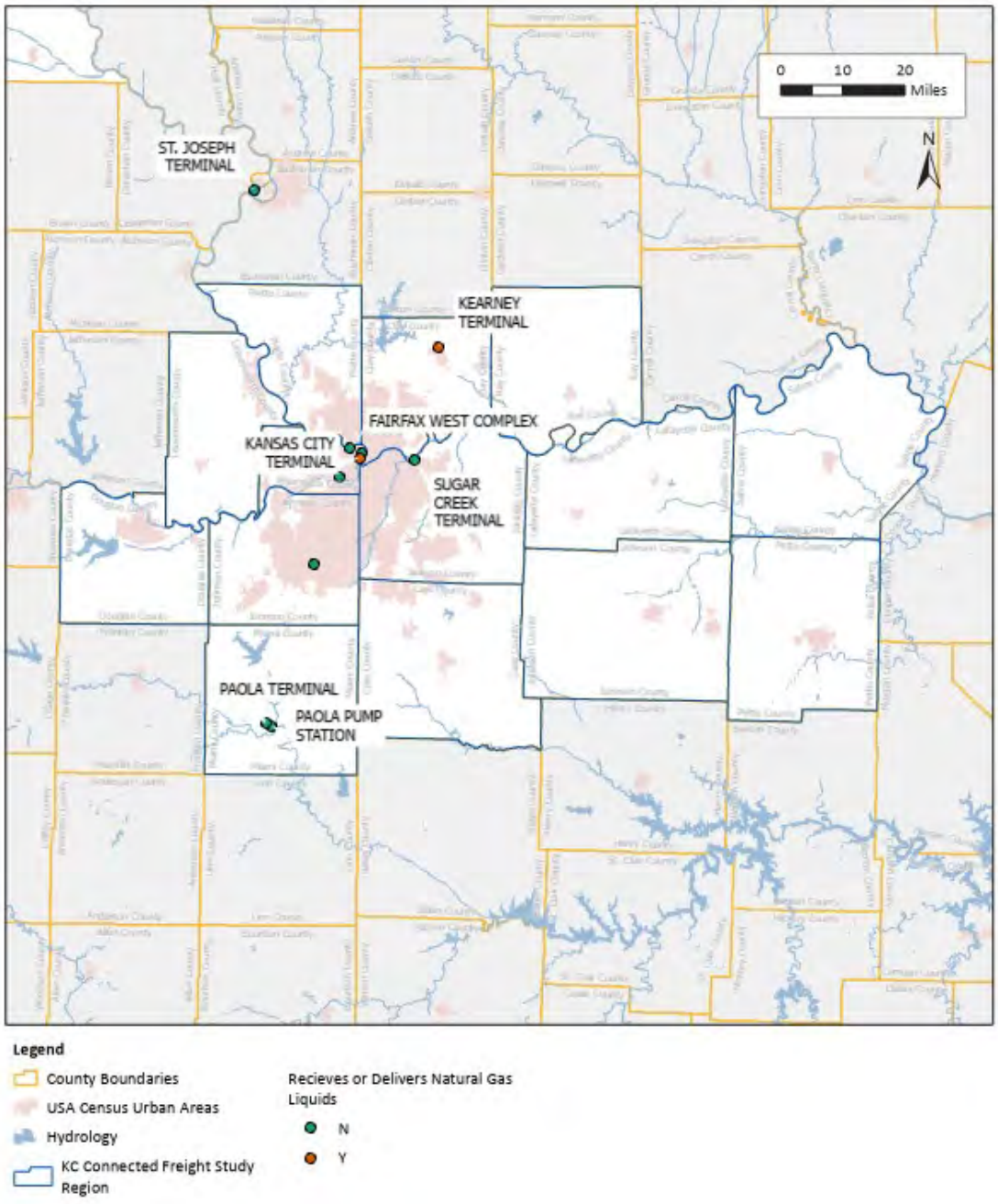
Figure 53. Pipeline Movements Originating from Kansas City Region



Source: FAF, 2022

Figure 54. Pipeline Movements Destined to Kansas City Region

The locations of pipeline terminals are shown in **Figure 55**. Each terminal shown on the map is a facility that can receive or deliver commodities via pipeline and truck, while the ability to receive or deliver by rail varies by terminal. All the terminals on the map move refined oil and do not move crude oil. The map shows whether each terminal moves natural gas liquids (NGL), gasoline, or distillate fuel.

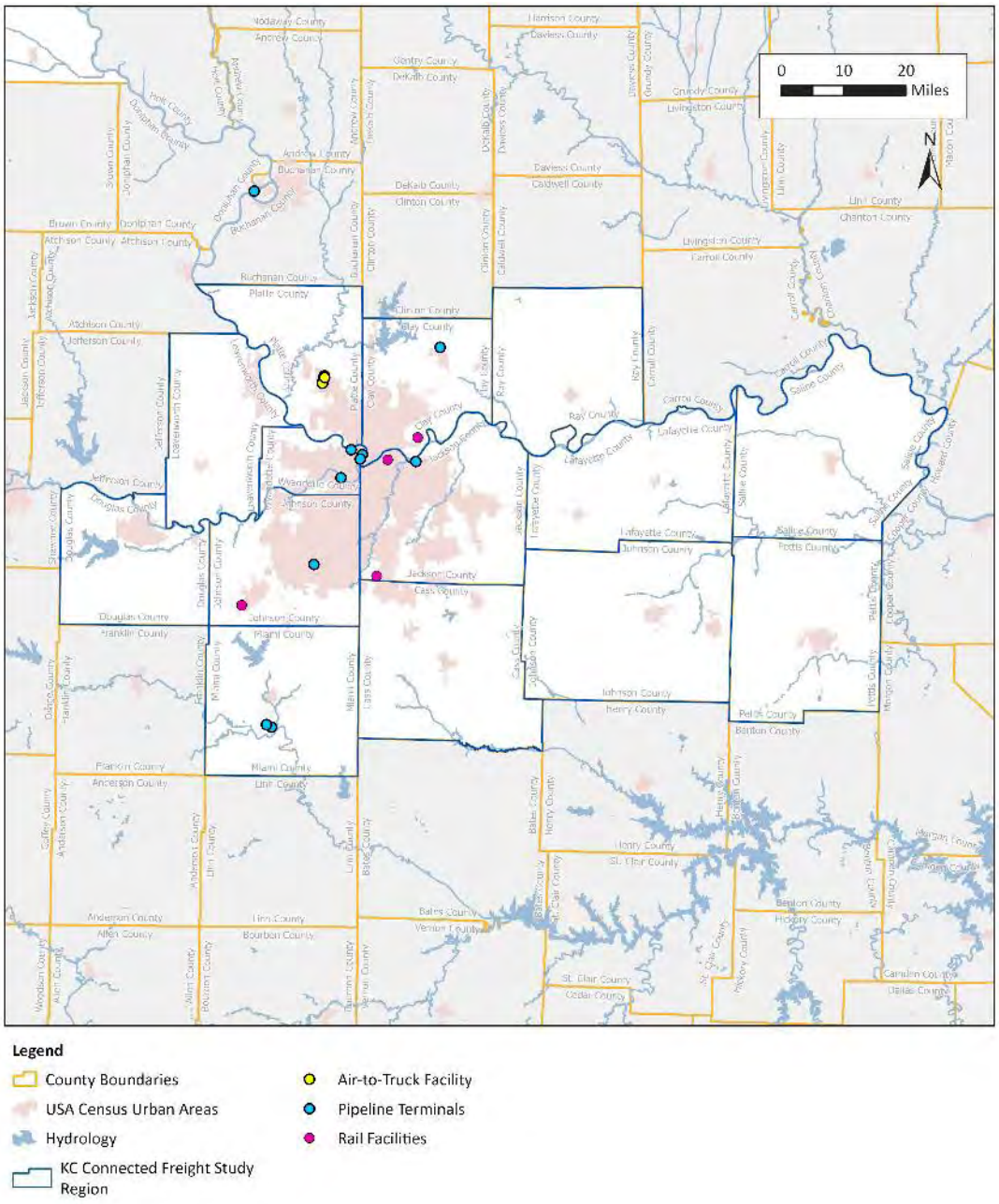


Source: U.S. Department of Transportation (USDOT)/Bureau of Transportation Statistics (BTS) National Transportation Atlas Database (NTAD), Pipeline Terminals, 2021, Available at: https://data-usdot.opendata.arcgis.com/datasets/usdot::intermodal-freight-facilities-pipeline-terminals/explore?location=39.257131%2C-94.445809%2C10.00 (last accessed on August 9, 2024)

Figure 55. Pipeline Terminals In and Around the Study Region

5.1.6. Intermodal Facilities

The locations of intermodal facilities including pipeline terminals, rail facilities, and air-to-truck facilities are shown in **Figure 56**.



Source: U.S. Department of Transportation (USDOT)/Bureau of Transportation Statistics (BTS) National Transportation Atlas Database (NTAD), Intermodal Terminals, 2021, Available at: https://data-usdot.opendata.arcgis.com/datasets/usdot::intermodal-freight-facilities-pipeline-terminals/explore?location=39.257131%2C-94.445809%2C10.00 (last accessed on August 9, 2024)

Figure 56. Intermodal Terminals In and Around the Study Region

5.1.7. Truck Parking Facilities

As shown in **Table 32**, the region is home to 33 private truck stops and 10 public rest areas with a total of 43 truck parking facilities. Private truck stops supply about 1,269 truck parking spaces, or an average of about 38 parking spaces per location. On the other hand, public truck stops supply about 345 truck parking spaces, or an average of 35 parking spaces per location. Together, they supply about 1,614 truck parking spaces. A high percentage of the truck stops provide a wide range of essential amenities to the trucking community such as: fuel, showers, food, store, CAT scale, ATM, and laundry. Few provide overnight parking (through a reservation system) and truck repair services.

Table 32. Existing Truck Stops and Rest Areas Inventory

Location #	Truck Stop Name	Type	Route	Municipality	County	State	Truck Parking Spaces	Amenities
1	Conoco	Private	KS-32	Edwardsville	Wyandotte	KS	NA	NA
2	Amoco	Private	I-49	Harrisonville	Cass	MO	NA	NA
3	Conoco	Private	MO-9	North Kansas City	Clay	MO	NA	NA
4	Texaco Travel Plaza/ Pilot's Travel Center	Private	I-435	Kansas City	Clay	MO	2	Fuel, Showers, CAT Scale, Store, ATM, Western Union, Check Cashing, Transflo Express
5	Phillips 66	Private	I-670	Kansas City	Jackson	MO	NA	NA
6	Ray Carroll Fuels	Private	MO-10 BUS	Richmond	Ray	MO	NA	Fuel
7	Trex Mart #1	Private	I-29	Camden Point	Platte	MO	NA	NA
8	Phillips 66	Private	Fairfax Trafficway	Kansas City	Wyandotte	KS	NA	NA
9	Sinclair	Private	E Front St	Kansas City	Jackson	MO	20	Deli, Restaurant, Scales, ATM, Fuel Card
10	QuikTrip	Private	I-635	Kansas City	Wyandotte	KS	18	Fuel, CAT Scales Store, ATM, FedEx, UPS, TripPak, Fuel Card, Pay Phones
11	Trex Mart #9	Private	I-29	Dearborn	Platte	MO	10	Deli, Restaurant, ATM, Fuel Card

Location #	Truck Stop Name	Type	Route	Municipality	County	State	Truck Parking Spaces	Amenities
12	QuikTrip	Private	I-29	Platte City	Platte	MO	20	Trucker Lounge, Deli, Restaurant, ATM, FedEx, UPS, Scales, Fuel Card
13	QuikTrip	Private	I-70	Oak Grove	Jackson	MO	30	Trucker Lounge, Deli, Restaurant, Laundry, Scales
14	QuikTrip	Private	I-35	Pleasant Valley	Clay	MO	40	Store, Deli, Restaurant, Internet, ATM, FedEx, UPS, Scales, Fuel Card
15	Love's Travel Stop	Private	I-70	Lawrence	Leavenworth	KS	50	Fuel, Restrooms, Gas, Store, McDonalds, Internet, ATM, Pay Phones
16	On The Go Travel Center	Private	I-435	Edwardsville	Wyandotte	KS	NA	Overnight for fee, 2 showers, Fuel, CAT scales, Store, Subway, Internet, Game Room, Laundry, FedEx, ATM, Fuel Card
17	Pilot Travel Center	Private	I-635	Kansas City	Wyandotte	KS	28	Fuel, Store, 2 showers, Trucker Lounge, ATM, Laundry, CAT Scales, TripPak, Pay Phones, Fuel Card
18	Amoco	Private	I-70	Grain Valley	Jackson	MO	10	Propane, Transflo Express, ATM, FedEx, UPS, Scales, Fuel Card

