2.0 Oklahoma's Freight Story Today

The first part of this chapter summarizes current state freight flows, direction of flow, and mode. Details on commodities, freight modes and facilities, and origins and destinations follow. This chapter closes with an assessment of current needs and challenges facing the Oklahoma freight system.

2.1 OVERVIEW

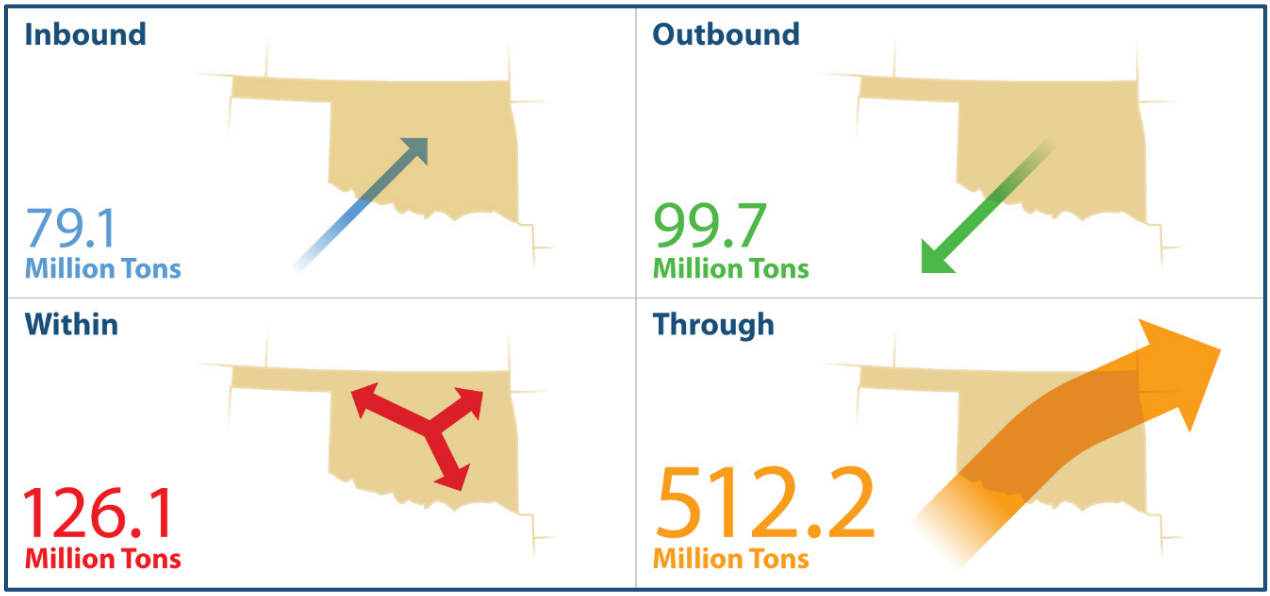
Freight is important to the transportation system and to the economy. Over 800 million tons of freight are transported annually in, out, within, and through Oklahoma. The value of goods transported annually is estimated at $1.3 billion.[3]

The freight flow data presented in this chapter is based on profiles from the IHS Markit Transearch database, and supplemented with the FHWA's Freight Analysis Framework 4 (FAF 4) data. The latest year for which these historical data are available is 2014, and they were escalated to the base year of 2015.

2.2 FREIGHT FLOWS

Figure 1 shows total freight flows by direction (inbound, outbound, within state and through). Through freight relates to shipments that begin out-of-state, pass through Oklahoma, and continue to a destination out of the state.

Figure 1. Oklahoma Freight Flows (2015) by Direction



Source: IHS Transearch, WSP analysis, 2017

All other traffic has an origin and/or destination in Oklahoma, and can be referred to as Oklahoma-based freight. The distinction is important because through freight imposes a burden on Oklahoma infrastructure, while having little connection to its economy; whereas state-based freight directly serves Oklahoma's businesses and people. For that reason, most of the discussion in this chapter will focus on Oklahoma-based freight. Nevertheless, through traffic is significant, representing 63 percent of total tonnage and 83 percent of total value.

Oklahoma has trading relationships throughout the world. Its principal trading partnerships are within the U.S. Of all freight that travels in, out, within, or through Oklahoma, nearly 90 percent of the tonnage is domestic. **Figure 2** shows some examples of top origins and destinations for selected commodities that flow in or out of Oklahoma. Texas is Oklahoma's foremost trading partner, but other major origins and destinations include California, Arkansas, Kansas, Louisiana, and Wyoming among others.

Figure 2. Example Commodities Flowing Into, and Out of, Oklahoma

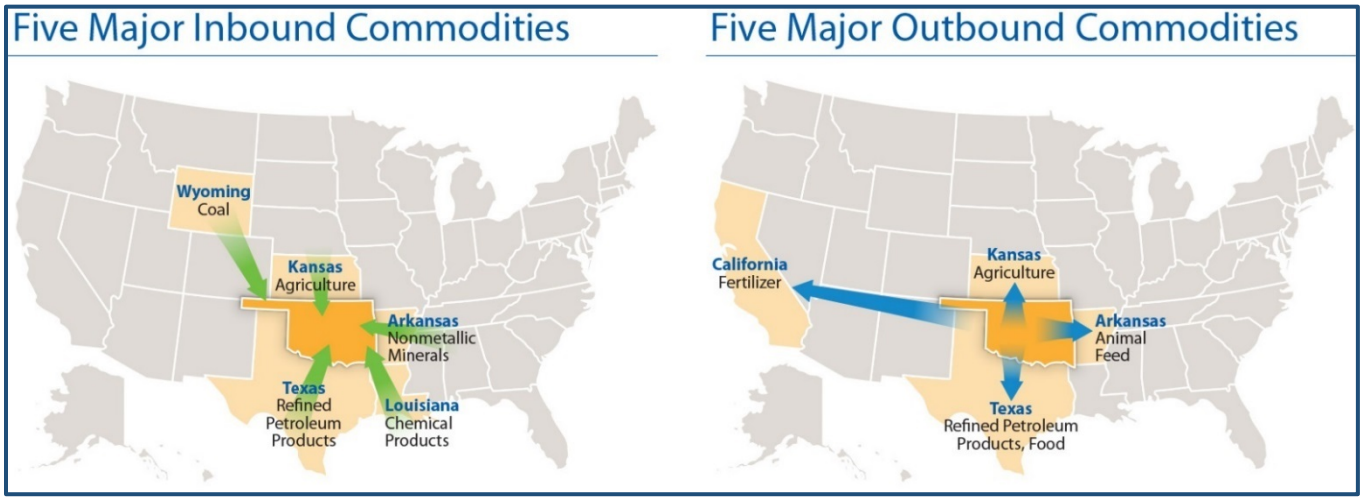


Table 3 displays aggregate freight flows broken down by direction and by mode. Most of the volume of through tonnage is moved by rail.

Table 3. Oklahoma Freight Flows

Tonnage 2015 by Mode and Direction (millions)					
Mode	Inbound	Outbound	Within	Through	Total
Truck	46.5	78.5	123.6	224.3	**472.9**
Rail	29.5	18.0	2.5	287.9	**337.9**
Water	3.1	3.2	0.0	0.0	**6.3**
Total	**79.1**	**99.7**	**126.1**	**512.2**	**817.1**

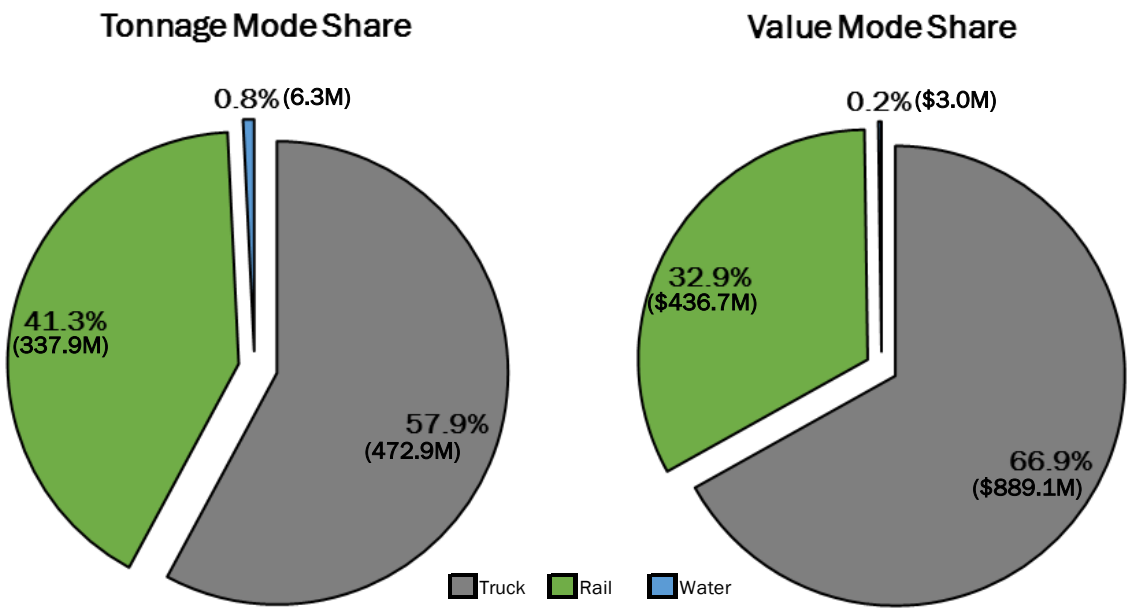
Source: IHS Transearch, WSP analysis, 2017

Of total freight tonnage and value, most is transported by truck, with most of the remainder moved by rail. Trucking is especially predominant for Oklahoma-based traffic. The third freight mode represented in Oklahoma is water, and the McClellan-Kerr Arkansas River Navigation System (MKARNS) classified as Marine Highway 40 (M-40) carries barge traffic into and out of the state.

