Status of the Nation's Highways, Bridges, and Transit

Conditions and Performance

23rd Edition

Part III: Highway Freight Transportation

REPORT TO CONGRESS

U.S. Department of Transportation
Federal Highway Administration
Federal Transit Administration

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Abbreviations

AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ATRI	American Transportation Research Institute
BTS	Bureau of Transportation Statistics
C&P	Conditions and Performance
DOT	U.S. Department of Transportation
FAF	Freight Analysis Framework
FARS	Fatality Analysis Reporting System
FAST Act	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
FPM	Freight Performance Measurement
GDP	Gross Domestic Product
HPMS	Highway Performance Monitoring System
IRI	International Roughness Index
MPO	Metropolitan Planning Organizations
MSA	Metropolitan Statistical Areas
NBI	National Bridge Inventory
NHFN	National Highway Freight Network
NHFP	National Highway Freight Program
NHS	National Highway System
NPMRDS	National Performance Management Research Data Set
PHFS	Primary Highway Freight System
TSI	Transportation Services Index
USACE	U.S. Army Corps of Engineers
VMT	Vehicle Miles Traveled

CHAPTER 11: Freight Transportation

Freight transportation is vital to the U.S. economy and the daily needs of Americans throughout the country. Households and businesses depend on the efficient and reliable delivery of freight to both urban and rural areas. Federal support for freight increased under the Fixing America's Surface Transportation (FAST) Act, as the FAST Act included provisions to define, establish, and provide funding for a national highway freight program. The FAST Act freight provisions were designed to address significant needs in the transportation system to ensure that projected increases in freight volumes can be handled efficiently across all transportation modes.

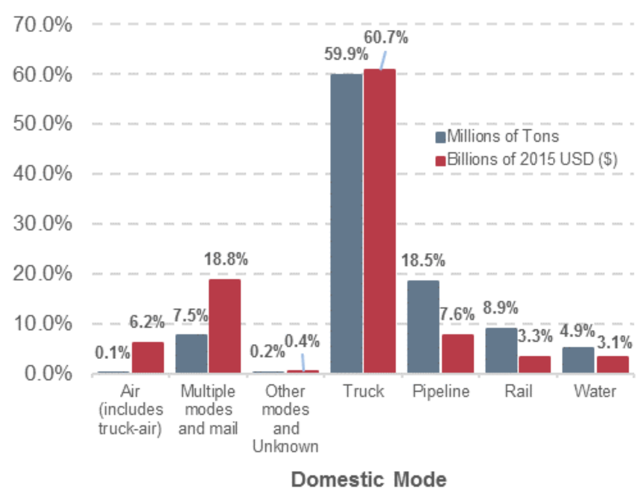
In 2015, the transportation system handled a record amount of freight—including a daily average of approximately 55 million tons of freight, worth approximately $49.5 billion. The freight transportation industry employed 4.6 million workers and contributed 9.5 percent of the Nation's economic activity as measured by gross domestic product (GDP).

Although freight moves on all modes of transportation, trucks are involved in the movement of most goods. The highway system is the most-used mode of transport for freight by tonnage and value of goods moved. Commodities moved by truck have a higher value per weight, which gives trucking a higher share of freight dollar value.

Trucking accounted for nearly 30.5 percent of total transportation and warehousing sector employment. Truck driving is by far the largest freight transportation occupation, with approximately 2.83 million truck drivers. About 57.5 percent of these professional truck drivers operate heavy trucks and 28.2 percent drive light trucks.

As freight movements increase, the number of available safe truck parking spaces diminishes and is a growing concern.

Mode Share by Tonnage and Value, 2015



Note: USD=U.S. dollars

Source: Bureau of Transportation Statistics and FHWA, Freight Analysis Framework, version 4.2, 2016.

Truck Parking

Truck drivers need safe, secure, and accessible truck parking. With the projected growth in truck traffic, demand for truck parking will continue to outpace supply. In 2014, FHWA worked with States and industry partners on the *Jason's Law Truck Parking Survey Results and Comparative Analysis* to assess these needs. The resulting information quantified the commercial motor vehicle parking shortage at facilities along the National Highway System. The survey provided direct insight into parking issues: more than 75 percent of truck drivers surveyed said they regularly experienced problems finding "safe parking locations when rest was needed."

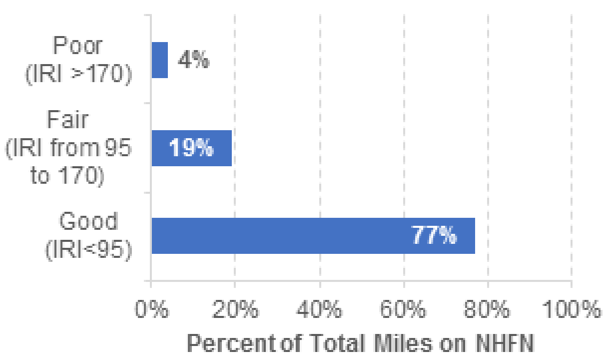
CHAPTER 12: Conditions and Performance of the National Highway Freight Network

The Fixing America's Surface Transportation (FAST) Act designated the National Highway Freight Network (NHFN) and established a national policy of maintaining and improving the conditions and performance of this new network. Furthermore, it required the development of a regular report on the conditions and performance of the NHFN. This chapter serves as the first of these reports.

Conditions

In 2012, the NHFN consisted of 51,029 centerline miles, including 46,947 centerline miles of Interstate and 4,082 centerline miles of non-Interstate roads. Based on 2014 international roughness index (IRI) data from the Highway Performance Monitoring System (HPMS), approximately 77 percent of pavement miles were rated as having good ride quality, 19 percent had fair ride quality, and 4 percent had poor ride quality.

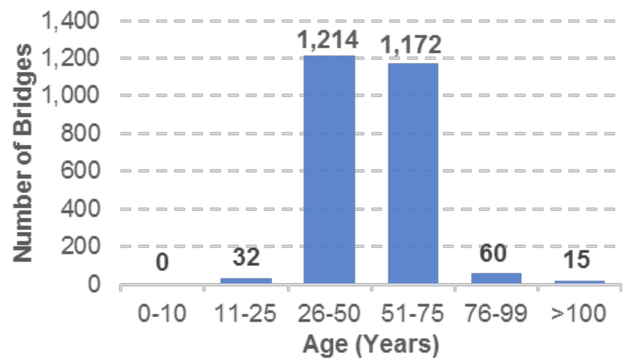
Pavement Ride Quality (IRI) Based on Mileage on NHFN



Source: IRI data in 2014 HPMS files.

The National Bridge Inventory is used to identify current bridge ratings for bridges on the NHFN. This analysis showed there are approximately 57,600 bridges on the NHFN. Around 4.3 percent of those bridges were rated as structurally deficient. Most of these structurally deficient bridges are 25 years and older, and over half are more than 50 years old. These findings have implications for future maintenance and funding needs as well as impacts to operations.

Age of Structurally Deficient Bridges on NHFN, 2014



Source: Bridge condition data contained in 2014 NBI files.

Performance

Travel time, speed, and safety are three measures of performance. Slower speeds and unreliable travel times caused by congestion increase fuel cost and affect operations and productivity, which adds expense to the freight transportation system. In 2014, congestion created stop-and-go conditions on 5,800 miles of the NHFN and caused traffic to travel below posted speed limits on an additional 4,500 miles of the high-volume truck portions of the NHFN. The projected growth in freight and its reliance on trucks will increase congestion and make it more difficult and costly to move freight.

A total of 3,633 fatal crashes occurred on the Interstate portion of the NHFN in 2014, resulting in 4,094 fatalities. In 2015, fatal crashes and fatalities increased by 5.7 percent and 6.1 percent, respectively.

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PART III

Highway Freight Transportation Conditions and Performance

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Introduction

The Moving Ahead for Progress in the 21st Century Act (MAP-21), enacted in 2012, included provisions to reduce traffic congestion and improve the efficiency of freight movement. MAP-21 called for freight-specific initiatives, including the development of a National Freight Strategic Plan, the designation of data-driven highway networks relevant to freight, and the establishment of a freight performance measure for the Interstate System. These initiatives subsequently formed the basis for freight provisions in the Fixing America's Surface Transportation (FAST) Act of 2015 (P.L. 114-94). The FAST Act directed FHWA to establish a National Highway Freight Program (NHFP) and a National Highway Freight Network (NHFN) under Title 23 to improve the efficient movement of freight. The law also created a multimodal freight program under Title 49 that requires the establishment of the National Multimodal Freight Network (NMFN). In addition, the FAST Act required the Federal Highway Administration (FHWA) Administrator to submit to Congress a report describing the conditions and performance of the NHFN.

As stated in the Fixing America's Surface Transportation Act:

"...the goals for the National Highway Freight Program are established in Section 167 of Title 23, subsection (b), and are as follows:

- To invest in infrastructure improvements and to implement operational improvements on the highways of the United States that –
  - Strengthen the contribution of the NHFN to the economic competitiveness of the United States;
  - Reduce congestion and bottlenecks on the NHFN;
  - Reduce the cost of freight transportation;
  - Improve the year-round reliability of freight transportation; and
  - Increase productivity, particularly for domestic industries and businesses that create high-value jobs;
- To improve the safety, security, efficiency, and resiliency of freight transportation in rural and urban areas;
- To improve the state of good repair of the NHFN;
- To use innovation and advanced technology to improve the safety, efficiency, and reliability of the NHFN;
- To improve the efficiency and productivity of the NHFN;
- To improve the flexibility of States to support multi-State corridor planning and the creation of multi-State organizations to increase the ability of States to address highway freight connectivity; and
- To reduce the environmental impacts of freight movement on the NHFN..."

Chapter 11 of this report addresses freight transportation on systems (including the National Network and National Highway System) covered in previous versions of the biennial *Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance* Report to Congress (C&P Report).

Chapter 12 addresses the statutory requirement of a report on the conditions and performance of the NHFN. Based on the goals of the NHFP, Chapter 12 discusses metrics used to analyze the current conditions and performance of the NHFN and provides information on freight movement on this network.

CHAPTER 11

Freight Transportation

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Freight is generally understood to be merchandise or commodities that are moved by a mode of transportation, such as a truck, ship, aircraft, pipeline, or train. Freight transportation is the physical process of transporting commodities or merchandise from one place to another for a fee.

Freight transportation affects every business and household in some way. The economy of the United States depends on freight transportation to connect businesses to markets throughout the world. Domestic manufacturers rely on the timely delivery of freight to meet production schedules. Wholesalers and retailers depend on a fast, reliable, and cost-effective transportation system. In the expanding world of e-commerce, households and small businesses depend on transportation to deliver freight directly to them. Service providers, public utilities, construction companies, and Government agencies rely on freight transportation to obtain needed equipment and supplies.

As the economy continues to grow in the coming decades, freight transportation demand is expected to increase. Projections released in March 2016 by the U.S. Department of Transportation's (DOT's) Bureau of Transportation Statistics (BTS) and FHWA show that freight tons moving on the Nation's transportation system will grow by 40 percent in the next three decades, and the value of the freight will almost double.[i]

Key Takeaways

- Freight transportation affects everyone.
- By the year 2045, the total value of freight in the United States is expected to nearly double that of 2012.
- Trucks move 64 percent of freight by ton and 69 percent of freight by value—by far the single largest mode.
- Intermodal Connectors provide the "last mile" linkage between freight facilities and the NHS.
- Since the year 2000, States have designated approximately 182 new freight intermodal connectors.
- The lack of safe truck parking in all States, and especially in and around large metropolitan areas, is a growing concern to truckers.

Freight System

The freight transportation system in the United States includes an extensive network of highways, railroads, waterways, pipelines, and airways: 958,000 miles of Federal-aid highways, 141,000 miles of railroads, 11,000 miles of inland waterways, and 1.6 million miles of pipelines. The United States has more than 19,000 airports and more than 5,000 coastal, Great Lakes, and inland waterway facilities. Freight moves to, from, and within the United States via this extensive network, sometimes using two or more modes along the supply chain, with trucks moving the largest share of freight by tonnage and value. By 2045, the total weight of freight on all modes of transportation is projected to reach 25 billion tons, whereas the value of freight is expected to grow to $37 trillion.[ii]

Exhibit 11-1 identifies the share of total tonnage and value moved by each freight transportation mode in the United States in 2015, broken out by origin and destination (import and export). The domestic movement of freight makes up 89 percent of the total weight of goods transported and 78 percent of the total value of goods transported.

Exhibit 11-1: Mode Share by Tonnage and Value, 2015

Domestic Mode	Millions of Tons				Billions of 2015 USD[1]			
	Domestic Only	Export	Import	Total	Domestic Only	Export	Import	Total
Air (includes truck-air)	0%	0%	0%	0%	1%	17%	14%	4%
Multiple Modes & Mail	2%	5%	3%	2%	12%	6%	6%	11%
Other Modes and Unknown	0%	0%	0%	0%	0%	1%	2%	0%
Pipeline	19%	13%	16%	18%	9%	4%	4%	8%
Rail	9%	15%	9%	9%	3%	5%	5%	3%
Truck	66%	52%	35%	64%	73%	57%	53%	69%
Water	4%	15%	11%	5%	3%	10%	9%	4%
No Domestic Mode	0%	0%	25%	2%	0%	0%	7%	1%
Total	**16,045**	**912**	**1,099**	**18,056**	**15,558**	**1,745**	**2,567**	**19,871**

[1] USD = U.S. dollars.

Source: Bureau of Transportation Statistics and FHWA, Freight Analysis Framework, version 4, 2016.

Freight transportation movements are expected to increase over the next few decades, as global populations grow and consumer spending power increases. *Exhibit 11-2* shows historical and forecasted mode share in ton-miles from 1990–2040. The data reveal that most freight transportation modes are expected to experience increased volumes, although the amount of expected growth will vary by mode, with pipelines projected to have negative growth to year 2040.