Location #	Truck Stop Name	Type	Route	Municipality	County	State	Truck Parking Spaces	Amenities
19	Star Fuel Center	Private	I-35	Olathe	Johnson	KS	30	Trucker Lounge, Deli, Restaurant, ATM, FedEx, UPS, Propane, TripPak, Scales, Travel Store, Fuel Card
20	TA Travel Center	Private	I-70	Oak Grove	Jackson	MO	118	Fuel, 9 Showers including 1 Handicap Shower, Popeyes, Cafe Express, Laundry, Trucker Lounge, Direct TV, Game Room
21	Flying J Travel Plaza	Private	I-435	Kansas City	Jackson	MO	121	Fuel, 6 showers, Hot Deli, Propane, Laundry, CAT Scales, TripPak, ATM, Game Room, FedEx, UPS, Fuel Card
22	Flying J Travel Plaza	Private	I-49	Peculiar	Cass	MO	NA	Fuel, 9 showers, Dennys, Pepperonis, Propane, Laundry, CAT Scales, TripPak, ATM, Game Room, FedEx, UPS, Fuel Card
23	Pilot Travel Center	Private	I-35	Kearney	Clay	MO	100	Fuel, 7 showers, Wingfoot Truck Care, Taco Bell, Internet, Laundry, CAT Scales, Transflo Express, TripPak, ATM, Western Union, Check Cashing, Game Room, UPS, Fuel Card

Location #	Truck Stop Name	Type	Route	Municipality	County	State	Truck Parking Spaces	Amenities
24	Petro	Private	I-70	Oak Grove	Jackson	MO	305	Fuel, 12 Showers, Iron Skillet, Buffet, Blimpie, Wendys, Dairy Queen, Laundry, Trucker Lounge
25	NHS Rest Stop or Truck Facility 23	Public	I-70W	Kansas City	Wyandotte	KS	100	No facilities
26	NHS Rest Stop or Truck Facility	Public	I-35S	Kearney	Clay	MO	20	No facilities
27	NHS Rest Stop or Truck Facility	Public	I-29S	Dearborn	Platte	MO	30	Restrooms, Picnic Table, Vending, Pets, Handicap
28	NHS Rest Stop or Truck Facility	Public	I-29N	Dearborn	Platte	MO	25	Restrooms, Picnic Table, Vending, Pets, Handicap
29	NHS Rest Stop or Truck Facility	Public	I-70E	Concordia	Lafayette	MO	30	Restrooms, Picnic Table, Vending, Pets, Handicap, Recycling Bins
30	NHS Rest Stop or Truck Facility	Public	I-70W	Concordia	Lafayette	MO	30	Restrooms, Picnic Table, Vending, Pets, Handicap
31	Betty's Truck Stop	Private	I-70	Sweet Springs	Saline	MO	27	Store, Deli
32	Stuckeys	Private	I-70	Nelson	Saline	MO	11	Fuel, Store, 1 Shower, Dairy Queen, ATM
33	Temp Stop	Private	65	Sedalia	Pettis	MO	20	Fuel, Store, 2 showers, Scales, ATM
34	Jump Stop	Private		Concordia	Lafayette	MO	2	Deli, Restaurant, ATM

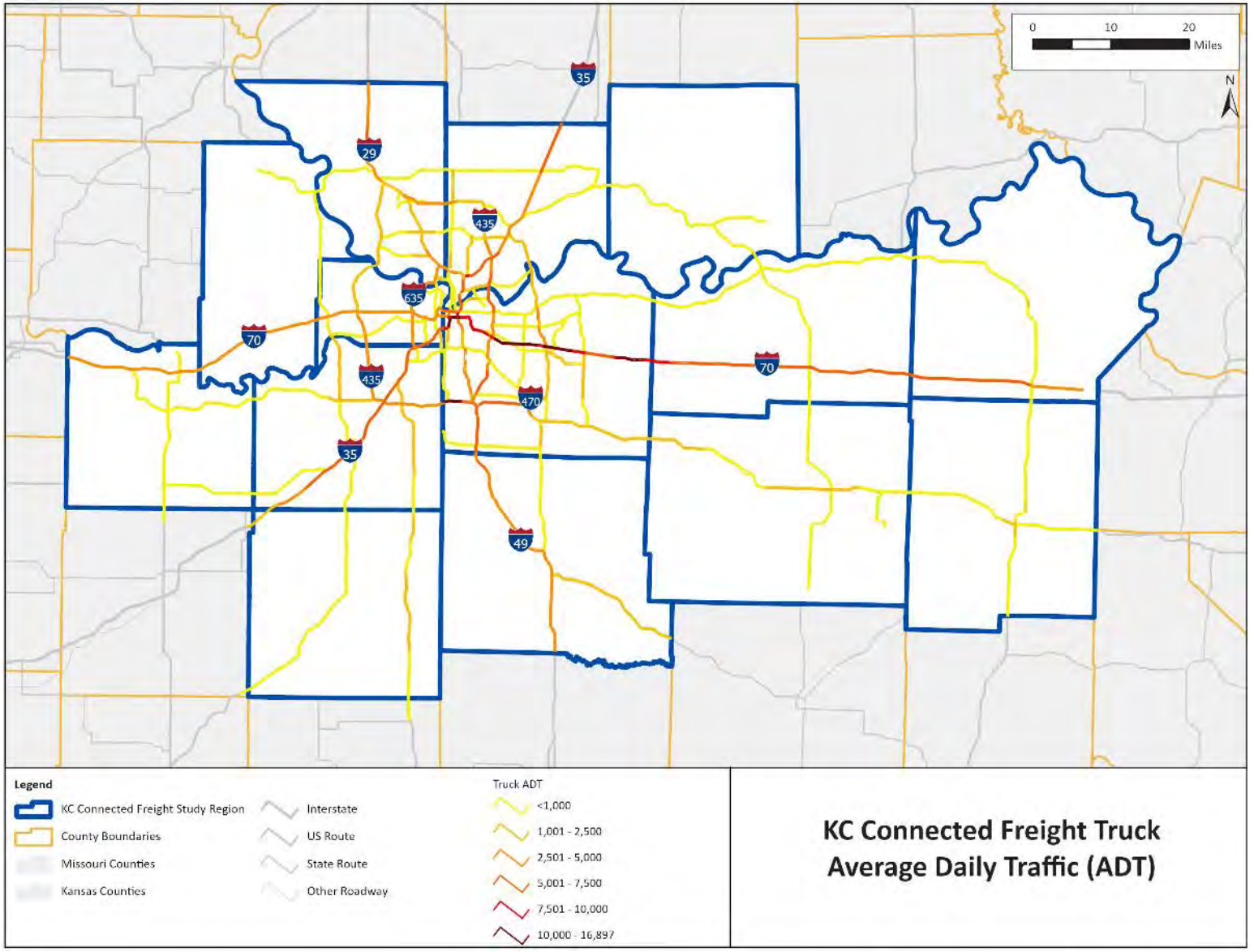
Location #	Truck Stop Name	Type	Route	Municipality	County	State	Truck Parking Spaces	Amenities
35	Break Time	Private	13	Warrensburg	Johnson	MO	50	Fuel, Store, Smokestack Bar BQ, Dashboard Diner, Hunt Brothers Pizza, CAT Scales, ATM
36	Pilot Travel Center	Private		Higginsville	Lafayette	MO	125	Fuel, 6 showers, McDonalds, Subway, Internet, Laundry, CAT Scales, Transflo Express, TripPak Truck Wash, ATM, Air fill, Pay phone
37	NHS Rest Stop or Truck Facility	Public	I-70W	Odessa	Lafayette	MO	15	No Facilities
38	NHS Rest Stop or Truck Facility	Public	I-70E	Odessa	Lafayette	MO	20	No Facilities
39	Loves Travel Stop	Private	I-70	Bates City	Lafayette	MO	100	Fuel, 30/50-amp hookups, Store, 7 Showers, Subway, Godfathers Pizza, Chester Chicken, ATM, Internet
40	Snappy Conoco	Private	I-35	Kansas City	Clay	MO	2	Trucker Lounge, Deli, Restaurant, ATM, Laundry, Motel, Fuel Card
41	NHS Rest Area	Public	I-70W	Lecompton	Douglas	KS	25	Fuel, Restrooms, Picnic Table, Handicap, Gas, Food, Store, Hardees, Taco Bell, Dunkin Donuts, Pizza Hut Express

Location #	Truck Stop Name	Type	Route	Municipality	County	State	Truck Parking Spaces	Amenities
42	NHS Rest Area	Public	I-70E	Tecumseh	Douglas	KS	50	Restrooms, Picnic Table, Handicap, Gas, Food, Store, Hardees, Taco Bell, Dunkin Donuts, Pizza Hut Express, ATM
43	TA Express	Private	I-70	Edgerton	Johnson	KS	30	Fuel, Store, 4 Showers, Deli, Laundry, CAT Scales
	TOTAL						**1,614**	

Source: MARC's Travel Demand Model Outputs, 2015 and 2050; 2023 INRIX Truck Speeds Data; CDM Smith's Programming and Statistical Analysis
Note: NA = No Data Available

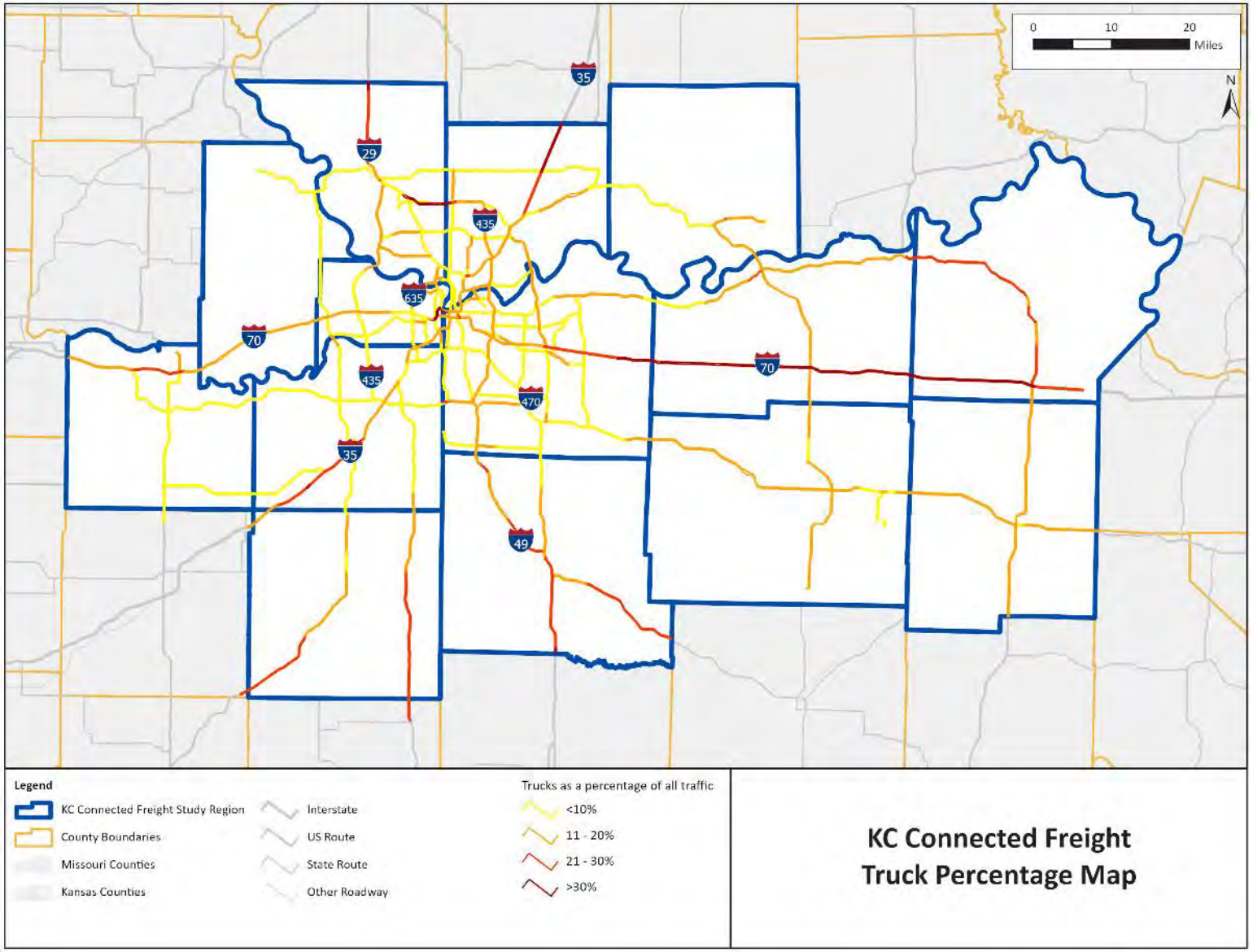
5.2. Truck Traffic

MARC provided existing truck and total ADT data for the study region, which the plan used to map truck ADT and truck percentage maps as shown in **Figure 57** and **Figure 58**. I-70 east of Kansas City and I-35 both north and south of the city generally carry over 7,500 daily trucks. I-70 west of, I-49 south of, I-29 north, and I-435 south and east of the city generally carry over 2,500 daily trucks and less than or equal to 7,500 daily trucks. In some rural parts in the south and the east of the study region, roads carrying over 1,000 daily trucks and less than or equal to 2,500 daily trucks also experience truck percentages over 20 percent.