Freight tonnage is slightly imbalanced into and out of the state with approximately 79 million tons inbound and 100 million tons outbound per year (**Table 3**). A total of approximately 126 million tons is moved within state. Through movement is by far the largest, at approximately 512 million tons. **Figure 3** shows the mode split for freight traveling in Oklahoma by tonnage and by value. As shown in the figures:

- Trucking predominates, especially for value.
- Rail also provides a substantial amount of freight transport in the state, accounting for nearly 33 percent by value but over 40 percent by weight.
- Waterways account for 6.3 million tons of freight annually, and, while representing less than 1 percent of the total by tonnage and value, are the mode of choice for many heavy and large commodities that are not time sensitive.

Figure 3. Oklahoma Freight Mode Share by Tonnage and Value

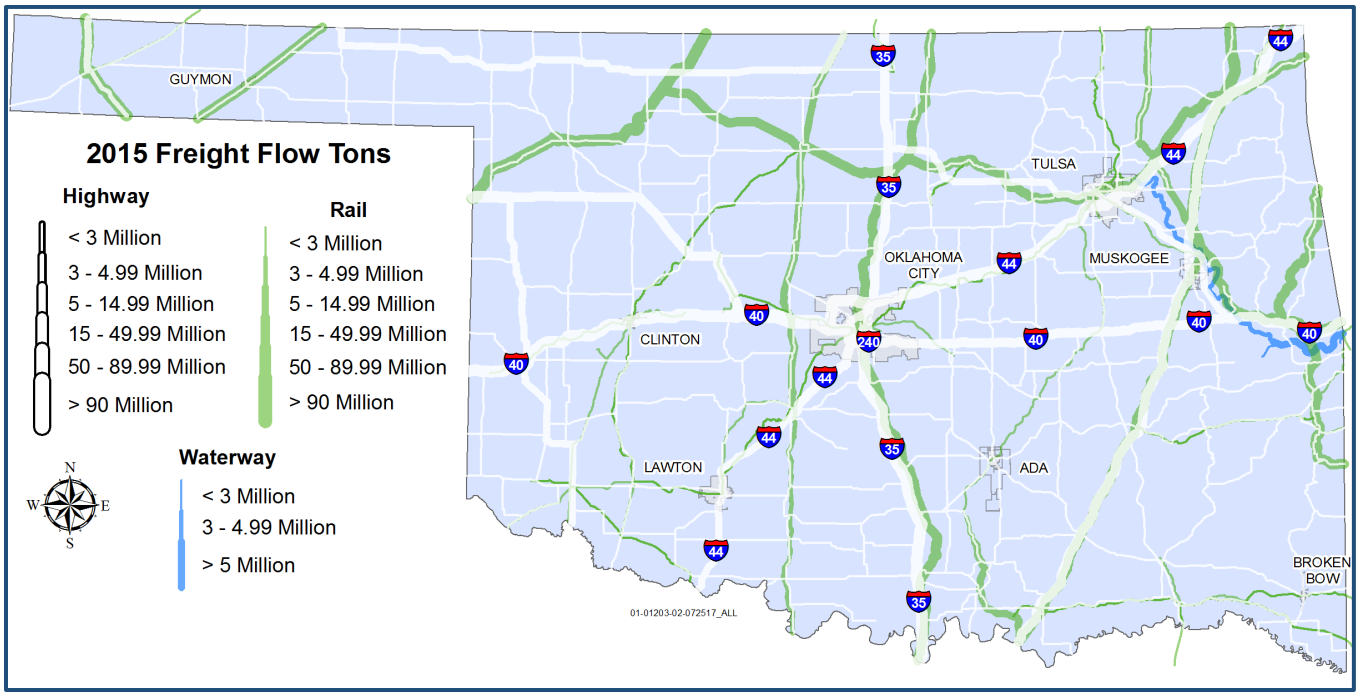


Source: IHS Transearch, WSP analysis, 2017

Relatively little freight is transported by air in Oklahoma,[4] and the primary role of ODOT in relation to airport freight transport is to provide adequate highway access to airports.

Figure 4 shows the total freight flows throughout Oklahoma for 2015. As shown, trucking predominates with the largest flows along I-35, I-44, I-40, I-240 and U.S. 69. Rail traffic flows principally in the north-south direction, with products moving to and from Texas or the Gulf of Mexico. The major east-west transcontinental railroad routes either bypass Oklahoma entirely (Union Pacific Railroad or UP) or pass through a corner of the state (BNSF Railway or BNSF). Water represents a much smaller tonnage and is carried exclusively on the MKARNS system. Oklahoma's transportation facilities are described later in this section.

Figure 4: Oklahoma Freight Flows – All Modes

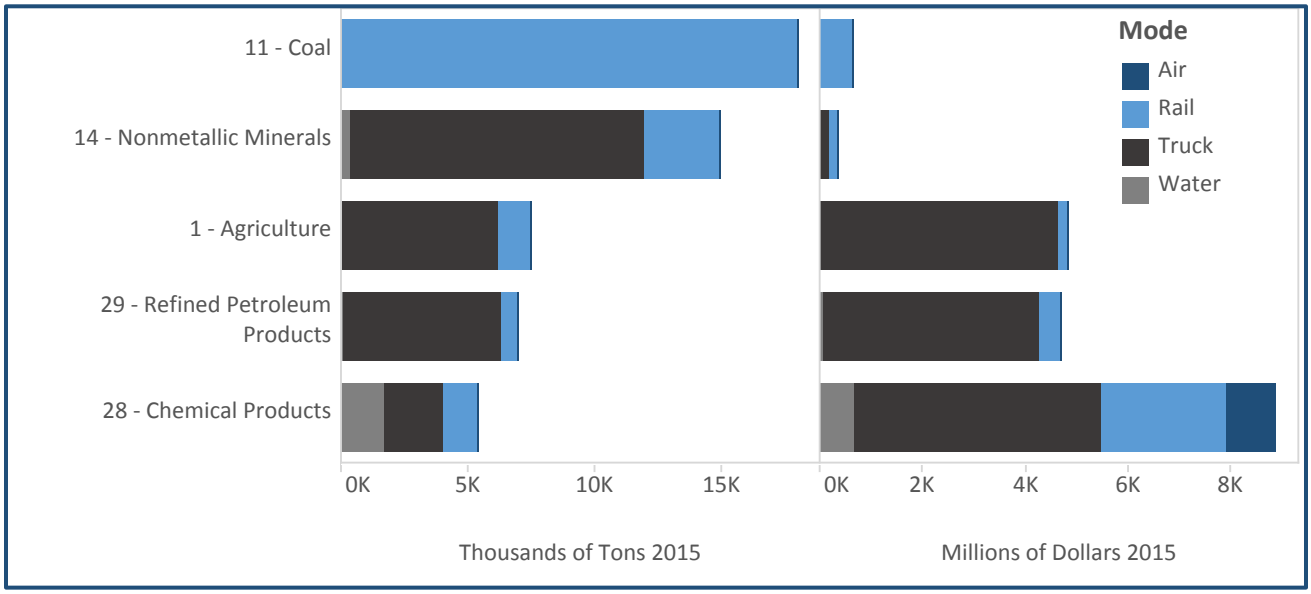


Source: IHS Transearch, WSP analysis, 2017

2.2.1 Inbound Commodity Movements by Mode

Oklahoma's top inbound commodity group[5] (**Figure 5**) ranked by tonnage is coal, at 18 million tons. Coal is consumed mainly by public utilities to generate electricity and is transported almost entirely by rail. The second-largest inbound commodity group is nonmetallic minerals, at 14 million tons. Examples of nonmetallic minerals include limestone, granite, stone, sand and gravel, potash, phosphate, and other fertilizer minerals. Nonmetallic minerals are largely transported by truck, but rail and water transport are also used.