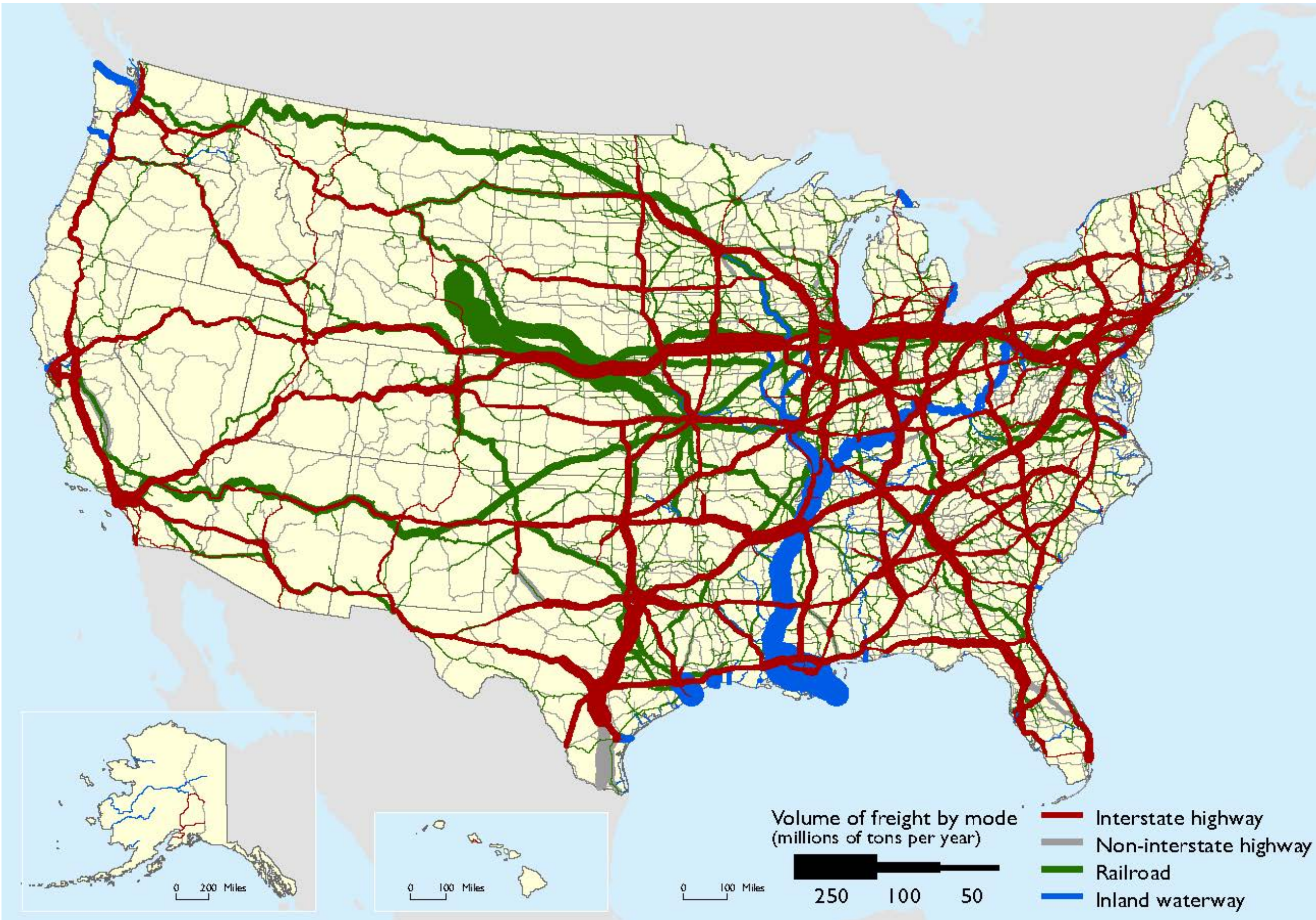
Exhibit 11-2: Historical and Forecasted Mode Share of Ton-miles, 1990–2040

Domestic Mode	Ton-miles Mode Share					Average Annual Growth Rate (percent)			
						Historical		Forecast	
	1990	2000	2010	2015	2040	1990 to 2000	2000 to 2010	2010 to 2015	2015 to 2040
Truck	36.4%	42.3%	44.0%	46.5%	54.4%	3.2	1.0	3.0	1.6
Railroad	22.9%	28.1%	29.4%	28.7%	25.9%	3.8	1.1	1.4	0.6
Pipeline	22.0%	17.3%	17.0%	16.7%	12.1%	-0.8	0.5	1.5	-0.3
Domestic Water Transportation	17.9%	11.5%	8.8%	7.4%	6.8%	-2.8	-2.0	-1.8	0.6
Air	0.8%	0.7%	0.8%	0.7%	0.7%	1.1	1.0	0.9	0.8
Total Ton-miles (trillions)	**4.8**	**5.6**	**6.0**	**6.6**	**8.4**	**1.6**	**0.6**	**1.9**	**1.0**

Source: 2016 Freight Quick Facts Report, DOT, Draft National Freight Strategic Plan, BTS Special Tabulation, Figure 4.

Exhibit 11-3 illustrates freight tonnage in 2014 by mode on the National Highway System (NHS), Class I railroads, and inland waterways.

Exhibit 11-3: Tonnage on Highways, Railroads, and Waterways, 2014



Sources: Highways—Federal Highway Administration, Freight Analysis Framework, Version 4; Rail—Surface Transportation Board, Annual Carload Waybill Sample, Federal Railroad Administration, Rail Freight Flow Assignments (2012); Waterways—U.S. Army Corps of Engineers (USACE), Annual Vessel Operating Activity, Tennessee Valley Authority, Lock Performance Monitoring System data for USACE, USACE Institute for Water Resources, Waterborne Foreign Trade Data, USACE Water Flow Assignments (2012).

Freight Transportation Demand

The BTS publication *Freight Facts and Figures 2015* indicates that the U.S. freight transportation system handled a record amount of freight in 2014. A daily average of approximately 55 million tons of freight valued at $49.3 billion moved across the transportation system in 2014 to meet the needs of the Nation's 122.5 million households, 7.5 million business establishments, and 90,056 Government units.[iii]

Freight transportation is important to the overall economy. In 2014, freight transportation establishments serving for-hire transportation and warehousing operations employed nearly 4.6 million workers and comprised 9.5 percent of the Nation's economic activity as measured by gross domestic product (GDP). Truck driving is by far the largest freight transportation occupation, with approximately 2.83 million truck drivers.[iv] About 57.5

percent of these professional truck drivers operate heavy or tractor-trailer trucks and 28.2 percent drive light or delivery service trucks.[v]

The BTS Freight Transportation Services Index (TSI) measures the output of services provided by for-hire transportation industries. This freight index correlates strongly with U.S. economic activity and helps illustrate the relationship between freight transportation and long-term changes in the U.S. economy.

Exhibit 11-4 shows the annual Freight TSI figures for the years 2000 and 2005–2016. The TSI declined steadily from 2005 through 2009. However, since 2010, the TSI has steadily increased, reaching its highest level in 2016.

The highway system is the most-used mode of transport for freight by tonnage and by the value of goods moved. The highway system is composed of all Federal, State, local, and private roads that move freight by commercial vehicles. The total tonnage for trucking is forecasted to grow by almost 45 percent by 2045, and the value of freight is forecasted to increase by 84 percent.[vi] The major highway systems that support the movement of freight are described in the following sections.

Exhibit 11-4: Annual Freight Transportation Services Index, 2000–2016[1]

Year	Freight TSI
2000	100.0
2005	112.4
2006	111.5
2007	110.1
2008	108.8
2009	98.3
2010	106.4
2011	110.9
2012	112.1
2013	116.2
2014	120.4
2015	122.1
2016	122.3

[1] The TSI is indexed such that the Year 2000 TSI equals 100.0.

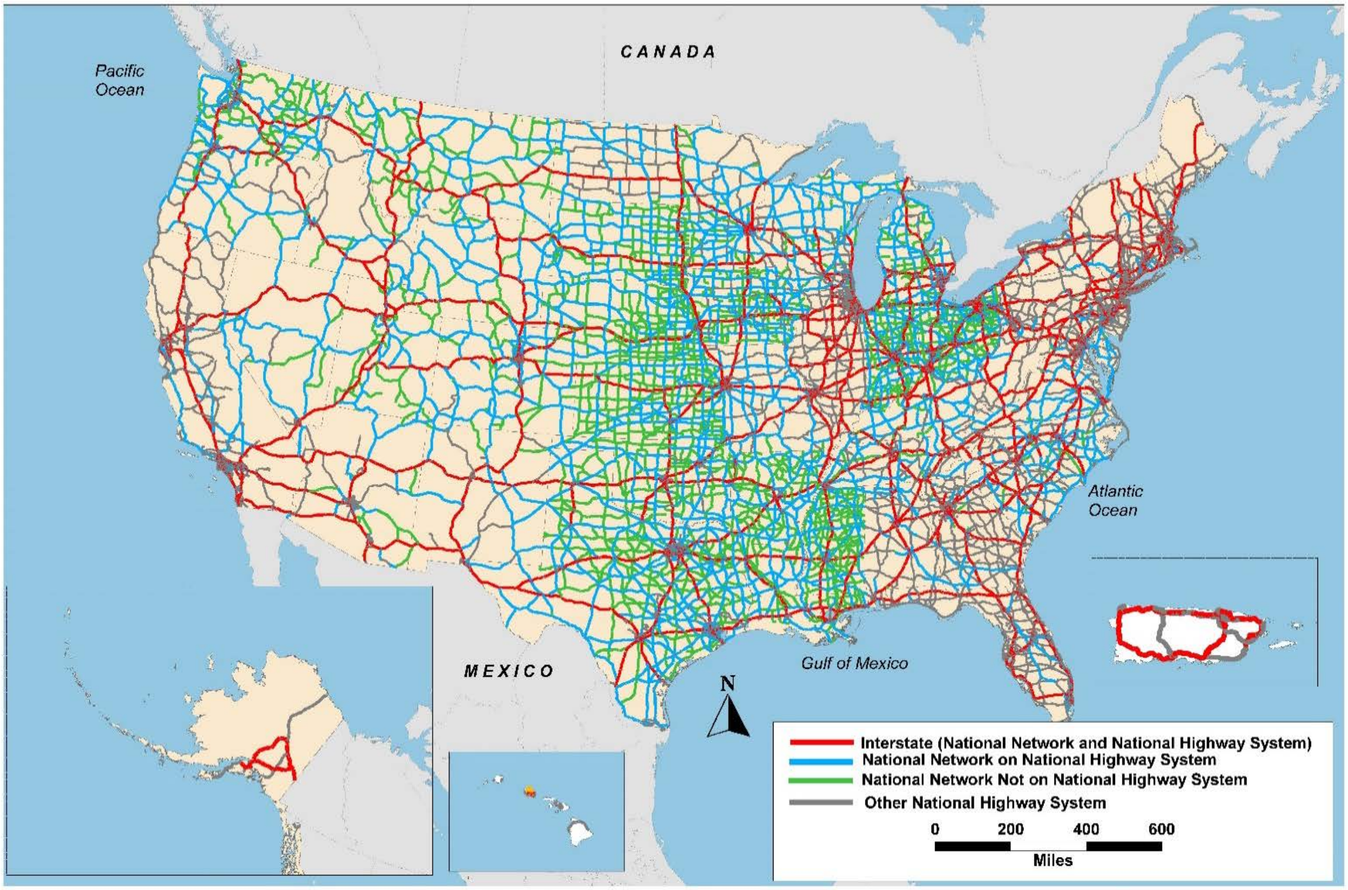
Source: U.S. Department of Transportation, Office of the Assistant Secretary for Research and Technology, Bureau of Transportation Statistics.

Freight Highway Systems

National Network

The National Network is the system of roadways officially designated to accommodate commercial freight-hauling vehicles authorized by the Surface Transportation Assistance Act (STAA) of 1982 (P.L. 97-424) and specified in the U.S. Code of Federal Regulations (23 CFR 658). The STAA requires States to allow conventional truck-trailer combinations on the Interstate System and certain portions of the Federal-aid Primary System. Conventional combinations are tractors with one semitrailer up to 48 feet in length or with one 28-foot semitrailer and one 28-foot trailer, and can be up to 102 inches wide. Currently, most States allow conventional combination trucks with single trailers up to 53 feet in length to operate without permits on their portions of the National Network. These National Network routes for conventional combination trucks as of 2014 are illustrated in *Exhibit 11-5*.

Exhibit 11-5: National Network for Conventional Combination Trucks, 2014[1,2]



[1] This map should not be interpreted as the official National Network and should not be used for truck size and weight enforcement purposes. The National Network and the National Highway System (NHS) are approximately 200,000 miles in length, but the National Network includes 65,000 miles of highways beyond the NHS, and the NHS encompasses about 50,000 miles that are not part of the National Network.

[2] "Other NHS" refers to NHS mileage that is not included on the National Network. Conventional combination trucks are tractors with one semitrailer up to 48 feet in length or with one 28-foot semitrailer and one 28-foot trailer. Conventional combination trucks can be up to 102 inches wide.

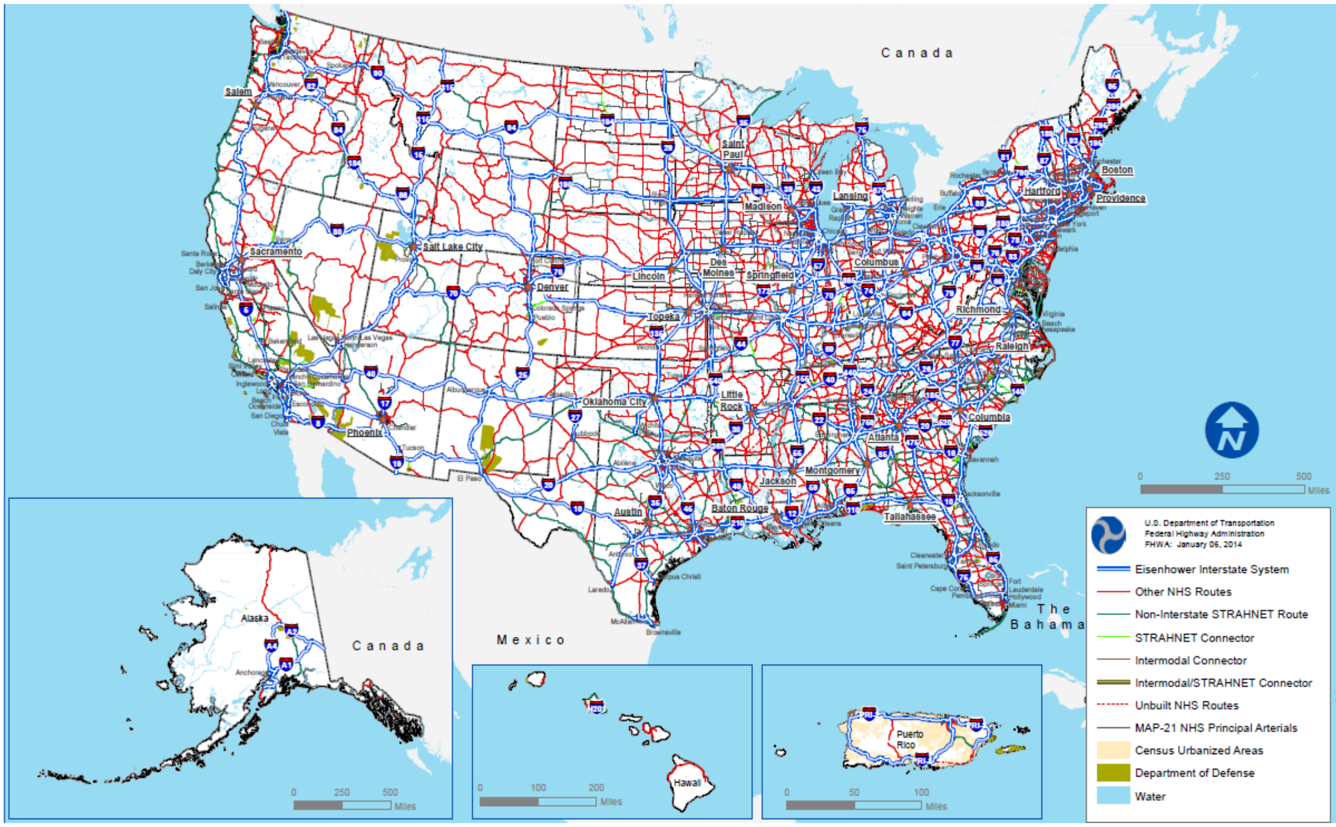
Source: DOT, FHWA, Office of Freight Management and Operations, Freight Analysis Framework, version 3.4, 2013.

