



# SFRP

State  
Freight & Rail  
Plan

Needs Assessment

**DRAFT**

# Introduction

Missouri’s role as a national freight crossroads makes it essential to evaluate both current freight conditions and the ability of the state’s multimodal system to meet future demand. Freight volumes are projected to grow significantly over the next two decades, shaped by shifts in commodity flows, emerging technologies and evolving supply chains. This growth presents both opportunities and challenges for Missouri’s highways, railroads, waterways and air cargo facilities.

**The purpose of this section is to provide a comprehensive needs assessment and freight forecast that:**



Establishes a baseline profile of current freight activity using 2023 Transearch data



Identifies projected freight flows through 2043, including modal trends and commodity shifts



Compares current system capacity to forecasted demand, highlighting infrastructure bottlenecks, regional pressures and at-risk corridors



Assesses emerging trends, such as e-commerce, near-shoring, connected and automated vehicles and energy transitions, that will influence Missouri’s future freight system



Links performance gaps and capacity constraints to the SFRP’s goals and objectives of promoting a Stewardship-driven, Safe, Prosperous, Reliable, Connected and Innovative freight system

This analysis serves as the foundation for identifying targeted investments and strategies to enable Missouri’s freight network to remain resilient, competitive and responsive to future economic growth. By understanding where the system is today, how it is projected to evolve and where pressures will emerge, Missouri can align its freight and rail strategies with both statewide priorities and national freight trends.

## Current Freight Volumes

Missouri’s multimodal transportation system moved over 1.10 billion tons of freight in 2023, underscoring its role as a critical hub for regional, national and international supply chains. Understanding these current volumes are essential to assessing system performance and identifying future needs. The data presented in this section is derived from 2023 Transearch data to provide a comprehensive view of freight activity across the state.

The discussion is organized into subsections by mode: truck, rail, water and air. For each mode, tables summarize total inbound, outbound, intrastate and through volumes in terms of tonnage and value. Additional tables highlight the top five commodities transported by that mode, reported in two-digit Standard Transportation Commodity Codes (STCCs) to provide a consistent basis for comparison across commodity groups.

This current freight profile establishes the baseline conditions against which future growth projections and needs assessments are evaluated, providing insight into how each mode contributes to the overall performance of Missouri’s freight transportation system.

### Highway

Highways carry most of Missouri’s freight in both value and tonnage, reflecting the state’s central location and extensive interstate network. **Table 1** and **Table 2** below summarize truck-based freight activity by movement type and identify the top five commodities transported by truck in 2023.

**Table 1 – Missouri Highway Freight Movement, 2023**

Freight Movement	Tons (000’s)	Value (\$M)
Inbound	94,976	128,417
Outbound	133,201	157,138
Throughput	297,929	627,950
Intrastate	98,213	53,302
<b>Total</b>	<b>624,319</b>	<b>\$966,807</b>

Source: GFT Analysis of Transearch Data, 2023.

**Table 2 – Missouri Top Five Commodities Transported by Truck, 2023**

Ranking	Commodity	Tons (000's)
1	Nonmetallic Minerals	156,338
2	Farm Products	115,769
3	Food or Kindred Products	89,230
4	Secondary Traffic	60,082
5	Petroleum or Coal Products	40,696

Source: GFT Analysis of Transearch Data, 2023.

## Rail

Missouri's freight rail system plays a vital role in moving bulk commodities such as coal, farm products and chemicals. **Table 3** and **Table 4** present 2023 rail volumes by movement type and highlight the top commodities supported by rail.

**Table 3 – Missouri Rail Freight Movement, 2023**

Freight Movement	Tons (000's)	Value (\$M)
Inbound	57,682	54,181
Outbound	32,609	48,967
Throughput	247,087	557,522
Intrastate	7,518	1,993
<b>Total</b>	<b>344,897</b>	<b>662,663</b>

Source: GFT Analysis of Transearch Data, 2023.

