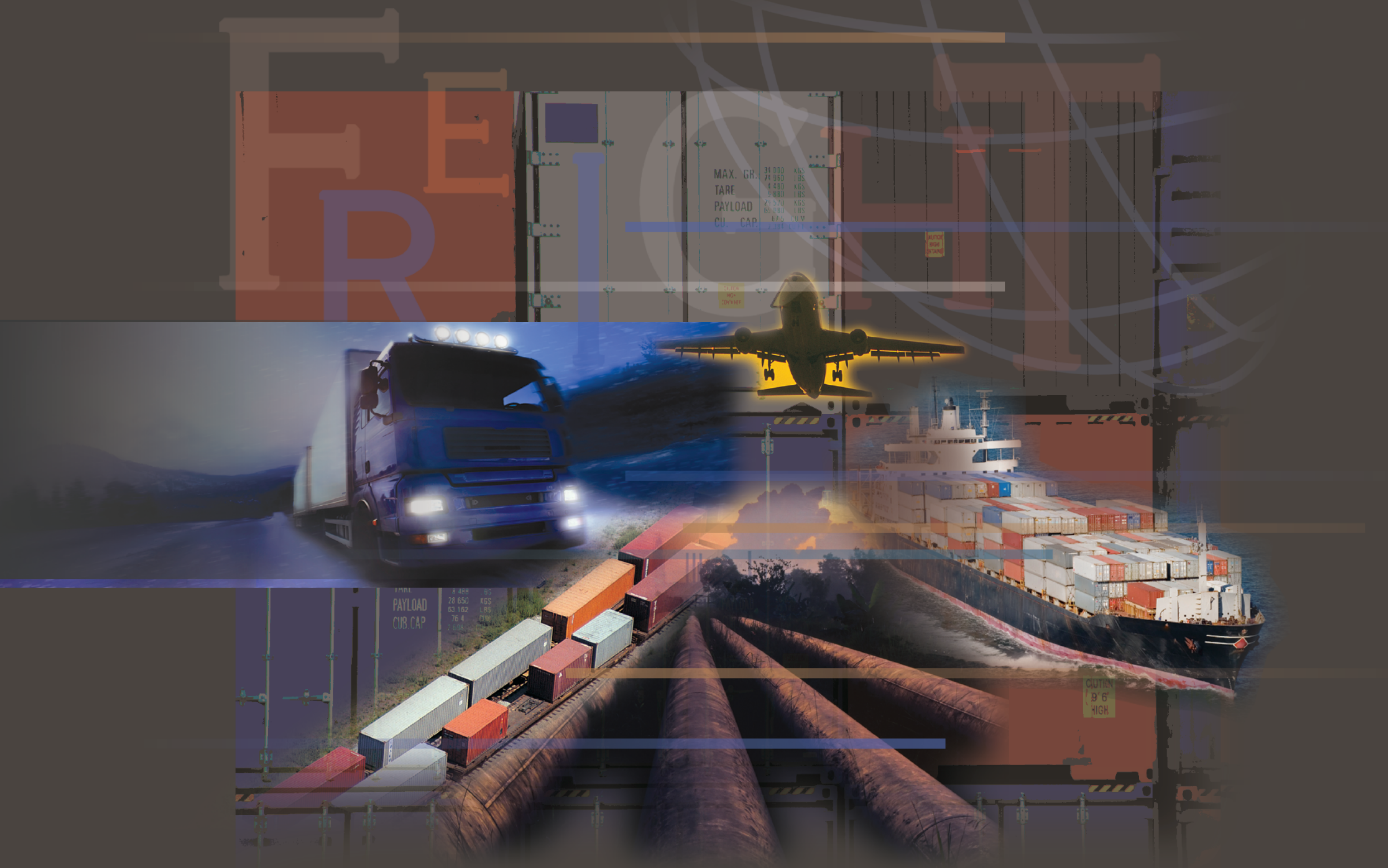
Freight Story 2008



U.S. Department of Transportation
Federal Highway Administration

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Quality Assurance Statement

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The Freight Story 2008

The U.S. economy depends on freight transportation to link businesses with suppliers and markets throughout the nation and the world. American farms and mines reach out to customers across and beyond the continent, using inexpensive transportation to compete against farms and mines in other countries. Domestic manufacturers increasingly use distant sources of raw materials and other inputs to produce goods for local and distant customers, all of which require efficient and reliable transportation to maintain a competitive advantage in a global marketplace. Wholesalers and retailers depend on fast and reliable transportation to obtain inexpensive or specialized goods through extensive supply chains. In the expanding world of e-commerce, households increasingly rely on freight transportation to deliver purchases directly to their door. Even service providers, public utilities, construction companies, and government agencies depend on freight transportation to get needed equipment and supplies from sources scattered throughout the world.

The U.S. economy requires effective freight transportation to operate at minimal cost and respond quickly to demand for goods. As the economy grows, the demand for goods and related freight transportation activity will increase. Current volumes of freight are straining the capacity of the transportation system to deliver goods quickly, reliably, and cheaply. Anticipated long-term growth of freight could overwhelm the system's ability to meet the needs of the American economy unless public agencies and private industry work together to improve system performance.

This report provides an overview of freight movement on the U.S. transportation system today and in the future. It discusses where the largest freight flows are concentrated and the pressures that existing and anticipated freight volumes place on the system. Special attention is given to freight congestion and its effects on highways, railroads, and waterways. The economic costs to shippers, carriers, and the overall economy also are examined. In addition, the report describes government and private sector efforts to improve freight transportation and mitigate the safety and environmental effects of growing volumes of freight. Finally, the report outlines a policy framework to help further discussion on ways to improve the freight system.

Notes on Statistics

The Freight Analysis Framework (FAF), version 2.2, is the source of all statistics in this report unless otherwise noted. FAF covers all freight flows to, from, and within the United States except shipments between foreign countries that are transported through the United States. Shipments to and from Puerto Rico are counted with Latin America. For more information, see www.ops.fhwa.dot.gov/freight/freight_analysis/faf.

FAF covers all modes of transportation. The truck, rail, and water categories include shipments transported by only one mode. Air includes shipments weighing more than 100 pounds moved by air or by air and truck. Intermodal includes all other shipments transported by more than one mode, such as bulk products moved by water and pipeline and mixed cargo hauled by truck and rail. Intermodal also includes courier and postal shipments weighing less than 100 pounds transported by any mode. Pipeline includes a small quantity of shipments moved by unknown modes.

The total value of commodities in FAF is greater than the U.S. Gross Domestic Product (GDP) because many products counted once for GDP may move multiple times during the year. For example, grain may move initially from farm to grain elevator, then from grain elevator to processing plant, and finally as cereal or bread from processing plant to market. These movements are counted three times in freight statistics but only once in GDP as food purchased by households.

The U.S. Department of Transportation, Federal Highway Administration, publishes FAF and other statistics in the annual *Freight Facts and Figures* publication. The 2007 edition is available at www.ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/docs/07factsfigures. Many statistics are based on the Economic Census, which is conducted once every five years. The 2002 Economic Census is the most recently published data.

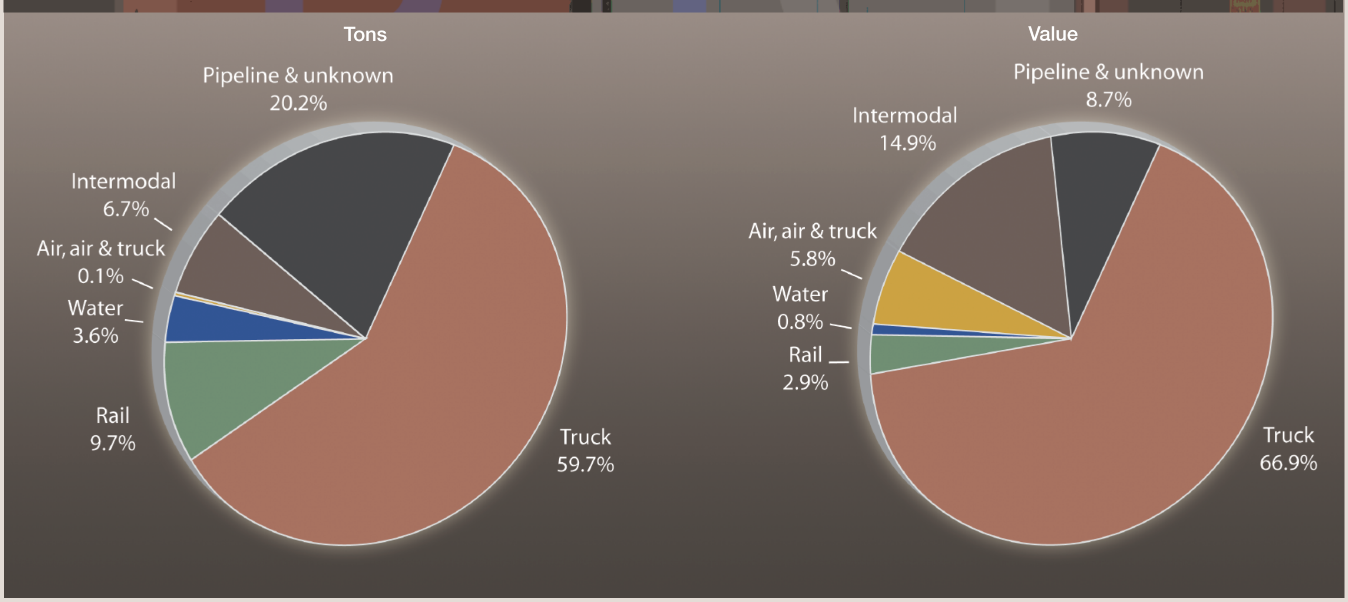
Large and Growing Demand for Freight Transportation

According to the Freight Analysis Framework (FAF), the U.S. transportation system moved an average of 53 million tons of freight worth $36 billion per day in 2002 to serve 109 million households, 24.8 million business establishments, and almost 88,000 units of government (USDOC Census Bureau 2006). More than one-half of the tonnage moved within local areas, and less than 10 percent was an import from or export to another country. Trucks hauled close to 60 percent of the weight and two-thirds of the value of shipments (Figure 1). Goods transported by more than one mode accounted for only 1 percent of domestic tons, but represented 60 percent of the weight of exports and almost 70 percent of imports.

FAF provisional estimates[1] for 2007 show an increase in tons moved by truck, rail, pipeline, intermodal, and air modes, with a slight decrease in tonnage moved by water. While the volume of freight moved by air and intermodal modes grew at faster rates between 2002 and 2007, the truck mode experienced an increase of more than ten percent in the same five years and carried more total tonnage than all other modes combined. These provisional estimates are consistent with annual growth rates in the FAF forecast for 2035.

The volume of freight increases as the economy expands and, in some cases, at a much greater rate.

Figure 1. Goods Movement by Mode: 2002



Notes: Intermodal includes U.S. Post Service and courier shipments and all intermodal combinations, except air and truck. Intermodal also includes oceangoing exports and imports that move between ports and interior domestic locations by modes other than water. Pipeline and unknown shipments are combined because data on region-to-region flows by pipeline are statistically uncertain. Data do not include imports and exports that pass through the United States from a foreign origin to a foreign destination by any mode. Numbers may not add to 100 due to rounding.
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.2, 2007.

[1] Provisional estimates are less detailed and based on less complete observations than the FAF base year estimate for 2002.

Table 1. Goods Movement: 2002 and 2035

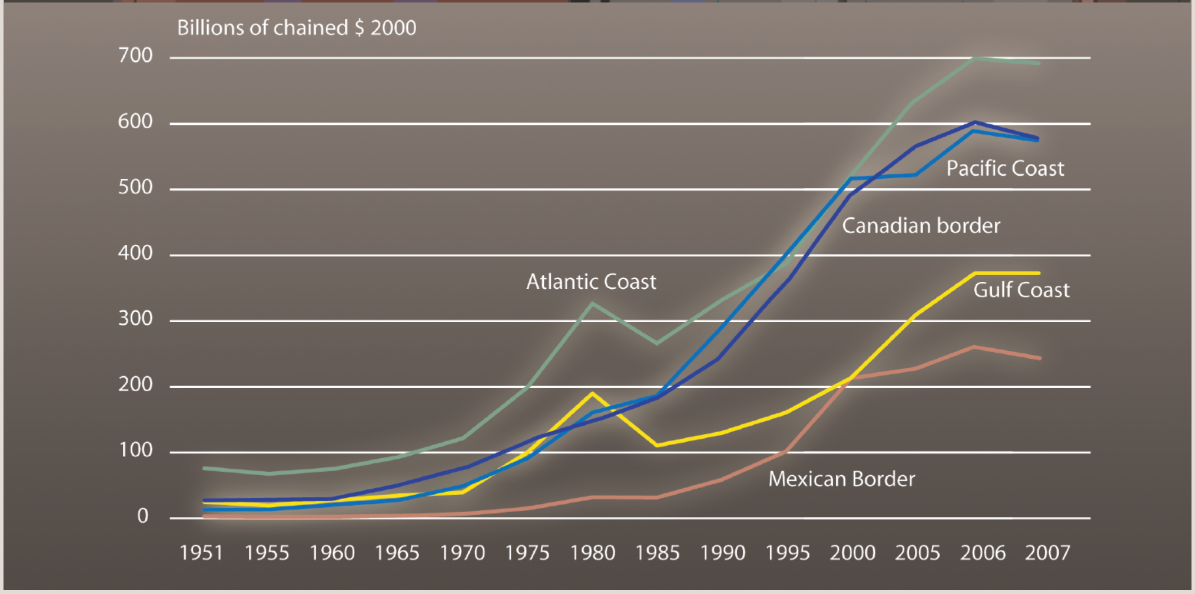
Mode	2002 (million tons)	Percent	2035 (million tons)	Percent	Percent Change 2002-2035
Total	19,328	100.0	37,211	100.0	92.5
Domestic	17,670	91.4	33,667	90.5	90.5
Imports plus exports	1,658	8.6	3,544	9.5	113.7

Note: Data do not include imports and exports that pass through the United States from a foreign origin to a foreign destination by any mode.
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.2, 2007.

