

EXTENT OF THE PROBLEM

INTRODUCTION

This chapter provides an overview of commercial vehicle parking supply and demand for the United States. First, factors driving the need for long-term and short-term parking are described to provide a basis for understanding the demand for parking. Next, an estimate of total parking demand is presented. A state-by-state estimate of demand is presented for the IHS, as well as for demand along high truck volume routes on the remaining portions of the NHS. Following this discussion, an estimate of parking supply is presented. The information presented includes an inventory of total public spaces and commercial truck stop and plaza spaces. Finally, this chapter includes a comparison of parking supply and demand on a state-by-state basis, for the purpose of portraying the extent of parking shortages nationwide.

FACTORS INFLUENCING PARKING DEMAND

Under the current federal HOS rules, drivers participating in interstate commerce are required to rest for a period of 8 hours after driving a maximum of 10 hours. These regulations resulted in a demand for long-term parking spaces, because long-haul drivers must complete a period of rest while en route to a destination. In addition to the breaks required for achieving long-term rest, drivers also take regular short breaks for activities such as eating, refueling, or using bathroom facilities. These breaks require short-term parking spaces at locations that provide amenities to support these activities.

Although drivers are required to obtain extended rest, there is no single agency, organization, or group that is responsible for providing drivers with extended rest locations. Essentially, drivers find such locations themselves and typically rely on two primary options: commercial truck stops and travel plazas or public rest areas. Commercial truck stops and travel plazas are designed to provide drivers with an opportunity to fulfill many nonrest-related activities, whereas public rest areas provide the driver with only minimal services.

The demand for truck parking along a particular stretch of highway is determined not only by the general factors that induce demand, but also by other factors that affect the distribution of that demand. For example, the desire of truck drivers to accommodate their natural sleep cycles results in greater demand for truck parking spaces at night than during the day. In addition, tight delivery schedules associated with just-in-time delivery can result in demand

for truck parking spaces near loading and unloading facilities, because drivers use these spaces as staging areas to help ensure on-time delivery. Truckers who drive as teams are likely to have different parking requirements, because one team member can drive while the other rests. Also, some states limit parking time at public rest areas, compelling commercial drivers to seek other locations.

Taken together, these factors can result in complex demand patterns for truck parking along roadway segments. For example, HOS rules require rest periods away from home primarily for long-haul drivers; a short-haul driver will typically arrive at the destination before a mandatory rest is required. Therefore, highways with a larger proportion of long-haul drivers will typically generate a larger demand for truck parking than do other highways (relative to the total number of trucks on the road). Because short-haul drivers are not required to take an extended rest, one might expect them to take more frequent, shorter breaks, which would favor the use of public rest areas over commercial truck stops and travel plazas. Stretches of a highway that are 8 to 10 hours from a key distribution center might be expected to have higher parking demand because the HOS rules will force drivers originating travel from that center to take an extended rest before resuming driving. Alternately, an area near a significant commercial vehicle destination may have a substantial early morning parking demand as drivers use rest facilities as staging areas while waiting for the loading and unloading facilities to open.

Although these factors help determine the total demand for truck parking in an area (i.e., the latent demand), other factors help determine how that demand is distributed among the available parking locations (i.e., the demand choice). For example, drivers wanting to take a short break are more likely to choose a location for its convenience, whereas drivers taking a long break are more likely to choose a location that has more favorable amenities. Drivers taking a break for a specific activity (e.g., to take a shower) will only park at a location that supports that activity. If one stretch of highway has a shortage of parking locations, demand that cannot be met on that stretch of highway will be met by parking locations on nearby stretches of highway.

PARKING DEMAND: NATIONAL COMMERCIAL VEHICLES

As part of the Section 4027 study, a demand model was developed and applied to estimate parking demand for

corridors along the Interstate and non-Interstate portions of the NHS. This model was designed to provide an estimate of demand for public and commercial parking spaces along a segment of roadway using some simple inputs, including the volume of truck travel, the proportion of long-haul drivers, and the speed limit. Additional details concerning the modeling approach can be found elsewhere (16).