Source: MARC, 2024

Figure 57. Existing Truck Average Daily Traffic



Source: MARC, 2024

Figure 58. Existing Truck Percentage of Total Traffic

5.3. Rail Traffic

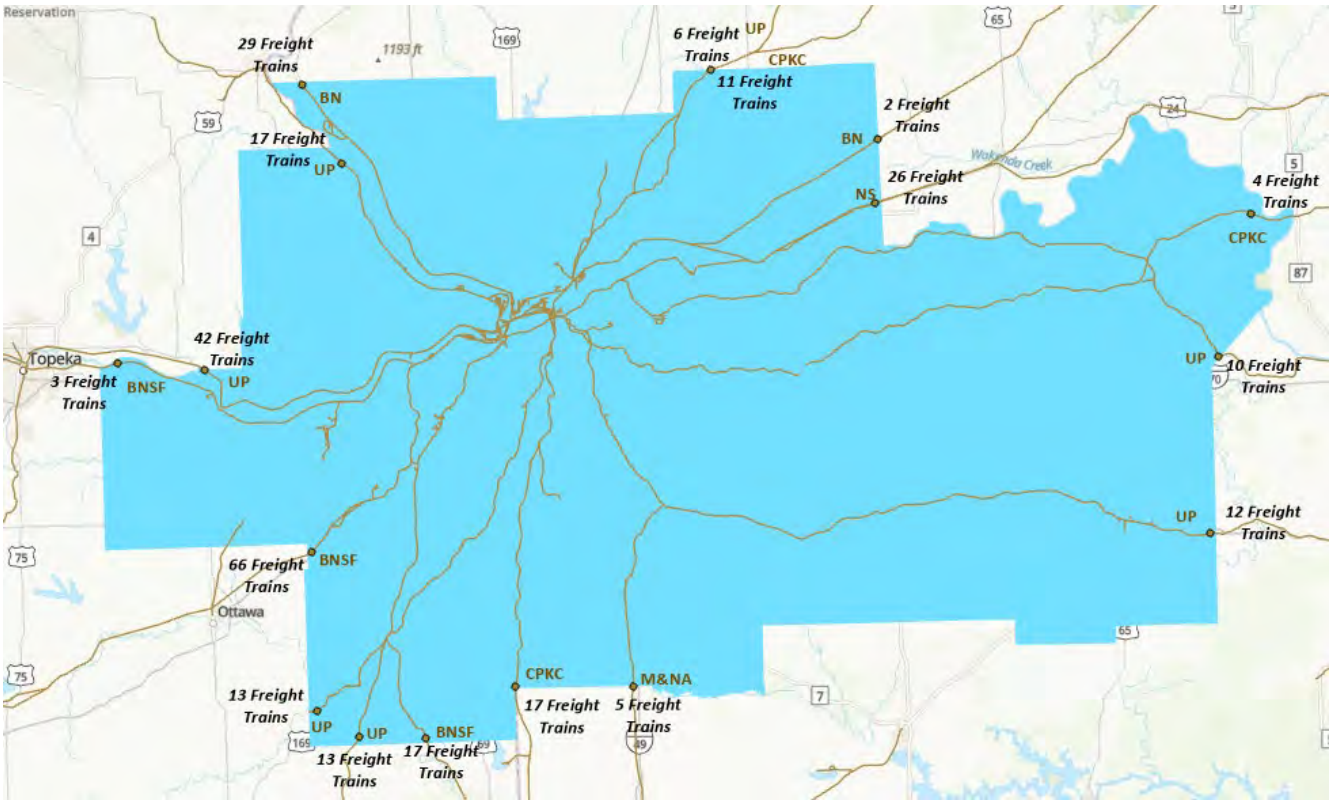
Figure 59 shows rail intermodal traffic by weight transported nationally, which illustrates Kansas City as a key rail intersection, particularly for the east-west connections.

Source: U.S. Department of Transportation, Federal Railroad Administration, special tabulation of 2018 rail intermodal flows, 2019, Available at: https://data.bts.gov/stories/s/Freight-Transportation-System-Extent-Use/r3vy-npqd (last accessed on August 9, 2024)

Figure 59. Rail Intermodal Flows through the Study Region and the United States

Based on FRA's grade crossings inventory,[77] we identified the latest (2019–2024) available data on daily through train counts that are not passenger train type (that is, daily freight through train counts) at the study region boundary as shown in **Figure 60**. These add up to a total of 293 daily freight trains either entering or leaving the Kansas City study region.

[77] https://safetydata.fra.dot.gov/OfficeofSafety/publicsite/DownloadCrossingInventoryData.aspx (last accessed on August 9, 2024)



Source: U.S. Department of Transportation, Federal Railroad Administration, Grade Crossings Inventory, Available at: https://safetydata.fra.dot.gov/OfficeofSafety/publicsite/DownloadCrossingInventoryData.aspx (last accessed on August 9, 2024)

Figure 60. Daily Non-Passenger (Freight) through Train Counts at Public Grade Crossings at the Study Region Boundary

5.4. Air Traffic

In calendar year 2023, Kansas City International (MCI) was ranked 42 in the nation both in terms of enplanements[78] and the all-cargo landed weight.[79] In fiscal year 2023, MCI handled 5,195,871 enplanements and enplaned 126,556,000 pounds[80] of cargo, a majority of which was air freight and trace amounts of mail.

5.5. Water Traffic

The Kansas City Port Authority was ranked 149 out of U.S. ports in 2022 by the Waterborne Commerce Statistics Center. The port saw 1.15 million short tons and only has domestic traffic.

[78] https://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/cy23_all_enplanements (last accessed on August 9, 2024)

[79] https://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/cy23_cargo_airports (last accessed on August 9, 2024)

[80] https://kc-airports.cdn.prismic.io/kc-airports/7368f096-c66e-45f2-a2ba-3c8cd8a3c03d_ACFR+23+Final.pdf (last accessed on August 9, 2024)

Products shipped through the terminal include fertilizer, grain, corn meal, bark, rock clinker, salt, rolled and coiled steel, H-beams, plate steel, rebar, and petroleum coke.

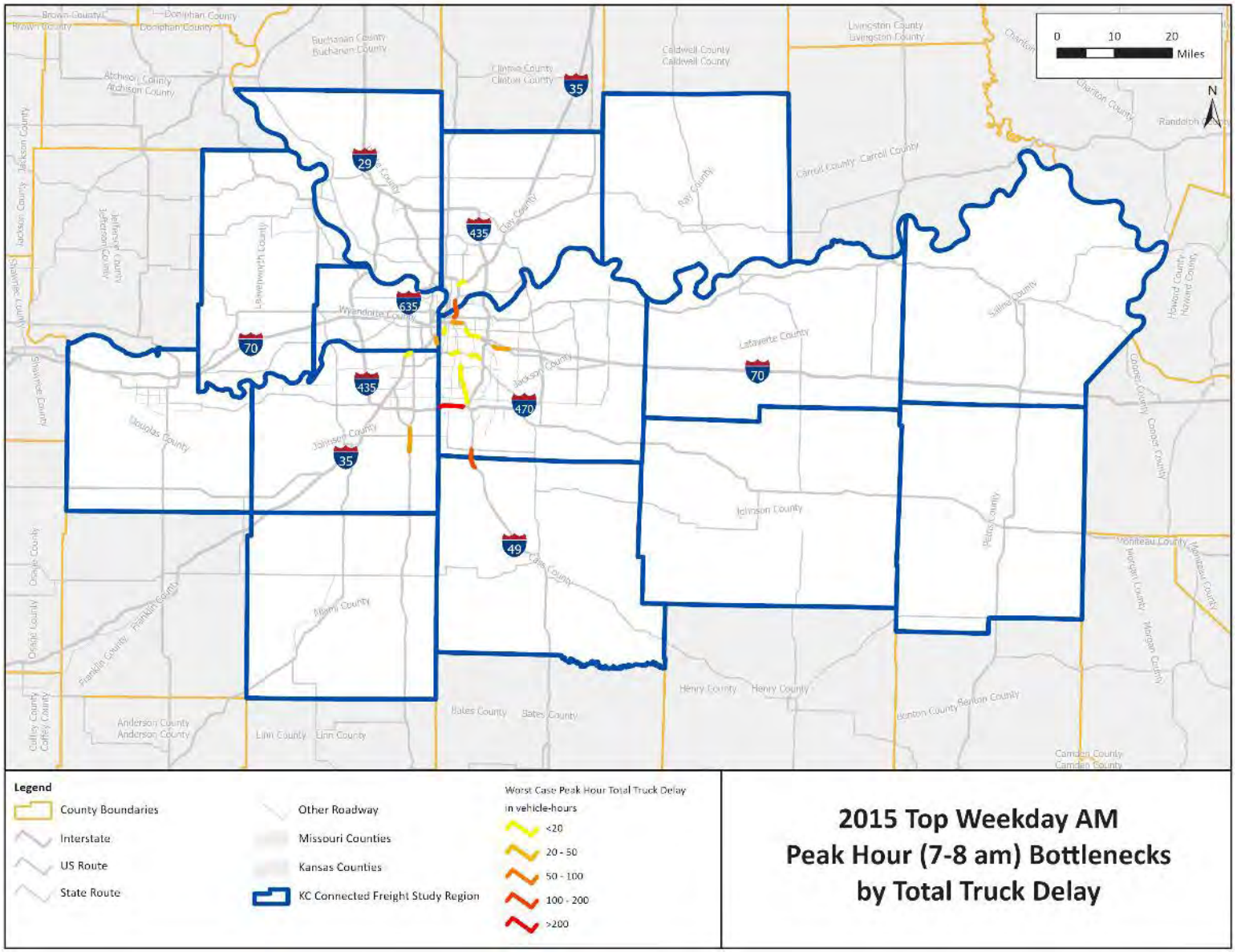
5.6. Truck Bottlenecks

Link travel speed estimates were collected from the MARC region's travel demand model for weekday AM peak hour (7–8 a.m.), weekday PM peak hour (5–6 p.m.) and free flow conditions for base year 2015 and horizon year 2050 to calculate travel time indices[81] for the AM and PM peak hours. The analysis identified roadway links with a travel time index greater than 1.50 as being severely congested. Based on proximity, the analysis combined severely congested roadway links to form a bottleneck segment and computed its aggregated travel time index. For each bottleneck segment, the analysis also derived 50th and the 95th percentile speed data for the Weekday AM period (6–10 a.m.) and Weekday PM period (3–7 p.m.) from 2023 INRIX raw truck speeds data and computed an aggregated truck travel time reliability index[82] as per the FHWA methodology for freight reliability.[83] The analysis estimated Weekday AM and PM peak hour worst-case total truck delay by combining truck delay due to severe congestion and added truck delay due to lack of travel time reliability. Lastly, the analysis identified the top truck bottlenecks based on the worst-case total truck delay. The locations of the 2015 AM Peak, 2015 PM Peak, 2050 AM Peak, and 2050 PM Peak top bottlenecks are shown in **Figure 61**, **Figure 62**, **Figure 63** and **Figure 64**. The same are also listed in **Table 33**, **Table 34**, **Table 35** and **Table 36**.