Between 1999 and 2004, container traffic increased 44 percent while U.S. Gross Domestic Product (GDP) in constant dollars increased 13 percent (USDOT MARAD 2004 and EOP 2008). Over the next three decades, U.S. GDP is expected to grow by almost 3 percent annually, driven in part by a population increase from 300 million people in 2008 to almost 380 million in 2035 (NSTP-RSC 2007 and USDOC Census Bureau 2004a). As a result, domestic tons are forecast to increase 2 percent each year, almost doubling between now and 2035 (Table 1). International trade is expected to increase even faster, which is consistent with its substantial growth rate over the last four decades (Figure 2).

In addition to moving larger volumes of freight, the transportation system is moving goods over greater distances. During the past decade, domestic tons transported increased by slightly more than 20 percent while ton miles rose by almost 30 percent (USDOT BTS 2006). This increase in the weighted average distance of shipments may be caused by the growth in East Coast demand for Asian products that are reshipped through the West Coast, the increase in agricultural exports, and the shift by Midwestern power plants from local sources to Powder River Basin coal.

Figure 2. Value of Merchandise Trade by Coasts and Borders: 1951 to 2007



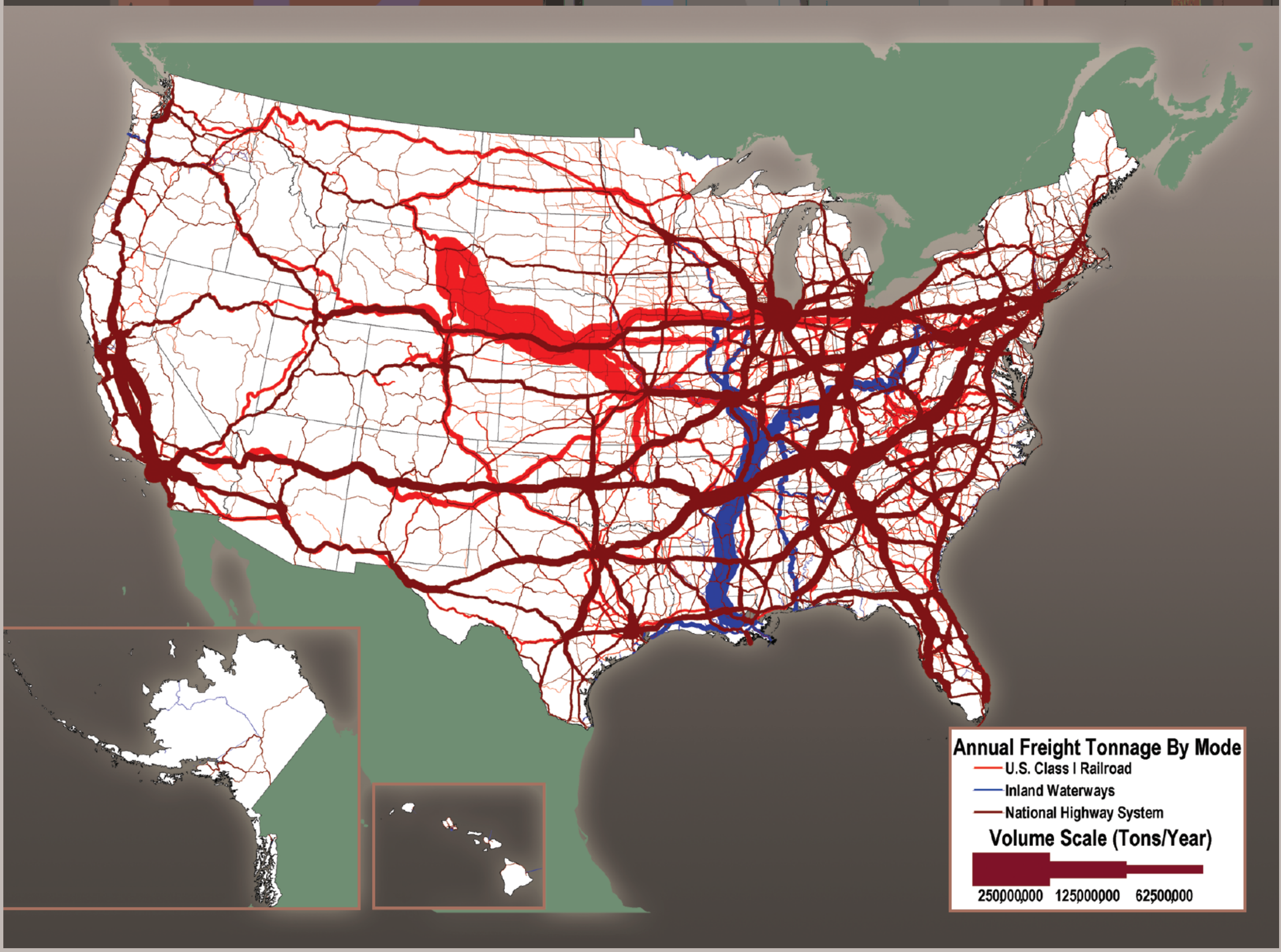
Source: U.S. Department of Transportation, Federal Highway Administration, *Freight Facts and Figures 2008* (Washington, DC: Forthcoming), figure 2-1.

Demands on the Transportation System

Freight moves throughout the United States on 985,000 miles of Federal-aid highways, 141,000 miles of railroads, 11,000 miles of inland waterways, and 1.6 million miles of pipelines (USDOT FHWA 2007a and USDOT FHWA 2007b). Figure 3 shows where flows are concentrated on highway, rail, and inland waterway networks.

Most of the nation's freight transportation network was developed before 1960 to provide national connectivity, move goods from farm to market and from fort to port, and serve industrial and population centers concentrated in the Northeast and the Midwest. The growth of population and manufacturing in the South and along the West Coast, the restructuring of

Figure 3. Tonnage on Highways, Railroads, and Inland Waterways: 2002



Sources: Highways: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.2, 2007.
Rail: Based on Surface Transportation Board, Annual Carload Waybill Sample and rail freight flow assignments done by Oak Ridge National Laboratory. **Inland Waterways:** U.S. Army Corps of Engineers (USACE), Annual Vessel Operating Activity and Lock Performance Monitoring System data, as processed for USACE by the Tennessee Valley Authority; and USACE, Institute for Water Resources, Waterborne Foreign Trade Data. Water flow asssignments done by Oak Ridge National Laboratory.

the economy from heavy industries to services, and the explosion of international trade are placing new demands on the freight system. Accordingly, ports, airports, and border crossings handle huge volumes of traffic. Railroads and steamship companies accommodate an enormous number of containers that would have been a technological novelty five decades ago. Trucks serve new inland distribution centers beyond the urban fringe, and air carriers deliver parcels anywhere in the country overnight. The freight system must serve an economy that is increasingly decentralized and organized around just-in-time delivery.

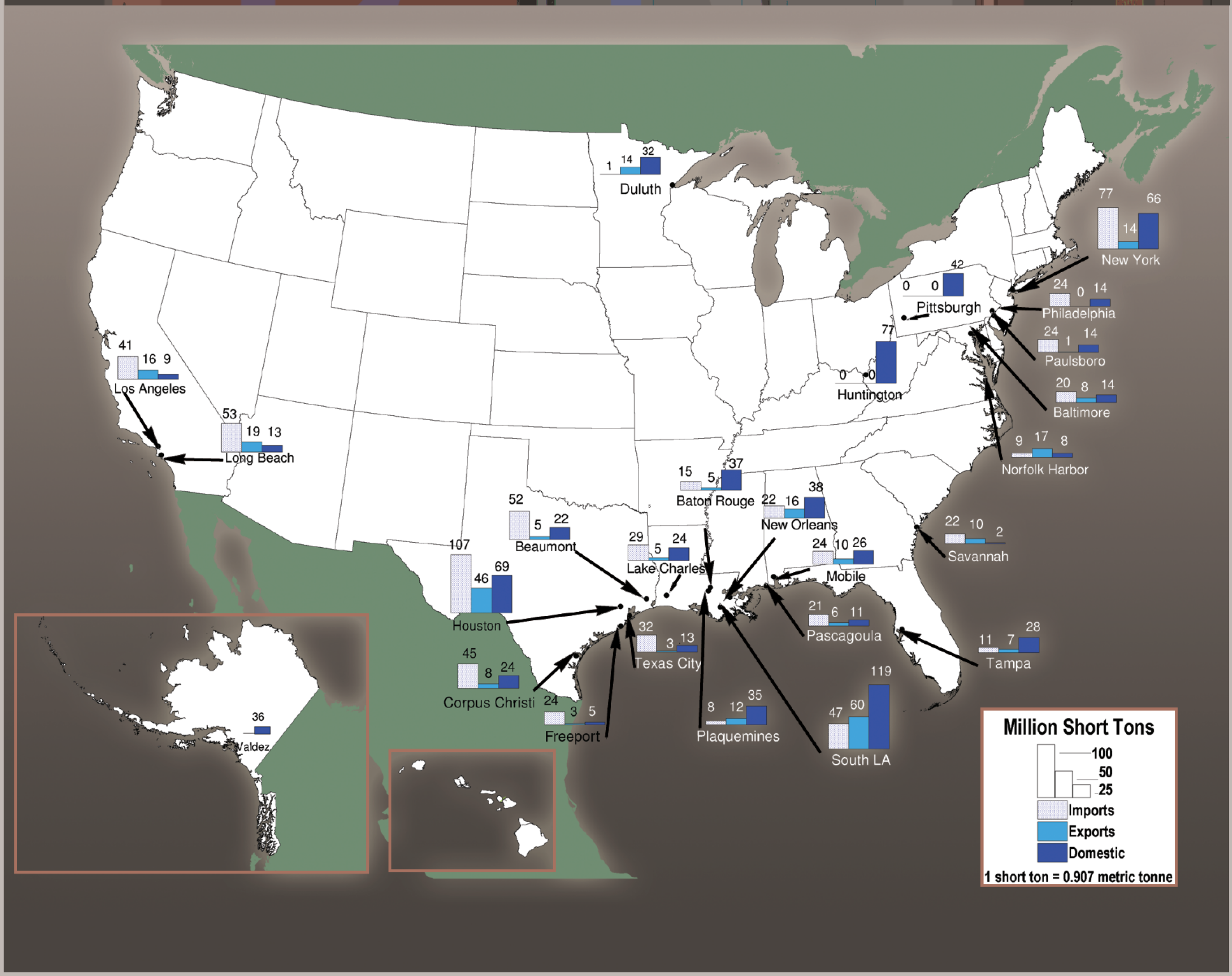
Pressures from existing and anticipated volumes of freight on the transportation system vary by the type of freight moved. The transportation of high-value, time-sensitive goods requires different routes, facilities, and services than does the movement of low-value bulk commodities (Table 2). Transportation facilities and services that handle bulk products tend to be specialized and seldom overlap with facilities and services for high-value, time-sensitive products. As shown in Figure 4, maritime facilities that serve bulk shipments are concentrated at Gulf Coast and Middle Atlantic ports while facilities that handle high-value, time-sensitive shipments are located at

Table 2. The Spectrum of Freight Moved in 2002

	High Value Time Sensitive	Bulk
Top 5 Commodity Classes	Machinery Electronics Mixed freight Motorized vehicles Textiles and leather	Natural Gas Gravel Cereal grains Crude petroleum Coal
Share of Total Tons	30%	70%
Share of Total Value	85%	15%
Key Performance Variables	Reliability Speed Flexibility	Reliability Cost
Share of Tons by Domestic Mode	88% Truck 7% Rail 5% All Other	51% Truck 12% Rail 32% Pipeline 5% Water <1% Air and Intermodal
Share of Value by Domestic Mode	83% Truck 10% Intermodal 3% Rail 4% All Other	36% Truck 5% Rail 53% Pipeline 4% Water 2% Air and Intermodal

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.2, 2007.

Figure 4. Top Water Ports by Tonnage: 2006



Source: U.S. Army Corps of Engineers, *2006 Waterborne Commerce of the United States, Part 5, National Summaries* (New Orleans, LA: 2007), table 5-2.

ports and airports in major cities and at several border crossings (Figure 5). The few ports that handle both high-value, containerized goods and bulk products use separate docks because different handling equipment is required.

During most of the twentieth century, the growth in bulk shipments stressed the transportation system. Examples include railcar shortages during grain harvests and port capacity limitations during the coal export boom. While many past stresses were relieved by the deregulation of transportation carriers and changes in the economy, continued growth of bulk movement and new economic conditions may be creating new stresses.