During the undertaking of the Section 4027 study, estimates of demand were developed for segments of the IHS as well as remaining segments of the NHS carrying more than 1,000 trucks per day. Daily parking demand estimates were developed for both commercial spaces and public spaces.

From the analysis, the total daily demand on Interstate highways was estimated to be 240,270 commercial vehicle parking spaces (56,355 spaces at public and 188,915 at commercial facilities), and the total demand on non-Interstate highways of the NHS was estimated to be approximately 42,030 spaces (9,645 at public and 32,385 at commercial facilities) (17).

PARKING SUPPLY: PUBLIC REST AREAS

As part of the Section 4027 study, a survey of 49 states (excluding Hawaii) was conducted to gather information on truck parking capacity at public rest areas and welcome centers. Information was obtained from all 49 state DOTs and their toll road agencies for a combined total of 1,771 public rest areas. The results for each state are summarized in Table 2.

As shown in Table 2, approximately 31,320 public, commercial vehicle parking spaces exist along the IHS and other portions of the NHS. A further analysis of the number of parking spaces at public rest areas along Interstate highways versus non-Interstate highways indicates a total of 28,400 spaces distributed along 39,963 mi of Interstate highways included in this inventory and 2,900 non-Interstate spaces distributed along 22,000 mi of non-Interstate highways.

PARKING SUPPLY: COMMERCIAL TRUCK STOP AND TRAVEL PLAZAS

As mentioned previously, commercial truck stops and travel plazas are designed to provide drivers with an opportunity to fulfill many nonrest-related activities, whereas public rest areas provide the driver with only minimal services. Commercial truck stop operators provide a number of services for trucks and typically provide extended parking to encourage drivers to use these services. In other words, commercial truck stop and travel plaza operators do not provide extended-stay parking as a primary service, but

only to encourage purchases of fuel, food, and other services. The primary data source for the inventory of commercial truck stops and travel plazas was the "Truck Stops Database" developed by Interstate America. This database includes an estimate of the number of commercial parking facilities in the United States and Canada (a total of 6,327 facilities), is updated annually, and contains information describing the number of commercial vehicle parking spaces available at a facility, as well as information about the amenities at those facilities. The results of this inventory for each state are summarized in Table 3.

This table lists the total number of commercial truck stop and travel plaza facilities identified in each state as well as the total number of parking spaces at those facilities. However, many of the private spaces are unmarked or unpaved and therefore should be considered as an approximation.

A further analysis of the number of parking spaces at commercial truck stops and travel plazas along Interstate highways versus non-Interstate highways indicates that there are a total of 253,775 spaces distributed along 39,963 mi of Interstate highways and 24,000 non-Interstate spaces distributed along 21,700 mi of non-Interstate highways.

ANALYSIS OF SUPPLY AND DEMAND

Table 4 presents an aggregate summary of commercial vehicle parking supply and demand for commercial truck stops and travel plaza and public rest areas based on the results previously discussed. In total, there is a demand for 66,000 public spaces on a daily basis compared with a supply of 31,300 spaces. On the commercial side, there is a demand for 221,300 commercial spaces compared with a supply of 277,775. These results indicate a severe shortage of public spaces and an adequate supply of commercial spaces. However, because parking demand and supply is very site specific, a state-by-state comparison of parking demand and parking supply provides some additional insight into the extent of the commercial vehicle parking problem.

To simplify the interpretation of these results, a rating system was developed to summarize the results of the supply-and-demand analysis for each state. The estimated demand divided by the estimated supply for both public and private parking spaces formed a demand/supply ratio that indicated the level of overcrowding statewide. A ratio of less than 1 indicates that demand is smaller than supply and overcrowding is not as likely, and a ratio of greater than 1 indicates that demand outstrips supply.