Figure 5. Top Inbound Commodity Groups Ranked by Tons (2015)

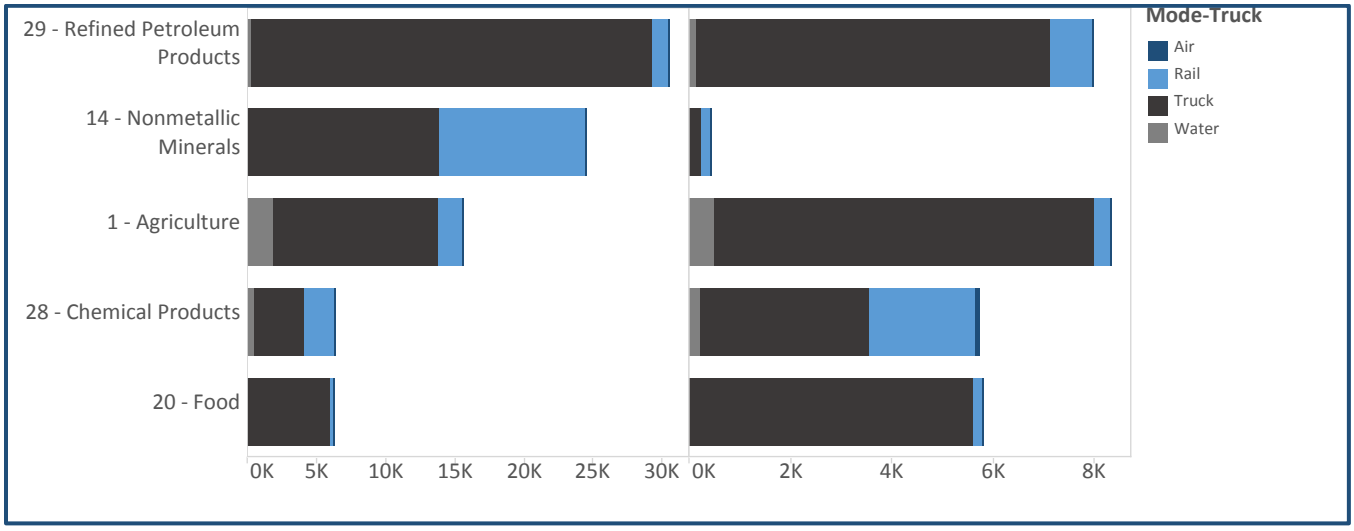


Source: IHS Transearch, WSP analysis, 2017

2.2.2 Outbound Commodity Movements by Mode

The top outbound commodity group by volume is refined petroleum products, at 30 million tons (**Figure 6**), which is transported mostly by truck. The second-largest commodity by weight is nonmetallic minerals. Most of these volumes are transported by truck, but a significant share is moved by rail. The third commodity group ranked by weight is agriculture.

Figure 6. Top Outbound Commodity Groups Ranked by Tons (2015)



Source: IHS Transearch, WSP analysis, 2017

Agriculture is the top outbound product by value. Other outbound commodities with high value include refined petroleum products, chemical products, and food.

2.3 THE HIGHWAY SYSTEM

2.3.1 Oklahoma Highways and Truck Freight Flows

ODOT is responsible for 12,255 highway miles in the state; the Oklahoma Turnpike Authority system covers 597 miles – for a total of 12,852 miles of highway network. Cities, towns, and counties are responsible for the remainder of the public road system; these roads are primarily minor collectors and local streets.

The State Highway System serves industries and population centers as well as freight passing through Oklahoma that originates and terminates in other states. By virtue of its location, Oklahoma is a crossroads of highway commerce. **Table 4** summarizes the ODOT highway mileage by type.

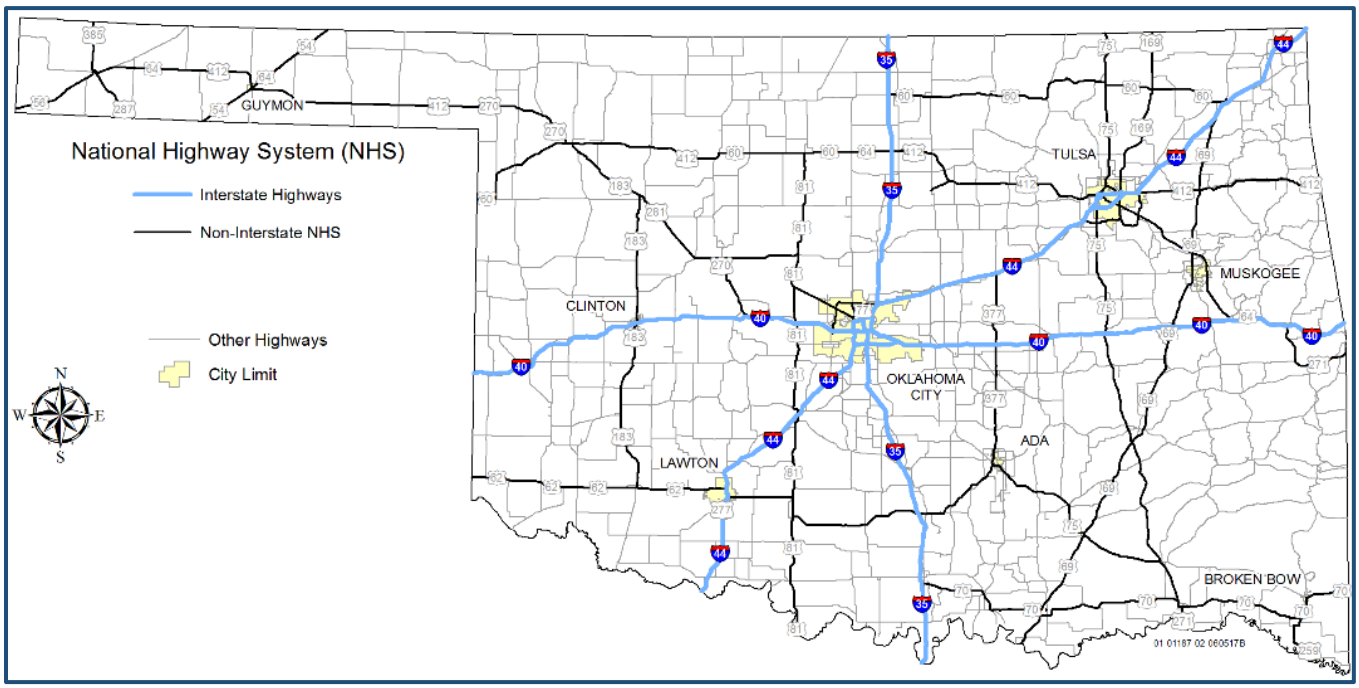
Table 4: Oklahoma Highway Mileage by Classification (2016)

Interstate	Other Freeways and Expressway	Other Principal Arterial	Minor Arterial	Major Collector	Total
933	195	2,982	2,886	5,856	**12,852**

Source: Federal Highway Administration, 2017

Figure 7 shows the Oklahoma highway network.

Figure 7. Oklahoma State Highway System

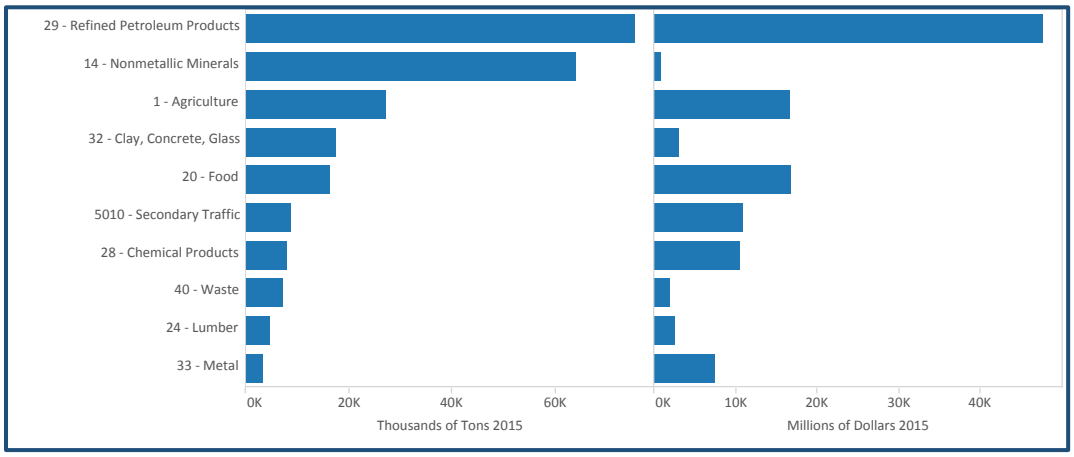


Source: IHS Transearch, Oklahoma Department of Transportation, and WSP analysis, 2017

2.3.2 Top Commodities by Truck Into, Out Of, Through and Within Oklahoma

The top commodity group for both tonnage and value transported by truck (**Figure 8**) is refined petroleum products. The second commodity group for tonnage by truck is nonmetallic minerals. Agricultural products and food are also highly ranked commodities by tonnage and value.

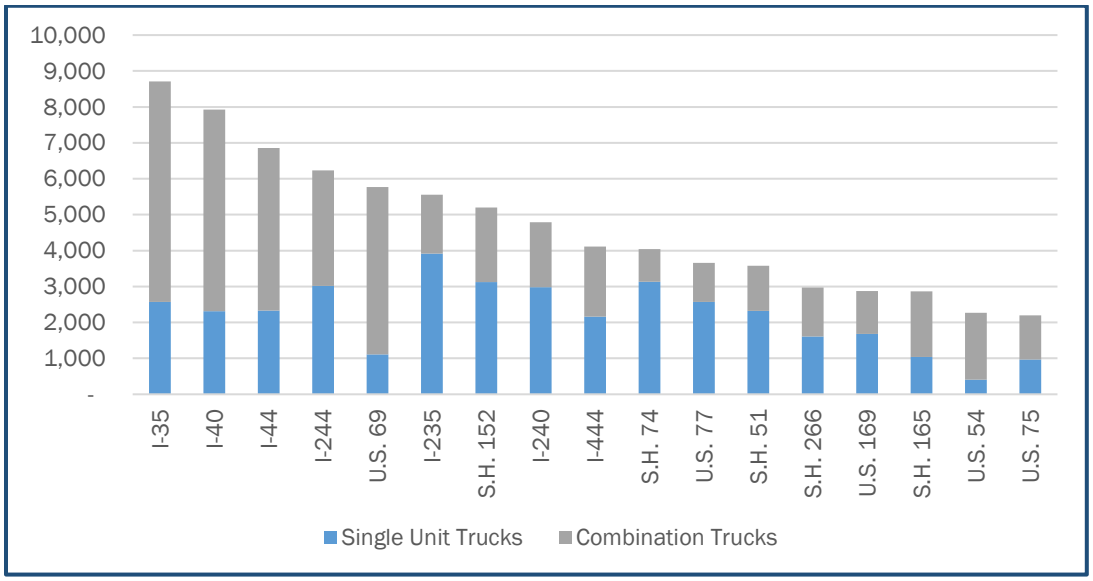
Figure 8. Top Oklahoma-Based Commodity Groups by Truck, Ranked by Tons (2015)



Source: IHS Transearch, WSP analysis, 2017

Figure 9 shows the Oklahoma highways that have the greatest truck volumes. I-35 and I-40 have the most trucks, followed by I-44 and I-244, with each of these facilities carrying more than 6,000 trucks per day. U.S. 69 carries approximately 6,000 trucks per day and represents a key north-south route that runs from Minnesota to Texas, forming an important connection between the Midwest and Dallas. It also intersects I-44 and I-40 in Oklahoma.