The twenty-first century economy emphasizes high-value, time-sensitive goods in the mix. The value of goods moved is forecast to grow in constant dollars by over 190 percent between 2002 and 2035, which is nearly twice the growth rate forecast for tonnage. As the value of goods transported grows, the cost of

Figure 5. Top 25 Foreign-Trade Gateways by Value: 2006

Notes: Data for all air gateways include a low level of small user-free airports located in the same region. Data for courier operations are included in the airport totals for JFK International Airport, New Orleans, Los Angeles, Chicago, Miami, and Anchorage. The New Orleans/Memphis Airports include all of Louis Armstrong International air cargo and the Federal Express portion of Memphis, which are not separated in the reporting system.
Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *National Transportation Statistics 2007* (Washington, DC: 2007).

holding inventory in warehouses or in transit also increases. Many industries have shifted to just-in-time delivery systems to minimize inventory costs and maximize responsiveness to rapidly changing markets, and just-in-time systems depend on fast and reliable transportation. According to one estimate, companies judged to be best in class for supply chain management have 40 percent higher profitability and 25 percent higher sales growth than those considered median class (Hermans 2006).

Just-in-time delivery systems contribute to an increase in transportation activity per ton mile and thus capacity requirements per ton. For many products, just-in-time logistical systems require more vehicles hauling smaller payloads to meet market demands. Consider pizza delivery: the marketplace will not wait for the accumulation of enough orders to fill a large vehicle before pizzas are dispatched to consumers (Pisarski 2001). This shift to more vehicles carrying less per vehicle has contributed to the 71 percent growth in the number of trucks used in for-hire transportation and the 115 percent increase in their vehicle miles of travel over the last 20 years of the twentieth century (USDOC Census Bureau 1995 and 2004b).

Anticipated growth in demand for high-value, time-sensitive goods is driving the forecast growth of trucking, both for truck-only service and for truck portions of intermodal service. As a consequence, trucks are becoming a significant portion of traffic on an increasing number of highways.

Additionally, typical freight-hauling vehicles are more than twice as long as passenger vehicles. They take up even more space when differences in operating characteristics and motorists' reactions to trucks are taken into account. Because of these factors, trucks have become a dominant part of the traffic stream when they are every fourth vehicle on the road. Trucks accounted for at least 25 percent of average daily traffic on almost 31,000 miles of the National Highway System (NHS) in 2002 and are expected to account for that share of traffic on 37,000 miles in 2035 (Figures 6 and 7, see pages 10-11).

Most freight moving by truck uses the Interstate System. Although all vehicle miles of travel are divided about equally among Interstate highways, the balance of the NHS, and other public roads, the Interstate System carries one-half of truck travel and three-fourths of travel by freight-hauling trucks serving places at least 50 miles apart (Table 3).

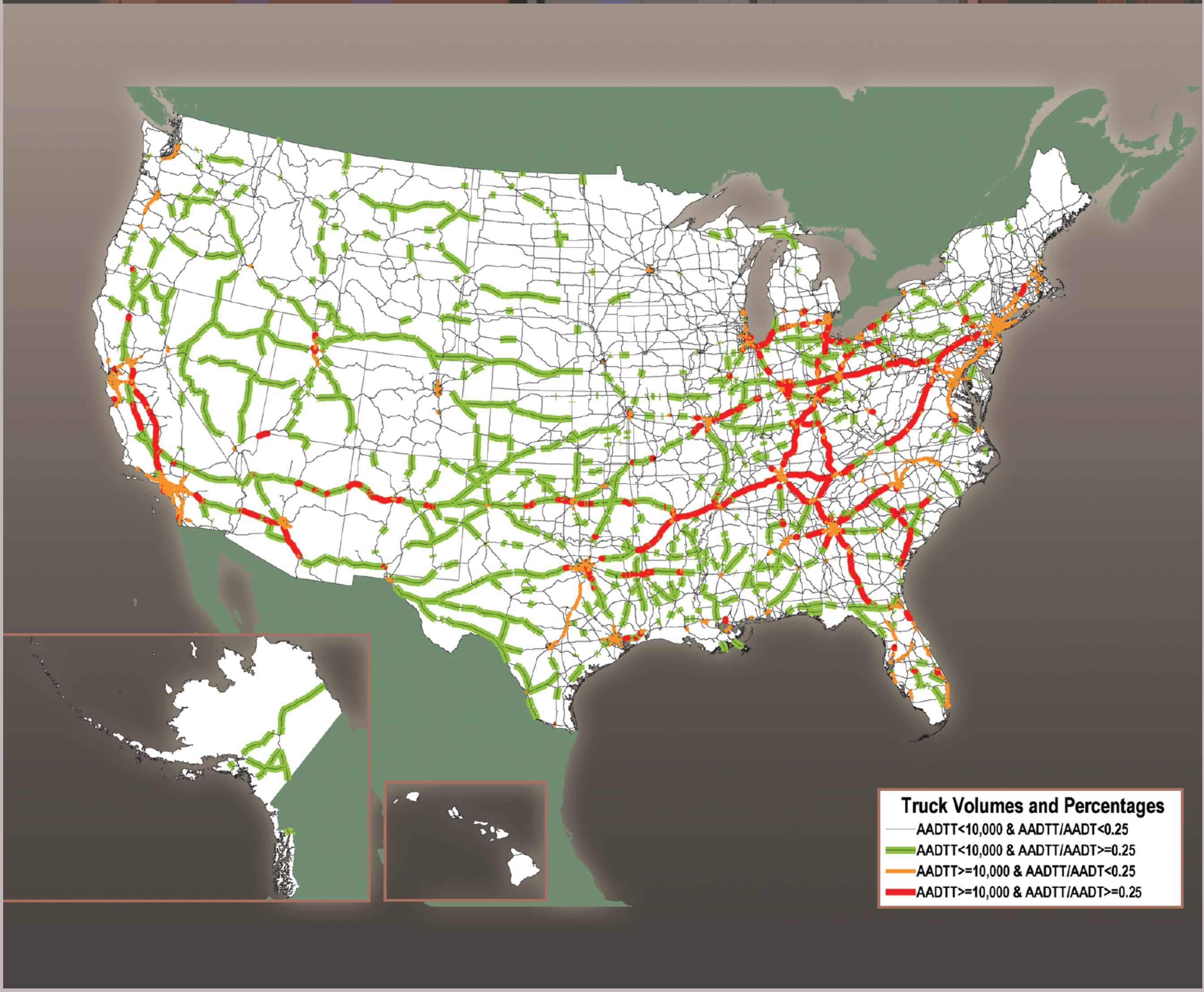
Table 3. Share of Vehicle Miles of Travel by Highway System

	Interstate Highway (Percent)	Balance of National Highway System (Percent)	Other Highways (Percent)
All vehicles	35	30	35
All trucks	49	26	25
Freight-hauling trucks serving places at least 50 miles apart	75	20	6

Note: Numbers do not add to 100 due to rounding.

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.2, 2007.

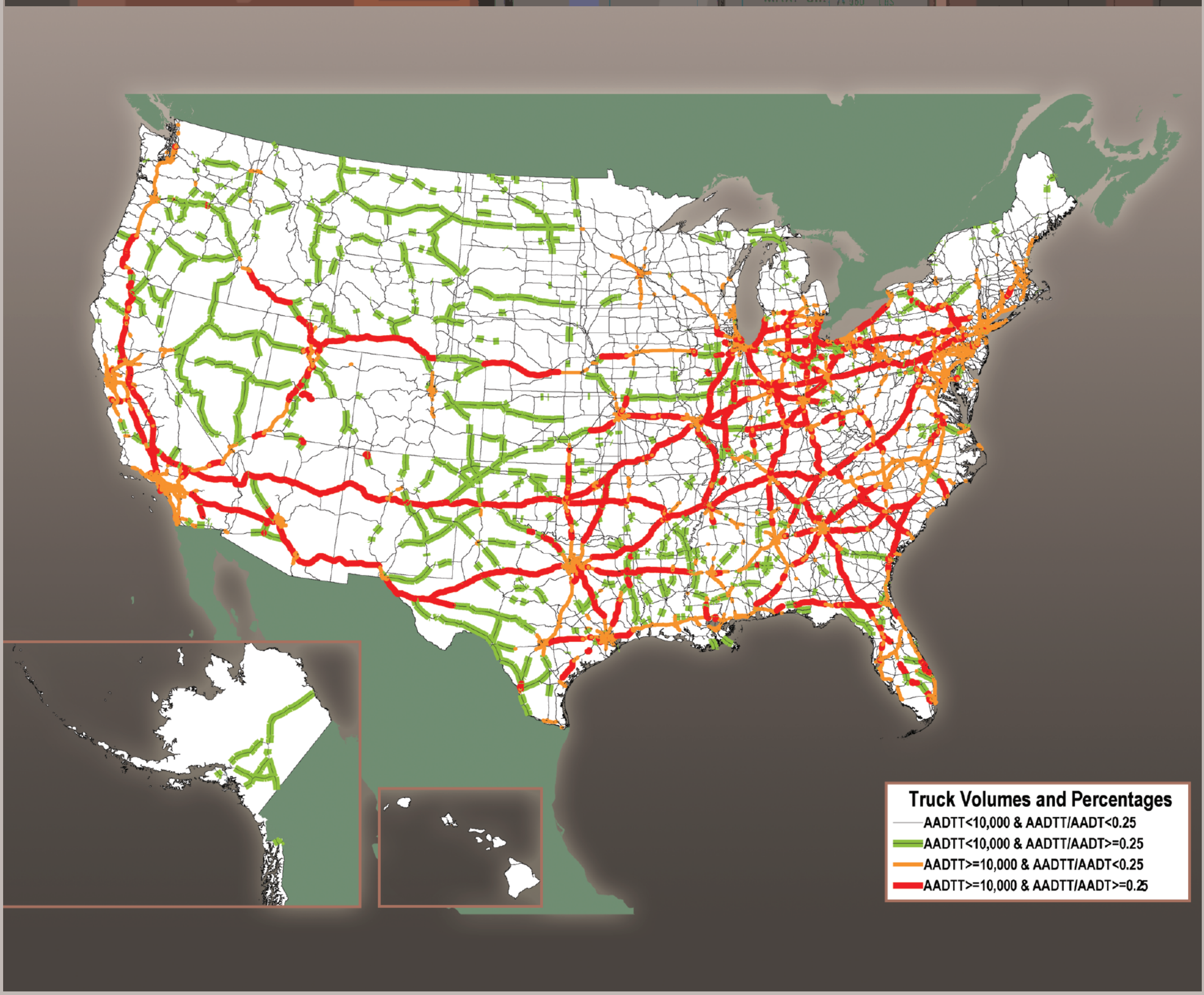
Figure 6. Major Truck Routes on the National Highway System: 2002



Notes: 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.

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.2, 2007.

Figure 7. Major Truck Routes on the National Highway System: 2035



Notes: 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.

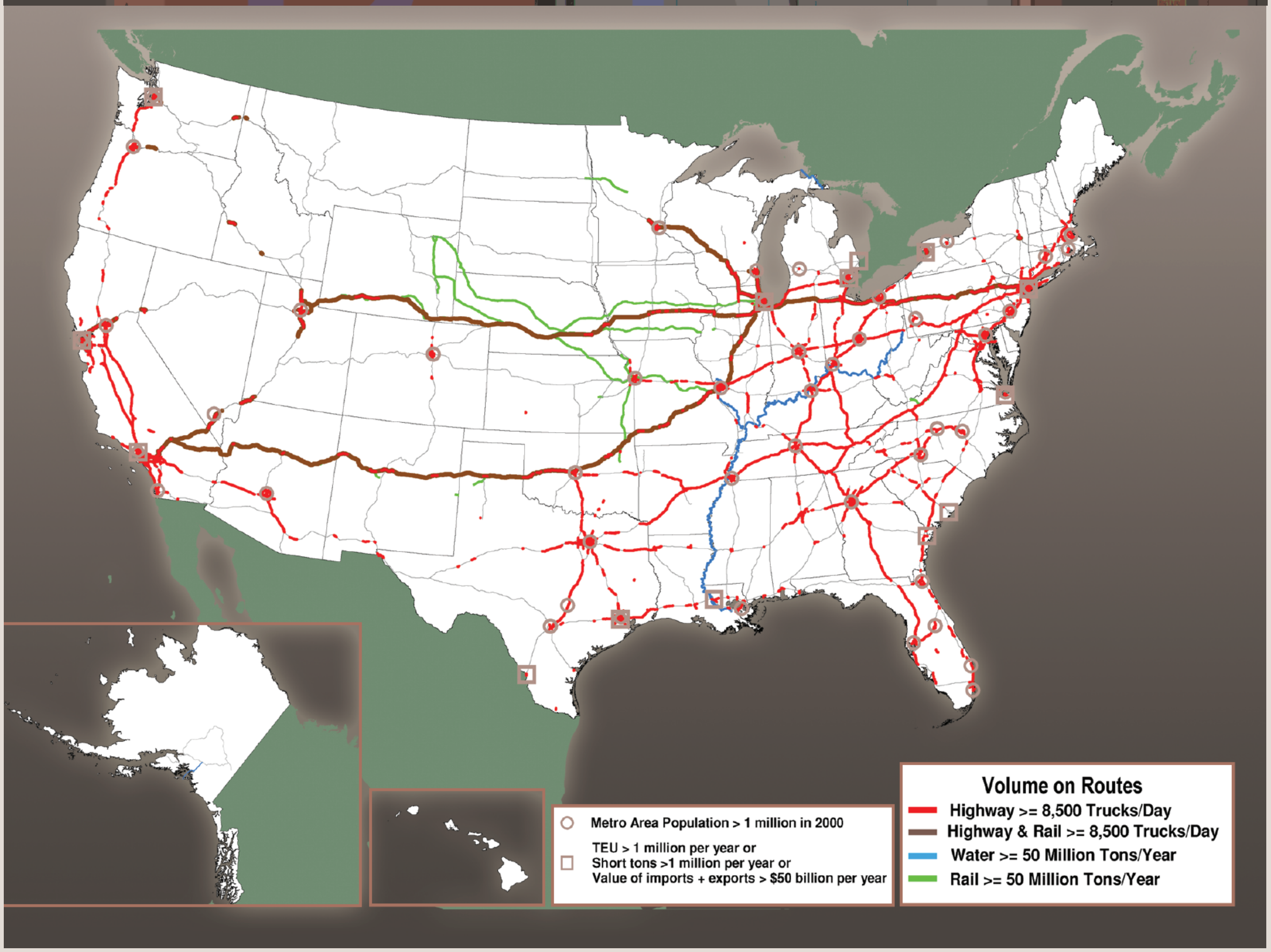
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.2, 2007.