Because of the uncertainty of the demand and supply estimates, using 1 as an exact cutoff for indicating whether

TABLE 2
PUBLIC REST AREA FACILITIES ALONG INTERSTATES AND OTHER NHS ROUTES CARRYING
MORE THAN 1,000 TRUCKS PER DAY

State	Parking Facilities	Parking Spaces	Weigh Stations	Imposes Time Limits
Alabama	27	710		✓
Alaska	N/A	460		
Arizona	38	560		
Arkansas	21	345		
California	88	1,110		✓
Colorado	31	170		
Connecticut	20	360	✓	
Delaware	1	70		✓
Florida	69	1,710	✓	✓
Georgia	31	1,165	✓	✓
Idaho	30	245	✓	✓
Illinois	54	1,270		
Indiana	52	2,430	✓	
Iowa	38	805		✓
Kansas	29	455		✓
Kentucky	44	990	✓	✓
Louisiana	15	220		
Maine	11	115		
Maryland	11	295		
Massachusetts	17	140		✓
Michigan	75	1,570		
Minnesota	40	535		✓
Mississippi	43	430	✓	✓
Missouri	35	620		
Montana	43	395	✓	
Nebraska	22	265		✓
Nevada	36	260		✓
New Hampshire	6	85		✓
New Jersey	19	670		✓
New Mexico	11	80	✓	✓
New York	36	1,260	✓	✓
North Carolina	37	645		
North Dakota	30	260		
Ohio	98	1,405		
Oklahoma	63	770		
Oregon	40	605		✓
Pennsylvania	65	1,300		✓
Rhode Island	5	270		
South Carolina	49	820		
South Dakota	21	370	✓	✓
Tennessee	30	770	✓	✓
Texas	105	655		✓
Utah	24	240		
Vermont	41	180		
Virginia	39	820		✓
Washington	29	455		✓
West Virginia	21	510		
Wisconsin	23	655		
Wyoming	58	795		
Total	1,771	31,300		

Notes: A checkmark in the “Weigh Stations” column indicates whether the state allows parking at weigh stations, and a checkmark in the “Imposes Time Limits” column indicates whether the state imposes time limits. NHS = National Highway System; N/A = not available.

Source: Fleger et al. (13).

shortages exist is not appropriate. Instead, the demand/supply ratios were grouped into three categories of spaces—surplus, sufficient, and shortage (see Table 5). Because the estimates of truck parking supply indicated a range of parking spaces, several different supply values could be used in determining this ratio; the results in this synthesis report used the maximum estimated truck parking spaces.

Table 6 provides a state-by-state breakdown of these results. It shows the demand/supply ratio and the parking space utilization category for each state. It also shows the demand/supply ratios for parking spaces at public rest areas and at commercial truck stops and travel plazas. The Total column refers to the ratio for parking spaces at both types of facilities.

TABLE 3
COMMERCIAL TRUCK STOP AND TRAVEL PLAZA FACILITIES
ALONG INTERSTATES AND OTHER NHS ROUTES CARRYING
MORE THAN 1,000 TRUCKS PER DAY

State	Parking Facilities	Parking Spaces
Alabama	100	6,900
Alaska	—	—
Arizona	60	8,140
Arkansas	110	7,520
California	125	7,500
Colorado	60	2,710
Connecticut	15	1,245
Delaware	10	325
Florida	85	7,340
Georgia	125	11,475
Idaho	25	1,970
Illinois	125	9,600
Indiana	120	14,530
Iowa	65	5,210
Kansas	55	4,385
Kentucky	80	7,190
Louisiana	115	9,160
Maine	20	1,250
Maryland	15	2,290
Massachusetts	20	1,920
Michigan	90	6,150
Minnesota	60	4,505
Mississippi	100	7,005
Missouri	140	12,275
Montana	40	3,085
Nebraska	50	2,835
Nevada	35	4,980
New Hampshire	15	700
New Jersey	35	3,730
New Mexico	50	6,325
New York	100	6,970
North Carolina	105	7,325
North Dakota	25	2,040
Ohio	135	11,475
Oklahoma	130	9,635
Oregon	55	5,705
Pennsylvania	135	14,505
Rhode Island	5	420
South Carolina	100	8,515
South Dakota	30	1,335
Tennessee	90	6,420
Texas	285	23,525
Utah	45	2,490
Vermont	65	450
Virginia	15	7,445
Washington	40	2,665
West Virginia	25	1,720
Wisconsin	80	5,975
Wyoming	50	3,810
Total	3,360	277,775

Notes: NHS = National Highway System.
Source: Fleger et al. (13).