National Highway System

The National Highway System (NHS) consists of roadways important to the Nation's economy, defense, and mobility. The NHS was developed by DOT in cooperation with the States, local officials, and metropolitan planning organizations (MPOs).

As discussed in Chapter 1, the NHS includes the Interstate System of Highways, other principal arterials, the Strategic Highway Network (STRAHNET), major strategic highway network connectors, and intermodal connectors. *Exhibit 11-6* shows the National Highway System as of 2014.

Exhibit 11-6: National Highway System (NHS)



Source: DOT, 2014.

Intermodal Connectors

Freight intermodal connectors are the roads that provide the "last mile" connection between major intermodal freight facilities and the NHS. They are critical components of our transportation system and can affect the timely and reliable delivery of goods. Public roads leading to major intermodal terminals are designated as NHS connectors by the DOT, in cooperation with State departments of transportation and MPOs. When considering changes to the intermodal connectors, FHWA reviews several factors, including annual freight volumes, daily vehicular traffic, and the importance of an intermodal facility within a specific State.[vii]

Exhibit 11-7 shows the number of new freight intermodal connectors, by mode, added to the NHS and the percentage change between the years 2000 and 2014. In total, 182 connectors were added, representing a 30-percent increase in the designation of intermodal connectors.

Exhibit 11-7: Number of Freight Intermodal Connectors by Mode, 2000–2014

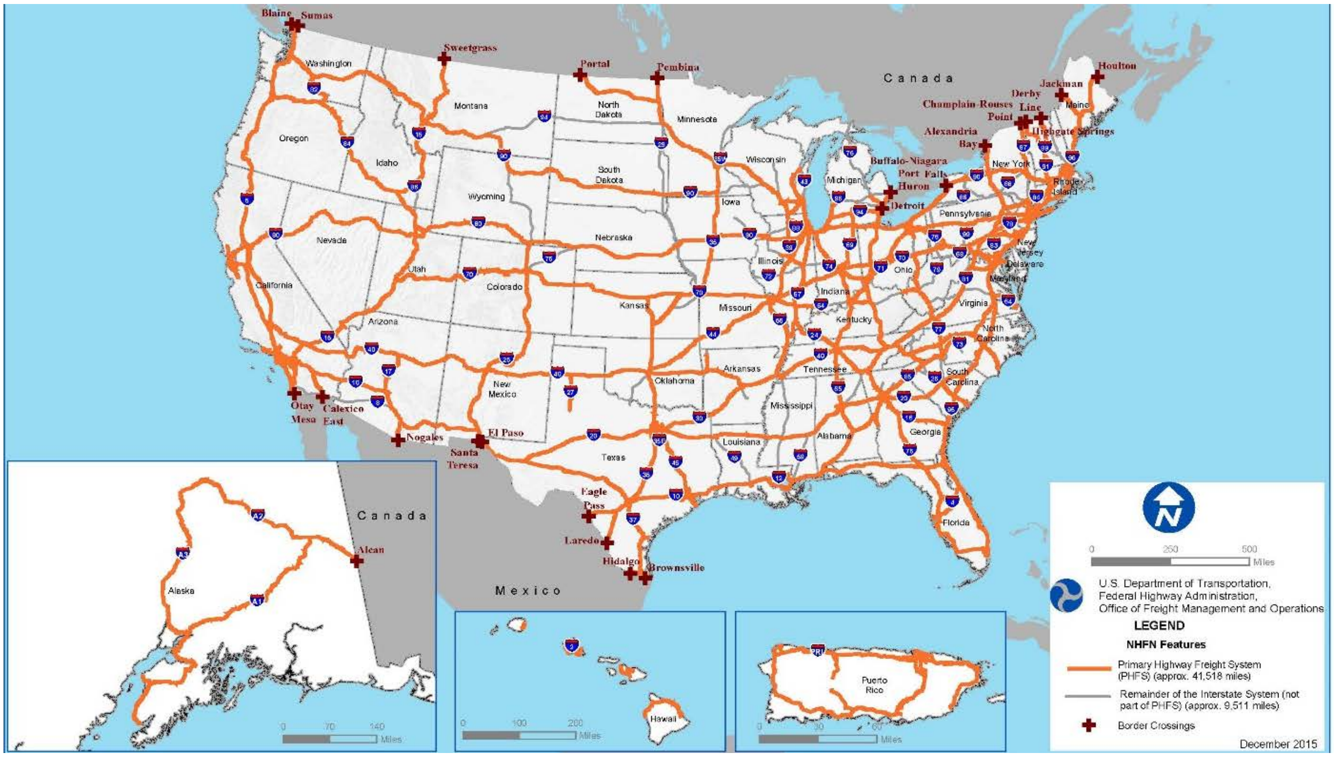
Mode	2000 Connectors	2014 Connectors	Net Change	Percentage Change
Port	252	329	77	31%
Rail	204	269	65	32%
Airport	99	132	33	33%
Pipeline	61	68	7	11%
Total	**616**	**798**	**182**	**30%**

Source: *Final Report, FHWA Freight Intermodal Connectors Study*, April 2017, Table 1.

National Highway Freight Network

The Fixing America's Surface Transportation (FAST) Act directed the FHWA Administrator to establish a National Highway Freight Network (NHFN) to strategically direct Federal resources and policies toward improved performance of highway portions of the U.S. freight transportation system. (See *Exhibit 11-8.*)

Exhibit 11-8: National Highway Freight Network (NHFN)



Source: DOT, FHWA Office of Freight Management and Operations, 2015.

The NHFN includes the following subsystems of roadways:

- **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. The network consists of 41,518 centerline miles, including 37,436 centerline miles of Interstate and 4,082 centerline miles of non-Interstate roads.
- **Other Interstate portions not on the 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. These portions amount to an estimated 9,511 centerline miles of Interstate nationwide, and will fluctuate with additions and deletions to the Interstate Highway System.
- **Critical Rural Freight Corridors (CRFCs):** These are public roads not in an urbanized area that provide access and connection to the PHFS and the Interstate System with ports, public transportation facilities, or other intermodal freight facilities.

- **Critical Urban Freight Corridors (CUFCs):** These are public roads in urbanized areas that provide access and connection to the PHFS and the Interstate System with ports, public transportation facilities, or other intermodal transportation facilities.

The NHFN consists of an estimated total of 51,029 centerline miles, not including CRFCs and CUFCs. Congress granted States, and in certain cases, MPOs, the ability to designate additional public roads as CRFCs and CUFCs in accordance with Section 1116 of the FAST Act. Designation is subject to mileage limitations. FHWA must re-designate the PHFS every 5 years, subject to a cap of up to 3 percent growth in total mileage with each re-designation.

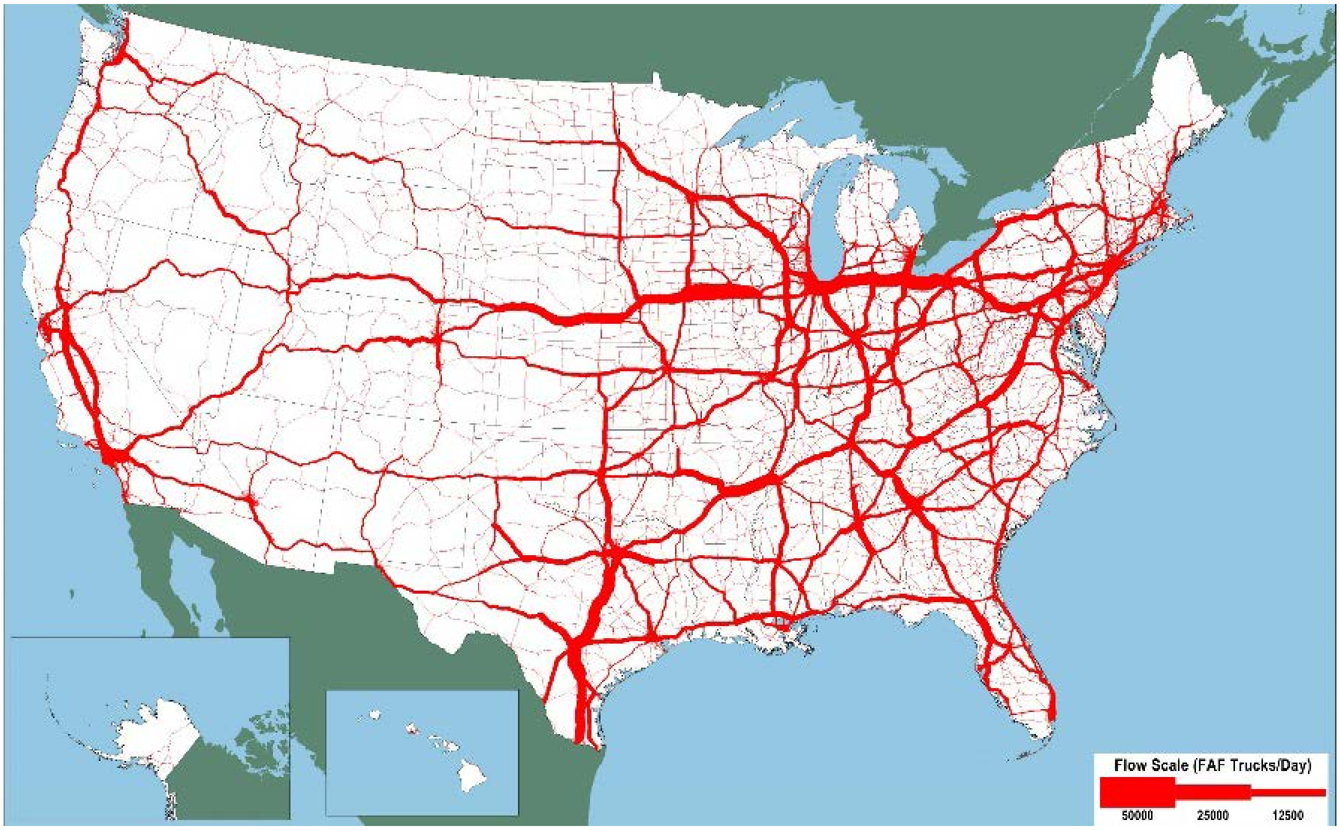
Freight on the NHS

As stated earlier, freight transportation is expected to increase over the next 30 years.

Approximately 50 percent of large freight trucks (trucks with a gross vehicle weight of over 10,000 pounds) operate within 50 miles of their origination and account for about 30 percent of truck vehicle miles traveled (VMT). By contrast, only 10 percent of large trucks operate more than 200 miles away from their origin, but these large trucks account for more than 30 percent of overall truck VMT. Long-distance truck travel also accounts for nearly all freight ton-miles and a large share of truck VMT.[viii]

The map in *Exhibit 11-9* illustrates the average daily long-haul freight truck volumes on the NHS in 2012, and the map in *Exhibit 11-10* illustrates the forecasted average daily long haul truck freight volumes in 2045 on the NHS.

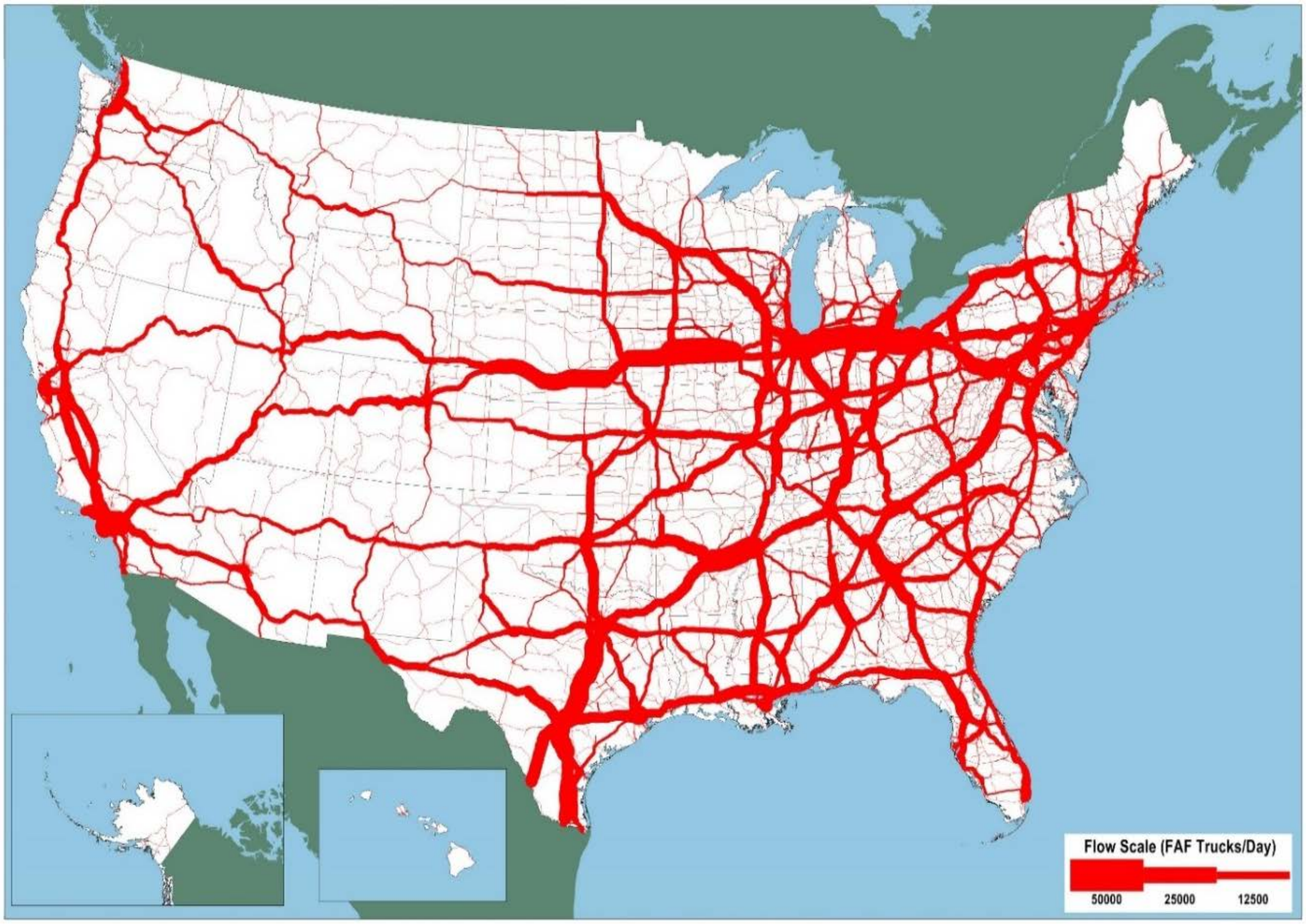
Exhibit 11-9: Average Daily Long Haul Freight Truck Traffic on the NHS, 2012



Note: Major flows include domestic and international freight moving by truck on highway segments with more than 25 FAF trucks per day and between places typically more than 50 miles apart.