Major Freight Corridors

The largest freight flows are concentrated on a relatively small number of corridors. Figure 8 highlights segments of the freight transportation network that carry more than 50 million tons per year, including:

- Highway segments that carry at least 8,500 trucks per day, which is the number needed to move 50 million tons per year at 16 tons per truck.
- Additional highway segments and parallel rail lines that together carry at least 8,500 truck, trailer-on-flatcar, and container-on-flatcar payloads of typically high-value, time-sensitive cargo at 16 tons per payload.
- Rail lines and waterways that carry 50 million tons in bulk cargo per year.

Figure 8. Components of Major Freight Corridors

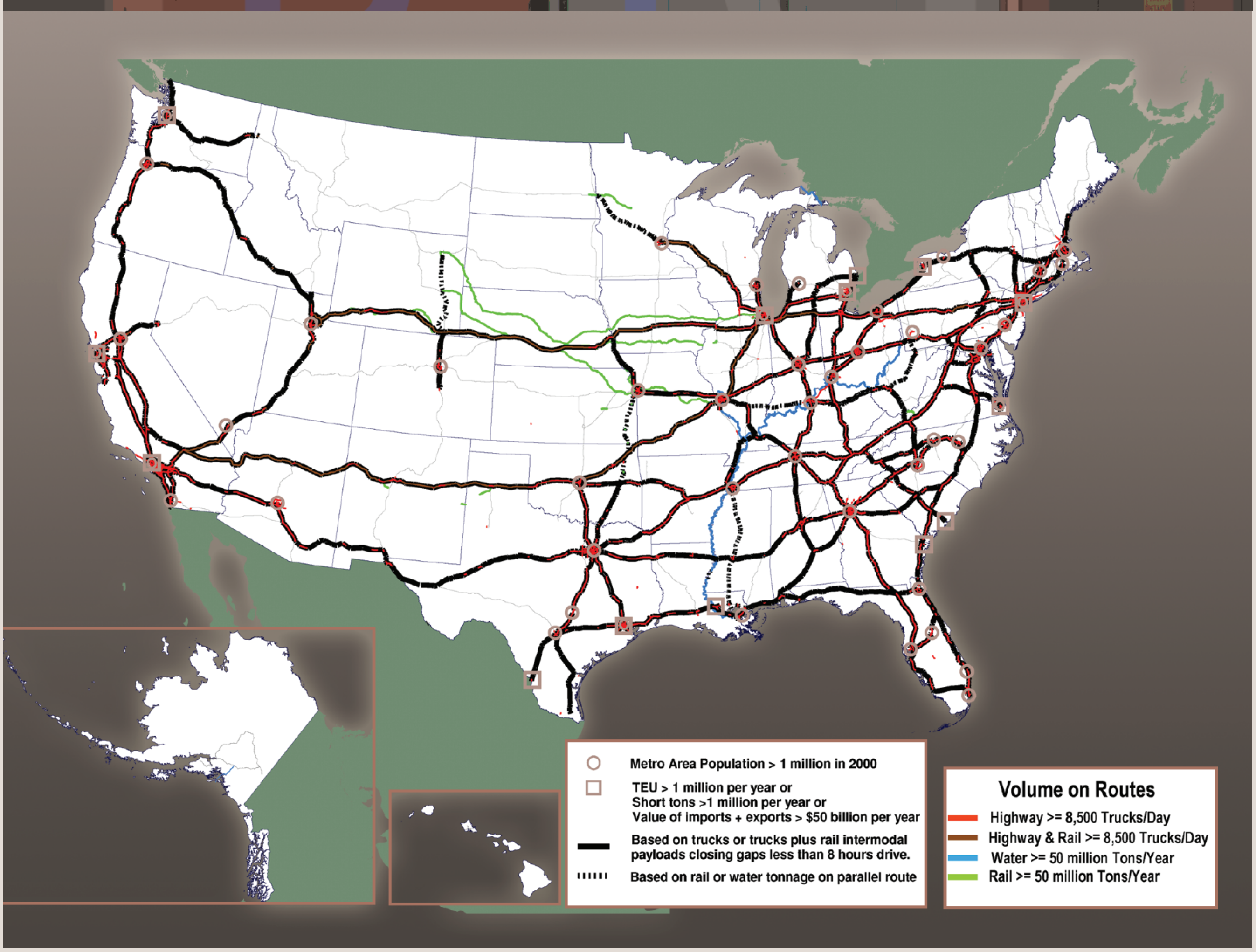


Notes: Highway & Rail is daily truck payload equivalents based on annual average daily truck traffic plus average daily intermodal service on parallel railroads. Average daily intermodal service is the annual tonnage moved by container-on-flatcar and trailer-on-flatcar service divided by 365 days per year and 16 tons per average truck payload.

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, 2008.

Figure 9 shows major freight corridors by connecting gaps less than 440 miles (the distance a truck can travel in 8 hours at 55 miles per hour) between highway segments displayed in Figure 8 and adding routes that parallel bulk cargo rail lines and waterways. The corridors in Figure 9 include approximately 26,000 miles of highways plus an additional 1,500 miles of bulk cargo rail and waterway routes measured along the nearest parallel highway. Interstate highways account for over 95 percent of the total 27,500 miles. The total mileage is about 60 percent of the length of the Interstate System and less than 17 percent of the National Network designated for conventional combination trucks.

Figure 9. Major Freight Corridors



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Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, 2008.

The National Network

The National Network was authorized by the Surface Transportation Assistance Act of 1982 (P.L. 97-424) and specified in the U.S. Code of Federal Regulations (23 CFR 658) to require states to allow conventional combinations on “the Interstate System and those portions of the Federal-aid Primary System ... serving to link principal cities and densely developed portions of the States ... [on] high volume route[s] utilized extensively by large vehicles for interstate commerce ... [which do] not have any unusual characteristics causing current or anticipated safety problems.” 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.

The National Network differs in extent and purpose from the National Highway System (NHS), which was created more than a decade later by the National Highway System Designation Act of 1995 (P.L. 104-59). Both are about the same length, roughly 200,000 miles, but the National Network includes approximately 65,000 miles of highways beyond the NHS, and the NHS includes about 50,000 miles of highways that are not on the National Network. The National Network supports interstate commerce by regulating the size of trucks, while the NHS supports interstate commerce by focusing federal investments.

The National Network has not changed significantly in a quarter century. It is modified only if segments are added to the Interstate highway system or if states petition to have a segment beyond the Interstate highway system added or deleted. Petitions for modifications have not been received in years, even though the geography of interstate commerce has changed significantly with the growth of smaller communities into principal cities and the emergence of new, densely developed areas. Consistency between the National Network and freight-related portions of the more recent NHS is not required.

The definition of conventional combinations is also unchanged, even though 48-feet is no longer the maximum length of a single trailer in the majority of states. Single 53-foot trailers are allowed in 25 states without special permits and in an additional 3 states subject to limits on distance of kingpin to rearmost axle.

Freight and Congestion

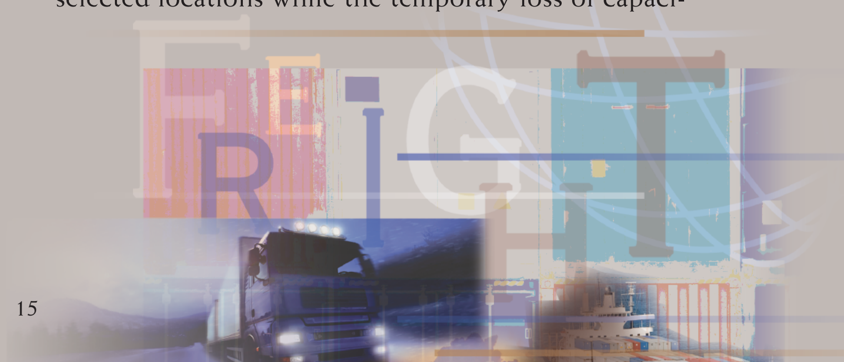
Congestion affects economic productivity in several ways. American businesses require more operators and equipment to deliver goods when shipping takes longer, more inventory when deliveries are unreliable, and more distribution centers to reach markets quickly when traffic is slow. Likewise, both businesses and households are affected by sluggish traffic on the ground and in the air, reducing the number of workers and job sites within easy reach of any location. The growth in freight is a major contributor to congestion in urban areas and on intercity routes, and congestion affects the timeliness and reliability of freight transportation. Long-distance freight movements are often a significant contributor to local congestion, and local congestion typically impedes freight to the detriment of local and distant economic activity.

Growing freight demand increases recurring congestion at freight bottlenecks, places where freight and passenger service conflict with one another, and where there is not enough room for local pickup and delivery. Congested freight hubs include international gateways such as ports, airports, and border crossings, and major domestic terminals and transfer points such as Chicago's rail yards. Bottlenecks between freight hubs are caused by converging traffic at highway intersections and railroad junctions, steep grades on highways and rail lines, lane reductions on highways and single-track portions of railroads, and locks and constrained channels on waterways. A preliminary study for the Federal Highway Administration (FHWA) identified intersections in large cities, where both personal vehicles and trucks clog the road, as the largest highway freight bottlenecks (USDOT FHWA 2005a).

As passenger cars and trucks compete for space on the highway system, commuter trains and freight trains compete for space on the railroad network in metropolitan areas. The growth in rail freight is occurring at the same time rising fuel prices and environmental concerns are encouraging greater use of transit.

Congestion also is caused by restrictions on freight movement, such as the lack of space for trucks in dense urban areas and limited delivery and pick-up times at ports, terminals, and shipper loading docks. One estimate of urban congestion attributes 947,000 hours of vehicle delay to delivery trucks parked at curbside in dense urban areas where office buildings and stores lack off-street loading facilities (ORNL 2004). Limitations on delivery times place significant demands on highway rest areas when large numbers of trucks park outside major metropolitan areas each night waiting for their destination to open and accept their shipments (USDOT FHWA 2002).

Bottlenecks cause recurring, predictable congestion in selected locations while the temporary loss of capaci-



ty, or nonrecurring congestion, is widespread and less predictable. Sources of nonrecurring delay include incidents, weather, work zones, and other disruptions. These nonrecurring, often-unpredictable, sources of highway delay have been estimated to exceed delay from recurring congestion (ORNL 2004). Weather, maintenance activities, and incidents have similar effects on aviation, railroads, pipelines, and waterways. Aviation is regularly disrupted by local weather delays, and inland waterways are closed by regional flooding and droughts.

Additionally, freight congestion is caused by other factors that are considered either recurring if they are systemic problems or non-recurring if they represent an isolated event. Recurring and non-recurring sources of freight congestion include equipment shortages, short-term labor disruptions, and long-term shortages in key occupations such as truck drivers, inefficient operating practices at terminals and border crossings, and traffic backups at toll booths. Technology is reducing some of these sources, such as through electronic toll collection.