**Table 4 – Missouri Top Five Commodities Transported, 2023**

Ranking	Commodity	Tons (000's)
1	Coal	97,453
2	Farm Products	49,556
3	Chemicals or Allied Products	47,398
4	Food or Kindred Products	46,682
5	Misc Mixed Shipments	29,140

Source: GFT Analysis of Transearch Data, 2023.

## Waterway

The Mississippi and Missouri Rivers continue to support barge movements of bulk commodities, particularly farm products and construction materials. Waterway volumes and top commodities for 2023 are shown below in **Table 5** and **Table 6**.

**Table 5 – Missouri Waterway Freight Movement, 2023**

Freight Movement	Tons (000's)	Value (\$M)
Inbound	5,857.90	4,603
Outbound	27,052.70	5,974
Throughput	13,250.60	8,388
Intrastate	4,988.80	255
<b>Total</b>	<b>51,150</b>	<b>19,220</b>

Source: GFT Analysis of Transearch Data, 2023.

**Table 6 – Missouri Top Five Commodities Transported by Water, 2023**

Ranking	Commodity	Tons (000's)
1	Farm Products	17,466
2	Nonmetallic Minerals	12,688
3	Clay, Concrete, Glass, or Stone	6,430
4	Chemicals or Allied Products	4,659
5	Petroleum or Coal Products	3,467

Source: GFT Analysis of Transearch Data, 2023.



Source: MoDOT

## Air Cargo

Although representing a small share of total tonnage, air cargo supports the movement of high-value and time-sensitive goods. **Table 7** and **Table 8** below show Missouri's 2023 air cargo volumes and leading commodities.

**Table 7 – Missouri Air Cargo Movement, 2023**

Freight Movement	Tons (000's)	Value (\$M)
Inbound	106	3,620
Outbound	100	3,577
Throughput	0	1
Intrastate	1	48
<b>Total</b>	<b>207</b>	<b>7,246</b>

Source: GFT Analysis of Transearch Data, 2023.

**Table 8 – Missouri Top Five Commodities Transported by Air, 2023**

Ranking	Commodity	Tons (000's)
1	Small Packaged Freight Shipments	72.60
2	Transportation Equipment	18.40
3	Electrical Equipment	18.10
4	Chemicals or Allied Products	13.20
5	Machinery	12.60

Source: GFT Analysis of Transearch Data, 2023.

## Future Freight Volumes

Looking ahead, Missouri’s multimodal transportation system is projected to handle nearly 1.30 billion tons of freight by 2043, reflecting continued growth in both traditional bulk commodities and higher-value manufactured goods. These forecasts, derived from Transearch data, provide insight into how freight demand is expected to evolve across modes and commodity groups over the next two decades.

As with the current freight volumes analysis, this section is organized into subsections by truck, rail, water and air. For each mode, tables present projects inbound, outbound, intrastate and through volumes in terms of tonnage and value. Additional tables highlight the top five commodities by mode in 2043, reported in two-digit STCCs to maintain comparability with current data.

These projections establish a forward-looking baseline for the needs assessment, highlighting where Missouri’s freight network will need to expand capacity, improve reliability and strengthen multimodal connections to support economic growth and maintain competitiveness in a changing marketplace.

### Highway

Highways are projected to continue carrying most of Missouri’s freight by 2043, with growth driven by both bulk and manufactured goods. **Table 9** and **Table 10** below summarize projected truck freight activity and highlight the top five commodities by tonnage.

**Table 9 – Projected Missouri 2043 Highway Freight Movement, 2023**

Freight Movement	Tons (000’s)	Value (\$M)
Inbound	121,027	173,370
Outbound	157,886	204,740
Throughput	372,222	877,846
Intrastate	114,088	63,924
<b>Total</b>	<b>765,223</b>	<b>1,319,880</b>

Source: GFT Analysis of Transearch Data, 2023.