[81] Travel time index = travel time during a time period / free flow time

[82] Travel time reliability index = 95th percentile travel time / 50th percentile travel time

[83] https://www.fhwa.dot.gov/tpm/guidance/hif18040.pdf (last accessed on August 9, 2024)



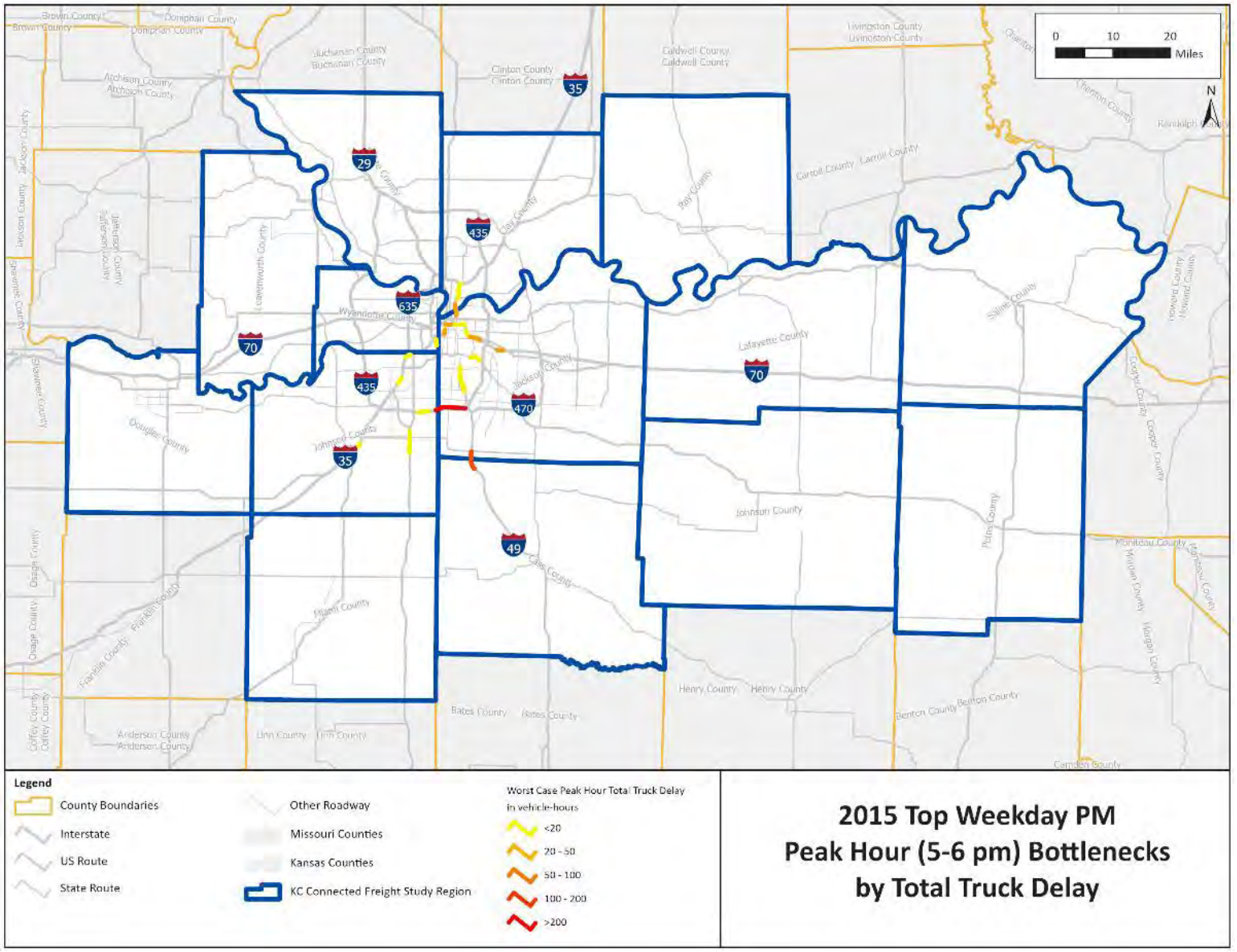
Source: MARC's Travel Demand Model Outputs, 2015 and 2050; 2023 INRIX Truck Speeds Data; CDM Smith's Programming and Statistical Analysis

Figure 61. 2015 Top Weekday AM Peak Hour Truck Bottlenecks Map

Table 33. 2015 Top Weekday AM Peak Hour Truck Bottlenecks List

Rank	Length in Miles	Roadway	Link Dir.	From Street (Approx.)	To Street (Approx.)	Peak Hour Truck Delay due to Congestion in Vehicle-Hours	Peak Hour Added Delay due to Unreliability in Vehicle-Hours	Worst Case Peak Hour Total Truck Delay
1	3.4	I-435	W	US 71	W of Wornall	106.0	81.0	187.0
2	3.7	I-49	N	163rd	MO 150	49.9	16.9	66.8
3	2.3	I-29	S	16th	I-70 / I-35	20.8	39.2	60.0
4	1.2	I-70 / I-670	W	Prospect	Bruce R Watkins / US 71	18.4	30.9	49.3
5	2.0	I-70	W	US 40	Blue Ridge Cut-Off	21.3	18.1	39.3
6	3.0	US 69	N	151st	Blue Valley	12.1	15.8	27.9
7	1.3	Rainbow Blvd / US 169	S	Southwest	39th	8.5	13.1	21.6
8	1.1	I-70	W	US 40	Jackson	13.9	5.7	19.6
9	5.0	Bruce R Watkins Dr / US 71	N	Bannister	63rd	12.5	6.6	19.1
10	0.6	I-35	S	Southwest	S of 27th	13.4	2.8	16.2
11	0.6	I-70	W	27th	23rd	5.1	7.5	12.6
12	2.6	Dr. Martin Luther King Jr Blvd	W	Eastwood	Lawn	6.7	3.0	9.7
13	0.9	I-35 S to I-29 / I-35 S Ramp	S	Antioch	Parvin	5.3	4.4	9.7
14	0.8	I-35	N	Antioch	Metcalf	2.9	6.1	9.0
15	1.1	Dr. Martin Luther King Jr Blvd	W	Bruce R Watkins / US 71	Cherry / Rockhill	4.7	3.6	8.3

Source: MARC's Travel Demand Model Outputs, 2015 and 2050; 2023 INRIX Truck Speeds Data; CDM Smith's Programming and Statistical Analysis



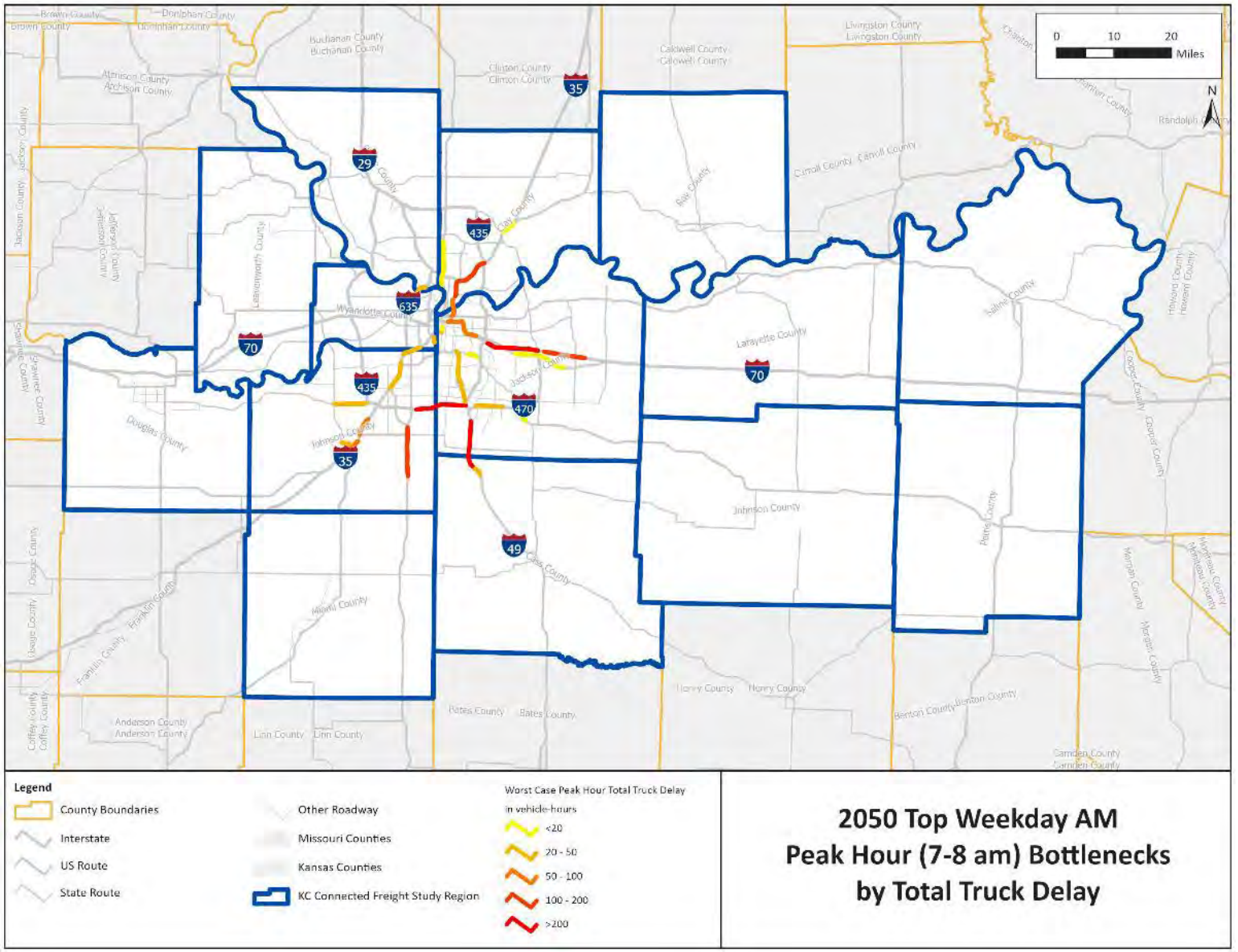
Source: MARC's Travel Demand Model Outputs, 2015 and 2050; 2023 INRIX Truck Speeds Data; CDM Smith's Programming and Statistical Analysis

Figure 62. 2015 Top Weekday PM Peak Hour Truck Bottlenecks Map

Table 34. 2015 Top Weekday PM Peak Hour Truck Bottlenecks List

Rank	Length in Miles	Roadway	Link Dir.	From Street (Approx.)	To Street (Approx.)	Peak Hour Truck Delay due to Congestion in Vehicle-Hours	Peak Hour Added Delay due to Unreliability in Vehicle-Hours	Worst Case Peak Hour Total Truck Delay
1	3.9	I-435	E	Stateline	US 71	60.1	69.9	130.0
2	3.4	I-49	S	MO 150	Cedar / 163rd	43.8	34.0	77.8
3	0.5	I-35 / Southwest Trafficway	N	27th	23rd / Avenida Cesar E Chavez	19.2	27.1	46.3
4	1.4	I-70	E	Jackson	US 40	17.1	25.4	42.4
5	0.7	I-670	E	I-35	Bruce R Watkins	13.3	10.9	24.2
6	1.4	I-29	N	Paseo	14th	10.3	12.7	23.0
7	0.8	I-70	E	W of Pittman	Sterling	13.7	8.5	22.2
8	3.3	Bruce R Watkins Dr / US 71	S	63rd	85th	10.4	8.5	18.9
9	0.5	I-35	S	West Pennway	Southwest	11.7	6.2	17.8
10	2.0	I-35 / I-29	N	Armour	I-29	9.9	7.5	17.4
11	1.6	I-35	S	Old 56	151st	15.1	2.0	17.0
12	0.7	I-70	E	W of Prospect	Truman	10.8	5.9	16.7
13	1.3	Rainbow Blvd / US 169	N	39th	Southwest	7.4	8.3	15.7
14	0.8	I-35	N	S of 75th	N of 75th	6.0	9.7	15.7
15	2.8	US 69	S	Blue Valley	151st	7.9	6.2	14.2
16	1.3	I-435	E	Lamar	Mission	3.6	8.3	12.0
17	2.3	Dr. Martin Luther King Jr Blvd	E	Lawn	Eastwood	4.4	5.6	10.0
18	0.8	I-35	N	Antioch	I-635	2.1	6.1	8.2
19	0.2	I-670	E	W of Paseo	Paseo	3.5	4.1	7.5
20	0.6	I-70	E	23rd	27th	4.2	3.3	7.5

Source: MARC's Travel Demand Model Outputs, 2015 and 2050; 2023 INRIX Truck Speeds Data; CDM Smith's Programming and Statistical Analysis



Source: MARC's Travel Demand Model Outputs, 2015 and 2050; 2023 INRIX Truck Speeds Data; CDM Smith's Programming and Statistical Analysis