Highway Congestion

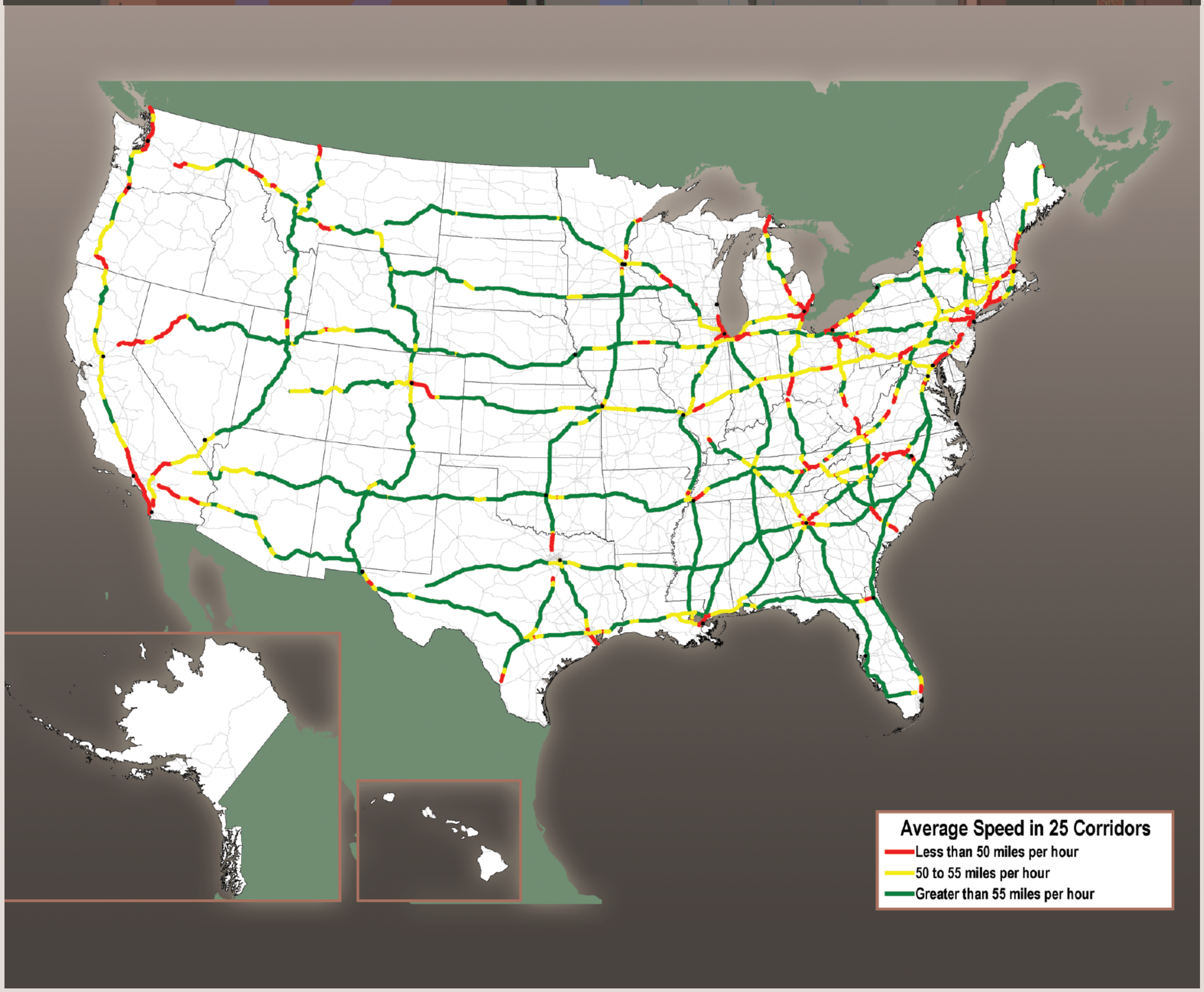
Trucks must contend with congested urban areas for most intercity trips. Recurring peak-period congestion slowed traffic on more than 10,600 miles of the NHS and created stop-and-go conditions on an additional 6,700 miles in 2002. Interstate commerce is most affected on congested segments that carry at least 10,000 trucks per day, including 3,300 miles with slowed traffic and an additional 3,000 miles with stop-and-go conditions (Figure 11, see page 18).

Congestion is forecast to spread from larger urban areas and a few intercity routes to large stretches of intercity highways in both urban and rural areas. Without operational improvements or additional capacity between now and 2035, recurring peak-period congestion is forecast to slow traffic on 20,000 miles of the NHS and create stop-and-go conditions on an additional 45,000 miles. Highway segments with slow traffic and more than 10,000 trucks per day are forecast to increase to more than 10,000 miles, while stop-and-go traffic on segments with more than 10,000 trucks per day is expected to occur on an additional 23,000 miles (Figure 12, see page 19).

Although freight congestion occurs throughout the nation, some local bottlenecks account for a substantial share of the total disruption. The top 10 highway-interchange bottlenecks cause an average of 1.5 million annual truck hours of delay each, compared to less than 250,000 annual hours of truck delay for other truck bottlenecks (USDOT FHWA 2005a).

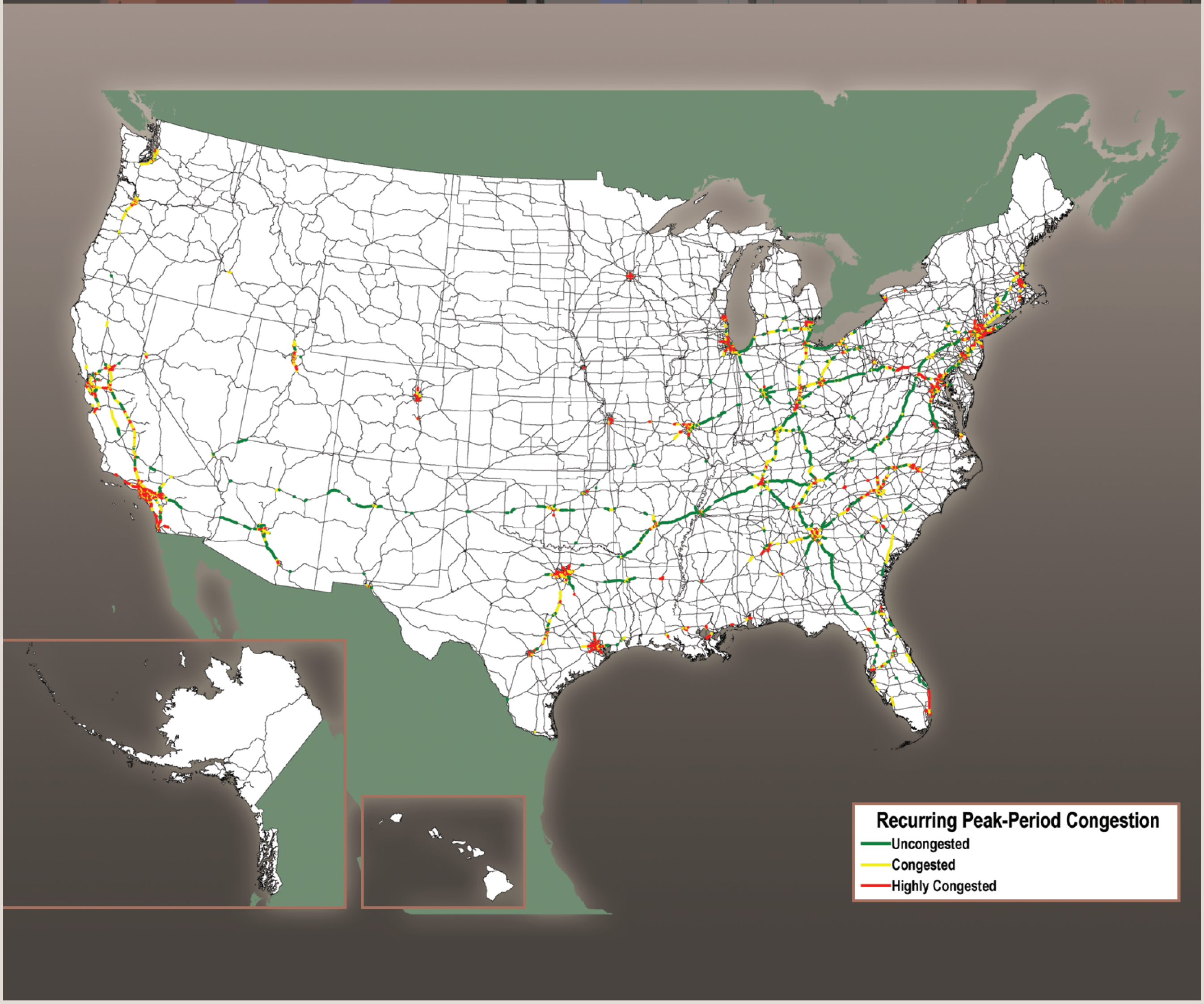
Until recently, estimates of highway delay have been based on comparisons of traffic volumes to physical highway capacity. To supplement these estimates with direct measures, FHWA and the American Transportation Research Institute are working together to calculate average truck speeds and travel time reliability using automatic vehicle location and mapping technologies. Data are being collected for approximately 32,000 miles of Interstate highways on 25 of the most heavily traveled routes (Figure 10) and at major border crossings (USDOT FHWA 2006). These data identify congested locations from all sources of delay, including both recurring and non-recurring congestion.

Figure 10. Average Truck Speeds on Selected Interstate Highways: 2007



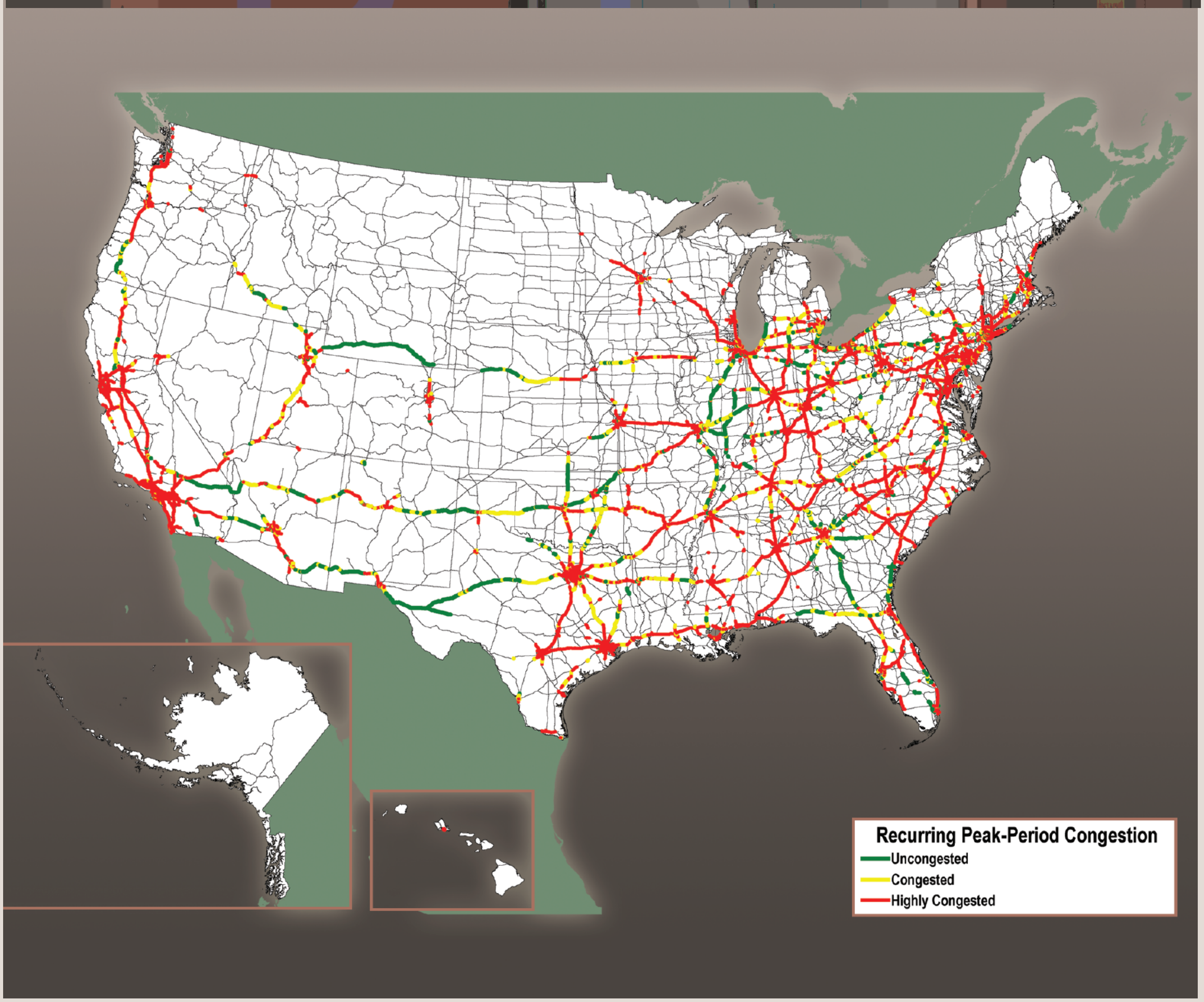
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Performance Measurement Program, 2008.

Figure 11. Peak-Period Congestion on High-Volume Portions of the National Highway System: 2002



Notes: High-volume truck portions of the National Highway System carry more than 10,000 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. Congested segments have reduced traffic speeds with volume/service flow ratios between 0.75 and 0.95.
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.2, 2007.