Figure 9. Major Oklahoma Truck Traffic Highways (2015)



Source: Oklahoma Department of Transportation, Traffic Analysis Branch, 2016.

2.3.3 ODOT Intelligent Transportation System Program

The ODOT Intelligent Transportation System (ITS) program employs and maintains technologies that benefit freight and is planning to expand its effort. This program works in parallel with project development to improve operations on the State Highway System. ITS improvements will benefit freight transportation considerably; and support this OFTP's goals of safety, infrastructure preservation, mobility, economic vitality environmental responsibility, and efficient system management and operation.

The chief ITS initiatives include the following:

- Dynamic message signs
- Land mobile radio for first responders
- Road weather information system
- Bluetooth sensors to provide commercial motor vehicle origin and destination data
- Vehicle-to-infrastructure communications

ODOT manages 2,600 linear miles of fiber optics and has 64 dynamic message signs (DMS) installed statewide. While these ITS technologies help trucks and general traffic, ODOT has freight-specific applications. For example, ODOT is adding permanent full-size DMSs in both directions near the Ports of Entry (POE) around the state. The POE personnel will be able to view and control the cameras. In addition, ODOT is installing more DMSs and cameras around the state—typically in metropolitan areas.

ODOT is expanding the Land Mobile Radio system to be statewide on a mesh network of Multiprotocol Label Switching equipment. In terms of traffic incident management, ODOT is replacing its static, public facing map with one that will report the latest road and weather conditions in real-time.[6]

The Road Weather Information System expansion project will add 16 new sites at critical bridges along I-35 (border to border) to supplement six existing sites. The system will provide pavement, bridge deck, and subsurface temperatures, as well as moisture and air temperatures. This data will be available to field divisions to inform decisions about deployment of roadway maintenance personnel. In addition to being more efficient, it will improve roadway operations and safety—a significant factor for trucking.[7]

ODOT has a contract with state universities to explore the use of Bluetooth sensors along I-35 and I-44, and in the Oklahoma City and Tulsa metropolitan areas. This will allow determination of origin-destination for trucks. Another demonstration project will use technology applications to develop computer recognition of vehicle classification.

These technologies allow ODOT to obtain and disseminate more up-to-the-minute information about highway conditions, which improve efficiency of operations and vehicular travel.

2.3.4 Heavy Cargo, Heavy Loads

Better ways to manage heavy cargo is a growing need in every state. For the purposes of developing a FAST Act-compliant freight plan, the definition of heavy loads includes regulation-size vehicles carrying heavy cargo, oversize/overweight loads (OSOW), and superloads. Harmonization of regulations and processes across state lines is an important topic in most states, and especially those like Oklahoma, which are in the middle of the country and experience a great deal of interstate transport.

HEAVY CARGO

Various industries—including construction, energy, and agriculture—use fully loaded regulation-size vehicles carrying heavy cargo. Heavy cargo includes construction aggregates, water furnished to well sites, and heavy farm or oil rig equipment.

OVERSIZE/OVERWEIGHT LOADS

Oklahoma's highways support the movement of regular and OSOW loads in accordance with state and federal statutes. OSOW loads are trucks whose dimensions and/or weight limits exceed legal limits, and with some exceptions, cannot be split into multiple smaller loads. The Oklahoma weight threshold for the common tractor trailer combinations is 80,000 pounds on interstate highways and 90,000 pounds on non-interstate highways. Many states, including Oklahoma, have automated permit processes and capture data for reference and planning. The automated permitting and routing system in Oklahoma is managed by the Oklahoma Department of Public Safety. Known as OKiePROS[8] and the first of its kind, the system speeds the approval process even for loads wide enough to affect two lanes, Creation and maintenance of databases from such systems is an important component to improving the efficiency of interstate operations.

SUPERLOADS

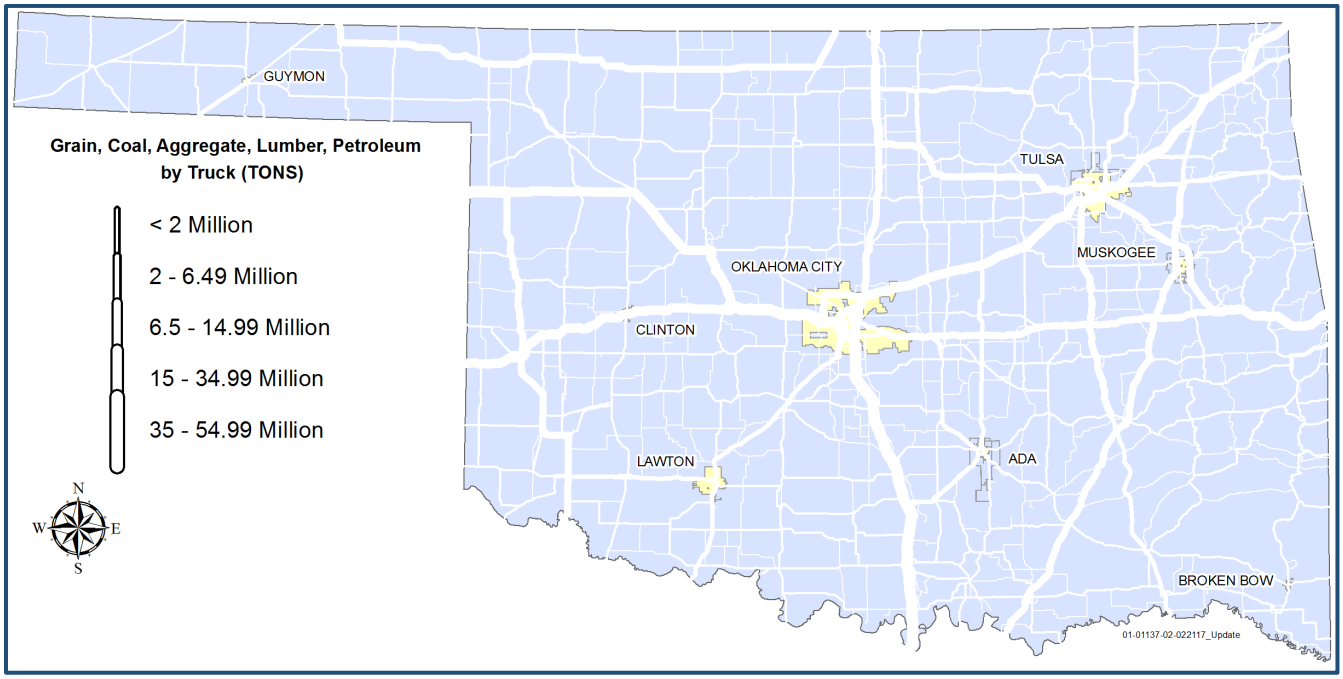
Loads or vehicles that are 16 feet wide x 21 feet high and 180,000 pounds or more are considered superloads in Oklahoma. When a load extends beyond the maximum dimensions or weight of a routine single-trip permit, it is subject to additional permitting requirements.

Energy-related businesses rely on this type of shipment, and wind energy components and drilling and mining equipment are moving in regions not previously traversed by this type of cargo. Agricultural equipment—implements of animal husbandry—forms a special class of OSOW requirements. The axle ratios on this equipment differ from trucks and can present special challenges for complying with bridge restrictions.

Oversize truck on S.H. 266

Figure 10 maps the flow of trucks with heavy loads traveling over the Oklahoma State Highway System, based on the Transearch freight flow analysis. The largest total freight volumes, for all modes combined, occur in the north-south corridor that includes the I-35 truck and the parallel BNSF rail corridor. Several corridors surrounding the ports in northeast Oklahoma also exhibit the transport of heavy loads.