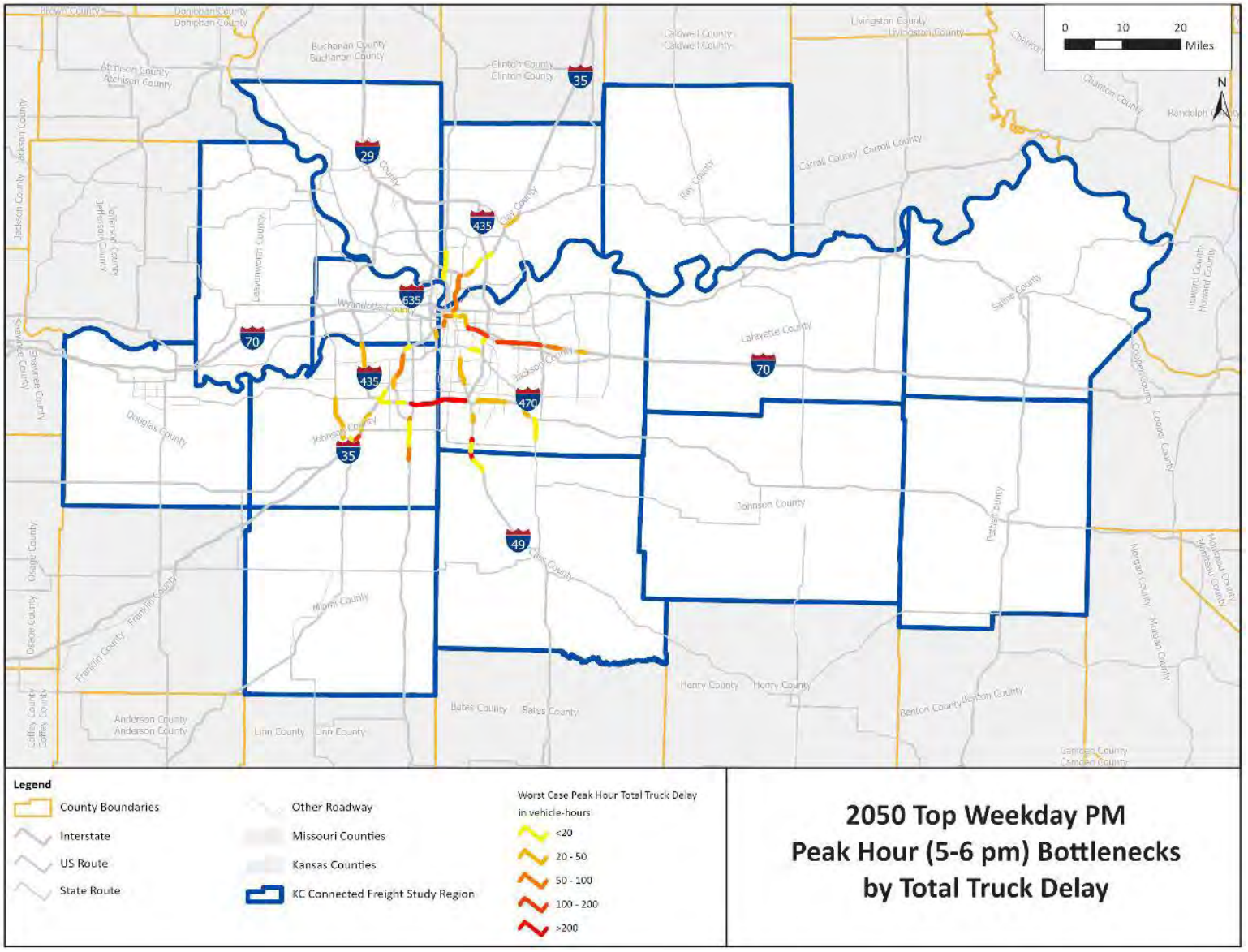
Figure 63. 2050 Top Weekday AM Peak Hour Truck Bottlenecks Map

Table 35. 2050 Top Weekday AM Peak Hour Truck Bottlenecks List

Rank	Length in Miles	Roadway	Link Dir.	From Street (Approx.)	To Street (Approx.)	Peak Hour Truck Delay due to Congestion in Vehicle-Hours	Peak Hour Added Delay due to Unreliability in Vehicle-Hours	Worst Case Peak Hour Total Truck Delay
1	10.4	I-49	N	163rd	Martha Truman	200.8	110.7	311.5
2	6.5	I-435	W	US 71	W of Nall	187.4	98.7	286.2
3	6.7	I-70	W	I-470	I-435	124.9	137.1	262.0
4	6.4	I-35 / I-29	S	I-435	Armour	59.3	86.9	146.2
5	5.3	I-70	W	MO 7	Little Blue	78.5	31.3	109.8
6	6.4	US 69	N	179th	Blue Valley	48.5	61.0	109.6
7	2.3	I-29	S	16th	I-70 / I-35	47.3	50.2	97.6
8	1.5	I-70 / I-670	W	Prospect	E of Grand	33.3	53.8	87.0
9	1.6	I-35	N	151st	Sheridian	57.2	16.4	73.6
10	1.6	I-70	W	27th	Prospect	21.4	35.9	57.3
11	2.3	I-35	N	Santa Fe	119th	40.9	12.8	53.7
12	1.7	I-70	W	US 40	N of 27th	38.6	13.1	51.7
13	3.5	I-470	W	View High	Blue Ridge	27.4	12.3	39.7
14	3.8	I-35	S	N of Shawnee Mission	87th	26.2	12.6	38.8
15	1.3	Rainbow Blvd / US 169	S	Southwest	39th	16.7	20.4	37.1
16	0.6	I-35	S	Southwest	S of 27th	28.3	4.4	32.6
17	6.8	Bruce R Watkins Dr / US 71	N	I-435	Dr. Martin Luther King Jr Blvd	20.3	9.2	29.5
18	1.8	I-49	N	171st / MO 58	Cedar / 163rd	16.3	12.6	28.9
19	0.8	I-35	N	S of 75th	N of 75th	15.3	12.2	27.5
20	4.2	KS 10	E	KS 7	I-435	14.9	9.3	24.2
21	3.0	KS 7	N	159th	Parker St	15.6	8.5	24.1
22	2.0	I-635	S	Horizons	KS 5	15.6	6.6	22.3
23	2.4	I-35	N	Antioch	18th / US 69	11.1	10.7	21.7
24	1.8	I-35	S	US 69	Cookingham / MO 291	17.5	2.2	19.7
25	1.9	US 50	W	3rd	I-470	13.5	3.5	17.0

Rank	Length in Miles	Roadway	Link Dir.	From Street (Approx.)	To Street (Approx.)	Peak Hour Truck Delay due to Congestion in Vehicle-Hours	Peak Hour Added Delay due to Unreliability in Vehicle-Hours	Worst Case Peak Hour Total Truck Delay
26	6.3	Arrowhead Trafficway / US 169	S	Barry	Briarcliff	12.9	3.5	16.4
27	6.7	US 40	W	Woods Chapel	Noland	3.4	10.4	13.9
28	0.3	I-35	N	Southwest	23rd / Avenida Cesar E Chavez	10.7	2.8	13.5
29	2.6	Dr. Martin Luther King Jr Blvd	W	Eastwood	Lawn	9.7	3.8	13.5

Source: MARC's Travel Demand Model Outputs, 2015 and 2050; 2023 INRIX Truck Speeds Data; CDM Smith's Programming and Statistical Analysis



Source: MARC's Travel Demand Model Outputs, 2015 and 2050; 2023 INRIX Truck Speeds Data; CDM Smith's Programming and Statistical Analysis

Figure 64. 2050 Top Weekday PM Peak Hour Truck Bottlenecks Map

Table 36. 2050 Top Weekday PM Peak Hour Truck Bottlenecks List

Rank	Length in Miles	Roadway	Link Dir.	From Street (Approx.)	To Street (Approx.)	Peak Hour Truck Delay due to Congestion in Vehicle-Hours	Peak Hour Added Delay due to Unreliability in Vehicle-Hours	Worst Case Peak Hour Total Truck Delay
1	7.1	I-435	E	Metcalf	US 71	149.2	160.0	309.2
2	4.6	I-49	S	140th	Cedar / 163rd	121.3	90.2	211.6
3	5.6	I-70	E	W of Pittman	I-470	98.0	45.8	143.8
4	2.8	I-70	E	Jackson	I-435	52.6	69.2	121.8
5	1.6	I-35	S	Old 56	151st	94.6	6.8	101.3
6	5.0	I-35 / I-29	N	I-70	I-29	50.1	41.1	91.2
7	0.5	I-35 / Southwest Trafficway	N	27th	23rd / Avenida Cesar E Chavez	37.2	44.9	82.1
8	2.2	I-70	E	Little Blue	Woods Chapel	32.3	32.0	64.3
9	0.8	I-670	E	I-35	Bruce R Watkins	34.1	28.9	63.0
10	2.7	I-35	N	S of 75th	Johnson	26.5	35.5	62.1
11	5.4	US 69	S	Blue Valley	167th	36.2	16.5	52.7
12	3.7	I-470	E	Blue Ridge	View High	24.6	24.9	49.6
13	3.9	I-35 / US 69	S	Shawnee Mission	91st	24.7	14.0	38.7
14	2.3	I-35	S	119th	Santa Fe	27.5	9.3	36.9
15	0.5	I-35	S	West Pennway	Southwest	21.9	9.6	31.5
16	1.4	I-70	E	Truman	27th	18.5	10.0	28.5
17	0.9	I-49	S	N of Blue Ridge	Harry S Truman	12.7	15.1	27.8
18	1.3	Rainbow Blvd / US 169	N	39th	Southwest	14.9	12.7	27.6
19	0.7	I-70	E	W of Prospect	Truman	16.5	7.8	24.3
20	0.9	I-35	N	Chouteau	Brighton	14.9	8.2	23.1
21	3.3	Bruce R Watkins Dr / US 71	S	63rd	85th	13.2	9.7	22.9
22	3.6	I-435	N	Renner	S of Midland	19.3	2.6	21.9
23	1.9	I-35	N	Cookingham / MO 291	US 69	13.4	7.5	20.9

Rank	Length in Miles	Roadway	Link Dir.	From Street (Approx.)	To Street (Approx.)	Peak Hour Truck Delay due to Congestion in Vehicle-Hours	Peak Hour Added Delay due to Unreliability in Vehicle-Hours	Worst Case Peak Hour Total Truck Delay
24	5.4	KS 7 / Parker St	S	KS 10	Old 56	13.2	7.4	20.5
25	0.9	I-70	E	MO 7	Adams Dairy	12.2	8.0	20.1
26	1.6	US 50	E	Chipman	3rd	12.2	7.8	20.0
27	3.0	US 69	N	151st	Blue Valley	9.6	8.7	18.4
28	0.8	I-35	N	Antioch	I-635	7.3	10.1	17.4
29	1.4	I-35	S	95th	I-435	10.9	5.9	16.8
30	0.6	I-29	S	Front	I-35 / I-29	5.7	11.1	16.8
31	1.8	I-49	S	Cedar / 163rd	171st / MO 58	12.7	3.5	16.2
32	0.7	I-670	W	E of Bruce R Watkins / US 71	W of Bruce R Watkins / US 71	3.8	12.1	15.9
33	1.0	I-35	N	Vivion	Poe	9.0	5.5	14.6
34	0.8	I-35	N	I-435	Pleasant Valley	5.5	8.8	14.3
35	1.9	KS 7 / Harrison St	S	Old 56	159th	7.9	6.4	14.2
36	4.6	Arrowhead Trafficway / US 169	N	Briarcliff	68th	9.0	5.1	14.2
37	1.0	I-435	S	I-70	S of Raytown	6.3	7.6	13.8
38	0.2	I-670	E	W of Paseo	Paseo	6.8	6.7	13.6
39	2.3	Dr. Martin Luther King Jr Blvd	E	Lawn	Eastwood	6.5	7.0	13.5
40	2.5	MO 291	S	US 50	Hook	8.0	4.3	12.3
41	1.6	I-435	W	I-35	Quivira	8.9	2.9	11.8
42	1.0	I-49	N	County Line / 155th	MO 150	10.3	1.4	11.7
43	1.5	I-70	W	I-635	57th	7.6	3.6	11.3
44	0.8	I-435	E	US 69	Antioch	2.6	8.2	10.9

Source: MARC's Travel Demand Model Outputs, 2015 and 2050; 2023 INRIX Truck Speeds Data; CDM Smith's Programming and Statistical Analysis