Figure 12. Peak-Period Congestion on High-Volume Portions of the National Highway System: 2035



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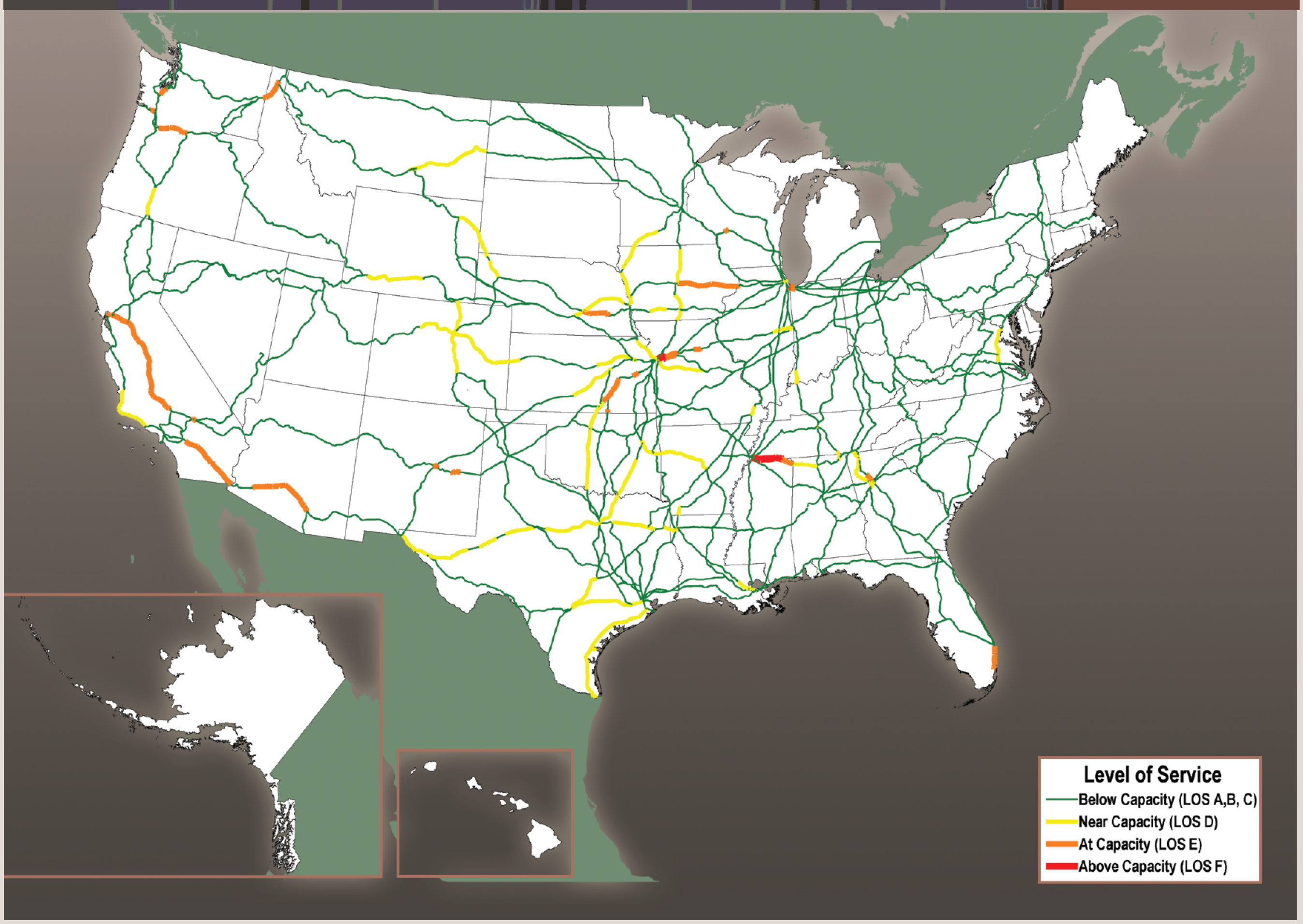
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.2, 2007.

Railroad Congestion

Class 1 (large interregional) freight railroads are experiencing significant growth in demand after decades of responding to a relatively stagnant market by reducing trackage by about 50 percent between 1960 and 2000 (USDOT BTS 2002). Trailer-on-flatcar and container-on-flatcar service, once a small market, is now a major source of traffic and revenue, with high speed intermodal trains vying for space on the network with slower trains carrying bulk commodities. Seasonal surges in freight demand and disruptions from incidents and maintenance activities add to congestion as volumes reach capacity on the reduced mainline railroad network. Class 1 railroads are responding with operational improvements and capital expenditures. In 2006, railroads invested $8.5 billion on renewal of existing roadway, structures, and equipment, and on expansion to serve additional traffic (AAR 2007). The results are relative stability in average speeds and terminal dwell times for each of the major railroads in 2007 (Railroad Performance Measures 2008).

Investment in Southern California's Alameda Corridor illustrates how improved freight flows through a local

Figure 13. Current Train Volumes Compared to Current Capacity



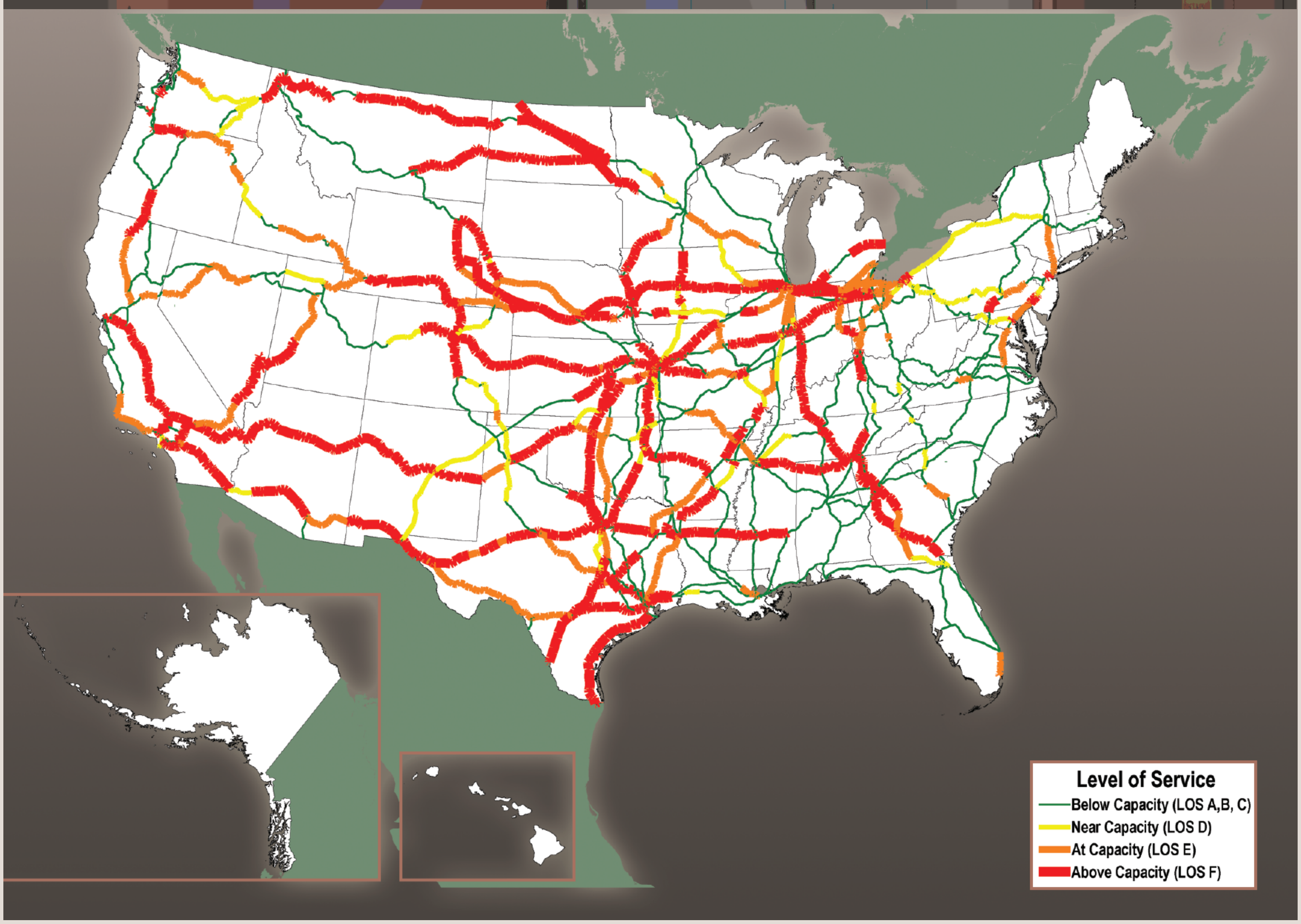
Note: Level of Service (LOS) A through F approximates the conditions described in Transportation Research Board, *Highway Capacity Manual 2000*.
Source: Association of American Railroads, *National Rail Infrastructure Capacity and Investment Study* prepared by Cambridge Systematics, Inc. (Washington, DC: September 2007), figure 4.4, page 4-10.

bottleneck affect destinations well beyond the metropolitan area and the State. The project reduced congestion on rail connections between the Ports of Los Angeles and Long Beach and the rest of the nation, as well as congestion on streets in the Los Angeles area that formerly crossed the railroad at grade.

Congestion on the mainline railroad network is forecast to spread significantly by 2035 (Figures 13 and 14). Using volume-to-capacity comparisons similar to highway calculations, the Association of American Railroads reports that rail lines experiencing unstable flows and service break-down conditions will increase from 108 miles today to almost 16,000 miles (30 percent of the network) in 2035 if current capacity is not increased. Rail routes that have moderate to very limited capacity to accommodate maintenance without serious service disruptions and to recover quickly from incidents will increase from 6,413 miles today to over 12,000 miles in 2035, affecting 25 percent of the network (AAR 2007).

The picture for short-line and regional railroads is less clear. Very few statistics are collected on this segment of the industry, which included 34 regional railroads and 529 local railroads in 2001 (ASLRRA 2002).

Figure 14. Train Volumes in 2035 Compared to Current Capacity



Note: Level of Service (LOS) A through F approximates the conditions described in Transportation Research Board, *Highway Capacity Manual 2000*.
Source: Association of American Railroads, *National Rail Infrastructure Capacity and Investment Study* prepared by Cambridge Systematics, Inc. (Washington, DC: September 2007), figure 5.4, page 5-5.

Some of these railroads provide links between port facilities and Class 1 railroads, while others serve small communities and shippers in rural areas.

Waterway Congestion

Deep draft ports experience congestion as space for increasing volumes of import and export cargo is limited by factors such as environmental and community concerns. Congestion also occurs when vessels arrive at the same time rather than spread through the week. Most ports must look to operational improvements to increase capacity and reduce congestion, such as reducing the amount of demurrage allowed for containers at terminals, instituting chassis pools, and moving to stack operations.

Even when ports can berth and unload a ship quickly, the increasing size of container ships is moving congestion from ports to access roads and railroads. The number of the world's Post-Panamax vessels, container ships that are too large to fit through the Panama Canal, increased from 331 in 2001 to 561 in 2004, with another 426 on order (USDOT MARAD 2005).

On inland waterways, lock operations and aging infrastructure cause continuous bottlenecks. In 2007, 31 percent of the 510,000 commercial vessel passages through federal and state locks experienced delay. Average delay for tows was 1 hour 32 minutes, and average processing time was about 30 minutes (USACE 2008). Inland waterways are especially susceptible to weather, including problems caused by flooding, droughts, and ice or other storm-related disruptions.

Safety and Environmental Concerns

Freight transportation is not just an issue of throughput and congestion. The growth in freight movement has heightened public concerns about safety and the environment. The freight community must respond to these concerns or face continuing constraints on freight movement across the country.

Highways and railroads account for nearly all fatalities and injuries involving freight transportation. Most of these fatalities involve people who are not part of the freight transportation industry, such as trespassers at railroad facilities and occupants of other vehicles killed in crashes involving large trucks. Approximately 12 percent of all highway-related fatalities involve large trucks. Despite a doubling in truck miles traveled, the number of large trucks involved in crashes has remained stable or declined over the last two decades.

Air quality is a key environmental issue facing the freight transportation industry today. A recent study for FHWA shows that freight transportation accounts for approximately one-half of nitrogen oxides (NO_x) emissions from mobile sources and 27 percent of all NO_x emissions at the national level. Freight transportation accounts for 36 percent of PM-10 emissions (particulate matter 10 microns in diameter) from mobile sources, which is less than 1 percent of all U.S. PM-10 emissions (USDOT FHWA 2005b). Diesel fuel use in heavy trucks, ships, and locomotives is the main source of both NO_x and PM-10 emissions from mobile sources. Initiatives to reduce diesel emissions from trucks, ships, and trains are underway.

Disposal of dredge spoil is a major challenge for maintaining or deepening channels to allow larger ships to berth. Land use and water quality concerns are raised against all types of freight facilities, and invasive species can spread through freight movement.

Incidents involving hazardous materials exacerbate public concern and cause real disruption. The railcar fire in the Howard Street tunnel under Baltimore City in 2001 illustrates the perceived and real problems of transporting hazardous materials (USDOT JPO 2002). This incident occurred on tracks next to a major league baseball stadium at game time during the evening rush hour. This incident forced the evacuation of thousands of people and closed businesses in much of downtown Baltimore. A vital railroad link between the Northeast and the South, as well as a local rail transit line and all east-west arterial streets through downtown, were closed for an extended period. The incident fueled demands to prohibit hazardous materials shipments by railroads through Baltimore and Washington, DC, even though alternative routes are very circuitous and expose many other communities to risk.

Restrictions on truck routes in urban areas are among the most localized sources of conflict between freight transportation and surrounding communities (TRB 2003). Typically the purview of local zoning and planning boards, restrictions on truck routes can have significant effects on the local economy and its connections with domestic and foreign trading partners. Although federal laws ensure access for interstate commerce by allowing conventional truck combinations on the National Network, public demands for eliminating some truck routes and for other restrictions on trucks may increase as neighborhoods near ports and industrial areas evolve into expensive residences and as trucks become a larger share of traffic on an increasing number of highways.

The Economic Costs of Freight Transportation

Over the past 25 years, freight transportation has become cheaper for a given level of service, contributing significantly to enhanced productivity and economic growth. However, market forces, environmental concerns, rising fuel prices, and other factors will increase the cost of moving all goods in the years ahead. In addition, congestion and other issues will affect the long and often vulnerable supply chains of high-value, time-sensitive commodities. If these forces are not mitigated, then the increased cost of moving freight will be felt throughout the economy, affecting businesses and households alike.

Congestion results in enormous costs to shippers, carriers, and the economy. For example, Nike must spend an additional $4 million per week to carry an extra 7-to-14 days of inventory to compensate for shipping delays (Isbell 2006). One day of delay requires American President Line's eastbound trans-Pacific services to increase its use of containers and chassis by 1,300, which adds $4 million in costs per year (Bowe 2006). A week-long disruption to container movements through the Ports of Los Angeles and Long Beach could cost the national economy between $65 and $150 million per day (US Congress CBO 2006). The 2,110 freight bottlenecks on highways throughout the United States cause more than 243 million hours of delay to truckers annually (USDOT FHWA 2005a). At a delay cost of $26.70 per hour, the conservative value used by FHWA's Highway Economic Requirements System model for estimating national highway costs and benefits, these bottlenecks cost truckers about $6.5 billion per year.