**Table 10 – Projected Missouri 2043 Top Five Commodities Transported by Truck, 2023**

Ranking	Commodity	Tons (000’s)
1	Nonmetallic Minerals	180,776
2	Farm Products	146,031
3	Food or Kindred Products	116,734
4	Secondary Traffic	74,019
5	Chemicals or Allied Products	43,928

Source: GFT Analysis of Transearch Data, 2023.

### Rail

Rail freight in Missouri is expected to experience notable shifts, with declines in coal offset by growth in chemicals, food products and transportation equipment. **Table 11** and **Table 12** below present projected 2043 rail volumes and leading commodities.

**Table 11 – Projected Missouri 2043 Rail Freight Movement, 2023**

Freight Movement	Tons (000’s)	Value (\$M)
Inbound	37,487	76,817
Outbound	34,917	61,669
Throughput	280,634	781,316
Intrastate	2,879	2,323
<b>Total</b>	<b>355,917</b>	<b>922,125</b>

Source: GFT Analysis of Transearch Data, 2023.

**Table 12 – Projected Missouri 2043 Top Five Commodities Transported by Rail, 2023**

Ranking	Commodity	Tons (000's)
1	Chemicals or Allied Products	74,434
2	Food or Kindred Products	73,958
3	Farm Products	60,220
4	Misc Mixed Shipments	40,055
5	Transportation Equipment	20,512

Source: GFT Analysis of Transearch Data, 2023.

## Waterway

Missouri’s inland waterways will remain essential for the movement of bulk commodities, especially farm products and nonmetallic minerals. **Table 13** and **Table 14** below show projected 2043 barge volumes and top commodities.

**Table 13 – Projected 2043 Missouri Waterway Freight Movement, 2023**

Freight Movement	Tons (000's)	Value (\$M)
Inbound	6,837	5,970
Outbound	34,120	8,085
Throughput	11,684	8,280
Intrastate	5,915	256
<b>Total</b>	<b>58,558</b>	<b>22,591</b>

Source: GFT Analysis of Transearch Data, 2023.

**Table 14 – Projected Missouri 2043 Top Five Commodities Transported by Water, 2023**

Ranking	Commodity	Tons (000's)
1	Farm Products	20,143
2	Nonmetallic Minerals	16,140
3	Chemicals or Allied Products	6,845
4	Clay, Concrete, Glass, or Stone	6,523
5	Petroleum or Coal Products	2,702

Source: GFT Analysis of Transearch Data, 2023.

## Air

Air cargo volumes, while comparatively small in tonnage, are expected to grow in value as high-value, time-sensitive goods continue to expand. **Table 15** and **Table 16** present Missouri’s projected 2043 air freight activity and leading commodities.

**Table 15 – Projected Missouri 2043 Air Cargo Movement, 2023**

Freight Movement	Tons (000's)	Value (\$M)
Inbound	153	5,302
Outbound	125	4,076
Throughput	0	2
Intrastate	2	74
<b>Total</b>	<b>280</b>	<b>9,454</b>

Source: GFT Analysis of Transearch Data, 2023.

**Table 16 – Projected Missouri 2043 Top Five Commodities Transported by Air, 2023**

Ranking	Commodity	Tons (000's)
1	Small Packaged Freight Shipments	84
2	Transportation Equipment	27
3	Electrical Equipment	27
4	Instruments, Photo Equipment, Optical Equipment	25
5	Chemicals or Allied Products	21

Source: GFT Analysis of Transearch Data, 2023.

### Emerging Trends

Missouri’s freight system will be shaped not only by projected growth in tonnage and value but also by several structural shifts in how goods are produced, distributed and consumed. These emerging trends will influence freight flows across all modes and require adaptive planning to enable the system to remain resilient and competitive.