Figure 10. Heavy-Loaded Truck Flows



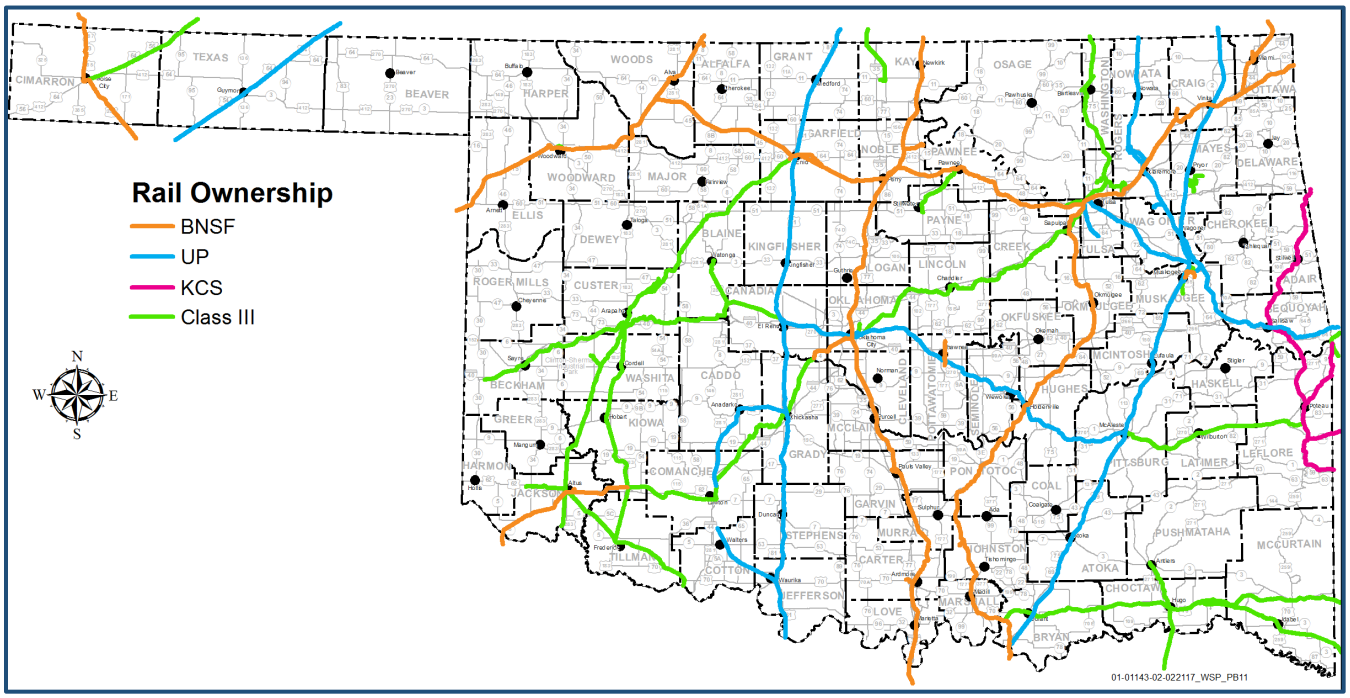
Source: IHS Transearch, Oklahoma Department of Transportation, and WSP analysis, 2017

2.4 RAIL

2.4.1 Oklahoma's Railroads

Figure 11 shows the location of the railroads within the state. The three Class I railroads[9] in Oklahoma are the BNSF Railway (BNSF) which owns 966 route-miles in the state, Union Pacific Railroad (UP) with 894 route-miles, and Kansas City Southern Railway Company (KCS) with 152 route-miles. Class I railroads serve multiple markets and population centers in the state as well as handling through traffic.

Figure 11. Oklahoma Rail Network



Source: Oklahoma DOT, 2017

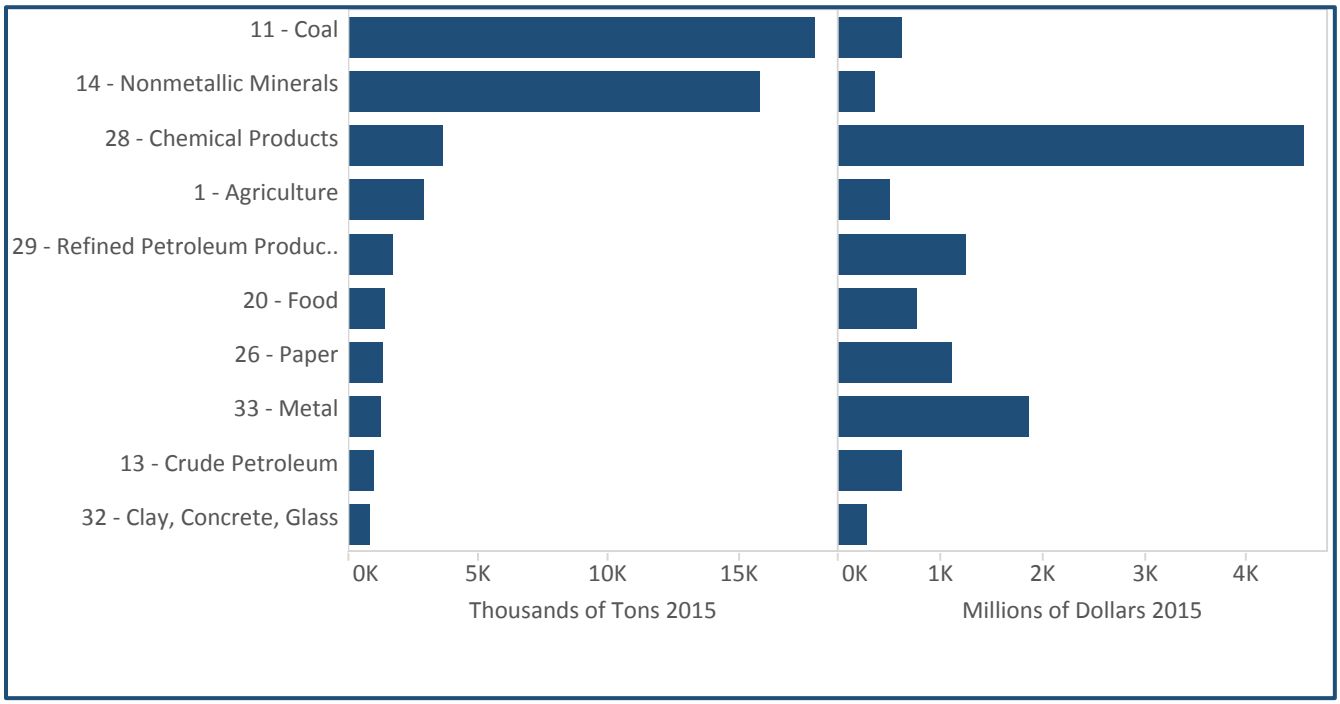
Oklahoma has 18 short-line railroads that provide critical connection to businesses in various parts of the state and play an important role in local economies.

Wichita, Tillman and Jackson Train

2.4.2 Commodity Flows by Rail Into, Out of, Through, and Within Oklahoma

The top weight commodity group transported by rail is coal, followed by nonmetallic minerals. Chemical products are the largest commodity group by value, with metal products following in second place (**Figure 12**).

Figure 12. Top OK-Based Commodity Groups by Rail, Ranked by Tons (2015)



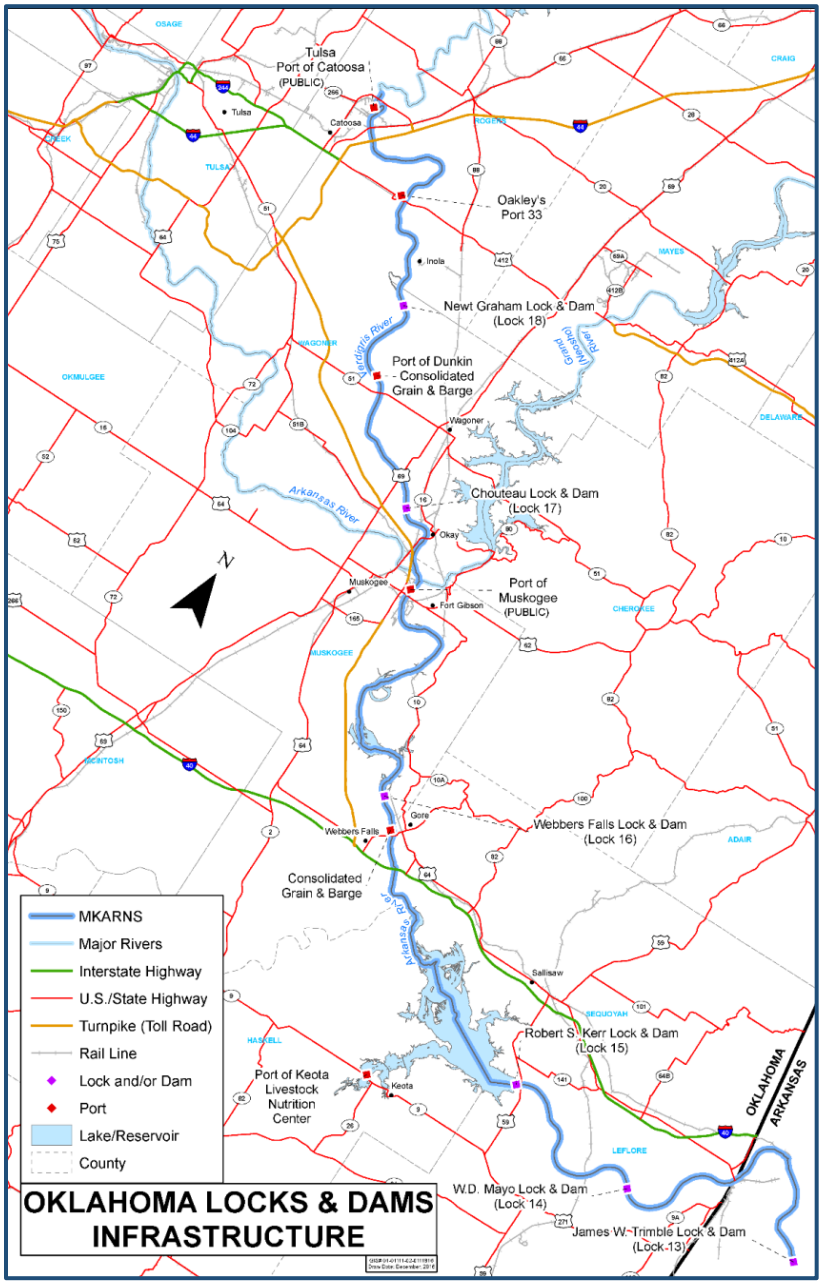
Source: IHS Transearch, WSP analysis, 2017

BNSF bridge over the Oklahoma River, south of downtown Oklahoma City

2.5 OKLAHOMA WATERWAY SYSTEM

Figure 13 displays the MKARNS system in Oklahoma and identifies each lock and/or dam. The MKARNS connects through the Arkansas and Mississippi Rivers to the Gulf of Mexico, the Great Lakes, the nation and the world.