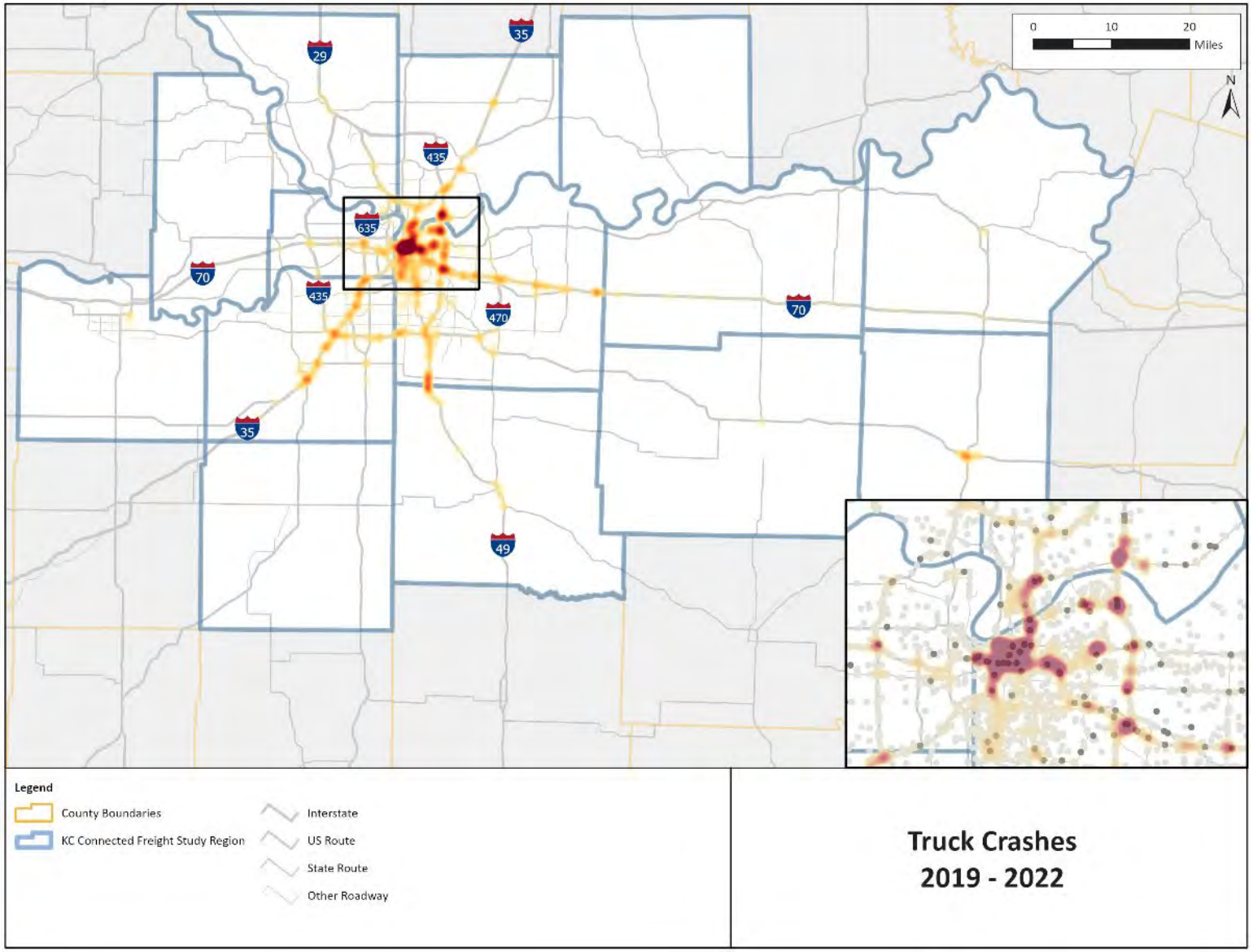
5.7. Truck Crash Hotspots

The study region saw 15,180 truck-involved crashes in the 4-year period between 2019–2022 (**Table 37**). Among these (excluding Douglas County where the crash severity types are unknown), 0.7 percent were fatal, 2.0 percent were suspected serious injury, 17.6 percent were minor injury, and 79.7 percent were property damage only (PDO) type crashes. The highest concentration of truck-involved crashes is seen in the I-70/I-35 confluence area near the city center (**Figure 65**). I-35 corridor and I-70 corridor segments and interchanges, interchanges on I-435 east of Kansas City, I-49 around Jackson County/Cass County boundary lines and US 50 near Sedalia are some of the notable places with a high crash frequency.

Table 37. Study Region's 2019-2022 Truck-Involved Crashes Summary

County	Fatal Crashes	Suspected Serious Injury Crashes	Minor Injury Crashes	Property Damage Only (PDO) Crashes	Total Crashes
Douglas	N/A	N/A	N/A	N/A	341
Johnson	16	33	405	1,939	2,393
Leavenworth	4	3	42	180	229
Miami	1	6	18	74	99
Wyandotte	9	19	195	732	955
Kansas Counties Sub-Total	**30**	**61**	**660**	**2,925**	**4,017**
Cass	8	25	82	580	695
Clay	4	35	247	1,409	1,695
Jackson	31	107	1,252	4,743	6,133
Johnson	3	23	65	312	403
Lafayette	8	11	69	477	565
Pettis	3	7	101	364	475
Platte	9	12	97	577	695
Ray	1	2	8	75	86
Saline		15	34	367	416
Missouri Counties Sub-Total	**67**	**237**	**1,955**	**8,904**	**11,163**
Regional Total	**97**	**298**	**2,615**	**11,829**	**15,180**

Source: MARC's and MoDOT's 4-year Truck-Involved Crashes, 2019-2022; CDM Smith's Analysis



Source: MARC's and MoDOT's 4-year Truck-Involved Crashes, 2019-2022; CDM Smith's Analysis

Figure 65. Study Region's Truck-Involved Crash Hotspots

5.8. Rail Safety

At-grade highway-railroad crossings can pose unique safety risks. Incidents such as the 2023 East Palestine, Ohio derailment are continuing to highlight the need to introduce additional rail safety regulations on the transport of toxic chemicals on rail lines through communities. The FRA and USDOT have established minimum safety requirements for the size of train crews. The rule, implemented June 10, 2024, requires a minimum of two-person train crews for all operations without special approval. This is a safety related improvement because it was found that a one-person crew can often not properly address situations like accidents, derailments, releases of hazardous materials, and highway-rail blockages where a second crew member would be needed to assist.[84]

In the five-year period between January 2019 and December 2023, there were 232 train accidents in the Kansas City study region, two-thirds of which are reported cases of derailments, and the rest are collisions or other events. In the same period, there were 95 highway-rail incidents. **Table 38** shows the distribution of the rail incidents among the counties in the study region.

Table 38. Study Region's 5-Year Rail Incidents Summary, 2019–2023

County	Collisions	Derailments	Other	Train Accidents excl. Highway-Rail Incidents Sub-Total	Highway-Rail Incidents	Total Rail Incidents
Douglas	0	1	0	1	3	4
Johnson	0	4	2	6	13	19
Leavenworth	0	1	0	1	1	2
Miami	0	2	1	3	1	4
Wyandotte	12	73	26	111	21	132
Kansas Counties Sub-Total	**12**	**81**	**29**	**122**	**39**	**161**
Cass	0	2	0	2	8	10
Clay	1	29	5	35	8	43
Jackson	1	47	13	61	22	83
Johnson	0	1	0	1	0	1
Lafayette	0	1	0	1	8	9

[84] Federal Register, 2024. 89 FR 25052 Train Crew Size Safety Requirements. https://www.federalregister.gov/documents/2024/04/09/2024-06625/train-crew-size-safety-requirements

County	Collisions	Derailments	Other	Train Accidents excl. Highway-Rail Incidents Sub-Total	Highway-Rail Incidents	Total Rail Incidents
Pettis	0	2	1	3	0	3
Platte	0	0	0	0	5	5
Ray	1	2	2	5	5	10
Saline	0	2	0	2	0	2
Missouri Counties Sub-Total	**3**	**86**	**21**	**110**	**56**	**166**
Regional Total	**15**	**167**	**50**	**232**	**95**	**327**

Source: FRA Safety Data - Accident Map with Table and Hwy/Rail Map with Table, 2019-2023

5.9. Infrastructure Condition

To keep existing industries and to attract new industries to the Kansas City region, it is essential to keep the infrastructure in good condition. Poor road, rail and bridge conditions can increase delays and vehicle operating costs for businesses and can cause some roadway crashes. Failure of bridges can also result in a catastrophic loss of life. This plan identified 1.5 percent of total road miles and 4.8 percent of the bridges regionally are in poor condition as shown in **Table 39** and **Table 40**. There is a high percentage of unpaved roadways on the Kansas side, which was not evaluated. Jackson County in Missouri is leading in terms of total miles of paved roadways in poor condition at 46.8 miles, followed by Wyandotte County in Kansas and Johnson at 22.8 miles, Platte and Saline counties in Missouri at 15–16 miles.

For a similar total number of bridges (about 1,400) on Kansas and Missouri side, only 2.0 percent of the bridges on Kansas side are in poor condition, this is 6.5 percent on Missouri side. Jackson County in Missouri is leading in terms of total number of bridges in poor condition at 50 bridges, and Cass, Clay, Johnson, Pettis and Saline counties in Missouri each have over 20 bridges in poor condition.

While bridge conditions were readily drawn from the National Bridge Inventory,[85] pavement conditions were established using 2010 Highway Performance Monitoring System (HPMS) data[86] on pavement characteristics and a FHWA Office of Infrastructure Methodology for rating the condition.[87] **Figure 66** shows poor pavement and bridge condition locations across the study

[85] https://www.fhwa.dot.gov/bridge/nbi/ascii.cfm (last accessed on August 9, 2024)

[86] https://geodata.bts.gov/datasets/c199f2799b724ffbacf4cafe3ee03e55/about (last accessed on August 9, 2024)

[87] https://www.fhwa.dot.gov/policyinformation/presentations/hisconf/thu01_hpms_and_tpm-part_1_overview_of_performance_measures-pavement_condition_max_grogg.pdf (last accessed on August 9, 2024)

region. Locations with over 5,000 vehicles per day are highlighted in a darker red shade to distinguish poor condition roads and bridges with higher traffic use.

Table 39. Study Region's Pavement Conditions Summary

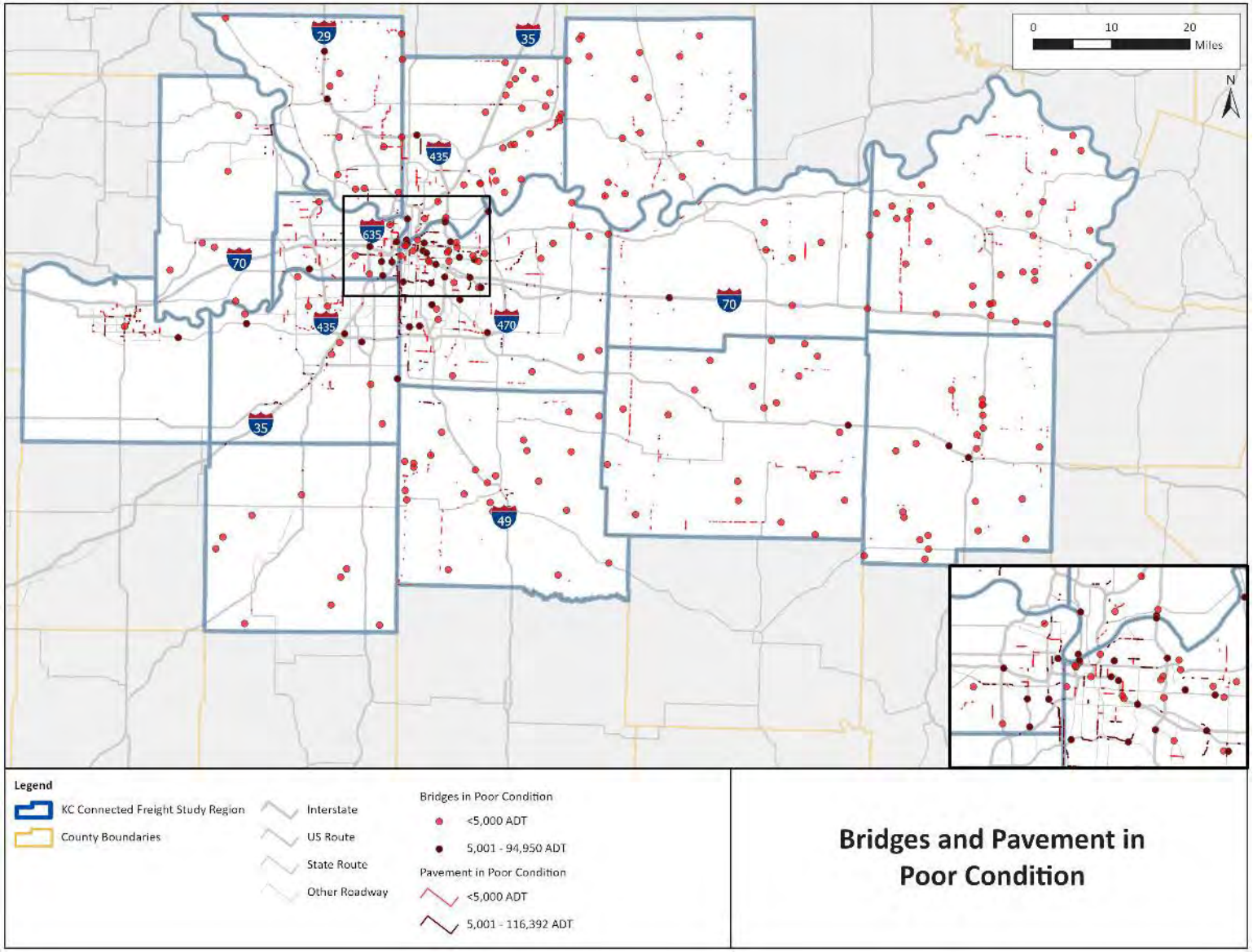
County	Road Miles in Good Condition	Road Miles in Fair Condition	Road Miles in Poor Condition	Road Miles Not Evaluated	Total Road Miles	Percent Road Miles in Poor Condition
Douglas	738.6	65.5	10.2	539.0	1,353.3	0.8%
Johnson	3,070.7	127.9	10.2	141.9	3,350.8	0.3%
Leavenworth	685.3	48.8	4.1	529.0	1,267.3	0.3%
Miami	424.4	33.7	0.6	855.8	1,314.5	0.0%
Wyandotte	1,089.7	70.2	22.8	1.6	1,184.4	1.9%
Kansas Counties Sub-Total	**6,008.8**	**346.1**	**48.0**	**2,067.4**	**8,470.2**	**0.6%**
Cass	157.4	214.5	8.5	0.5	380.8	2.2%
Clay	250.9	185.0	13.7	0.0	449.6	3.1%
Jackson	648.1	308.0	46.8	0.0	1,002.9	4.7%
Johnson	90.5	240.4	15.4	0.0	346.3	4.5%
Lafayette	66.2	220.1	7.4	0.0	293.7	2.5%
Pettis	90.9	204.6	5.0	0.0	300.5	1.7%
Platte	126.0	178.7	15.4	0.0	320.2	4.8%
Ray	48.2	172.0	6.4	0.0	226.6	2.8%
Saline	74.8	182.3	15.8	0.0	272.9	5.8%
Missouri Counties Sub-Total	**1,552.9**	**1,905.6**	**134.4**	**0.5**	**3,593.5**	**3.7%**
Regional Total	**7,561.7**	**2,251.7**	**182.3**	**2,067.9**	**12,063.6**	**1.5%**

Source: HPMS Data, 2020; FHWA Office of Infrastructure Methodology for Pavement Condition Determination; CDM Smith's Analysis.