Source: DOT, FHWA Office of Freight Management and Operations, Freight Analysis Framework, version 4.3, 2017.

Exhibit 11-10: Forecasted Average Daily Long Haul Freight Truck Traffic on the NHS, 2045



Note: Major flows include domestic and international freight moving by truck on highway segments with more than 25 FAF trucks per day and between places typically more than 50 miles apart.

Source: DOT, FHWA Office of Freight Management and Operations, Freight Analysis Framework, version 4.3, 2017.

These maps illustrate the projected increase in tonnage flows across the NHS (*Exhibit 11-10*) compared with the current tonnage flows shown in *Exhibit 11-9*. Truck volumes on many key routes of the NHS are expected to increase significantly between 2014 and 2045. These projected increases can have major implications for highway congestion and freight movement efficiency, especially near large urban areas along major truck corridors.

Trucks carry high-value, time-sensitive freight, as well as lower-value, bulk tonnage such as agricultural products, gasoline for local distribution, and municipal solid waste. *Exhibit 11-11* shows truck VMT and registrations for 2014. In this table, data reveal that combination trucks and single-unit trucks account for 9.2 percent of total miles driven in 2014. On average, combination trucks drove approximately five times more miles per year than did single-unit trucks.

Exhibit 11-11: Truck Vehicle Miles Traveled and Registrations, 2014[1]

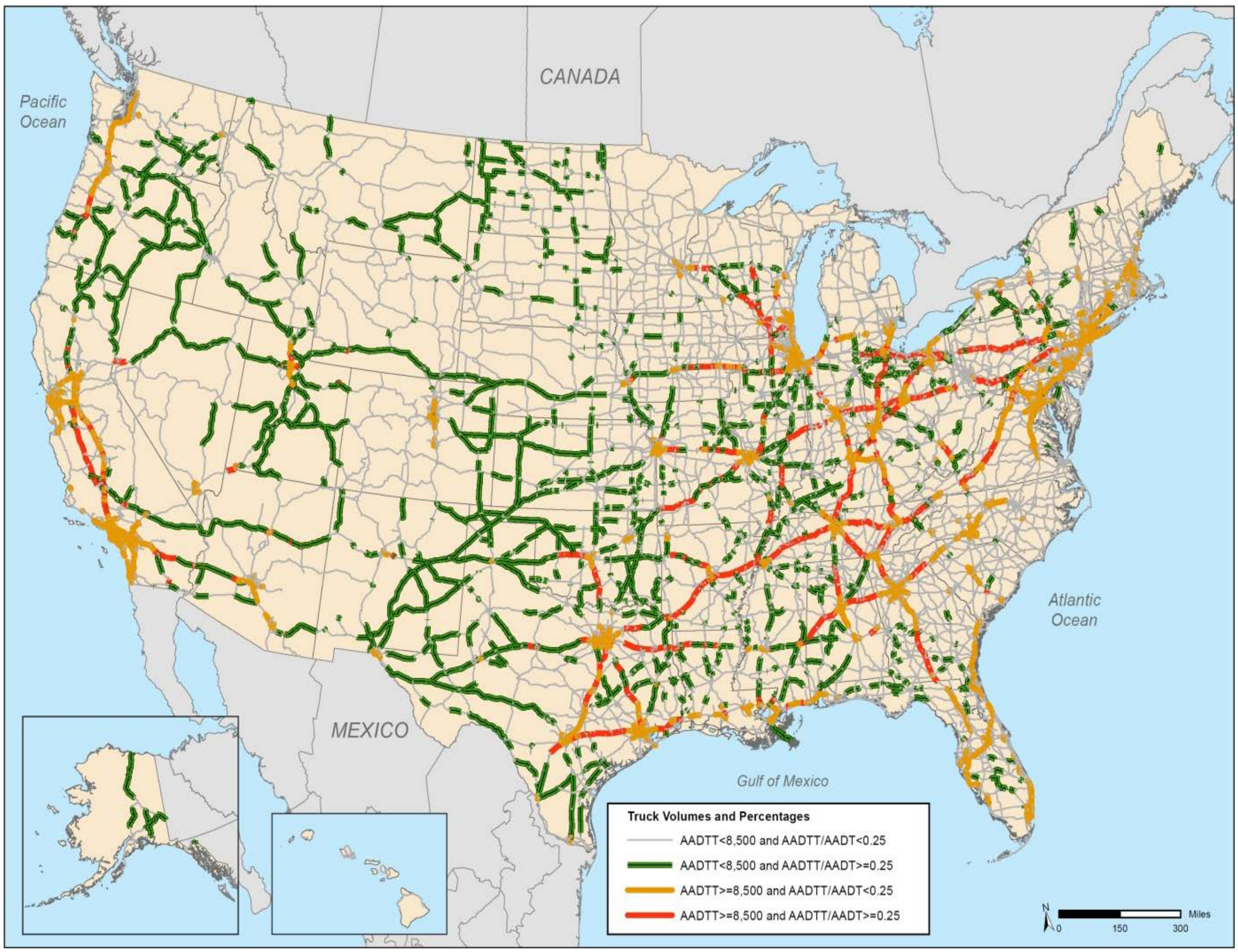
Vehicle Type	Urban and Rural Miles		Registered Vehicles		Average VMT per Year
	Billion VMT	Percent	Billion VMT	Percent	
Single-unit Trucks	109.3	3.6	8.3	3.2	13,123
Combination Trucks	169.8	5.6	2.6	1.0	65,897
All Vehicles	3,025.7	100.0	260.4	100.0	11,621

[1] VMT = vehicle miles traveled.

Source: FHWA Highway Statistics 2014, Table VM-1. (https://www.fhwa.dot.gov/policyinformation/statistics/2014/vm1.cfm)

The map in *Exhibit 11-12* identifies the major truck routes on the NHS. These routes handle more than 8,500 trucks per day or are routes where trucks comprise at least 25 percent of the traffic.

Exhibit 11-12: Major Truck Routes on the NHS[1]



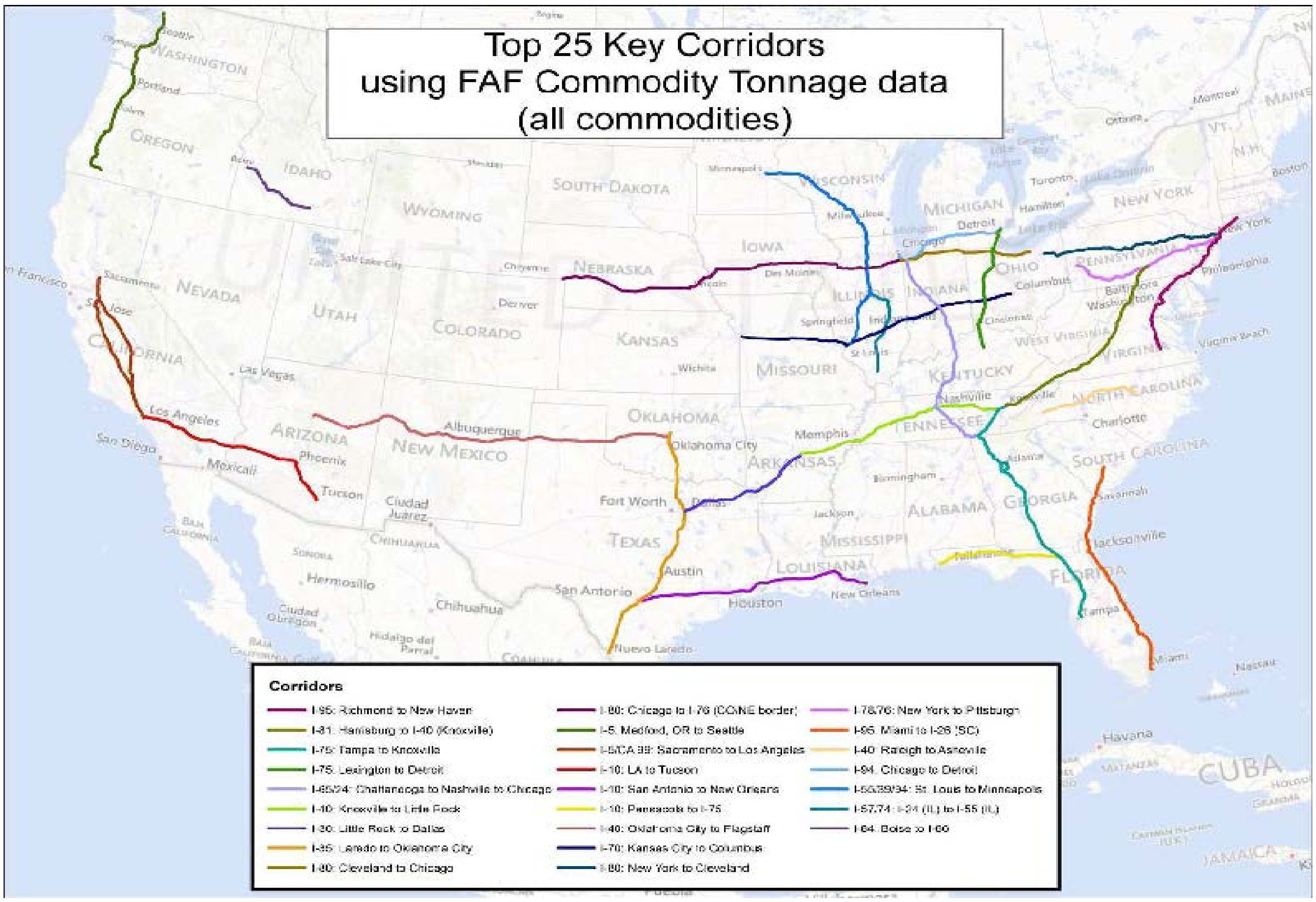
[1] AADTT is average annual daily truck traffic and includes all freight-hauling and other trucks with six or more tires. AADT is average annual daily traffic and includes all motor vehicles. NHS mileage as of 2011, prior to MAP-21 system expansion.

Source: DOT, FHWA Office of Freight Management and Operations, Freight Analysis Framework, Version 3.4, 2013.

Top 25 Domestic Freight Corridors

To determine the top 25 domestic freight corridors, FHWA used Freight Analysis Framework (FAF), version 3 data to identify the top 10 percent of the FAF highway segments by tonnage. FHWA connected segments with the highest tonnage and known freight generators (land uses or groups of land uses that generate high freight transportation volumes, such as truck terminals, intermodal rail yards, water ports, airports, warehouses and distribution centers, or large manufacturing facilities) or population centers (origins and destinations). *Exhibit 11-13* shows the top 25 key corridors with the greatest network commodity tonnage of freight movement, based on FAF data for 2015.

Exhibit 11-13: Top 25 Corridors by Freight Tonnage, 2015



Source: DOT, FHWA Office of Freight Management and Operations, Freight Analysis Framework, FAF version 3.

Freight Challenges

There are substantial challenges to moving freight on a highway network that is projected to see continued increases in freight volume but may be difficult to expand in places to provide additional capacity. To address the challenges and ensure that the U.S. freight system and its highway network are prepared to support U.S. economic growth and competitiveness, freight stakeholders will need to understand and address the impact of increased freight movement on such areas as safety, reliability, efficiency, and the environment. A few of those challenges are described in this section.

Truck Parking

One of the major challenges to the effective movement of freight is that of safe and available truck parking. An inadequate supply of truck parking spaces can have negative consequences. Tired truck drivers may continue to drive because they have difficulty finding a place to park for rest. Truck drivers may choose to park at unsafe locations, such as on the shoulder of the road, exit ramps, or vacant lots, if they are unable to locate official, available parking. With the projected growth of truck traffic, the demand for truck parking will continue to outpace the supply of public and private parking facilities and could exacerbate truck parking problems experienced in many regions.

To address this concern, the *Jason's Law Truck Parking Survey Results and Comparative Analysis* report evaluated the adequacy of truck parking capacity across the Nation. FHWA worked with the American Association of State Highway and Transportation Officials (AASHTO) and other industry stakeholders to develop a truck parking survey that was responsive to a requirement in MAP-21. The survey was administered to every State in 2014. In addition, survey responses were provided by truck drivers, State motor carrier safety enforcement officials, travel plaza and truck stop owners and operators, trucking firm managers, and logistics personnel.