Figure 13. McClellan-Kerr Arkansas River Navigation System

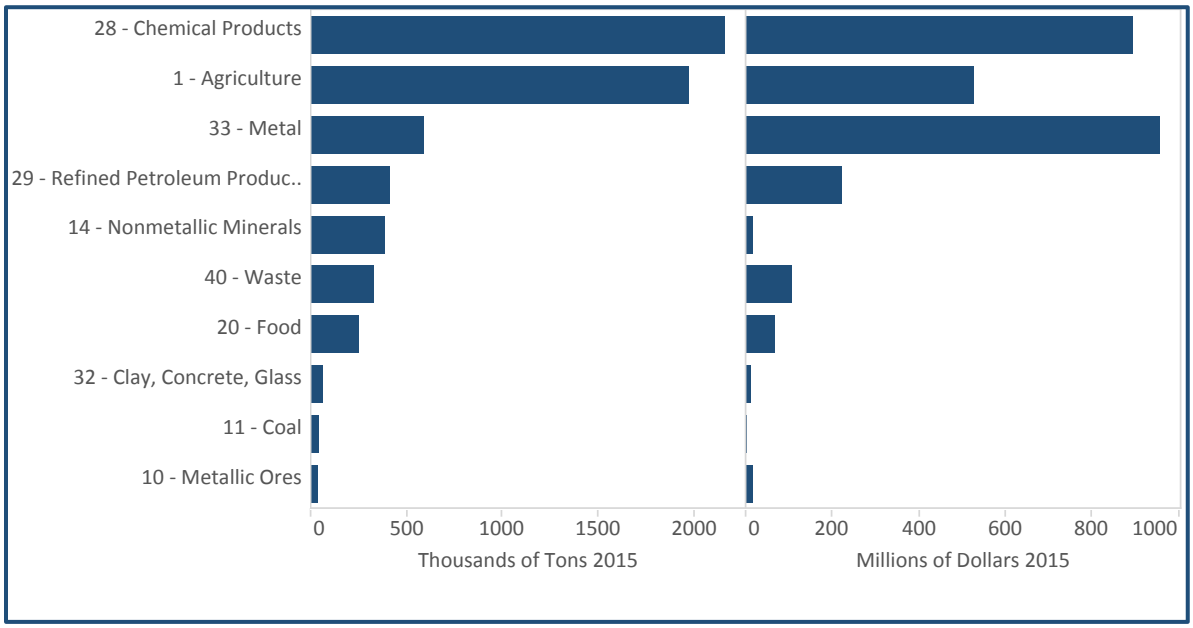


Source: Oklahoma Department of Transportation, 2017.

2.5.1 Commodity Flows by Water Into, Out of, Through, and Within Oklahoma

The top four commodity groups in both tons and value transported by waterways in Oklahoma are chemical products, agriculture, metal products, and refined petroleum products (**Figure 14**).

Figure 14. Top OK-Based Commodity Groups by Water, Ranked by Tons (2015)



Source: IHS Transearch, WSP analysis, 2017

2.5.2 Waterway System and Volume

Oklahoma's waterborne freight traffic is handled entirely via the MKARNS, which connects Oklahoma to the Lower Mississippi River, providing access to states along the Mississippi/Missouri/Ohio river system, the Great Lakes, the Gulf of Mexico, the U.S. Intracoastal Waterway system, and deep-draft open-ocean shipping lanes, and linking Oklahoma with global waterborne trading partners.

Waterborne transport plays a critically important role in allowing Oklahoma to ship and receive fertilizer, grain, metal products, large machinery and equipment, and other cargo that is physically or economically impractical to move by other modes. Oklahoma's ports also serve freight shippers and receivers in Kansas and other states via landside truck and rail connections.

The MKARNS is a 445-mile navigation channel that includes the Verdigris, Arkansas, and White Rivers. From the Mississippi River, the channel follows the Arkansas River across the Oklahoma state line to the Port of Muskogee; from there, the navigation channel follows the Verdigris River, running 51 miles upstream to the Tulsa Port of Catoosa.

RELIABILITY

The MKARNS is an all-season, ice-free system offering high reliability. There have been no closures due to low water events. In 2015, operations were suspended for 90 days due to heavy rains.

2.5.3 Key Facilities

Tulsa Port of Catoosa

The Tulsa Port of Catoosa is located at the head of the MKARNS in northeast Oklahoma. The port is situated on approximately 2,500 acres, accommodating an industrial park with 63 facilities, primarily including manufacturing, distribution, and goods processing companies. Along its 1.5-mile channel, the port offers a diversified set of cargo handling facilities, including unique capabilities for the handling of oversize/overweight "project cargo." Port facilities handled more than two million tons of waterborne freight in 2016.

Tulsa Port of Catoosa

Port of Muskogee

The Port of Muskogee is located near the confluence of the Arkansas, Verdigris, and Grand Rivers. The port is situated on approximately 450 acres. The port also owns the John T. Griffin Industrial Park, which consists of 527 acres. In 2015, the port handled 689,000 tons of cargo.

Port of Muskogee

In addition to terminals, mooring and dock facilities, and a 94,000-square-foot warehouse, the port has overhead and mobile cranes for transloading between barge, rail, and truck, including a 100-metric-ton marine travel lift. The Port of Muskogee provides extensive rail service (via UP) to its users. In 2015, the port was served by 2,210 railcars handling 205,054 tons of freight. The port cannot accommodate unit trains due to track curvature issues, and has submitted a Transportation Investment Generating Economic Recovery grant application to extend tracks and reduce curvature.

OAKLEY'S PORT 33

Oakley's Port 33 is a privately owned port located in Catoosa, southeast of the Tulsa Port of Catoosa and east of Tulsa, just north of the U.S. 412 bridge over the Verdigris River. Formerly named Johnston's Port 33, Bruce Oakley purchased the port in 2014. Port 33 handles over 2.7 million tons of dry bulk annually.

Oakley's Port 33, Catoosa

The original facility consisted of 35 acres, and includes six transfer docks and warehousing for 10 different fertilizer companies. In 2009, a 90-acre expansion area (Port 33 South) was added, which will allow the port to double its capacity. Collectively, Port 33 offers eight docks and five 70-foot truck scales, with fleeting for around 100 barges. Port 33 is entirely truck-served; there is no direct rail service to the site. The nearest rail service is the Burlington Northern Santa Fe, which is seven miles away in Catoosa.

2.6 OKLAHOMA AIR CARGO SYSTEM

Access to reliable air freight services is important to many businesses with high-value products or those requiring rapid transport. This includes medical instruments and advanced manufacturing components as well as many other commodities. Many manufacturers also utilize air freight for repair parts and stock outs. Adequate air service is an integral part of the capabilities necessary to support robust supply chains in the state. Oklahoma is fortunate to have air cargo access through Oklahoma City and Tulsa, and through its proximity to Dallas, TX.

There are three primary commercial service airports in Oklahoma: Lawton-Fort Sill Regional in Lawton, Will Rogers World in Oklahoma City, and Tulsa International in Tulsa. A primary service airport enplanes more than 10,000 people annually with scheduled service. There are two secondary commercial service airports at Enid and Ponca City. There are numerous regional and small private airports throughout the state for general service aviation and chartered freight service.

2.7 OKLAHOMA MULTIMODAL FREIGHT ASSETS

An important element of the freight system is the multimodal freight transfer of assets. These are facilities where freight is transferred from one mode to another. They may also provide storage capacity as well as services that add value to the product being shipped.

Oklahoma is fortunate to have options for several modes of freight transportation, including truck, rail, air and waterways. In addition, multiple modes are often involved in goods movement by using transload facilities. Transload freight occurs because of delivery or financial advantages, and constitutes a growing trend for freight

shipments in Oklahoma. In particular, there is an increasing demand for shipments that travel on Oklahoma rail or water systems, and use truck for "last mile" transport.

For purposes of this OFTP, three types of multimodal assets are addressed:

- Truck-rail container and trailer-transfer terminals (intermodal terminals)
- Transload terminals
- Grain elevators

2.7.1 Intermodal Terminals

Freight transportation planning has historically been mode-oriented. Increasingly, planning is shifting to a supply-chain focus with network connectivity being as important as the individual modal structure. Oklahoma's ability to reach markets outside the state and the nation depends on the interaction of the different modes and the way in which shippers can access the network.