#### E-Commerce and Last-Mile Delivery

The rapid growth of e-commerce is driving an increase in parcel shipments and fundamentally altering urban freight dynamics. Last-mile delivery has become a critical component of supply chains, placing new demands on local road networks and distribution facilities, particularly in metropolitan areas like St. Louis and Kansas City. Managing congestion, curb access and delivery efficiency will be key challenges.



Source: MoDOT

#### Near Shoring and Regional Supply Chains

Global supply chain disruptions and rising transportation costs are accelerating the trend toward near-shoring and regional production. For Missouri, this shift could reshape inbound and outbound flows, with more intermediate goods and components moving within North America rather than overseas. Trade corridor patterns may adjust accordingly, reinforcing the importance of Missouri’s highway and rail connectivity to Mexico and Canada.

### Connected and Autonomous Vehicles (CAVs)

Autonomous trucking is rapidly transitioning from pilot testing to active commercial deployment across the U.S. Several long-haul AV developers — including Aurora, Kodiak, Waymo and Plus — are now operating automated Class-8 tractors on major interstate corridors in Texas, Arizona, New Mexico, Colorado, Wyoming, Oklahoma and other Sun Belt states. These trucks are already traveling coast-to-coast routes that pass through Missouri, but due to current Missouri statute requiring a human driver behind the wheel, fully driverless operation cannot occur within state boundaries. As a result, AV-equipped trucks currently perform “state-line handoffs”, stopping at Missouri’s borders to switch to human drivers before continuing their route. This mirrors long-standing oversize/overweight permitting practices where operators must comply with differing state-by-state regulations.

Despite common assumptions, AV tractors have performed reliably in harsh operating conditions, including snow, wind and reduced visibility — and avoid human overcorrection or fatigue-related deceleration. However, current technology and regulations limit autonomous operation to interstate corridors, meaning human drivers remain essential for first-mile and last-mile movements to ports, rail terminals, airports and distribution centers. Industry experts underscore that widespread AV adoption will actually increase the need for short-haul and regional drivers, particularly for the “last-leg” movements that AVs cannot complete autonomously. Additionally, remote-

operations centers, where trained staff can intervene digitally during unusual events, are becoming a critical workforce component, suggesting new job types that may emerge in Missouri.

Stakeholder outreach reinforced these trends and revealed additional AV-related considerations across modes. Rail operators described growing use of autonomous and semi-autonomous inspection systems, including drone-assisted inspections and automated geometry cars that reduce worker exposure and improve safety.

Port stakeholders noted early movement toward autonomous yard tractors and automated gate operations, reflecting a broader industry trend toward partial terminal automation.

Aviation representatives identified the potential for autonomous ground-service equipment in the future, particularly in cargo-handling environments. Trucking industry stakeholders emphasized that inconsistent work-zone layouts, irregular signage and constrained lane widths pose difficulties not only for human drivers but also for AV perception systems, highlighting the need for more uniform work-zone standards as automation expands. They also stressed that AV long-haul operations will likely shift freight patterns, requiring designated staging locations near urban freight hubs where AVs transition to human drivers. This aligns with national practice in AV-active states, where Department of Transportation (DOT) s are beginning to plan for driver-change facilities near key interchanges. Collectively,

stakeholder input suggests that autonomous technologies will shape workforce needs, last-mile logistics, infrastructure consistency and intermodal coordination across Missouri's freight network.

As AV deployment expands nationally, the most significant needs for Missouri are policy readiness, interagency coordination and the future establishment of driver transfer or staging locations near major freight markets. Other states advancing AV trucking have created governor-appointed task forces that include DOTs, highway patrol, emergency responders, insurers and AV operators to develop safety protocols, emergency response procedures and communications plans. Missouri will need similar coordination to prepare for AV integration while maintaining law enforcement familiarity, incident response procedures and public awareness. Because AV firms increasingly rely on remote operations personnel who can intervene digitally during unexpected events, Missouri may also see emerging workforce opportunities in remote driving assistance, safety monitoring and operations centers. As these technologies mature, freight operations along key routes like I-70 and I-44 will increasingly benefit from enhanced connectivity and automation.