The survey results provided insight into issues associated with providing and maintaining commercial vehicle parking facilities and services, including shortages in geographic regions and a lack of truck parking information. The survey found that more than 75 percent of truck drivers responding said they regularly experienced problems with finding "safe parking locations when rest was needed." Ninety percent reported struggling to find safe parking at night. The report also documented the location of more than 308,000 truck parking spaces, including 36,000 at public rest areas and nearly 273,000 at private truck stops.[ix]

The *Jason's Law* report identified several key findings, including the following:

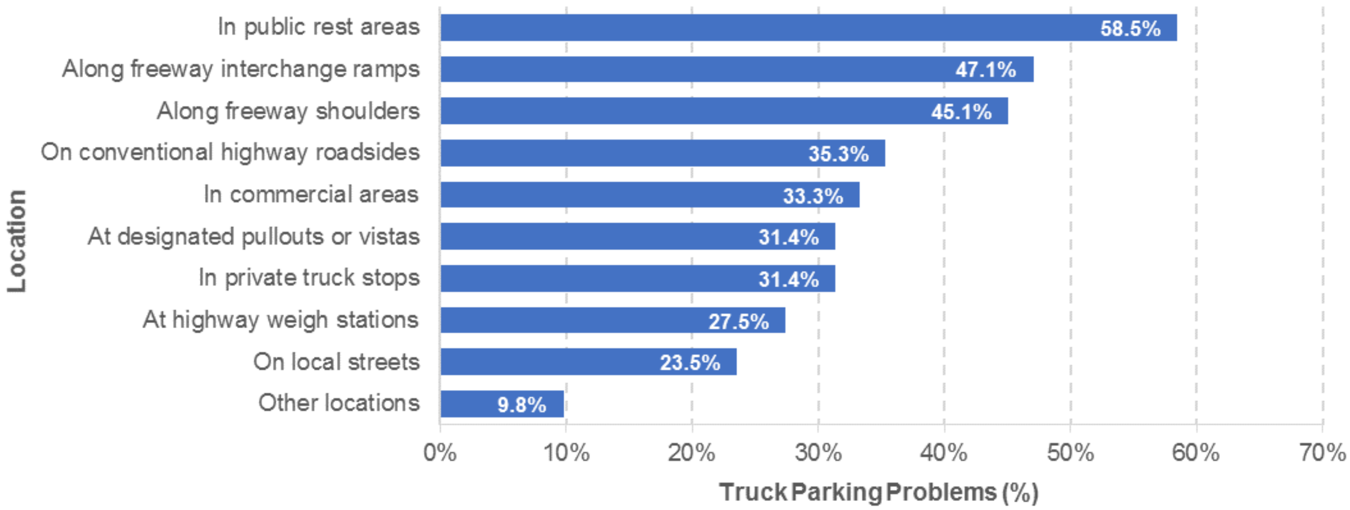
- Truck parking capacity is a problem in all States. The greatest problems were found on major freight corridors and in large metropolitan areas.
- Consistent, continued measurement and data are important to understanding dynamic truck parking needs and whether the situation is changing.
- Truck parking analysis is an important component of State and MPO freight plans, as well as regional and corridor-based freight planning.
- There is a need to understand the supply chains of key industries and major commodities.
- There is a need to understand the movement of freight, within and through a State, to better anticipate and plan for parking needs.
- Local regulations and zoning requirements often create challenges for the development of truck parking facilities.
- Public- and private-sector coordination is critical to address long-term truck parking needs.

The *Jason's Law* survey found that 38 States reported having truck parking problems in 2014. Truck drivers, however, reported truck parking problems in all States.

Most States provided information on observed problems, including shortages and the existence of unofficial parking (parking in areas not designated for parking). Only limited information was reported on actual use of the parking facilities, maintenance, and future parking capacity plans.

The *Jason's Law* survey responses indicated that truck drivers were observed using other, unofficial parking places due to parking shortages. This is indicated in *Exhibit 11-14*, a chart showing the types of truck parking locations in which parking problems were reported by States in 2014.

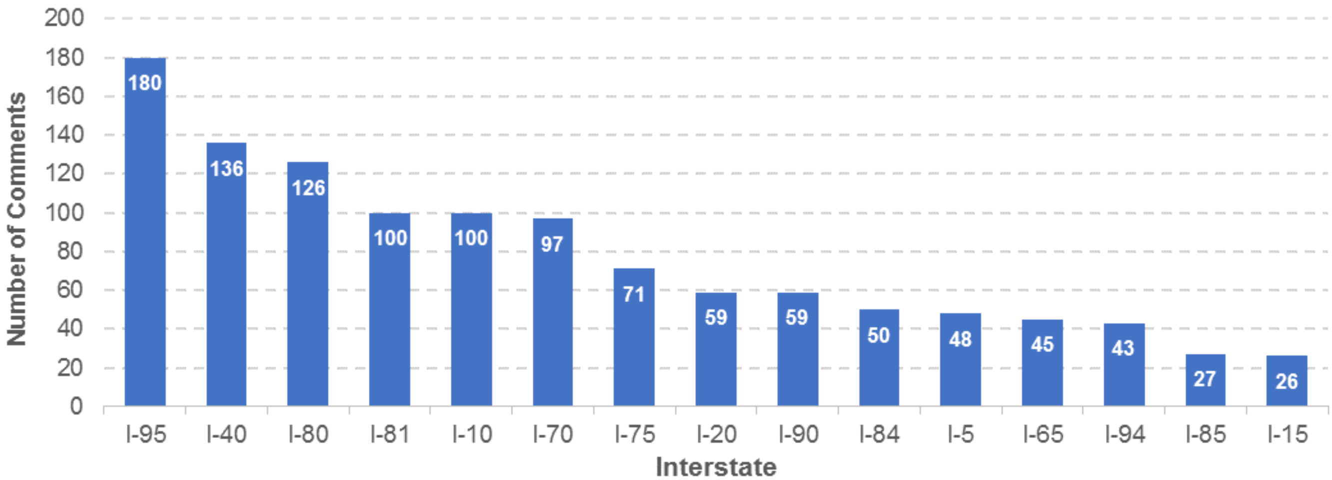
Exhibit 11-14: Locations of Truck Parking Problems Reported by States, 2014



Source: DOT, *Jason's Law Truck Parking Survey Results and Comparative Analysis: Survey of State Departments of Transportation*, Figure 9.

Exhibit 11-15 shows the 15 Interstate corridors most identified with parking shortages, according to a survey of truck drivers by the trucking industry.

Exhibit 11-15: Top 15 Interstates with Truck Parking Shortages Cited by OOIDA/ATA Truck Drivers and Professionals, 2014



Source: American Trucking Associations and Owner Operator Independent Drivers Association Survey.

Additional analysis would be necessary to fully understand truck parking issues, including a comparison of parking utilization across origins and destinations; and near freight generators (such as distribution centers), intermodal facilities, and ports.

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[i] DOT Releases 30-Year Freight Projections, BTS 13-16, 3/3/16. (https://www.bts.gov/statistical-releases)
[ii] BTS, 2016. *Freight Facts and Figures 2015*.
[iii] BTS, 2016. *Freight Facts and Figures 2015*, pg. 3.
[iv] BTS, 2017. *Transportation Economic Trends*, Chapter 4: Transportation Employment. (https://cms.bts.dot.gov/archive/publications/transportation_economic_trends/ch4/index)
[v] DOT, FHWA, 2016. *Freight Quick Facts Report*, September 2016, pp. 3, 9.
[vi] BTS, 2016. *Freight Facts and Figures 2015*, pg. 3.
[vii] DOT, FHWA, 2017. *Freight Intermodal Connectors Study,* Final Report, April 2017.
[viii] BTS, 2016. *Freight Facts and Figures 2015,* pg. 4
[ix] (https://ops.fhwa.dot.gov/freight/infrastructure/truck_parking/jason_law/truckparkingsurvey/jasons_law.pdf)

CHAPTER 12

Conditions and Performance of the National Highway Freight Network

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Introduction

The Fixing America's Surface Transportation (FAST) Act designated a freight network and established a national policy of maintaining and improving the conditions and performance of the new National Highway Freight Network (NHFN). The law also required the development of a regular report on the conditions and performance of the NHFN. This chapter serves as the first of these reports.

Using the definitions associated with the longstanding Congressional reporting requirement that produces the *Conditions and Performance Report on the Status of the Nation's Highways, Bridges, and Transit* as a model, the terms "conditions" and "performance" may be defined as follows:

- "Conditions" refers to the physical state of the infrastructure, and therefore shows a snapshot in time of infrastructure quality.
- "Performance" reflects how the system is performing relative to a program goal, the direct products and services delivered by a program, and/or the results of those products and services.

Key Takeaways

- The FAST Act established the National Highway Freight Network (NHFN) and required a conditions and performance report.
- Pavement IRI was acceptable on 96 percent of the NHFN roadways, based on 2014 data.
- Nearly one-third of the bridges on the NHFN are 51 years or older, based on 2014 data.
- The number of crashes and fatalities on the NHFN increased from 2014 to 2015, by 5.7 percent and 6.1 percent respectively, based on 2015 data.
- Travel time has become less predictable over the last 5 years, with the Travel Time Reliability Planning Time Index increasing in 14 of the top 25 intercity truck corridors, based on 2011–2014 data.
- Average travel speed has decreased in 13 of the top 25 freight-significant corridors, based on 2011–2015 data.

It is generally acknowledged that "conditions" and "performance" measures are related to each other, as the condition of an infrastructure asset typically affects its performance. The structural integrity of a bridge or the ride quality of a roadway are examples of conditions metrics. Examples of performance metrics include congestion or travel time on a roadway, changes in that roadway's congestion statistics over time, safety metrics, and how the conditions on the roadway affect the overall movement of goods through a region. The goal areas of the FAST Act have been used in this chapter as a guide to reporting on conditions and performance of the NHFN. *Exhibit 12-1* shows how the goal areas for the NHFN in the FAST Act relate to conditions and performance measures included in this report.

Exhibit 12-1: Conditions and Performance by Goal Area

Goal Area	Measure
State of Good Repair	▪ International Roughness Index for Pavement ▪ Percentages of Structurally Deficient Bridges ▪ Age of Structurally Deficient Bridges ▪ Percent Good, Fair, and Poor for Bridge Deck Elements
Safety, Security, and Resilience	▪ Number of Crashes and Number of Fatalities

Goal Area	Measure
Congestion, Economic Efficiency, Productivity, and Competitiveness	▪ Planning Time Index ▪ Truck Tonnage ▪ Truck Volumes ▪ Average Speeds

The goals addressed in this report reflect areas where measures were defined and datasets were available at the time of the writing of this report. In keeping with the focus of this report, the goals used were specific to measures obtainable for the NHFN roadways. It is possible that, in future iterations of this report, additional metrics for NHFN goal areas will be developed and new datasets may become available to improve the range of measures available to understand the conditions and performance of this highway freight network.

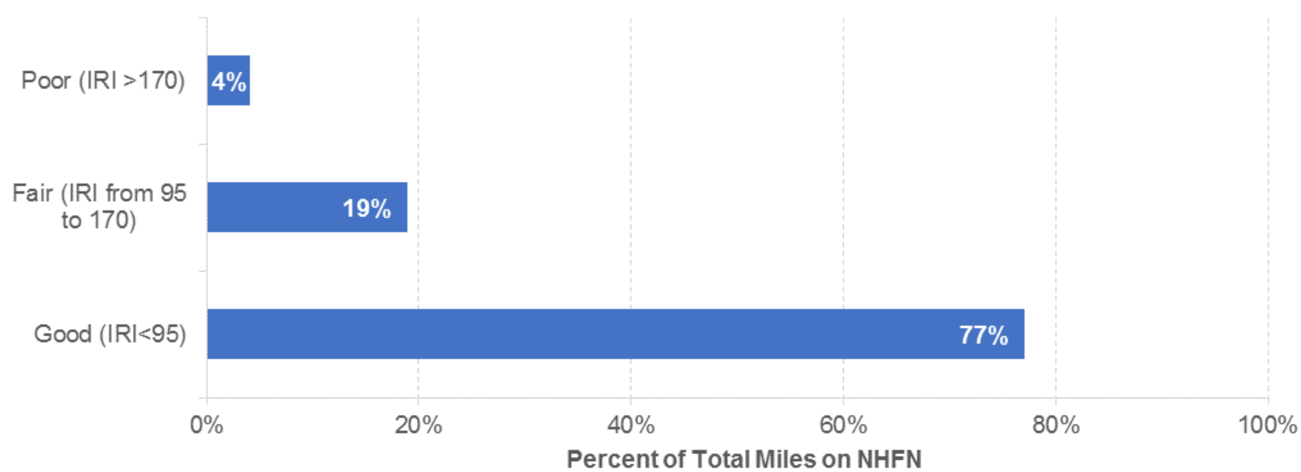
Conditions

Pavement Quality on the NHFN

Designated in 2015 based on 2012 data, the original NHFN consisted of 51,029 centerline miles, including 46,947 centerline miles of Interstate and 4,082 centerline miles of non-Interstate roads, using the Highway Performance Monitoring System (HPMS) dataset. The routes comprising the total miles include the underlying Primary Highway Freight System (PHFS) of 41,518 centerline miles, of which 37,436 miles were Interstate and 4,082 miles were non-Interstate roads, combined with the remaining 9,511 miles of Interstate roads not included in the PHFS. The overall centerline mileage will fluctuate with additions and deletions (rare) to the Interstate Highway System, as well as when States elect to designate Critical Rural Freight Corridors (CRFCs) and Critical Urban Freight Corridors (CUFCs). *Exhibit 11-8* shows the original NHFN as established by Congress.

Pavement conditions are reported to FHWA by States through the HPMS for Federal-aid highways. The reporting agency uses the International Roughness Index (IRI) to measure the smoothness of pavement and ride quality. The IRI measures smoothness using an algorithm based on the longitudinal profile of a section of the road. Lower IRI values indicate better pavement conditions (i.e., smoother), whereas higher values indicate worse conditions. The IRI represents pavement ride quality in terms of the cumulative deviation from a smooth surface in inches per mile, as shown in the categories in *Exhibit 12-2*.

Exhibit 12-2: Pavement Ride Quality (IRI) on the NHFN (Based on Mileage)



Source: HPMS data from 2014.

Using more recent Interstate mileage data from the HPMS in 2014, the NHFN now comprises 52,020 centerline miles of roadway. Seventy-seven percent of pavement miles on the NHFN were rated as having good ride quality per 2015 HPMS data, 19 percent had fair ride quality, and 4 percent had poor ride quality. Approximately 96 percent of roadways on the NHFN had an acceptable IRI, as measured by the combined number of good and fair roadways. The data showed that 15 percent of the non-Interstate portion of the NHFN had a poor IRI, whereas only approximately 3 percent of the Interstate roadways on the NHFN had a poor IRI.

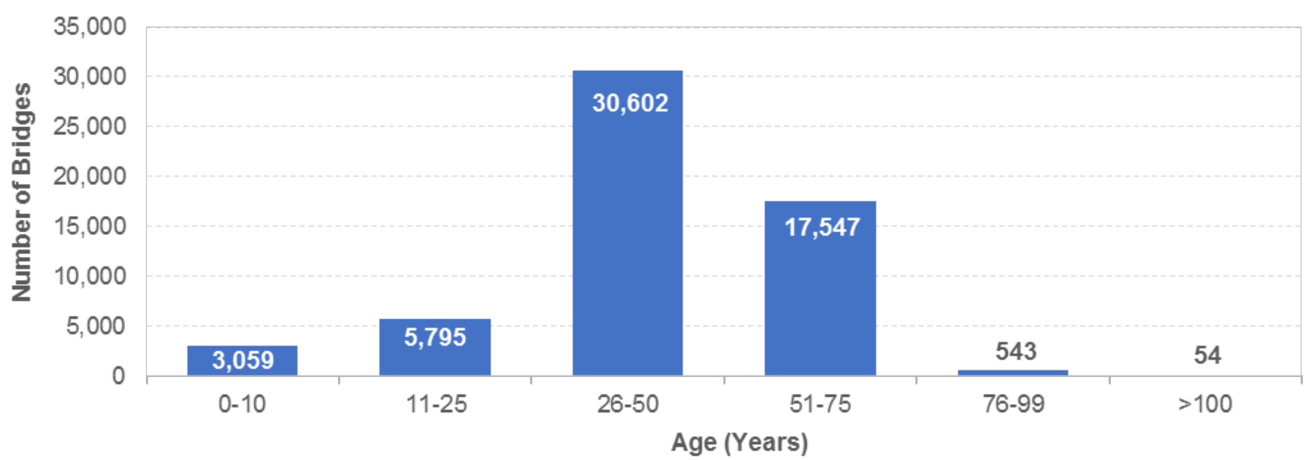
Bridges on the NHFN

Structural status and bridge age are two commonly used metrics to determine the condition of bridges. The classification of a bridge as structurally deficient does not imply that a bridge is unsafe; rather, it indicates the extent to which a bridge has deteriorated from its original condition. Structurally deficient bridges are characterized by the deteriorated condition of bridge elements and reduced load-bearing capacity. In some cases, weight restrictions are placed on structurally deficient bridges. Such load limitations may affect freight routing and efficiency. The age of a bridge is also relevant to freight routing and efficiency, as most bridges were designed for a 50-year life span and would be expected to be replaced or need major rehabilitation efforts after they have been in service for 50 years. Construction projects can increase freight delays, create workzone areas for increased safety consideration, and in some cases necessitate rerouting for a period of time.