Table 40. Study Region's Bridge Conditions Summary, 2023

County	Bridges in Good Condition	Bridges in Fair Condition	Bridges in Poor Condition	All Bridges	Percent Bridges in Poor Condition
Douglas	240	74	2	316	0.6%
Johnson	592	171	12	775	1.5%
Leavenworth	149	83	6	238	2.5%
Miami	223	86	9	318	2.8%
Wyandotte	206	102	10	318	3.1%
Kansas Counties Sub-Total	**1,410**	**516**	**39**	**1,965**	**2.0%**
Cass	149	210	24	383	6.3%
Clay	175	232	31	438	7.1%
Jackson	392	490	50	932	5.4%
Johnson	184	266	21	471	4.5%
Lafayette	84	153	7	244	2.9%
Pettis	98	117	24	239	10.0%
Platte	114	157	14	285	4.9%
Ray	77	93	17	187	9.1%
Saline	76	120	32	228	14.0%
Missouri Counties Sub-Total	**1,349**	**1,838**	**220**	**3,407**	**6.5%**
Regional Total	**2,759**	**2,354**	**259**	**5,372**	**4.8%**

Source: National Bridge Inventory, 2023



Source: National Bridge Inventory, 2023; HPMS Data, 2020; FHWA Office of Infrastructure Methodology for Pavement Condition Determination; CDM Smith's Analysis

Figure 66. Study Region's Poor Bridge and Pavement Condition Locations

6. Farm-to-Market Routes Identification

Most states do not officially designate farm-to-market roads but rather use the classifications of rural collectors. Collectors serve the critical roles of gathering traffic from local roads and funneling vehicles into the arterial network. Although subtly different, two classifications are included in the collector category. Major Collectors are longer, have fewer points of access, have higher speed limits, and can have more travel lanes. Minor Collector is the classification for collectors not classified as major collectors. One distinction between the two classifications is that minor collectors are focused more on access than on mobility, therefore they often have more access points.

The terms “Farm-to-Market” road and “Ranch-to-Market” road are most closely associated with Texas where they indicate roadways that are part of the state's system of secondary and connecting routes, built and maintained by the Texas Department of Transportation. Texas established this system in 1949 to improve access to rural areas. In Texas, all Farm- or Ranch-to-Market roads are paved and primarily two-lane roads.

Missouri has a similar state-operated system of farm to market roads, called supplemental routes. Missouri uses single (e.g., "A", "B", etc.) and double letters (e.g., "AA", "BB", etc.) to identify the supplemental road system. Kansans does not have a similar system.

Other states with a designated farm to market road system include Iowa, Louisiana, and Ohio.

6.1. Methodology

Major rural collectors with an ADT of 1,000 or more vehicles were identified. These segments were then analyzed for connections to the arterial network and grain elevators/food processing sites to complete the “Primary Farm-to-Market” designation. All other collectors were classified with a “Secondary Farm-to-Market” designation. Both the Primary and Secondary Farm-to-Market networks were evaluated, and minimal network extensions are added to ensure connectivity of the Farm-to-Market network to the nearest arterial or freeway network.

The proposed network was visually compared to the static USDA cropland file to assure the study area’s concentration of farmland was being served by the Farm-to-Market network.

6.2. Network Map

Applying the methodology, Primary Farm-to-Market roads (in black) and Secondary Farm-to-Market roads (in grey) were identified for the study region as shown in **Figure 67**. This also shows the identified locations of seventy-eight (78) grain elevators. Forty-two (42) Primary Farm to Market Roads were identified as shown in **Table 41**.

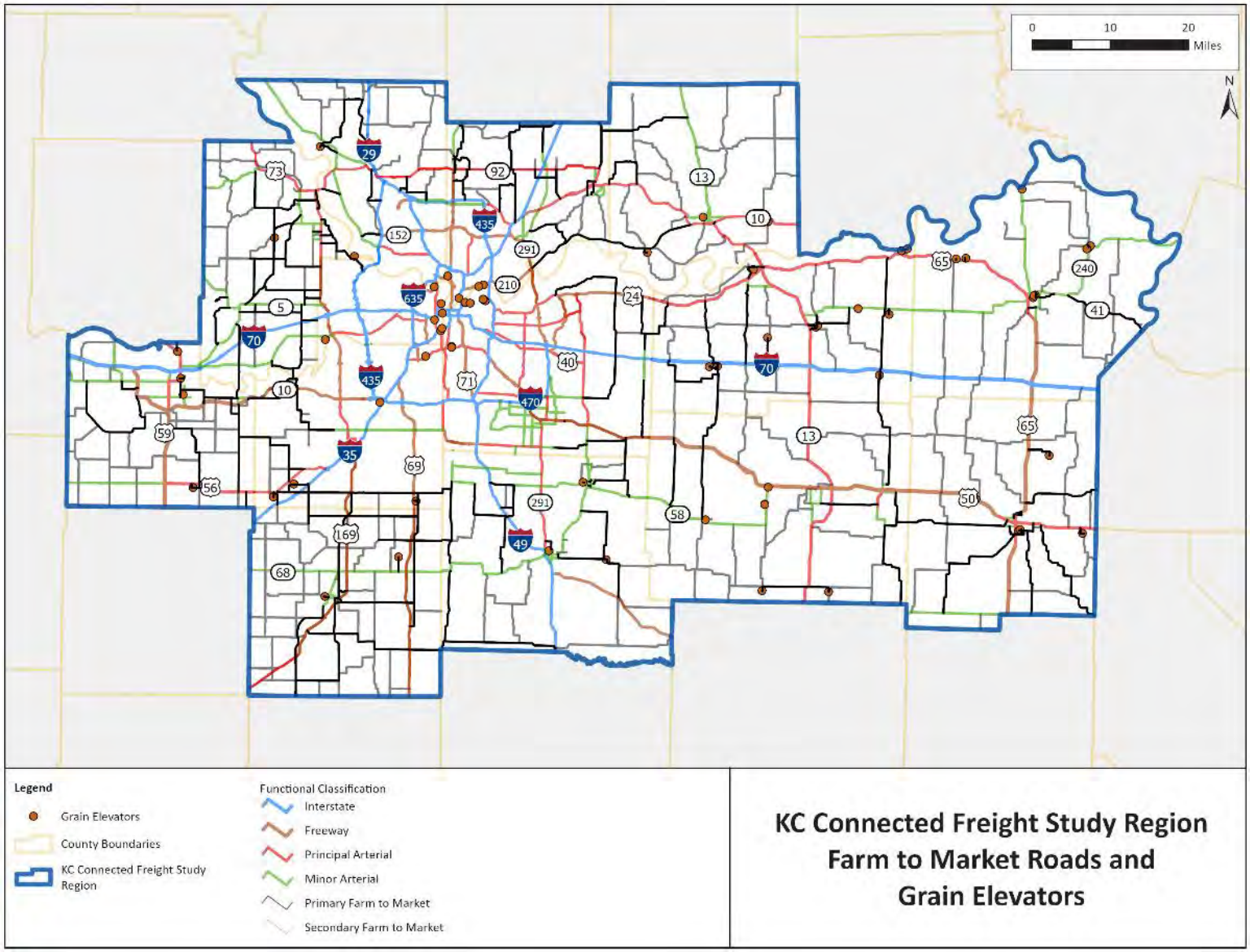


Figure 67. Study Region's Identified Farm-to-Market Network Map

Table 41. Study Region's Primary Farm-to-Market Routes List

No.	Primary Farm to Market Routes	Approximate Length (miles)	County	State
1	2200 Rd	11.00	Douglas	KS
2	1700 Rd/High St	13.50	Douglas	KS
3	1150 Rd/KS-1023	16.75	Douglas	KS
4	Connecticut St/KS-442	10.00	Douglas	KS
5	W 199th St	21.00	Johnson	KS
6	W 135th St/Kill Creek Rd/Gardner Rd	10.75	Johnson	KS
7	W 143rd St/Edgerton Rd/W 151st St/Four Corners Rd/W 175th St	12.00	Johnson	KS
8	307th St/KS-92	13.25	Leavenworth	KS
9	Tonganoxie Dr/187th St	14.00	Leavenworth	KS
10	Fairmount Rd/175th St/Tonganoxie Rd	11.75	Leavenworth	KS
11	158th St/Golden Rd	12.25	Leavenworth	KS
12	W 223rd St	14.00	Miami	KS
13	Metcalf Rd	15.75	Miami	KS
14	311th St	10.00	Miami	KS
15	Plum Creek Rd/Old Kansas City Rd	14.25	Miami	KS
16	Hospital Dr/ Hedge Ln Rd/W 391st St	15.75	Miami	KS
17	343rd St/Block Rd/351st St/Somerset Rd/359th St	19.25	Miami	KS
18	E 347th St	15.50	Cass	MO
19	Highway D	10.00	Cass	MO
20	Holmes Rd	10.75	Cass	MO
21	Highway C/CC/MO-33	13.50	Clay	MO
22	Highway A/136th St/Stark Ave	12.75	Clay	MO
23	MO-210/Highway H/Highway EE	17.75	Clay	MO
24	Highway F/Highway D/Commercial Ave	10.00	Clay	MO
25	E Colburn Rd/Buckner Tarsney Rd	16.75	Jackson	MO
26	Sibley St/Blue Mills Rd	10.25	Jackson	MO
27	Highway WV/Highway D/SE 23 Highway	17.50	Johnson	MO
28	NE 23 Highway	12.00	Johnson	MO
29	MO-131	16.25	Johnson	MO
30	MO-23	18.75	Lafayette	MO
31	Highway O	10.25	Lafayette	MO
32	MO-131	15.50	Lafayette	MO
33	Highway Z/Highway TT/Highway OO	9.75	Lafayette	MO
34	Highway U	11.25	Pettis	MO
35	Highway M	16.50	Pettis	MO
36	MO-127/Highway B	17.25	Pettis	MO
37	Highway HH	10.50	Pettis	MO
38	Highway Y/Winchester Drive	13.50	Pettis	MO
39	Highway P/MO-391	18.50	Platte	MO
40	MO-210	11.75	Ray	MO
41	Highway D	10.75	Ray	MO
42	MO-41	11.50	Saline	MO

Source: MARC, MoDOT and L-DC MPO Road Network with Functional Classification and Average Daily Traffic (ADT) Data; Google Maps' Grain Elevator Facilities Data; Missouri Department of Agriculture Licensed Grain Dealer/Warehouse Database Listings; Kansas State University's Mapping of Cooperative and Non-cooperative Grain Locations in Kansas; CDM Smith's Analysis

7. First-Mile and Last-Mile Access Concepts

This section describes the first-mile and last-mile freight concepts, policies, and strategies as they apply within the Kansas City's freight planning region for consideration by regional stakeholders. Urban versus rural first mile and last mile strategies are also highlighted and use case analysis demonstrating the benefits of mixing policy and strategy.

7.1. First-Mile and Last-Mile Regional Freight Context

In the general sense of freight transportation and goods movement, the first mile is the transportation of completed goods or products from the factory or production plant to a distribution center. Last mile transport operations include moving these products or goods from a warehouse or distribution center to the desired delivery location, such as retail stores, office and business centers and residential communities. First and last mile connections link "truck-generating" facilities to mainline routes of travel. In a broad sense this can mean almost every road, however, in a planning context, first and last mile connections in a planning context commonly refer to the roadways that link freight handling facilities with major travel corridors. These first and last mile connections are important elements of freight movement because they connect the freight network with access to major highways, airports, and intermodal terminals, such as interstates or major regional highways. These connections are typically classified as collectors or local routes. Typically, the first and last mile connections serve agricultural, commercial, and industrial land uses. Residential neighborhoods except mixed-use type developments are typically not part of the regional first mile and last mile system.

7.2. Urban versus Rural First-Mile versus Last-Mile Logistics

Over the past century, economic and demographic growth has been concentrated in major U.S. metropolitan areas. In 1920, approximately half of the U.S. population lived in rural areas, while today four out of every five U.S. residents live in urban areas.[88] However, urban residents continue to rely on rural areas for agricultural and manufactured products, as well as for energy and natural resources. As populations and the associated tax bases of rural areas decline and urban areas densify with competing land uses, building and maintaining the freight infrastructure necessary to support economic productivity and competitiveness is a growing challenge.