### Artificial Intelligence

Artificial Intelligence (AI) is rapidly transforming freight operations and transportation system management and Missouri stakeholders are beginning to adopt or explore these technologies across

multiple modes. During modal outreach, Class I railroads highlighted their growing use of AI-enabled safety systems, including acoustic wayside detectors, automated track inspection, wheel-profile analytics and predictive maintenance tools, technologies that reduce derailment risk and support Federal Railroad Administration (FRA)'s broader shift toward risk-based safety oversight. Aviation stakeholders expressed interest in AI for cargo-handling optimization, aircraft and equipment predictive maintenance and improved operational forecasting, particularly as mid-size airports expand their air cargo role. Ports and waterway operators noted opportunities to use AI for terminal yard management, crane scheduling, drone-based inspections and navigation forecasting during high-water events.

For highway freight operations, AI is increasingly used for incident detection, predictive analytics, work-zone monitoring and advanced routing, as documented by Federal Highway Administration (FHWA) and U.S. Department of Transportation (USDOT). Trucking industry stakeholders emphasized that travel-time unpredictability and inconsistent work-zone layouts create challenges for both human drivers and perception-based automated systems. They expressed interest in AI applications that improve construction-zone communication, freight visibility and corridor reliability. Integrating these capabilities into MoDOT's Transportation Management Center (TMC) could support faster incident response, enhance freight safety and strengthen travel-time reliability on critical corridors.

Over time, AI-enabled analytics will also improve MoDOT's ability to monitor freight performance, identify emerging bottlenecks and prioritize investments more effectively across the statewide network.

### Commodity Shifts

Evolving commodity markets will also shape future freight volumes. Agricultural exports are expected to remain a cornerstone of Missouri's economy, while growth in advanced manufacturing, energy transitions and food processing will drive changes in mode choice and logistics patterns. Declines in coal and petroleum movements contrast with increases in higher-value goods such as chemicals, transportation equipment and refrigerated products.

### Overall Freight Growth

By 2043, Transearch projects nearly 1.30 billion tons of freight moving through Missouri's multimodal system. Growth will not be uniform; truck freight is anticipated to capture the largest share of increases, while rail and water remain essential for bulk commodities. Sector-specific dynamics, particularly in manufacturing, distribution and agriculture, will define how this growth is distributed across modes and regions.

Together, these trends underscore the need for a flexible and future-ready freight system that can adapt to technological change, evolving supply chains and shifting commodity flows. Missouri's ability to respond proactively will be central to maintaining its role as a national freight crossroads.

## Comparing Current System Performance to Future System

Performance measures provide Missouri with a critical lens for evaluating how today's multimodal freight system is functioning and where future demand will place additional pressure on capacity, safety and reliability. By benchmarking current volumes against projected 2043 freight flows, decision-makers can better understand how Missouri's system is positioned to meet the challenges of a growing and evolving freight economy.

The following subsections compare current system performance with expected future performance for highways, rail, waterways and air cargo. For each mode, Transearch tonnage and value projections are paired with the State Freight and Rail Plan (SFRP) goals and objectives to identify where performance gaps may emerge and what areas will require targeted investment. This comparison highlights both existing strengths and future vulnerabilities in Missouri's multimodal freight network.

## Highway Freight: Current to Future Performance

Missouri maintains the seventh-largest state highway system in the nation, with more than 33,800 miles of roadway and over 10,000 bridges. Highways carry most of the freight in Missouri, approximately 55% of statewide tonnage in 2023. Pavement conditions remain relatively strong, with about 89% of major highways rated in good condition. However, recurring congestion, truck parking shortages and first-/last-mile bottlenecks continue to constrain efficiency. Metro areas remain primary freight congestion hotspots, with estimated statewide congestion costs reaching approximately \$630 million in 2023.