Congestion costs are compounded by continuing increases in operating costs per mile and per hour. The cost of highway diesel fuel increased 126 percent over the decade ending in 2006 (USDOE EIA 2008). Future labor costs are projected to increase at a faster rate than in the past in response to the growing shortage of truck drivers (ATA 2005). To attract and retain more drivers and adjust to new safety regulations, carriers may reduce the number of hours drivers are on the road, which will in turn increase operating costs. Railroads also are facing labor recruitment challenges (USDOT FRA 2007). Beyond fuel and labor, truck operating costs are affected by needed repairs to damaged equipment caused by deteriorating roads, taxes and tolls to pay for repair of infrastructure, and insurance and additional equipment required to meet security, safety, and environmental requirements.

Increased costs to carriers are reflected eventually in increased prices paid for freight transportation. Between 2003 and 2006, prices increased 13 percent for truck transportation, 25 percent for rail transportation, 11 percent for scheduled air freight, 11 percent for water transportation, 9 percent for port and harbor operations, 5 percent for marine cargo handling, 22 percent for pipeline transportation of crude petroleum, and 8 percent for pipeline transportation of refined petroleum products (USDOL BLS 2007).

When the entire economy is taken into account, transportation services contribute more than 5 percent to the production of GDP (USDOT BTS 1998). For-hire and in-house trucking accounts for more than one-half of this contribution. The importance of transportation varies by economic sector. For example, $1 of final demand for agricultural products requires 14.2 cents in transportation services, compared with 9.1 cents for manufactured goods and about 8 cents for mining products. An increase in transportation cost affects lower margin bulk commodities more than high-value, time-sensitive commodities that have higher margins. In either case, an increase in transportation costs will ripple through all these industries, affecting not only the cost of goods from all economic sectors but also markets that may remain open for the goods.

The Freight Challenge

How can the nation move more goods cheaply and reliably on an increasingly constrained infrastructure without affecting safety and degrading the environment? No doubt, the challenge is enormous. To a great extent, efficiency gains from economic deregulation have been achieved and absorbed by the system. Opportunities for operational improvements are still available and need to be utilized. New physical capacity is limited by available financing, competition with other needs and uses, and environmental concerns. In addition, traditional strategies aimed at passenger travel may not apply.

The freight transportation challenge differs from that of urban commuting and other passenger travel in several ways:

- Freight moves long distances through localities and responds to distant economic demands while the majority of passenger travel occurs between local origins and destinations. Freight movement often creates local problems without local benefits.

- Freight movements fluctuate more quickly and in greater relative amounts than passenger travel. While both passenger travel and freight respond to long-term demographic change, freight responds more quickly than passenger travel to short-term economic fluctuations. Fluctuations can be national or local. The addition or loss of just one major business can dramatically change the level of freight activity in a locality.

- Freight movement is heterogeneous compared to passenger travel. Patterns of passenger travel tend to be very similar across metropolitan areas and among large economic and social strata. The freight transportation demands of farms, steel mills, and clothing boutiques differ radically from one another. Solutions aimed at average conditions are less likely to work because the freight demands of economic sectors vary widely.

- Improvements targeted at freight demand are needed as freight accounts for a larger share of the transportation system, and as improvements targeted at general traffic or passenger travel are less likely to aid the flow of freight as an incidental by-product.

Local public action is difficult to marshal because freight traffic and the benefits of serving that traffic rarely stay within a single political jurisdiction. One-half of the weight and two-thirds of the value of all freight movements cross a state or international boundary. Federal legislation established metropolitan planning organizations (MPOs) four decades ago to coordinate transportation planning and investment across state and local lines within urban areas, but freight corridors extend well beyond even the largest metropolitan regions and usually involve several states. Creative and ad hoc arrangements are often required through pooled fund studies and multistate coalitions to plan and invest in freight corridors that span regions and even the continent, but there are few institutional arrangements that coordinate this activity.

The growing needs of freight transportation can bring into focus conflicts between interstate and local interests. Many communities do not want the noise and other aspects of trucks and trains that pass through with little benefit to the locality, but those transits can have a huge impact on national freight movement and regional economies.

Beyond the challenges of intergovernmental coordination, freight transportation raises additional issues involving the relationships between public and private sectors. Virtually all carriers and many freight facilities are privately owned. The private sector owns $985 billion in transportation equipment plus $558 billion in transportation structures. In comparison, public agencies own $486 billion in transportation equipment plus $2.4 trillion in highways.[2] Freight railroad facilities and services are owned almost entirely by the private sector, while trucks owed by the private sector operate over public highways. Likewise, air cargo services owned by the private sector operate in public airways and mostly at public airports. Privately owned ships operate over public waterways and at both public and private port facilities. Most pipelines are privately owned but significantly controlled by public regulation.

In the public sector, virtually all truck routes are owned by state or local governments, and airports and harbors are typically owned by public authorities. Air and water navigation is typically handled at the federal level, and safety is regulated by all levels of government. As a consequence of this mixed ownership and management, most solutions to freight problems require joint action by both public and private sectors. Financial, planning, and other institutional mechanisms for developing and implementing joint efforts have been limited, inhibiting effective measures to improve the performance and minimize the public costs of the freight transportation system.[3]

[2] Fixed assets are for 2006 and include both passenger and freight transportation. See the Bureau of Economic Analysis at www.bea.gov/bea/dn/FA2004/.
[3] Coordination issues are discussed on the U.S. Department of Transportation Freight Transportation Web site, www.freight.dot.gov.

Responses to the Freight Challenge

Freight has moved to the forefront of many debates and plans concerning transportation in recent years. Stakeholders increasingly express concern that piecemeal improvements to the freight transportation system are not enough. The freight challenge requires a wide range of activities by the private sector and all levels of government that may be organized formally or informally to pursue common objectives.

To better understand the freight challenge and activities conducted by both the private sector and all levels of government, the Transportation Research Board convened the Freight Transportation Industry Roundtable. Comprised of individuals from transportation providers, shippers, state agencies, port authorities, and the U.S. Department of Transportation (USDOT), the Roundtable developed an initial Framework for a National Freight Policy to identify freight activities and focus those activities toward common objectives (Table 5, see page 30).

The Framework for a National Freight Policy continues to evolve as a joint effort of USDOT and its partners in the public and private sectors to inventory existing and proposed strategies, tactics, and activities to improve freight transportation (USDOT 2008). The framework's focus is national rather than federal, and reflects the critical roles of the Federal Government, States, localities, and the private sector. Each strategy has at least one tactic, each tactic has at least one activity, and each activity has "owners" who are responsible for establishing milestones and articulating the consequences of moving the activity forward. The Framework is structured to identify examples of good practice, actions that would benefit from increased collaboration, conflicts that require resolution, and issues that need more attention. It provides a common ground for discussion rather than a forum for developing a formal industry consensus or official USDOT views.

Government Responses at the National Level

Freight is the focus of several congressional actions, including the most recent reauthorization of the Federal-aid Highway Program through the Safe, Accountable, Flexible, Efficient Transportation Equity Act: Legacy for Users (SAFETEA-LU) (P.L. 109-059). SAFETEA-LU authorized $4.6 billion for freight-oriented infrastructure investments (Table 4), expanded eligibility for financing freight projects under the Transportation Infrastructure Finance and Innovation Act Program, extended the State Infrastructure Bank Program, and modified the U.S. tax code to encour-

Table 4. Direct Expenditures for Freight Infrastructure in SAFETEA-LU

Projects of National/Regional Significance	$1.779 billion over 5 years
National Corridor Infrastructure Improvement	$1.948 billion over 5 years
Coordinated Border Infrastructure Program	$833 million over 5 years
Freight Intermodal Distribution Pilot Grant Program	$30 million over 5 years
Truck Parking	$25 million over 4 years
Total	$4.615 billion

Source: U.S. Department of Transportation, *2006 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance* (Washington, DC: 2007), page 14-7, available at www.fhwa.dot.gov/policy/2006cpr/chap14.htm.

Table 5. Framework for a National Freight Policy

Vision: The United States freight transportation system will ensure the efficient, reliable, safe and secure movement of goods and support the nation's economic growth while improving environmental quality.

Objectives	Strategies
Improve the operations of the existing freight transportation system.	Improve management and operations of existing facilities. Maintain and preserve existing infrastructure. Explore opportunities for privatization. Ensure the availability of a skilled labor pool sufficient to meet transportation needs.
Add physical capacity to the freight transportation system in places where investment makes economic sense.	Provide physical access to interstate commerce. Facilitate regionally-based solutions for nationally significant freight corridors and major gateways. Utilize and promote new/expanded financing tools to incentivize private sector investment in transportation projects.
Better align all costs and benefits among parties affected by the freight system to improve productivity.	Utilize public sector pricing tools. Utilize private sector pricing tools. Spend public revenues raised from transportation on transportation. Explore opportunities for public-private partnerships and/or privatization. Track progress of performance measured at system and program levels. Ensure benefit-cost analysis and informed decision making are enacted at system and program levels.
Reduce or remove statutory, regulatory, and institutional barriers to improved freight transportation performance.	Identify/inventory potential statutory, regulatory, and institutional changes. Provide pilot projects with temporary relief from unnecessarily restrictive regulations and/or processes. Encourage regionally-based intermodal gateway responses. Actively engage and support the establishment of international standards to facilitate freight movement.
Proactively identify and address emerging transportation needs.	Develop data and analytical capacity for making future investment decisions. Conduct freight-related research and development. Maintain dialogue between and among public and private sector freight stakeholders. Make public sector institutional arrangements more responsive. Make the public sector transportation system and investments more accountable and performance oriented. Establish the federal role in freight transportation.
Maximize the safety and security of the freight transportation system.	Pursue activities that improve safety of the freight transportation system. Manage public exposure to hazardous materials. Ensure a balanced approach to security and efficiency in all freight initiatives. Preserve redundant capacity for security and reliability.
Mitigate and better manage the environmental, health, energy, and community impacts of freight transportation.	Pursue pollution reduction technologies and operations. Pursue investments to mitigate environmental, health, and community transportation impacts. Promote adaptive reuse of brownfields and dredge material. Prevent introduction of or control invasive species. Pursue energy conservation strategies and alternative fuels in freight operations.

Source: U.S. Department of Transportation, Freight Transportation Web site, available at www.freight.dot.gov/freight_framework.

age up to $15 billion in investment in freight facilities through private activity bonds.

Beyond concrete and steel, SAFETEA-LU funds freight planning capacity building (P.L. 109-059, Section 5204), supports freight analysis through the surface transportation congestion relief solutions research initiative (P.L. 109-059, Section 5502), and established the National Cooperative Freight Research Program (NCFRP) (P.L. 109-059, Section 5209), and Hazardous Materials Cooperative Research Program (HMCRP) (P.L. 109-059, Section 7131). The research programs provide about $2 million per year on a range of projects (Table 6). Public agencies and private industry work closely together on the NCFRP and HMCRP and actively seek new participants from diverse academic backgrounds and experience to guide individual research through project panels.

SAFETEA-LU also established the National Surface Transportation Policy and Revenue Study Commission (P.L. 109-059, Section 1909(b)), which stated, "The Commission believes the national interest in quality transportation is best served when ... freight movement is explicitly valued. Operation of

Table 6. Cooperative Freight and Hazardous Research Projects through 2008

Project Number	Project Title
NCFRP 01	Review and Analysis of Freight Transportation Markets and Relationships
NCFRP 02	Impacts of Public Policy on the Freight Transportation System
NCFRP 03	Performance Measures for Freight Transportation
NCFRP 04	Identifying and Using Low-Cost and Quickly Implementable Ways to Address Freight-System Mobility Constraints
NCFRP 05	Framework and Tools for Estimating Benefits of Specific Freight Network Investment Needs
NCFRP 06	Freight-Demand Modeling to Support Public-Sector Decision Making
NCFRP 09	Institutional Arrangements in the Freight Transportation System
NCFRP 10	Separation of Vehicles: Commercial Motor Vehicle Only Lanes
NCFRP 11	Current and Future Contributions to Freight Demand in North America
NCFRP 12	Specifications for Freight Transportation Data Architecture
NCFRP 13	Developing High Productivity Truck Corridors
NCFRP 14	Truck Drayage Practices
NCFRP 15	Understanding Urban Goods Movements
NCFRP 16	Representing Freight in Air Quality and Greenhouse Gas Models
NCFRP 17	Synthesis of Short Sea Shipping in North America
HMCRP 01	Hazardous Materials Commodity Flow Data and Analysis
HMCRP 02	Hazardous Materials Transportation Incident Data for Root Cause Analysis
HMCRP 03	A Guide for Assessing Emergency Response Needs and Capabilities for Hazardous Materials Releases
HMCRP 04	Emerging Technologies Applicable to Hazardous Materials Transportation Safety and Security
HMCRP 05	Evaluation of the Potential Benefits of Electronic Shipping Papers for Hazardous Materials Shipments
HMCRP 06	Assessing Soil and Groundwater Environmental Hazards from Hazardous Materials Transportation Incidents

Source: Transportation Research Board, NCFRP Projects, available at www.trb.org/CRP/NCFRP/NCFRPProjects.asp as of July 9, 2008; HMCRP Projects, available at www.trb.org/CRP/HMCRP/HMCRPProjects.asp as of July 9, 2008.