To inventory the bridges on the NHFN, the National Bridge Inventory (NBI) was analyzed using ArcGIS software to determine which bridges are on the NHFN and to identify current bridge ratings. This analysis showed that there are approximately 57,600 bridges on the NHFN, 4.3 percent of which were rated as structurally deficient.

The age of a bridge structure is an important indicator of its serviceability; that is, the condition under which a bridge is still considered useful. Nearly 31.5 percent of bridges on the NHFN are 51 years old or older. More than 53 percent of the bridges are 26 to 50 years old. A breakdown of the age of bridges on the NHFN, grouped into six unequal but meaningful segments, is shown in *Exhibit 12-3*.

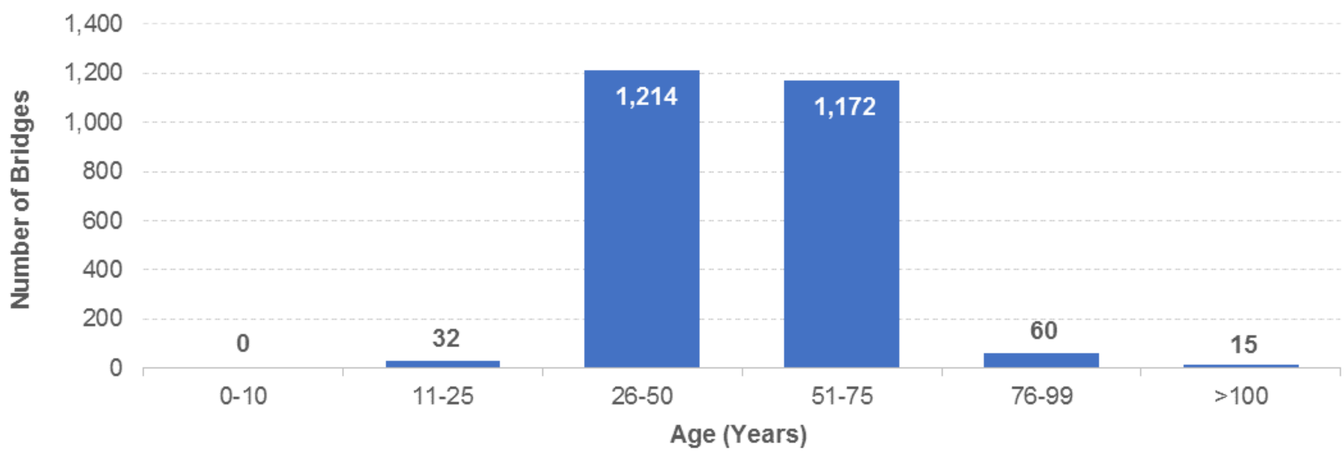
Exhibit 12-3: Age of Bridges on the NHFN



Source: NBI data from 2014.

More than half of the structurally deficient bridges on the NHFN are over 50 years old, as shown by the bar graph of structurally deficient NHFN bridges by age in *Exhibit 12-4*. This result has funding and operations implications, as these bridges will need significant rehabilitation and replacement now or in the near future.

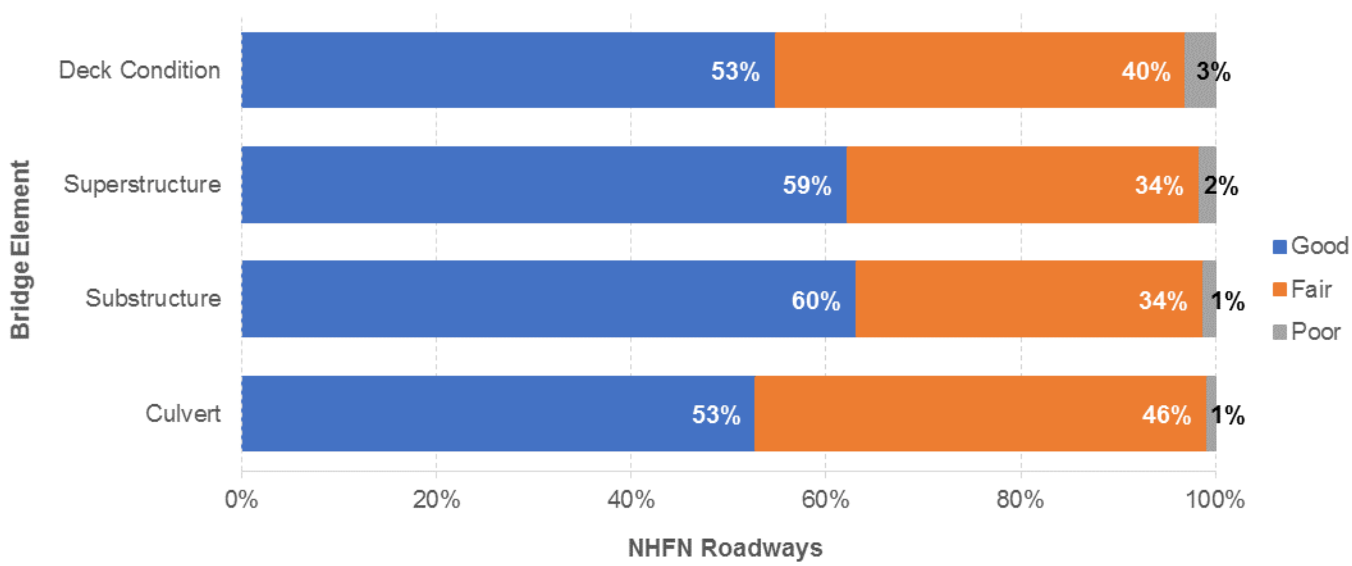
Exhibit 12-4: Age of Structurally Deficient Bridges on the NHFN



Source: NBI data from 2014.

Exhibit 12-5 summarizes the bridge element conditions on the NHFN as of 2014, including the condition rating for individual culverts and for the deck, superstructure, and substructure of bridges. The results show that greater than 96 percent of each of the individual elements of NHFN bridges and culverts on the NHFN are in good or fair condition.

Exhibit 12-5: Bridge Element Conditions on the NHFN, 2014



Source: NBI data from 2014.

Performance

Safety Data on the NHFN

Safety performance measures are indicators that enable decision makers and other stakeholders to monitor changes in system conditions and performance against established visions, goals, and objectives. Typical safety performance measures relate to the number and rate of fatalities and or crashes. The crash statistics discussed in this section were extracted from the Fatality Analysis Reporting System (FARS) for rural and urban Interstate highways, which make up the bulk of the NHFN.

The table in *Exhibit 12-6* shows the number of fatal motor vehicle crashes and fatalities on the NHFN in 2014 and 2015, along with a breakdown of crash locations between urban and rural areas. There were 3,633 fatal crashes reported on the Interstate System portion of the NHFN in 2014, resulting in 4,094 fatalities. In 2015, the number of crashes and the number of fatalities increased by 5.7 percent and 6.1 percent, respectively.

Crashes involving trucks on the Interstate System portion of the NHFN have increased in recent years, rising from 942 crashes and 1,104 fatalities in 2015 to 1,053 crashes and 1,194 fatalities in 2016.

Exhibit 12-6: Fatal Motor Vehicle Crashes and Fatalities on the Interstate System portion of the NHFN, 2014 and 2015

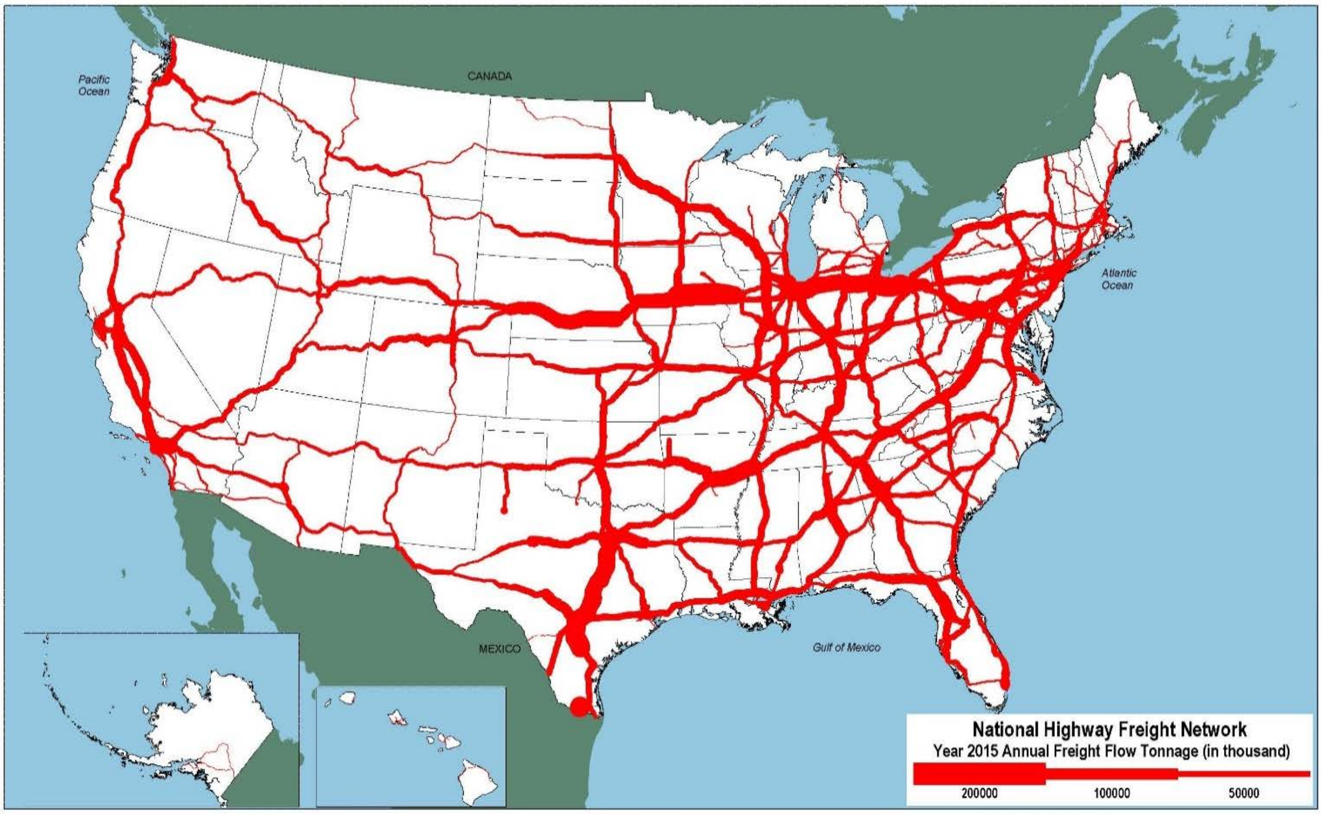
Year	Rural/Urban						Total	
	Rural		Urban		Unknown			
	Crashes	Fatalities	Crashes	Fatalities	Crashes	Fatalities	Crashes	Fatalities
2014	1,521	1,762	2,112	2,332	0	0	3,633	4,094
2015	1,647	1,918	2,190	2,424	4	4	3,841	4,346

Source: Information obtained from crash data contained in Fatality Analysis Reporting System (FARS) files.

Freight Volumes

The map in *Exhibit 12-7* shows the 2015 volume of freight moved by trucks on the NHFN, in millions of tons.

Exhibit 12-7: Tonnage on the NHFN, 2015

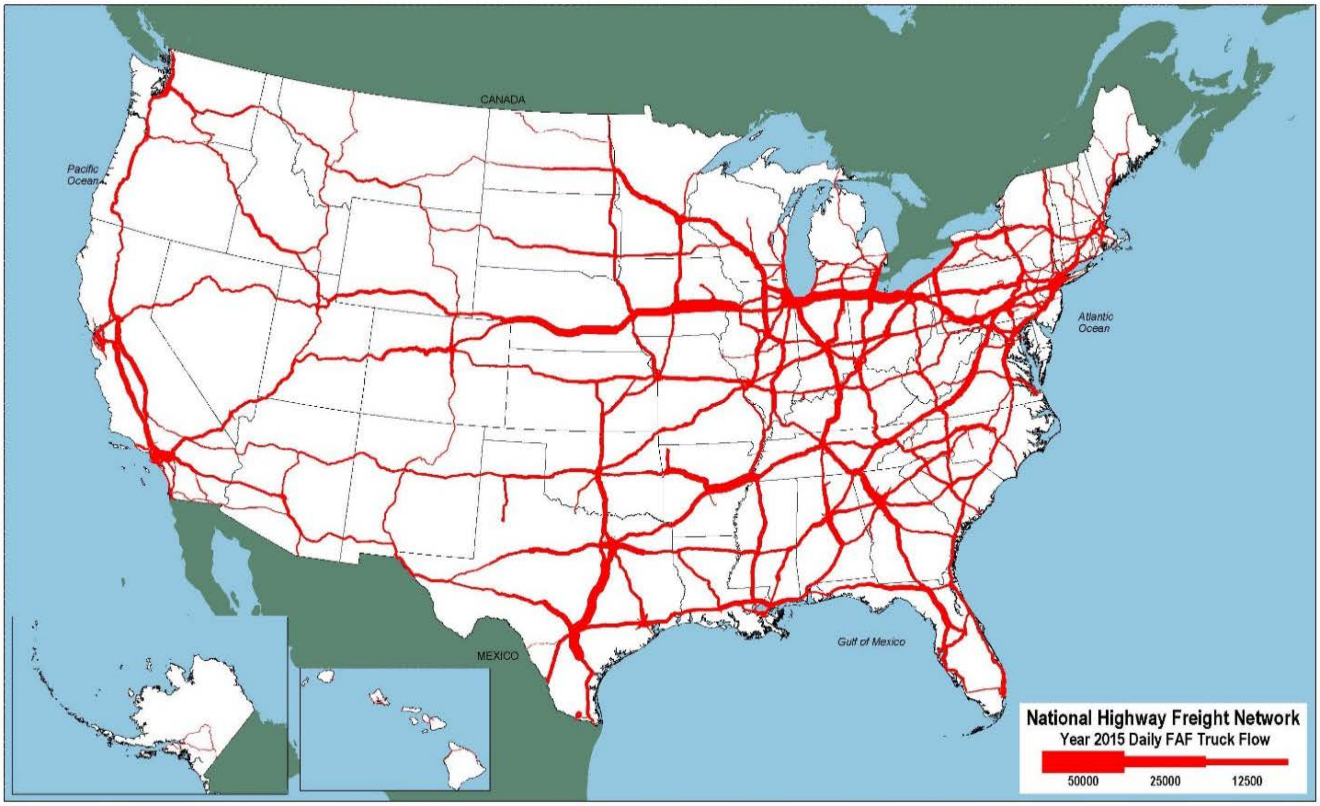


Note: Long haul freight typically serves locations at least 50 miles apart, excluding trucks that are used in movements by multiple modes and mail.