Highways are the backbone of Missouri's freight network, carrying over 624 million tons in 2023 and projected to grow to more than 765 million tons by 2043. Growth is expected across both bulk and manufactured goods, with significant increases in food products, farm products and secondary traffic. In response to growing freight and passenger demand, Missouri is making a historic investment in its highway system, including the addition of a third lane along I-70, which is expected to significantly improve capacity, reliability and safety on one of the state's most critical freight corridors.

### Implications for Performance:

- **Reliable:** While the addition of a third lane along I-70 represents a historic investment that is expected to significantly improve corridor capacity and reliability, projected growth in truck volumes will continue to place pressure on key freight corridors. Even with the historic addition of a third lane along I-70. Bottlenecks are likely to persist at interchanges, urban approaches and other major routes such as I-44, requiring continued focus on system wide reliability.
- **Stewardship:** Higher freight tonnage will place additional strain on pavement and bridge conditions, increasing life-cycle maintenance costs.
- **Safe:** More truck activity, combined with last-mile delivery growth in urban areas, heightens safety risks for vulnerable road users.
- **Connected:** First- and last-mile connectivity to freight generators will be critical as demand grows.

## Freight Rail: Current to Future Performance

Missouri hosts the 11th-largest rail network in the U.S., with about 3,800 miles of track served by five Class I railroads and 15 short lines. Rail moves roughly 30% of Missouri's freight by weight, anchored by the Kansas City and St. Louis hubs, two of the nation's most significant rail centers. Network conditions are generally strong, but chokepoints persist in urban areas where intermodal terminals, low-clearance bridges and at-grade crossings constrain efficiency. Missouri has more than 3,300 public crossings, posing ongoing safety risks despite declining blocked crossing incidents since 2021.

Rail carried nearly 345 million tons in 2023 and is projected to rise slightly to 356 million tons by 2043. The commodity mix, however, is expected to shift dramatically: coal tonnage will decline, while chemicals, food products and transportation equipment increase.

### Implications for Performance:

- **Prosperous:** Rail's role in supporting Missouri's agricultural and manufacturing competitiveness continues as commodity flows shift.
- **Reliable:** Growth in higher-value freight requires ongoing investment in intermodal terminals and short-line resilience.
- **Innovative:** Rail carriers' deployment of advanced safety and scheduling technologies will maximize efficiency.

**Waterway Freight:** Current to Future Performance Missouri's 1,050 miles of navigable rivers and 18 public port authorities play a vital role in supporting agriculture and bulk commodity movement. In 2023, 51.10 million tons of freight moved by water. However, reliability is increasingly constrained by aging infrastructure, with locks and dams on the Mississippi River average more than 75 years old, with average delays at key locks ranging from one to five hours.

By 2043, tonnage on Missouri's waterways is projected to increase to nearly 59 million tons. Farm products and nonmetallic minerals will continue to dominate waterborne freight, underscoring the importance of maintaining channel depth and lock reliability to enable dependable barge operations.

### Implications for Performance:

- **Stewardship:** Maintaining channel depth and lock reliability will be essential to supporting continued barge traffic.
- **Reliable:** Adapting infrastructure strategies to reduce weather-related disruptions to waterway reliability.
- **Connected:** Strengthening intermodal links at ports will help waterways complement rail and truck freight, particularly in serving export markets.

## Air Cargo: Current to Future Performance

Air cargo serves a specialized but high-value segment of Missouri's freight economy. Major operations are concentrated at St. Louis Lambert International (STL), Kansas City International (MCI) and Springfield-Branson National (SGF), with several regional airports supporting cargo movement. In 2023, air freight totaled approximately 207,000 tons valued at \$7.20 billion. The system is not significantly constrained by infrastructure conditions but remains sensitive to demand fluctuations and broader supply chain dynamics.