7.3. Urban First-Mile and Last-Mile Freight Characteristics and Challenges

Increasing population density and traffic volumes in urbanized areas create last-mile challenges for shippers and carriers. Urban Core areas are experiencing an emergence of newer technology freight delivery services, whereas the suburban areas have larger average development

[88] https://www.census.gov/newsroom/press-releases/2022/urban-rural-populations.html (last accessed on August 9, 2024)

footprints and newer freight generating patterns. Urban areas tend to have infrastructure that is harder for trucks to navigate and have higher levels of congestion, as freight and passenger traffic often compete for the use of the same and limited infrastructure. Freight trains in urban areas often compete with passenger rail traffic along shared-use corridors or face other delays at heavily trafficked rail hubs. According to one research study, the cost of providing last-mile delivery services in urban areas accounts for 41 percent[89] of overall supply chain costs.

Many of the most significant freight bottlenecks occur at major highway interchanges in metropolitan areas. Trucks moving through urban areas often encounter congestion and network inefficiencies due to peak period traffic volumes, special events, work zones, crashes, and other incidents. In addition, physical roadway geometrics and operational constraints (street width, roadway design, one-way streets, time-of-day restrictions, etc.) of the urban environment, can make it difficult or impossible for larger freight delivery vehicles to use certain routes or access certain neighborhoods. Truck drivers can also have difficulty finding available on-street and off-street loading and parking areas. Finally, urban residents may have concerns about safety, emissions, and noise associated with truck movements in their communities. Policies such as first-mile and last-mile truck route designations and truck restrictions are increasingly seen as potential means to address these concerns.

The metropolitan area of Kansas acts as a freight distribution hub receiving large amounts of imported manufactured/finished products from the nation's major container ports located in the west and east coasts of U.S., often transported from the region's boundaries to the region's distribution centers and ports (Port KC and its sister ports), and then to the region's manufacturers, wholesalers, and retailers as truck hauling containers and oversized cargo such as transportation or wind turbine blades. Getting freight to and from these distribution centers and ports often requires large or oversize trucks to navigate an urban environment. Their surrounding land uses may also limit the ability of these distribution centers and ports to expand their facilities for increased capacity. Moving large or oversize trucks through urban areas can also increase the potential for safety issues stemming from conflicts between trucks and other road users.

Manufacturing production tends to be concentrated in and around major urban areas. Highway congestion and unreliable travel times in these urban areas impact logistics systems and timing of shipments necessary for just-in-time manufacturing. Delayed shipments can have costly ripple effects on the production process. To mitigate delays from congestion and unreliability, shippers must allocate additional buffer time for deliveries, and manufacturers must maintain additional supply on-site as late deliveries can affect production and increase costs for these industries. Public transportation agencies investing in the alleviation of bottlenecks and safety

[89] Barabas, M., Last mile delivery costs: The most expensive step in the supply chain, Elite EXTRA, December 28, 2023, Available at: https://eliteextra.com/last-mile-delivery-costs-the-most-expensive step-in-the-supply-chain/ (last accessed on August 9, 2024)

hotspots can reduce the delays during peak delivery time windows. Ease of access to freeways and rail yards and availability of skilled labor force and supporting wholesale and retail trade industries are important factors considered by private developers when establishing manufacturing plants. Urban policy makers try to reduce conflicts between heavy manufacturing and residential land uses by using buffer land uses, such as light manufacturing and commercial land uses.

7.4. Rural First-Mile and Last-Mile Freight Characteristics and Challenges

Rural areas provide essential goods and resources to sustain both rural and urban markets and produce goods for export. Rural businesses and industries often specialize in resource-based sectors such as agriculture, forestry, and mining that serve as the foundation and source of raw materials for national and global supply chains. In addition, some manufacturing businesses are in rural areas due to the greater availability and lower cost of land and their proximity to raw materials and other inputs. Rural roadway and rail infrastructure provides a vital first link in shipping resources and commodities to market, and the last link that delivers products to rural communities.

Moving resources from their point of origin to where they are needed typically involves the use of trucks for some portion of their journey. An estimated 47 percent[90] of truck vehicle-miles traveled (VMT) occurs on rural roads, causing rural roads to deteriorate more quickly than they otherwise might. Many rural areas face declining populations and corresponding declines in the tax bases required to effectively maintain these areas' transportation infrastructure. Nearly three-quarters (72 percent[91]) of rural roads are owned by local jurisdictions, and many of these roads are ineligible for most Federal-aid funds due to eligibility requirements, such as being a part of the federal-aid highway system (include higher functional classification roads and exclude a significant portion of low ADT roads), meeting match requirements, documented use of funds, ensured allowable costs, and having appropriate agreements in place. The combination of these factors can make it difficult to keep rural infrastructure in a state of good repair.

When infrastructure is inadequate or in poor condition, rerouting can also lead to inefficiencies. Eighty percent of closed bridges and 90 percent of posted bridges that have weight restrictions are in rural areas.[92] When accessible bridges are not available, trucks need to find a detour route, increasing delays in freight deliveries and raising costs for shippers and consumers. In rural

[90] U.S DOT, National Freight Strategic Plan, 2020. Available at: https://www.transportation.gov/sites/dot.gov/files/2020-09/NFSP_fullplan_508.pdf (last accessed on August 9, 2024)

[91] FHWA. (n.d.), Federal-Aid Highway program, U.S. Department of Transportation/Federal Highway Administration, Available at: https://www.fhwa.dot.gov/federal-aidessentials/federalaid.cfm (last accessed on August 9, 2024)

[92] Overview of the Build America Bureau and The U.S. Department of Transportation Rural Transportation Initiatives, U.S. Department of Transportation, 2020, Available at: https://www.transportation.gov/testimony/overview-build-america-bureau-and-us-department-transportation-rural-transportation (last accessed on August 9, 2024)

areas, these detours may be three times the distance of urban area detours[93] due to lower network density and redundancy. Detours may also result from seasonal or long-lasting severe weather events such as flooding, wildfire, or other severe storm damage.

7.5. Urban and Rural First-Mile and Last-Mile Strategies for Consideration

First-mile and last-mile infrastructure policy and strategies for improving freight movement efficiency and reducing shipper costs often differ based on the infrastructure development characteristics and conditions of the geographies under consideration as well as industry and manufacturing needs. In general, first mile and last mile policies relate to the following:

- Making strategic, efficiency enhancing, and prioritized roadway and rail infrastructure investments identified through comprehensive freight planning efforts.
- Investing in sustainable freight planning and infrastructure improvements that result in reduced greenhouse gas emissions.
- Enhancing vehicular, bicycle, and pedestrian safety through reducing freight and other modal conflicts.
- Lowering shipper costs.
- Promoting economic development.

Typical freight first mile and last mile strategies that work to address the previously mentioned policies for implementing freight system improvements may include the following:

- Urbanized or densely developed geographies
  - **Curb space management:** providing adequate curb space for trucks through signage, enforcement, and geometric design details such as curb space lengths, height, and type (rolled/sloped versus raised/high-profile).
  - **Micro freight hubs:** allowance for consolidating similar freight generators and receivers with similar small-package freight shipping and delivery needs into hubs that provide reductions in pick-ups and deliveries resulting in fewer freight vehicles.
  - **Off-peak deliveries:** allow for pick-ups and deliveries during non-peak congestion periods, including early morning and late-night arrival and departure windows.
  - **Autonomous vehicles (cars, vans, drones):** Use of driverless vehicles that reduce the impact on congestion and provide efficiency by reducing the number of drivers.

[93] Overview of the Build America Bureau and The U.S. Department of Transportation Rural Transportation Initiatives, U.S. Department of Transportation, 2020, Available at: https://www.transportation.gov/testimony/overview-build-america-bureau-and-us-department-transportation-rural-transportation (last accessed on August 9, 2024)

  - **Vehicle size limits:** restricting large vehicles to certain delivery windows (often off-peak periods) or prohibiting congestive-type vehicles from utilizing certain roadway segments, forcing the use of smaller, nimbler and less congestion-causing vehicles.
  - **Coordinate traffic signal timing:** conduct traffic signal timing studies for urban arterials, placing an emphasis on identifying strategic first-mile/last-mile corridors to provide optimal signal timings and detection for truck operations and reductions in engine idling and greenhouse gas emissions that result in improved air quality.
  - **Freight design requirement training:** support municipal training on design requirements of freight-intensive development to accommodate freight needs in central business districts.
  - **Freight Parking:** develop plans and policies to identify and accommodate safe freight vehicle parking during deliveries without creating additional traffic congestion. Examples of this include middle two-way left turn lanes (in an otherwise two-lane area) that double as short-term or temporary parking lanes and temporary staging lots that allow for metered freight delivery flow in areas of high-density shipment receiving.
- Rural or non-urbanized geographies
  - **Increase signage and wayfinding:** designate truck routes and provide enhanced signage emphasizing routes providing first mile and last mile routing for major freight generators in rural areas so that the first mile and last mile network is readily known to providers.
  - **Increase truck parking capacity:** provide additional overnight, rest, and respite facilities for long-haul freight shipping vehicles to service outlying rural areas.
  - **Rural-focused freight vehicle design requirements:** ensure adequate lane and shoulder widths, pavement thickness, and appropriate load ratings on roads, bridges, and parking areas through training and design manuals.
  - **Environmental enhancements:** local and regional policies and ordinances focused on reducing engine idling, greenhouse gas emissions and engine braking will improve air and noise pollution. Signage and other notification methods for drivers are essential to successful reduction or mitigation of noise and air impacts.
  - **Manage conflicts:** protect rural freight generator clusters and areas of high importance and implement “freight-first” policies to reduce conflicts at those clusters and at ports, airports, and intermodal hubs.
  - **Educate and train:** educate and train local and regional rural planning stakeholders about freight operations and economic and quality of life impacts resulting from inefficient operations.
  - **Coordinate** freight plans and programs of municipalities.

- **Prioritize** freight focused projects.
- **Encourage** consolidation of freight focused land developments into a freight hub with rail access.
- **Preserve** deteriorating roads, rails, and bridges.
- **Maintain** a minimum vertical clearance on first and last mile designated routes.
- **Locate** value added services (logistics, packaging and labeling) and employee housing close to new freight focused land developments.

7.6. Use Case Analysis

Applying the principles outlaid for the first mile and last mile access earlier, this plan analyzed a use case of locating an intermodal freight facility in a developed or urbanized area, as shown in the callout box below.

Planning Considerations for Locating Intermodal Freight Facility in Developed or Urbanized Areas

Intermodal freight facilities may bring many positive aspects and improvements to a city, such as the potential for new jobs, new residents, and an improved wage base. However, increased movements of freight on heavy trucks and substantial increases in rail movements through an urbanized area require many considerations when choosing to pursue the development of an intermodal freight hub. Those considerations may include:

1. **Property ownership and regulatory control of land use**. Cities and other urbanized areas may need to consider how to exercise regulatory zoning control to affect allowed and special uses, visual screening, operational hours, environmental and light emissions, and impacts to neighboring properties.
2. **Compatible industries**. Intermodal freight hubs typically host several types and sizes of industries that are transferring and warehousing a wide variety of products. Hazardous materials storage and transportation on the local system, along with oversize loads (weight and size) should be considered in tandem with regulatory zoning control and other factors when deciding which industries are appropriate for locating in the community and utilizing the transportation network.
3. **Scope of freight reach**. Communities should consider whether the proposed goods and commodity imports and exports will be transported regionally, nationally or internationally. The types of goods and commodities expected to flow through the area and broader region should be considered, and the modes and types of transportation used (heavy trucks, rail cars, etc.) to be accommodated may require infrastructure updates and improvements.
4. **Community vetting and stakeholder input**. Community input, balanced with stakeholder needs and issues should be considered early and upfront during a facility siting process. An engagement process should be developed to assist with handling any conflicts within the local community and to provide the community with maximum benefits while minimizing impacts.
5. **Known transportation challenges**. Existing transportation and infrastructure issues within a community's system may be related to network capacity, operations (congestion, parking, signals, signage, vertical and horizontal clearances, geometric designs, detours, and other local ordinances), safety hotspots, and existing infrastructure age, deterioration and functional obsoletion.
6. **First-mile and last-mile transportation challenges**. Communities should consider infrastructure needs at delivery and manufacturing endpoints. Known issues should be addressed or mitigated for intermodal hub development efficiency. Communities should develop plans, if necessary, to expand existing infrastructure regarding known first-mile and last-mile issues and concerns.
7. **Service, technology, and policy considerations**. Updates to service, technology, or policy support could improve first mile and last mile access in communities. Intelligent transportation system (ITS) improvements and other regional policies should be coordinated with other state and local ITS providers to ensure a regionally cohesive system that provides benefits to the community and industries.
8. **Workforce skills, availability, and development**. Cities, regional communities, and broader industries should consider the availability of the existing labor force, its relative skill level, and potential to train the workforce to assist industry. This includes immigration and migration factors, availability of higher education and industrial training institutions, and policies to facilitate workforce training and re-training as necessary.