Source: Information obtained from FAF data, version 4.

Truck traffic on the NHFN is expected to increase significantly between 2015 and 2045. The current average daily long haul truck traffic on the NHFN is shown for 2015 in *Exhibit 12-8* and the forecasted growth in average daily long haul truck traffic on the NHFN for 2045 is shown *Exhibit 12-9*.

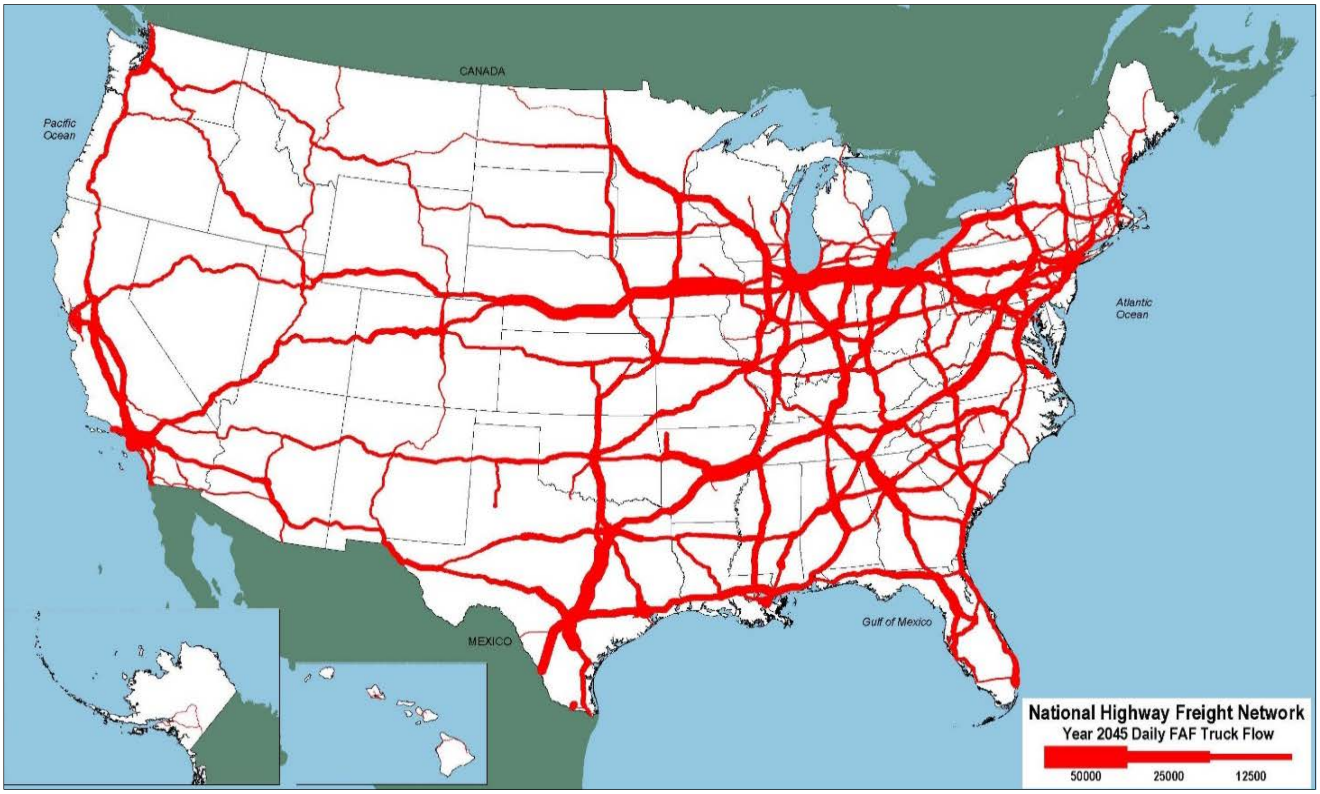
Exhibit 12-8: Average Daily Long Haul Truck Traffic on the NHFN, 2015



Note: Major flows include domestic and international freight moving by truck on highway segments with more than 25 FAF trucks per day and between places typically more than 50 miles apart.

Source: Information obtained from FAF data, version 4.

Exhibit 12-9: Forecasted Average Daily Long Haul Truck Traffic on the NHFN, 2045



Note: Major flows include domestic and international freight moving by truck on highway segments with more than 25 FAF trucks per day and between places typically more than 50 miles apart.

Source: Information obtained from FAF data, version 4.

Congestion

Congestion on highways and bridges occurs when traffic demand approaches or exceeds the available capacity of the system. "Recurring" congestion refers to congestion taking place at roughly the same place and time every day, usually during peak traffic periods due to insufficient infrastructure or physical capacity, such as roadways that are too narrow to accommodate the demand. "Nonrecurring" congestion is caused by temporary disruptions that render part of the roadway unusable. Factors that trigger nonrecurring congestion include traffic incidents, bad weather, construction work, poor traffic signal timing, and special events. About half the total congestion occurrence on roadways is recurring, with the other half nonrecurring.

FHWA monitors performance for the freight system as part of its Freight Performance Measurement (FPM) program to analyze the impacts of congestion and determine the operational capacity and efficiency of key freight routes in the United States. Freight highway congestion is measured using truck probe data from more than 600,000 trucks equipped with GPS. These trucks provide billions of position signals that FHWA analyzes to determine truck freight performance, both for routine monitoring and for ad hoc analysis to understand truck movements and impacts, such as when an incident affects highway network reliability. Over time, the number of vehicle probes will need to increase to improve the comprehensiveness of the data. FHWA estimates that the current number of probes represents approximately 30 percent of the truck population for

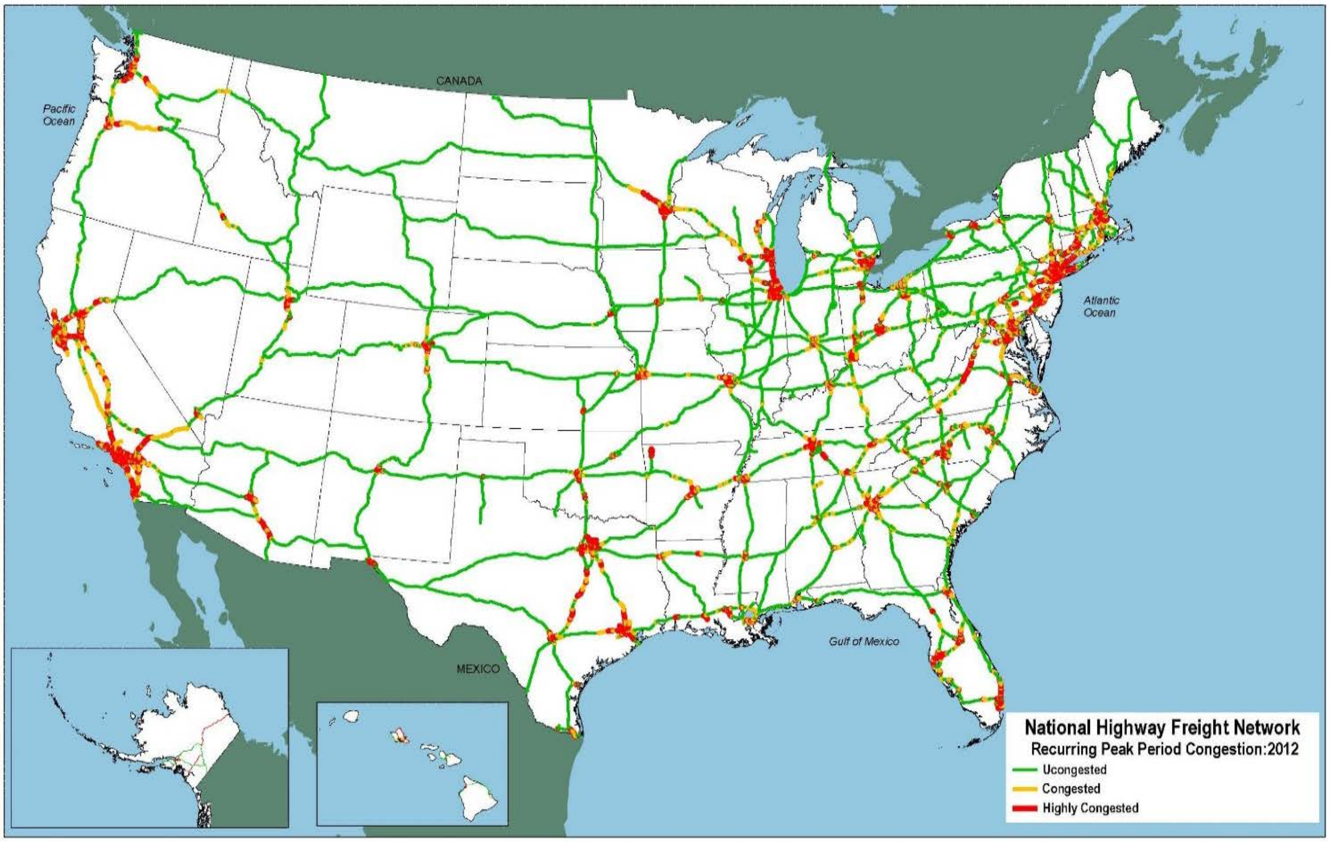
Classes 6, 7, and 8 (i.e., trucks with gross vehicle weight exceeding 19,500 pounds). In addition to the FPM truck probe data, FHWA uses information from the FAF tool for tonnage and volume flows.

FPM's routine monitoring of truck freight performance is principally used to monitor congestion, using measures of travel time reliability and speed for corridors, border crossings, urban areas, freight intermodal connections, and freight bottlenecks. FHWA produces quarterly performance monitoring reports that provide insight into these areas. More information is available on FHWA's Website at (http://ops.fhwa.dot.gov/freight/freight_analysis/perform_meas/).

FHWA produces a Freight Movement Efficiency Index that combines measures of speeds and travel times for intermodal locations, urban areas, bottlenecks, and border crossings. FHWA monitors travel times for the top 25 freight corridors in the United States. All of these freight corridors are designated on the NHFN. The measures indicate that the current congestion negatively influencing truck carrier operations occurs on a recurring basis during peak periods, particularly in and near major metropolitan areas.

The two maps in *Exhibits 12-10* and *12-11* show the locations of peak-period congestion on the NHFN and for the high-volume truck portions of the NHFN. High-volume truck portions of the NHFN carry more than 8,500 trucks per day, including freight-hauling long-distance trucks, freight-hauling local trucks, and other trucks with six or more tires. Highly congested segments are stop-and-go conditions with volume/service flow ratios greater than 0.95. The volume/service flow ratio is calculated as an indicator of peak hour congestion. Congested segments have reduced traffic speeds with volume/service flow ratios between 0.75 and 0.95. Although the NHFN was designated in 2015, the peak-period congestion depicted in the exhibits below were developed using 2012 data.

Exhibit 12-10: Peak-period Congestion on the NHFN, 2012



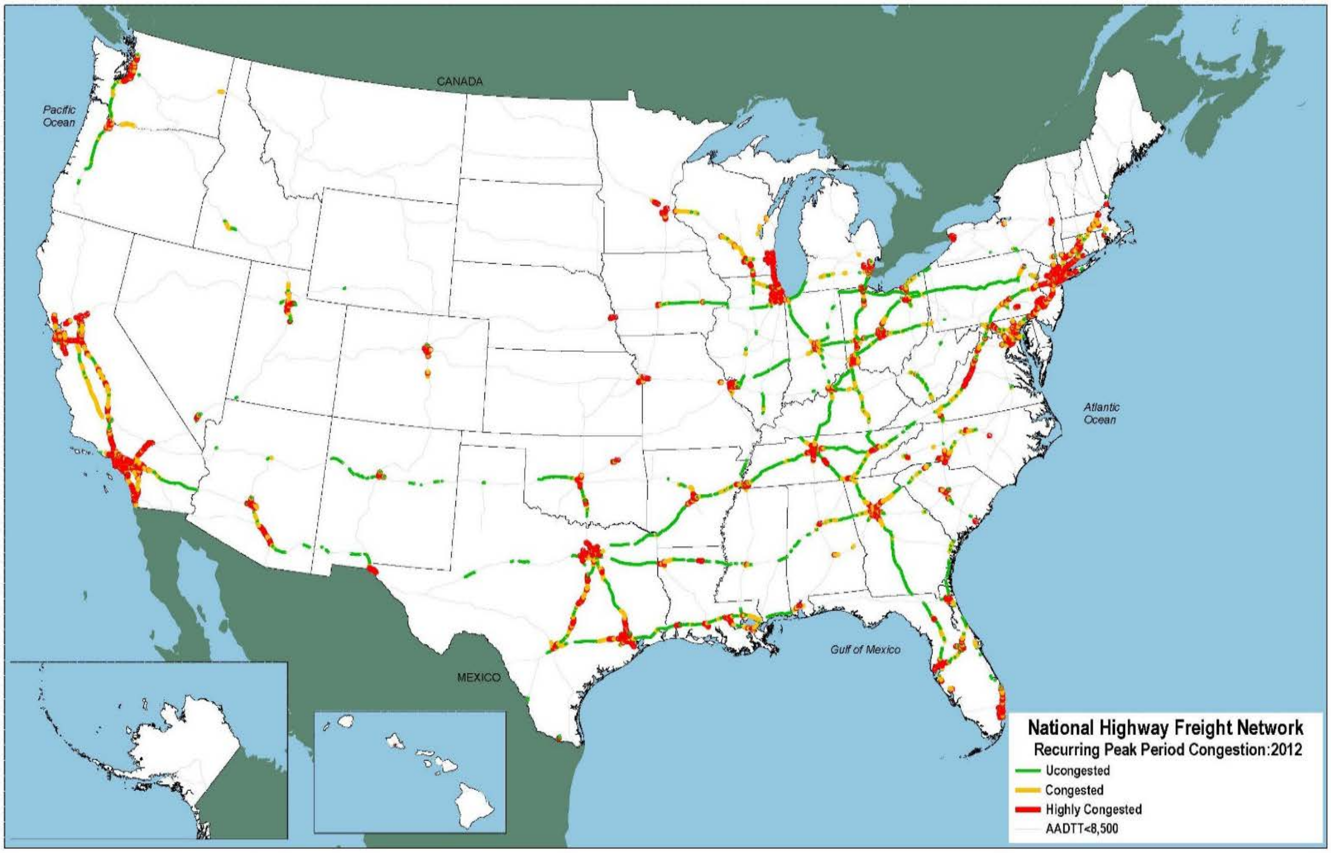
Note: The volume/service flow ratio is estimated using the procedures outlined in the HPMS Field Manual, Appendix N.