Source: MoDOT

## Summary

Comparing current and future freight volumes across all modes underscores Missouri's role as a multimodal freight hub and highlights the pressures that will mount as nearly 1.30 billion tons of goods move through the state by 2043. Highways will continue to bear the brunt of growth, rail will evolve with changing commodity markets, waterways will remain vital for bulk exports and air cargo will expand as a high-value niche.

By 2043, air cargo is projected to increase to 280,000 tons valued at \$9.50 billion — a 35% increase in tonnage and nearly one-third increase in value.

### Implications for Performance:

- **Prosperous:** Growth in e-commerce and high-value goods strengthens Missouri's role in global supply chains, particularly near St. Louis Lambert International and Kansas City International airports.
- **Connected:** Stronger ground access to airports will be necessary to enable seamless multimodal freight movement.
- **Innovative:** Integration of automation, advanced logistics hubs and improved airside facilities will be key to meeting future demand.

Tying these changes back to the SFRP goals and objectives emphasizes the need for Missouri to:

- Invest in reliability by addressing highway bottlenecks and strengthening multimodal resilience.
- Advance stewardship through proactive maintenance and sustainable infrastructure strategies.
- Promote safety for both heavy truck corridors and vulnerable users in urban freight environments.

- Support a prosperous economy by adapting to commodity shifts and capitalizing on high-value logistics sectors.
- Strengthen connectivity across first-/last-mile freight links, ports and airports.
- Pursue innovation through technology adoption and funding strategies that support long-term competitiveness.

## Comparison of System Capacity to Forecasted Volumes

Missouri's multimodal freight system is projected to handle nearly 1.30 billion tons of freight by 2043, a 14% increase over 2023 levels. While this growth underscores the state's importance as a national freight hub, it also highlights areas where system capacity may not keep pace with future demand. The

following subsections identify gaps between current performance and forecasted volumes, focusing on modal capacity constraints, regional infrastructure needs and risk areas where bottlenecks or underperformance are most likely.

## Gaps Between Current Performance and Future Demand

### Highways:

- Truck volumes are projected to increase by more than 140 million tons between 2023 and 2043, amplifying pressure on Missouri's interstate corridors, especially I-70, I-44, I-435, I-29, I-55, I-35 I-49 and I-270.
- Existing bottlenecks in Kansas City, St. Louis and Springfield will worsen, threatening reliability and safety.
- First-/last-mile connections around distribution hubs will become more strained by growth in e-commerce and parcel shipments, risking gaps in connected objectives.

### Rail:

- Shifting commodity patterns—from coal to chemicals, food products and transportation equipment—will place new demands on intermodal capacity.

Aging short line infrastructure may prevent railroads from handling heavier axle loads or growing agricultural exports without investment, creating a stewardship gap.

## Waterways

- Channel maintenance and lock/dam reliability will determine system performance, even though projected tonnage growth is modest.
- Weather variability introduces risk to navigation reliability, potentially undercutting Missouri's competitive advantage in barge transport.

## Air

- Capacity at major airports may be adequate for projected tonnage, but ground access, warehouse space and cargo handling facilities could be limiting factors.
- Growth in small-package freight will stress connected objectives unless roadway and distribution access improvements are made.

## Modal Capacity Constraints

- **Highways:** Without capacity expansion or demand management, congestion on I-70 and I-44 corridors is likely to reduce reliability and increase costs for shippers.
- **Rail:** Intermodal terminal capacity (e.g., Kansas City) may not be sufficient for projected growth in manufactured goods.
- **Waterways:** Infrastructure reliability (locks, levees, dredging) remains a constraint, particularly during extreme weather events.
- **Air:** Cargo handling and logistics integration, rather than runway capacity, represent the main constraint for Missouri's air freight system.

## Infrastructure Needs by Region

- **St. Louis Region:** Key interstate bottlenecks, Mississippi River navigation reliability and urban last-mile delivery pressures should be primary focus.
- **Kansas City Region:** Intermodal rail hubs and interstate congestion points are critical to future freight reliability.
- **Southwest Missouri (Springfield/Joplin):** Growth along I-44 freight corridor requires targeted capacity and safety enhancements.
- **Rural Corridors:** Short line rail and rural highway connections will need investment to maintain access to agricultural markets.