Oklahoma has not had an intermodal terminal since 2005, when BNSF closed its intermodal terminal near Oklahoma City due to lack of demand. Container service for Oklahoma shippers and receivers is provided outside the state by way of Dallas, TX, Kansas City, MO, or Memphis, TN, depending on the location of the shipper in the state and the direction of the shipment. While some state development agencies might hope for new container services within the state, the realities of market costs make that nearly impossible. With relatively short distances to three major metropolitan areas with major intermodal terminals, Oklahoma is at a disadvantage for having one of the major railroads establish a new intermodal terminal in the state.

BNSF Cherokee Yard in Tulsa

The railroads and the asset-based intermodal service providers are engaged in efforts to increase the productive use of their equipment and improve levels of service in selected markets. This is true of all intermodal equipment but particularly for domestic, 53-foot containers. This need for efficiency in turning equipment pushes the services away from areas with a lower density of freight traffic. This is generating a move toward consolidating service to select terminal locations. The current intermodal service network fostered by this trend toward consolidation has a direct impact on the access that Oklahoma shippers have to localized container facilities.

2.7.2 Transload Terminals

Transloading is another form of transfer of freight from one mode of transportation to another; however, it pertains to non-containerized freight. It is used by railroad customers who do not have direct access to a rail line or who want a competitive option to a railroad that directly serves the shipper.

Transload operations involve products shipped in liquid or dry bulk or as break-bulk, dimensional cargo. Dry bulk commodities are shipped in unpackaged quantities. When direct truck-rail transfer is not possible, dry bulk commodities can be stored in an open stockpile (aggregates, minerals, ore, etc.) or in covered storage such as silos (grain). Liquids (petroleum, chemicals) are stored in tanks.

Oklahoma has over 40 transload terminals that handle a spectrum of products including sand, aggregates, grain, bulk, and dimensional products.

2.7.3 Grain Elevators

Grain elevators are a special form of a transload facility. Grain is delivered to the elevator by truck, stored, and then loaded into grain cars. The elevator provides storage capacity not available on the farm, but also aggregates smaller shipments into train-sized lots, reducing transportation costs to the shipper.

There are 101 grain elevators, located in 29 of Oklahoma's 77 counties. Garfield County, with Enid as the County Seat, has the largest number with 12 elevators. This is no surprise since western Oklahoma produces the state's largest crop—wheat, and Enid sits at the intersection of the UP, BNSF, and Grainbelt railroads. The Oklahoma State Rail Plan: 2018–2021 covers the topic of elevators and rail service in greater detail.

2.8 CURRENT CONDITIONS AND CHALLENGES

2.8.1 Truck Operations Concerns and Needs

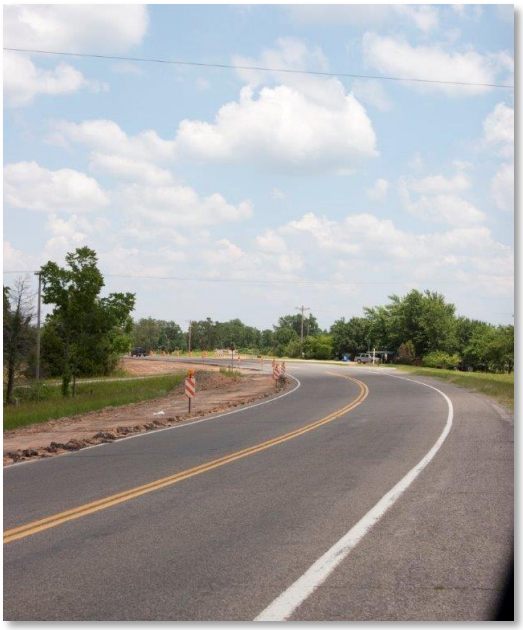
There are some specialized concerns affecting truck freight operations that warrant further consideration.

AGRICULTURAL EQUIPMENT ON ROADWAYS

As small family farms have given way to larger agricultural operations, equipment size has grown. It is necessary for this equipment to travel on local roads in order to move from field to field, or to deliver commodities to other locations, such as grain elevators using farm trailers and trucks. Off-highway equipment, such as combines, has different axle ratios that do not necessarily match that of regular trucking equipment. Load-posted bridges can require equipment to travel significant out-of-route miles to move on a single property.

NEED FOR SHOULDERS

Given that agriculture is one of Oklahoma's largest industries, this situation requires full consideration in infrastructure planning. One particular issue is the lack of shoulders on rural two-lane highways, which makes passing less safe, and affords no provision to pullover when breakdowns occur.



Constructing Shoulder on Rural Highway

> We need to work on providing adequate shoulders on our rural state highways for the safety of our employees and for rural residents.
> *—Oklahoma construction material supply company communications director*

HAZARDOUS MATERIALS

Just as OSOW cargo is increasing in volume, so is the amount of hazardous material, which includes chemicals and petroleum products that are part of the Oklahoma economy. Railroads are limiting their availability for some commodities, thereby pushing the haulage to truck. In Oklahoma, U.S. 69 is heavily used by the military to transport explosives. This is another example of the need for planning for hazardous routing and public safety.

MILITARY USE

An economic impact report produced by the Oklahoma Department of Commerce describes five military installations in Oklahoma employing 69,190 military personnel, military trainees, federal civilian personnel, and contractors. The economic impact in fiscal year 2010 was $9.6 billion to the gross domestic product (GDP) of Oklahoma (7 percent of the state's economy).[10]

> The Interstate and National Highway System is very important to assist the military in meeting their required response times. The combination of rail and highway transport options allows us to meet this portion of our mission.
> *—Engineer, Major Military Installation in Oklahoma*

The military uses commercial vehicles to provide the necessary military materials as well as the consumer goods required to support the base population. The facility at McAlester Army Ammunition Plant receives supplies and equipment, and produces armaments, with raw materials and products shipped by truck and rail. All the installations have rapid deployment needs that require a surge in capacity from commercial providers. The volume of traffic on U.S. 69 associated with the munitions depot is already high. A deployment surge would severely push the limits of that highway. This corridor has national significance and is designated as part of the Strategic Highway Network.

OVERSIZE AND OVERWEIGHT

It is important that states plan for and develop effective infrastructure on a network of routes that can accommodate the OSOW needs. This includes incorporating bridge limits and height restrictions. In Oklahoma, superload permits often trigger additional requirements, and can be more expensive than routine OSOW permits.

The agricultural bulk-transport sector has long been a proponent of higher weight limits, as have the logging and steel industries. Oklahoma has most of these commodity groups at the top of its economy. The higher weight limits reduce the number of trucks and improve hauling capacity. However, as weight increases, so does roadway deterioration.

RELIABILITY

Congestion has a direct economic impact on business. More equipment is required when transport times are longer; inventory requirements increase when deliveries are unreliable and additional distribution centers are needed to quickly meet market demand.[11] Restricted traffic flow in the highway network contributes to a higher cost of goods for business and consumers. Congestion affects transport time in two ways: reducing speed and

decreasing reliability. The reliability of travel time is more important to the planning of capacity and on-time service than is overall speed.

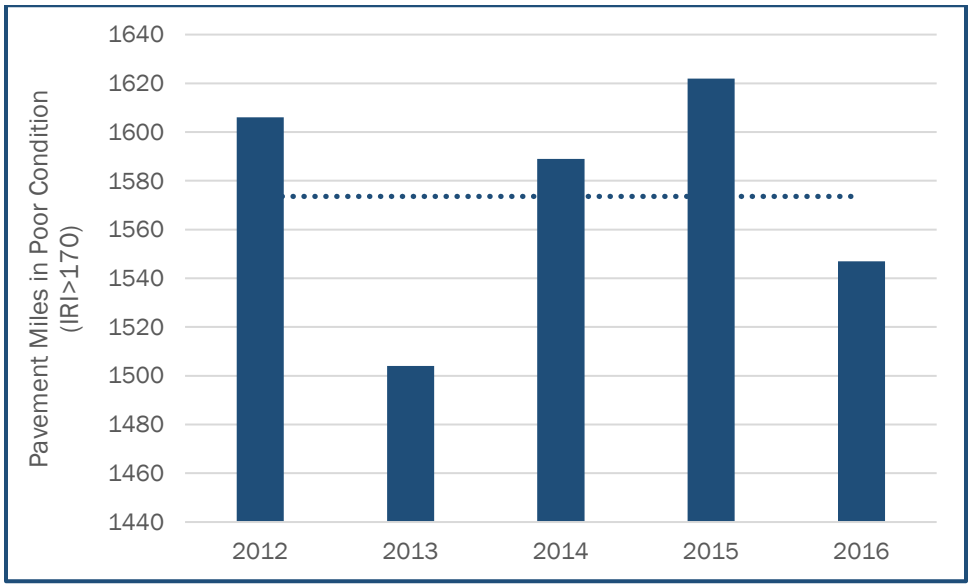
An analysis of delay and reliability was conducted as part of this planning process.[12] As would be expected, deteriorations in reliability occur in the more populated metropolitan areas. Chapter 5 presents details of these findings.

Pavement Condition

For the most part, the major highways are in fair to good condition with segments of the network northeast of Tulsa and in the Oklahoma Panhandle rated as poor. The challenge ODOT faces is to maintain pavement condition with current funding levels while addressing pavement deterioration from increased weight and volumes of vehicles, weather, and infrastructure age.

Figure 15 displays the number of miles of pavement on the State Highway System that were rated poor throughout the state between 2012 and 2016, using the International Roughness Index (IRI). As shown, poor pavement mileage increases and decreases, but the overall trend is relatively flat.