Note: Highly congested segments are stop-and-go conditions with volume/service flow ratios greater than 0.95. Congested segments have reduced traffic speeds with volume/service flow ratios between 0.75 and 0.95.

Note: Long haul freight trucks typically serve locations at least 50 miles apart, excluding trucks that are used in movements by multiple modes and mail.

Source: Information obtained from FAF data, version 4.

Exhibit 12-11: Peak-period Congestion on the High-volume Truck Portions of NHFN, 2012



Note: The volume/service flow ratio is estimated using the procedures outlined in the HPMS Field Manual, Appendix N.

Note: Highly congested segments are stop-and-go conditions with volume/service flow ratios greater than 0.95. Congested segments have reduced traffic speeds with volume/service flow ratios between 0.75 and 0.95.

Note: Long haul freight trucks typically serve locations at least 50 miles apart, excluding trucks that are used in movements by multiple modes and mail.

Source: Information obtained from FAF data, version 4.

The table in *Exhibit 12-12* shows the speeds experienced on the top 25 congested freight-significant locations within a pre-selected sample of freight facilities (predominantly interchanges), all of which are on the NHFN. The rankings are based on a volume-weighted calculation of congestion that considers the volume of truck traffic, which is captured through truck probe sample data. Note: Variations in the concentration of truck probes reporting by facility compared to actual truck traffic may affect the ranking of these facilities.

Exhibit 12-12: Top 25 Congested Freight-significant Locations on the NHFN, 2014[1]

Congestion Ranking[2]	Location Description[3]	State	Average Speed[4]	Peak Average Speed	Nonpeak Average Speed	Nonpeak/Peak Ratio
1	Atlanta, GA: I-285 at I-85 (North)	GA	40	28	47	1.68
2	Chicago, IL: I-290 at I-90/I-94	IL	27	21	29	1.38
3	Fort Lee, NJ: I-95 at SR 4	NJ	36	29	39	1.33
4	Louisville, KY: I-65 at I-64/I-71	KY	44	38	47	1.24
5	Houston, TX: I-610 at US 290	TX	38	29	43	1.51
6	Houston, TX: I-10 at I-45	TX	42	32	47	1.48
7	Cincinnati, OH: I-71 at I-75	OH	47	40	50	1.23
8	Houston, TX: I-45 at US 59	TX	39	28	44	1.54
9	Los Angeles, CA: SR 60 at SR 57	CA	45	38	48	1.28
10	Houston, TX: I-10 at US 59	TX	43	32	50	1.57
11	Dallas, TX: I-45 at I-30	TX	39	28	44	1.55
12	Atlanta, GA: I-75 at I-285 (North)	GA	46	35	51	1.46
13	St. Louis, MO: I-70 at I-64 (West)	MO	42	38	44	1.15
14	Seattle, WA: I-5 at I-90	WA	35	26	40	1.54
15	Chicago, IL: I-90 at I-94 (North)	IL	32	18	40	2.25
16	Austin, TX: I-35	TX	33	21	40	1.90
17	Auburn, WA: SR 18 at SR 167	WA	46	39	50	1.29
18	Los Angeles, CA: I-710 at I-105	CA	44	34	49	1.42
19	Baton Rouge, LA: I-10 at I-110	LA	42	35	46	1.34
20	Hartford, CT: I-84 at I-91	CT	46	37	50	1.36
21	Houston, TX: I-45 at I-610 (North)	TX	46	36	51	1.43
22	Seattle, WA: I-90 at I-405	WA	39	29	45	1.58
23	Cincinnati, OH: I-75 at I-74	OH	45	40	48	1.20
24	Indianapolis, IN: I-65 at I-70 (North)	IN	50	45	52	1.16
25	Denver, CO: I-70 at I-25	CO	45	39	49	1.26

[1] Using data associated with the FHWA-sponsored Freight Performance Measures (FPM) initiative, the American Transportation Research Institute provides a yearly analysis to quantify the impact of traffic congestion on truck-borne freight at 250 specific locations throughout the United States.

[2] The ranking analysis factors in the number of trucks using a particular highway facility and the impact that congestion has on average commercial vehicle speed in each of the 250 study areas. These data represent truck travel during weekdays at all hours of the day in 2014.

[3] These locations were identified over several years through reviews of past research, available highway speed and volume data sets, and surveys of private- and public-sector stakeholders.

[4] Average speeds below a free flow of 55 miles per hour indicate congestion.

Source: American Transportation Research Institute (ATRI), Congestion Impact Analysis of Freight Significant Highway Locations.

The National Performance Management Research Data Set (NPMRDS) truck probe data also measure corridor-level travel time reliability. Travel time reliability is derived from measured average speeds of commercial vehicles for the top 25 domestic freight corridors annually. Compared with simple average measures of congestion, measures of travel time reliability—the certainty (or variability) of travel conditions from day to day—provide a different perspective of improved travel beyond a simple average travel time. From an economic perspective, low reliability can cause drivers to budget extra time in planning trips or to suffer the consequences of being delayed. This extra time usually carries higher value beyond the typical travel time. Unpredictable travel times are problematic for truck drivers and freight receivers because they can cause unwanted schedule changes that can add cost and delay to their operations.

Exhibit 12-13 shows the Travel Reliability Planning Time Index for the 25 freight-significant corridors on the NHFN. Values greater than 1.00 illustrate travel time variability. Higher numbers indicate greater variability, and the numbers after the decimal points can be treated as percentages. For example, the 2014 Travel Reliability Planning Time Index for Corridor 25 was 1.85. This means travel times were 85 percent longer on heavy travel days, compared with normal days, for drivers traveling the I-95 corridor from Richmond, VA to New Haven, CT.

Exhibit 12-13: Travel Reliability Planning Time Index for the Top 25 Freight-significant Corridors on the NHFN, 2011–2014

Planning Time Index (95th Percentile/50th Percentile)						
Corridor		**2011**	**2012**	**2013**	**2014**	**2015**
1	I-5: Medford, OR to Seattle	1.31	1.34	1.37	1.41	1.48
2	I-5/CA 99: Sacramento to Los Angeles	1.28	1.33	1.34	1.33	1.35
3	I-10: Los Angeles to Tucson	1.24	1.21	1.26	1.27	1.34
4	I-10: San Antonio to New Orleans	1.23	1.28	1.30	1.31	1.31
5	I-10: Pensacola to I-75	1.06	1.06	1.06	1.07	1.06
6	I-30: Little Rock to Dallas	1.21	1.15	1.14	1.17	1.18
7	I-35: Laredo to Oklahoma City	1.24	1.24	1.28	1.30	1.39
8	I-40: Oklahoma City to Flagstaff	1.10	1.12	1.11	1.11	1.12
9	I-40: Knoxville to Little Rock	1.17	1.18	1.20	1.24	1.16
10	I-40: Raleigh to Asheville	1.11	1.12	1.14	1.15	1.15
11	I-55/I-39/I-94: St. Louis to Minneapolis	1.15	1.13	1.14	1.14	1.15
12	I-57/I-74: I-24 (IL) to I-55 (IL)	1.09	1.12	1.15	1.14	1.10
13	I-70: Kansas City to Columbus	1.21	1.18	1.20	1.20	1.21
14	I-65/I-24: Chattanooga to Nashville to Chicago	1.26	1.26	1.29	1.34	1.34
15	I-75: Tampa to Knoxville	1.16	1.16	1.20	1.21	1.22
16	I-75: Lexington to Detroit	1.26	1.24	1.29	1.30	1.34
17	I-78/I-76: New York to Pittsburgh	1.16	1.20	1.20	1.21	1.22
18	I-80: New York to Cleveland	1.26	1.19	1.19	1.20	1.22
19	I-80: Cleveland to Chicago	1.18	1.14	1.17	1.21	1.17
20	I-80: Chicago to I-76 (CO/NE border)	1.13	1.12	1.12	1.12	1.12
21	I-81: Harrisburg to I-40 (Knoxville)	1.11	1.12	1.11	1.11	1.10
22	I-84: Boise to I-86	1.14	1.08	1.09	1.14	1.14
23	I-94: Chicago to Detroit	1.09	1.08	1.10	1.15	1.11
24	I-95: Miami to I-26 (SC)	1.17	1.18	1.21	1.23	1.26
25	I-95: Richmond to New Haven	1.62	1.59	1.69	1.85	1.76

Source: NPMRDS truck probe data.

Finally, as shown below in *Exhibit 12-14*, the NPMRDS truck probe data indicate the average travel speed for the top 25 freight-significant corridors on the NHFN from 2011 to 2015. The average travel speeds shown serve as an indicator of congestion for each corridor.

The efficient and reliable movement of goods is important to the U.S. economy. Truck travel time and speed are two indicators of transportation system performance. Slower speeds and unreliable travel times caused by congestion and inclement weather conditions increase fuel costs and affect efficiency and productivity.

Exhibit 12-14: Average Weekday Travel Speeds for the Top 25 Freight-significant Corridors on the NHFN, 2011–2015[1]

Corridor		2011	2012	2013	2014	2015
1	I-5: Medford, OR to Seattle	56.64	56.33	56.12	54.94	56.15
2	I-5/CA 99: Sacramento to Los Angeles	56.19	56.05	56.11	55.99	56.11
3	I-10: Los Angeles to Tucson	59.53	59.42	59.42	58.60	59.54
4	I-10: San Antonio to New Orleans	61.79	61.45	61.77	60.82	61.78
5	I-10: Pensacola to I-75	64.69	63.90	64.03	63.99	64.27
6	I-30: Little Rock to Dallas	61.78	62.64	62.82	62.13	62.70
7	I-35: Laredo to Oklahoma City	61.06	61.45	61.05	59.76	60.29
8	I-40: Oklahoma City to Flagstaff	63.99	63.86	64.15	64.31	64.18
9	I-40: Knoxville to Little Rock	62.34	62.24	62.14	61.53	62.30
10	I-40: Raleigh to Asheville	62.42	62.36	62.32	61.62	61.90
11	I-55/I-39/I-94: St. Louis to Minneapolis	62.00	62.37	62.16	62.10	62.57
12	I-57/I-74: I-24 (IL) to I-55 (IL)	62.86	62.71	62.56	62.76	63.59
13	I-70: Kansas City to Columbus	61.51	61.94	61.81	61.50	61.98
14	I-65/I-24: Chattanooga to Nashville to Chicago	60.97	61.04	60.85	59.57	59.95
15	I-75: Tampa to Knoxville	62.74	62.47	62.39	61.67	62.13
16	I-75: Lexington to Detroit	60.18	60.76	60.66	59.30	59.43
17	I-78/I-76: New York to Pittsburgh	59.59	59.94	59.88	59.34	59.70
18	I-80: New York to Cleveland	60.78	61.12	61.13	60.68	61.14
19	I-80: Cleveland to Chicago	61.86	62.26	61.99	61.57	62.09
20	I-80: Chicago to I-76 (CO/NE border)	62.96	63.16	63.36	63.39	63.64
21	I-81: Harrisburg to I-40 (Knoxville)	62.38	62.42	62.60	62.60	62.53
22	I-84: Boise to I-86	61.81	62.53	62.53	62.43	62.91
23	I-94: Chicago to Detroit	59.89	60.54	59.95	58.74	59.24
24	I-95: Miami to I-26 (SC)	63.07	62.63	62.48	61.77	62.27
25	I-95: Richmond to New Haven	55.36	55.52	54.70	51.72	54.33

[1] Weekdays (24/7).

Source: NPMRDS truck probe data.

Data Needs

FHWA prepared this first baseline report on the conditions and performance of the NHFN with available data to be responsive to the statutory reporting requirements of the FAST Act. Although conditions and performance data are available for most of the roadways on the NHFN, actions would be needed to report such data comprehensively for all four subsystems of roadways that make up the NHFN. Specifically, improving the database relationship between NHFN geography and HPMS and NBI data will greatly assist in the preparation of future NHFN conditions and performance reports and allow for a better understanding of the system and its needs.

The HPMS is a critical data set, containing information on pavement characteristics, conditions, and truck volumes. More than 85 percent of the NHFN consists of Interstate mileage for which the HPMS collects comprehensive conditions and performance data including pavement condition information and truck volume data. The remaining 15 percent of the NHFN is made up of 4,082 non-Interstate miles that are part of the PHFS portion of the NHFN and the estimated total possible CUFC and CRFC mileage that States and MPOs may elect to designate as part of the NHFN. For this 15 percent of roadways, less comprehensive conditions and performance data are available through the HPMS. These data may include sampled data rather than roadway-specific data or the data may not be readily available for States to report in the HPMS.

Similar limitations exist with respect to the NHFN data from the NBI. Condition data for all bridges on the Nation's roadways are reported to FHWA through the NBI. However, at the time of the drafting of this report, there was no specific identifier in the NBI data set indicating whether a bridge is on the NHFN. Future versions of the NBI will include the NHFN as a specific identifier in its coding guide. This identifier will allow for more accurate reporting on the condition of bridges on all four roadway subsystems that make up the NHFN.

In summary, this 2017 report provides a baseline description of the current conditions and performance of the NHFN. Future reports are expected to offer more detailed analysis of the trends and patterns in freight conditions and performance.

Furthermore, the NHFN is an evolving network based on changes to the Interstate System. The network will also change in size and coverage as States and MPOs elect to designate, de-designate, or re-designate CRFCs and CUFCs, and when DOT makes subsequent re-designations of the NHFN.

Finally, the measures summarized and graphed in this report, and their utility and comprehensiveness, are a function of data quality and availability. Because the FAST Act requires an assessment report of the NHFN every 2 years, subsequent versions of this report will provide the opportunity, subject to the availability of new, improved data, to replace some exhibits and improve others to reflect the evolving quality of the data and the performance measures.

Status of the Nation's Highways, Bridges, and Transit

Conditions and Performance

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