## Risk Areas and Bottlenecks

- **Urban vs. Rural Stress:** Urban areas will face congestion and safety pressures from truck and parcel growth, while rural areas risk underinvestment in short line railroads, bridges and two-lane freight routes.
- **Key Corridors at Risk:**
  - **I-70:** Projected truck volume growth will continue to place pressure on one of the state's most heavily traveled freight corridors. While the addition of a third lane is expected to significantly improve capacity and reliability along I-70, long-term growth in freight demand and interchange activity may continue to influence performance, particularly near urban areas.
  - **I-44:** Growth in farm products and manufactured goods will test capacity and safety performance.
  - **Mississippi River navigation:** Lock and dam reliability remains a single point of failure for barge traffic.
  - **Kansas City and St. Louis intermodal facilities:** Terminal capacity may fall behind demand for trail-truck transfers.

## Summary

Missouri's freight network is well-positioned to handle projected growth overall, but without strategic investments, several gaps will emerge between system capacity and forecasted demand. Highways face the greatest challenges, with rail, waterways

and air cargo also requiring targeted upgrades to maintain reliability, safety and competitiveness. Identifying and addressing these gaps will be essential to achieving the SFRP goals of a prosperous, reliable and connected multimodal freight system.

## Summary of Findings

Missouri's multimodal freight system is a cornerstone of the state's economy, moving over 1.10 billion tons of freight in 2023 and projected to handle nearly 1.30 billion tons by 2043. Growth will be driven by both bulk commodities, such as farm products and nonmetallic minerals, and higher-value manufactured goods, including chemicals, transportation equipment, and small packaged freight.

Each mode will face distinct challenges:

- Highways will continue to carry the majority of freight. Major investments, including the addition of a third lane along I-70, are expected to improve capacity and reliability; however, rising truck volumes and growth on other key corridors such as I-44 will continue to challenge systemwide performance. [LW5.1][MC5.2]
- Rail will experience a commodity shift from coal to higher-value products, with potential strain on short lines and intermodal hubs.
- Waterways will remain vital for agricultural exports but are dependent on resilient lock, dam, and channel infrastructure.
- Air Cargo, though small in tonnage, will grow in value, stressing distribution facilities and first-/last-mile access.

Emerging trends such as e-commerce, regional supply chain shifts, connected and automated vehicle adoption, and changing commodity markets will further reshape Missouri's freight landscape.

## Implications for Freight and Rail Investment Strategies

These findings have direct implications for how Missouri should prioritize freight and rail investments over the next two decades:

- Highways: Invest in capacity, safety, and reliability improvements on critical freight corridors (I-70, I-44, I-55, and I-35), while addressing urban congestion and first-/last-mile delivery challenges.
- Rail: Modernize short line rail infrastructure, expand intermodal capacity in Kansas City and St. Louis, and support projects that align with commodity shifts toward chemicals, food products, and advanced manufacturing.
- Waterways: Support investments in navigation reliability, including dredging, lock and dam maintenance, and climate resilience, to protect Missouri's position in agricultural exports.
- Air cargo: Enhance ground access, cargo handling capacity, and logistics integration at key airports to accommodate growing demand for time-sensitive, high-value shipments.
- Multimodal connections: Strengthen intermodal hubs and first-/last-mile freight connections to promote efficiency and resiliency across the network.

In line with the SFRP goals of being prosperous, reliable, connected and innovative, Missouri's investment strategies should focus not only on maintaining a state of good repair but also on preparing the freight system to adapt to changing technologies, supply chains, and commodity flows. Strategic, data-driven investments will keep freight a powerful economic driver for Missouri while preserving the state's role as a vital national freight crossroads.