Figure 15. Pavement Condition



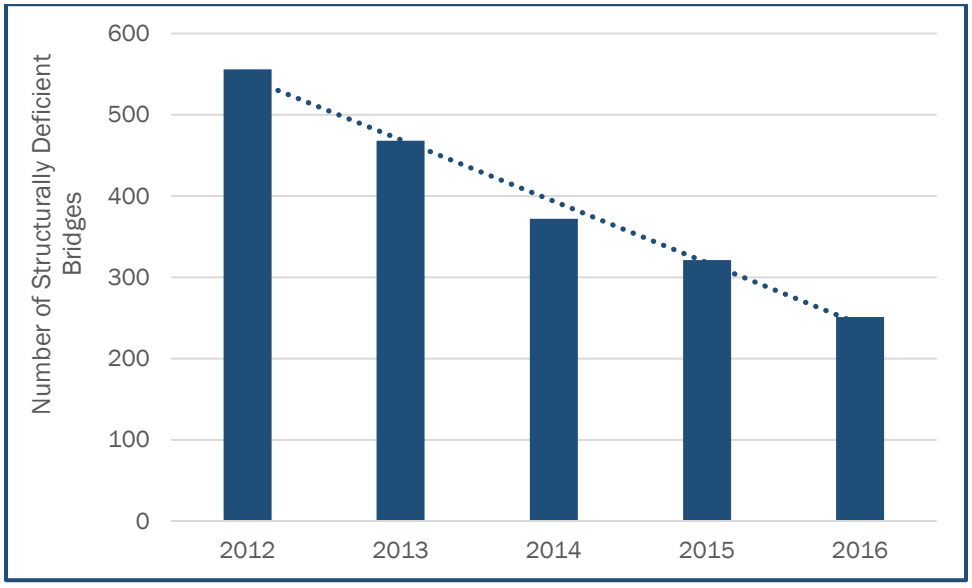
Source: Oklahoma DOT

Bridge Condition

ODOT has a very aggressive bridge repair program in place. **Figure 16** shows the rapid decline in the number of structurally deficient bridges on the State Highway System between 2012 and 2016. The number of structurally deficient bridges is targeted to drop to less than 1 percent by the end of the decade.

S.H. 15 in Woodward County

Figure 16. Bridge Condition



Source: Oklahoma DOT

2.8.2 Freight Railroad Concerns and Needs

The 2012 Oklahoma Statewide Freight and Passenger Rail Plan identified four broad needs. Preliminary stakeholder discussions for the Oklahoma State Rail Plan: 2018–2021 covered many of the same issues:

- The need to support and promote rational growth of the short-line industry and passenger rail service in the state
- The need to find new sources of funds to replace lease revenues lost as rail lines owned by the state revert to the rail operators as part of the lease-purchase program
- The need to fully realize the economic and public benefits of rail transportation
- The need to inform the public of the benefits of rail transportation.

NEED TO SUPPORT SHORT-LINE RAIL INDUSTRY

Oklahoma's short-line railroads are important to the economy of the state. They provide rail service to some of the state's smaller economic centers and communities. Several needs have been identified to preserve and grow the role of the short-line railroads:

- **Track Upgrades** – Upgrading all critical lines to accommodate the higher capacity, heavier weight freight cars will permit Oklahoma's rail customers to remain competitive. A number of Class III (short-line) railroads are unable to accommodate industry-standard 286,000 pound gross weight. In some cases, track infrastructure limits railcar size; other times bridges are inadequate to withstand the weight of these heavier railcars.
- **Unit Train Capacity** – The rail industry has also shifted toward handling unit trains, which typically include at least 110 cars and travel as one unit between origin and destination. The other common train type is "manifest" trains, which are constituted at classification yards with railcars of multiple origins and destinations. But not all of Oklahoma's rail infrastructure can accommodate unit trains. For example, connections between Class I (large) railroads and the regional Class III railroad at Enid, OK, limits train size to 50 cars, which is smaller than most unit trains.

- **Rail Corridor Preservation** – A rail corridor preservation program to retain abandoned rail lines for future rail use (even in those instances where the tracks have been removed) should be considered. Some Oklahoma rail lines are underutilized, which is a cause for concern.

NEED FOR RAIL-SERVED INDUSTRIAL PARKS

The need to establish more rail-served industrial parks has been identified. The industrial parks would generate new rail business not only for the short-line and Class I railroads but also additional economic development in smaller communities. There is need for rail spurs and industrial rail leads connecting Oklahoma's industrial properties to the Oklahoma rail network.

Both Oklahoma City and Tulsa have been cited as areas where additional transload facilities could enhance economic development. Additional team tracks would provide alternatives to shippers that are not directly served by rail in rural areas. In some cases, multimodal facilities need to be upgraded. For example, the track geometry at the Port of Muskogee prevents use by six-axle locomotives and long blocks of 286,000 pound railcars. As opportunities for new industries arise, rail improvements need to be addressed.

HIGHWAY-RAIL GRADE CROSSING IMPROVEMENT

When asked about freight bottlenecks for the Oklahoma State Rail Plan: 2018–2021, stakeholders cited impeded highway freight mobility attributable to at-grade highway-rail crossings. These included crossings in Claremore, Moore, Owasso, and Thomas.

At-Grade Rail Crossing

ELIMINATION OF BOTTLENECKS AND OTHER IMPEDANCES

A critical need, which will be examined and addressed in more detail in later sections, is the elimination of operating hindrances due to capacity restrictions or physical obstructions. Capacity restrictions include track and facility capacity. Physical obstructions limit the ability to use larger profile freight cars, particularly in transporting containers or automobiles.

2.8.3 Waterways Concerns and Needs

MKARNS MAINTENANCE BACKLOG

While the MKARNS offers strong performance and high reliability, it also faces a significant maintenance backlog. Although Oklahoma's ports have different individual plans and needs, there is agreement that the single most important priority is to preserve the safe, reliable, and productive operation of the MKARNS itself.

Like the rest of the U.S. Inland Waterway system, the MKARNS has a substantial list of unfunded "critical backlog" projects, above and beyond routine maintenance. "Critical backlog" is defined as an estimated 50 percent chance of component or asset failure within a five-year period.

MKARNS DEEPENING

The MKARNS has a 9-foot controlling navigation depth, while most of the Inland Waterway system offers at least 12-foot depths. The shallower 9-foot depth means that barges cannot be as heavily loaded. This, in turn, means

that the costs of barge shipment must be spread over less tonnage, producing higher cost-per-ton rates for shippers.

Plans to deepen the MKARNS to 12 feet have not been advanced due to the significant capital and maintenance costs. While deepening would benefit freight shippers, it is not clear that the cost savings would result in significant additional freight being attracted to the MKARNS, since barge shipping is already significantly more cost effective than truck or rail on a per-ton basis. Ports might see some increase in traffic—and in revenues—but they might not, and their return on investment might actually decline.

Market Growth and Change

The total volume of freight on the MKARNS, and the mix of commodities making up the total, is constantly changing. Since 2004, Oklahoma's MKARNS traffic has fluctuated between 3.8 and 6.2 million tons annually. Chemical fertilizer volume has been remarkably stable, showing consistent year-over-year growth; grains have been more variable, while energy products and building materials have been highly variable.

There is now some uncertainty about the future of the chemical fertilizer market as well. Exploring and developing new markets for upbound MKARNS commodities should be a priority for Oklahoma, since this will not only increase overall freight tonnage, but also help ensure that empty barges are available for downbound traffic.

Modal Linkages and Landside Access

Each of Oklahoma's ports depends on efficient connections with truck and rail, but they have very different types of needs:

- For the Tulsa Port of Catoosa, rail access is very strong, but the accommodation of OSOW freight moving by truck has been identified as a need to support the port's heavy-lift project cargo opportunities.
- For the Port of Muskogee, the primary identified need is for rail improvements that would allow long unit trains to call directly at the port, reducing costs for current rail users and potentially attracting new rail business.
- For Port 33, the provision of the connector road between the original facility and Port 33 South addressed a major need. Given the port's exclusive dependence on trucking, the primary need is to ensure that critical truck access routes can accommodate future growth in a safe, efficient, reliable manner.

2.8.4 Challenges for All Freight Modes

Freight transportation requires smooth pavement, structurally sound bridges, and ongoing railroad and waterway infrastructure improvements to deliver products safely and efficiently. Highways need to be maintained and interchanges need to be reconstructed. Growth needs to be accommodated without deterioration in freight service performance. Freight rail systems require track repair and bridge rehabilitation, and rail-highway crossings must be safe. The MKARNS needs to address deferred maintenance on its locks and dams.

The financial challenges for ODOT are increasing as it seeks to maintain and improve the state transportation system. Revenue growth is minimal and costs are escalating. Based on fiscal year 2015, ODOT's total budget was about $1.9 billion, with a capital budget of $1.1 billion, which was broken down as follows:

- About 50 percent from federal revenue—mostly federal highway funds
- About 15 percent from state motor fuel tax
- The remaining 35 percent from a combination of bonds and other state and local revenues

With vehicle fuel efficiency increasing, and accelerating demands on the system, Oklahomans must address transportation funding issues. Oklahoma's 2015 through 2040 LRTP shows that the expected funding gap averages $360 million per year over 25 years, if current trends continue. Needs exceed expected available revenues by nearly 20 percent annually. Clearly a major component of addressing Oklahoma's freight needs is the challenge of finding additional funding.