National Freight Transportation Program to Enhance U.S. Global Competitiveness

The National Surface Transportation Policy and Revenue Study Commission supports the creation and funding of a national freight transportation program to implement much needed infrastructure improvements. The program will bring together local, state, and federal interests to make the national transportation system more reliable and efficient. As envisioned, the program will "provide public investment in crucial, high-cost transportation infrastructure," especially on networks that carry large volumes of freight, such as intermodal connectors, sections of interstate highways near port facilities, strategic national rail bridges, and corridor development. Public-private projects that have the potential to facilitate international trade, relieve congestion, or enable "green" intermodal facilities would be included under this program.

A key activity of the National Freight Transportation Program is the development of a national strategic plan to set goals and guide activities. The U.S. Department of Transportation would use state and metropolitan-area plans as a basis for developing the national plan. USDOT would work with states, local governments, multistate coalitions, and other public and private-sector stakeholders to set state and metropolitan-area performance standards for their programs. Each state and metropolitan area would be expected to meet national standards.

Only projects identified in the national plan would be eligible for federal funds. Federal participation in individual projects would be set at 80 percent, with higher participation levels based on the extent of national benefits. Apart from demonstrating that a proposed project under a plan is cost effective and justified, additional federal requirements would be kept to a minimum.

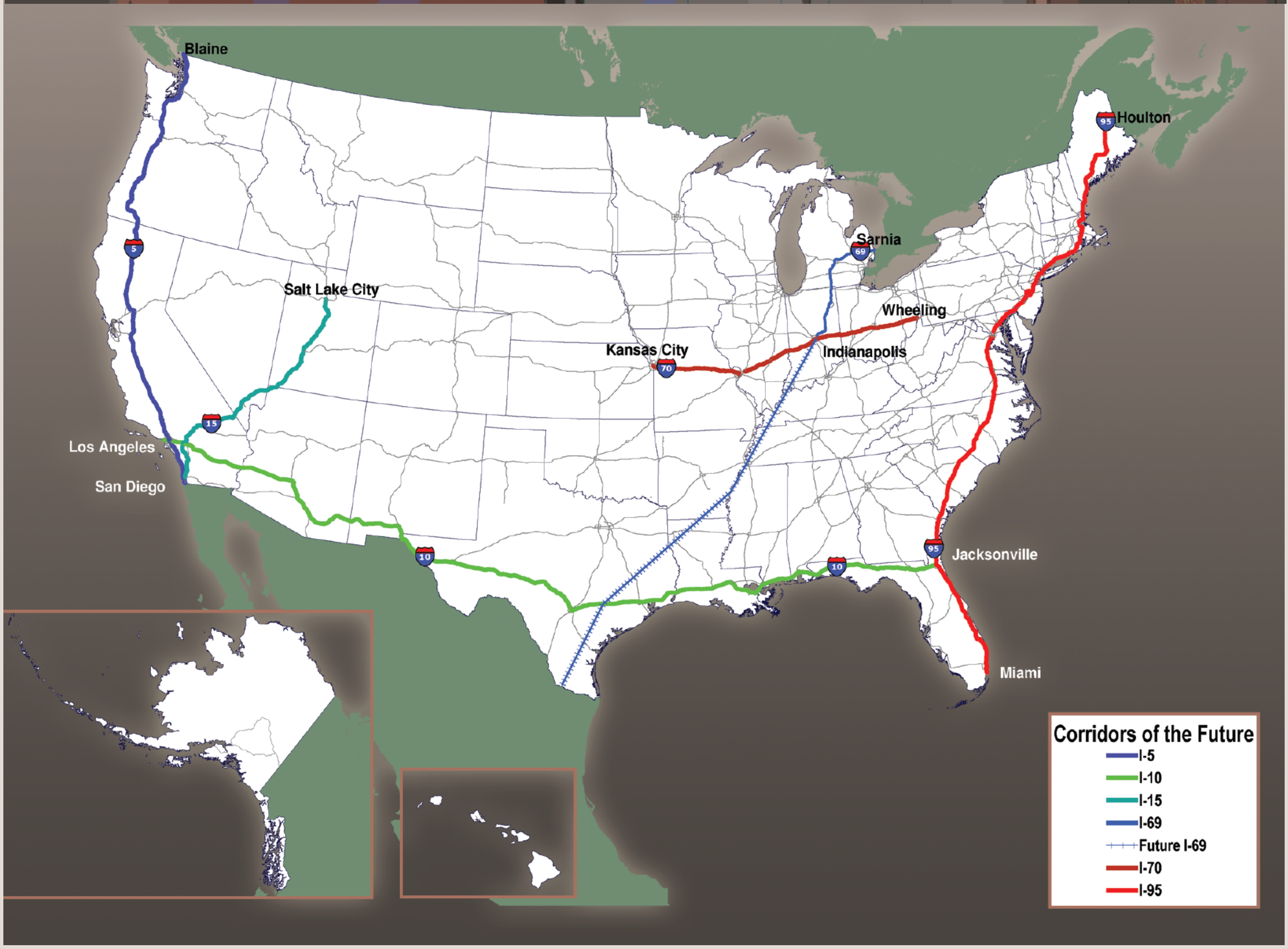
From National Surface Transportation Policy and Revenue Study Commission, "Transportation for Tomorrow: Report of the National Surface Transportation Policy and Revenue Study Commission," Volume 1, 2008, at: www.transportationfortomorrow.org/final_report.

private and public sector freight systems (including rail, trucking, waterways, and ports) that fully serve the needs of the Nation's economy is a priority" (NSTP-RSC 2008). The Commission identified freight as a key focus area in developing and funding a future transportation program (see box on page 32).

Since passage of SAFETEA-LU, USDOT has launched the Corridors of the Future program, a federal initiative aimed at reducing congestion and improving freight transportation efficiency through multijurisdictional planning and collaboration. Six corridors, identified in Figure 15, were selected from a pool of 38 to participate in the program. The six corridors account for nearly 23 percent of daily Interstate travel. USDOT and representatives from the six corridors focus on 1) alternatives to tax-revenue financing, 2) regional planning and project development, and 3) performance measures for the corridor. These issues are at the forefront of how the transportation network will be advanced in the coming decades.

The Corridors of the Future program is part of the broader USDOT initiative "National Strategy to Reduce Congestion on America's Transportation Network." This initiative also includes urban partner-

Figure 15. Corridors of the Future



Source: U.S. Department of Transportation, Corridors of the Future Program, available at www.corridors.dot.gov.

ships to reduce metropolitan congestion through pricing strategies and innovative technologies, as well as measures to enhance aviation system capacity. For more information, visit www.fightgridlocknow.gov.

Other federal freight initiatives include:

- The establishment of the cabinet-level Committee on the Marine Transportation System to coordinate the many federal agencies with responsibilities for the complex and diverse system of waterways, ports, and their intermodal connections. (For more information, visit www.cmts.gov.)
- The Motor Carrier Safety Assistance Program of the Federal Motor Carrier Safety Administration to improve safety among motor carriers. (For more information, visit www.fmcsa.dot.gov/safety-security/safety-initiatives/mcsap/mcsap.htm.)
- The Hazardous Materials Emergency Preparedness grant program of the Pipeline and Hazardous Materials Safety Administration to provide financial and technical assistance as well as national direction and guidance to enhance state, territorial, tribal, and local hazardous materials emergency planning and training. (For more information, visit http://hazmat.dot.gov/training/state/hmep/hmep.)
- The analysis and professional development programs of FHWA's Office of Freight Management and Operations to provide 1) a comprehensive picture of commodity movements through its Freight Analysis Framework; 2) highway travel time and reliability measures through its Performance Measurement Program; 3) new forecasting methods through its Freight Model Improvement Program, and 4) training, technical assistance, and information sharing among professionals in public agencies and industry through its Freight Professional Development Program. (For more information, visit www.ops.fhwa.dot.gov/freight).
- The Smartway program of the U.S. Environmental Protection Agency to provide the trucking industry with technical assistance and incentives to reduce long-haul truck energy consumption and emissions. (For more information, visit www.epa.gov/smartway.)

Responses at the State Level

Many state departments of transportation have established freight offices or designated freight coordinators, and several have initiated statewide freight plans. For example, the Minnesota Department of Transportation created a Freight Planning and Development Unit to 1) review the Department's role in freight transportation; 2) develop strategies for improving freight information; and 3) integrate freight transportation into the policy, planning, and investment processes. (For more information, visit www.dot.state.mn.us/ofrw/freight.html.)

Washington State's efforts go beyond planning to include financing freight projects though its Freight Mobility Strategic Investment Board. The Board's mission is to develop a comprehensive and coordinated state program to facilitate freight movement and to mitigate its effects on local communities. To date, the Board has funded dozens of freight mobility projects and provided technical assistance to eliminate chokepoints so that freight moves smoothly and communities experience fewer disruptions in local traffic. Board-funded projects must be ready for construction within 12 months of receiving funding. To meet this requirement, the Board works with project staff to leverage funding, develop partnerships, and build negotiation skills. (For more information, visit www.fmsib.wa.gov.)

Many states realize that solutions to their freight problems require actions well beyond the state's borders. As a result, 12 corridor coalitions have been created to pursue those solutions. (For more information, visit www.ops.fhwa.dot.gov/freight/corridor_coal.htm.) Some coalitions sponsor research to better understand freight problems throughout their corridor, while others develop specific plans through the Corridors of the Future program. One group, the I-95 Corridor Coalition, is developing a Freight Academy to provide continued education to the region's freight transportation professionals. (For more information, visit www.freightacademy.org.)

Growing state interest in freight issues is underscored by activities of the American Association of State Highway and Transportation Officials (AASHTO), including publication of the *Freight Bottom Line Report*, formal adoption of several freight policy proposals, and the ongoing work of five freight committees and subcommittees. (For more information, visit http://freight.transportation.org.) AASHTO and FHWA cosponsor biennial Freight Transportation Partnership meetings attended by federal and state officials and private sector representatives. Participants share experiences and discuss organizational and institutional issues that need to be addressed to better advance freight transportation projects more effectively. (For more information, visit www.ops.fhwa.dot.gov/freight/partnership.htm.)

Responses at the Local Level

MPOs in larger cities are developing freight plans and programs and engaging private-sector stakeholders through advisory committees. For example, the Atlanta Regional Commission and Georgia DOT together developed a data-driven, policy-based Regional Freight Mobility Plan for the Atlanta metropolitan area. The Plan examined regional goods movement by all modes and culminated in the development of a framework to address regional freight mobility needs and challenges. (For more information, visit www.atlantaregional.com/freightmobility.) Similar efforts are underway in Philadelphia, Chicago, and Los Angeles.

Another notable local initiative is the PierPASS OffPeak program, which was created by the marine terminal operators at the Ports of Los Angeles and Long Beach to alleviate truck traffic congestion and improve air quality in the region. (For more information, visit www.pierpass.org.) Trucks with loaded containers entering or exiting marine terminals during peak hours are charged a terminal mitigation fee. The fee encourages cargo owners and their carriers to move cargo at night and on weekends and defrays the additional costs of keeping the terminal open longer hours. As a result, congestion is reduced during peak daytime periods at port gates and on major highways around the ports, and air quality is improved.

Private Sector and Public-Private Responses

Carriers, shippers, terminal operators, and other private sector players in the freight transportation industry deal with the freight challenge on a daily basis, either through the actions of individual businesses, collective action through associations, or cooperative ventures with public agencies. For example:

- Wal-mart established a Sustainable Value Networks program with its suppliers and other partners to reduce logistics costs through operating efficiency improvements, less wasteful packaging, and alternative fuels use. (For more information, visit www.walmartstores.com/Sustainability/7672.aspx.)

- The Ocean Carrier Equipment Management Association, an association of 18 major ocean common carriers, formed the Consolidated Chassis Management LLC in 2005 to develop and own chassis pools. It currently has more than 35,000 chassis under management at pools in Denver, Salt Lake City, Tampa, Memphis, Nashville, Charleston, Atlanta, Charlotte, Jacksonville, and Savannah. (For more information, visit www.ocema.org.)
- Several associations are proposing new or additional infrastructure investments in freight corridors, such as the "Critical Commerce Corridors" program of the American Road and Transportation Builders Association and the "Let's Rebuild America" program of the U.S. Chamber of Commerce.
- The Intermodal Freight Technology Working Group (IFTWG), a public-private partnership, focuses on the identification and evaluation of technology-based options for improving the efficiency, safety, and security of intermodal freight movement. (For more information, visit www.intermodal.org/iftwg_files/index.shtml.) The IFTWG worked with FHWA to establish the Universal Electronic Freight Manifest initiative, which provides all supply chain partners with timely access to shipment information. (For more information, visit www.ops.fhwa.dot.gov/freight/intermodal/efmi/index.htm.)

Conclusion

The nation's economy depends on the collective action of all stakeholders to maintain and enhance the freight transportation system within the context of safety and environmental concerns. Bold ideas have moved freight forward in the past, such as the domestic canals and railroads of the nineteenth century, the Panama Canal at the beginning of the twentieth century, containerization and the Interstate highway system starting at mid-century, and the establishment of nationwide, overnight delivery services in the last half of the twentieth century. Few would claim to see the next big idea with clarity, but most would agree that creative solutions, both large and small, are needed to keep goods moving and to meet the needs of the economy and the nation.

Freight Story 2008 provides a useful starting point for discussions on the freight transportation challenge and opportunities to improve system reliability and efficiency. Current responses to the freight challenge continue to evolve, and new responses are emerging through discussions of future directions for transportation policies and programs. All stakeholders are encouraged to contribute to these discussions and advance ideas through the Framework for a National Freight Policy.

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