TABLE 4
SUMMARY OF NATIONAL SUPPLY AND DEMAND

Roadway System	Daily Parking Demand		Parking Supply	
	Public	Commercial	Public	Commercial
Interstate	56,355	188,915	28,400	253,775
Other	9,645	32,385	2,900	24,000
Total	66,000	221,300	31,300	277,775

Source: Fleger et al. (13).

TABLE 5
DEMAND/SUPPLY RATIO CATEGORIES

Demand/Supply Ratio	Parking Space Utilization
Less than 0.9	Surplus spaces
0.9 to 1.1	Sufficient spaces
More than 1.1	Shortage of spaces

Notes: The first category, "Surplus spaces," indicates that the number of parking spaces available is likely to exceed the peak demand. The second category, "Sufficient spaces," indicates that the peak demand and the supply of parking spaces are nearly the same. The third category, "Shortage of spaces," indicates that overcrowding is likely.
Source: Fleger et al. (13).

TABLE 6
PARKING SPACE UTILIZATION BY STATE: DEMAND/SUPPLY RATIO ALONG INTERSTATES AND OTHER NHS ROUTES CARRYING MORE THAN 1,000 TRUCKS PER DAY

State	Public		Private		Total	
	Ratio	Category	Ratio	Category	Ratio	Category
Alabama	2.29	Shortage	0.79	Surplus	0.93	Sufficient
Alaska ¹	0.05	Surplus	N/A	N/A	N/A	Surplus
Arizona	1.88	Shortage	0.43	Surplus	0.53	Surplus
Arkansas	5.20	Shortage	0.79	Surplus	0.99	Sufficient
California	4.10	Shortage	2.03	Shortage	2.29	Shortage
Colorado	4.55	Shortage	0.94	Sufficient	1.15	Shortage
Connecticut	1.71	Shortage	1.66	Shortage	1.67	Shortage
Delaware	2.94	Shortage	2.14	Shortage	2.28	Shortage
Florida	0.99	Sufficient	0.77	Surplus	0.81	Surplus
Georgia	1.88	Shortage	0.64	Surplus	0.75	Surplus
Idaho	3.00	Shortage	1.25	Shortage	1.44	Shortage
Illinois	2.63	Shortage	1.16	Shortage	1.33	Shortage
Indiana	1.77	Shortage	0.99	Sufficient	1.10	Shortage
Iowa	0.86	Surplus	0.44	Surplus	0.50	Surplus
Kansas	1.24	Shortage	0.44	Surplus	0.51	Surplus
Kentucky	2.23	Shortage	1.03	Sufficient	1.17	Shortage
Louisiana	9.32	Shortage	0.75	Surplus	0.96	Sufficient
Maine	1.81	Shortage	0.55	Surplus	0.66	Surplus
Maryland	2.01	Shortage	0.87	Surplus	1.00	Sufficient
Massachusetts	6.16	Shortage	1.51	Shortage	1.83	Shortage
Michigan	0.81	Surplus	0.69	Surplus	0.72	Surplus
Minnesota	1.63	Shortage	0.65	Surplus	0.75	Surplus
Mississippi	2.93	Shortage	0.60	Surplus	0.73	Surplus
Missouri	4.28	Shortage	0.72	Surplus	0.89	Surplus
Montana	1.18	Shortage	0.50	Surplus	0.58	Surplus
Nebraska	0.95	Sufficient	0.30	Surplus	0.35	Surplus
Nevada	2.62	Shortage	0.46	Surplus	0.57	Surplus
New Hampshire	0.84	Surplus	0.35	Surplus	0.40	Surplus
New Jersey	0.69	Surplus	0.41	Surplus	0.45	Surplus
New Mexico	15.62	Shortage	0.65	Surplus	0.83	Surplus
New York	1.43	Shortage	0.87	Surplus	0.95	Sufficient
North Carolina	1.98	Shortage	0.58	Surplus	0.69	Surplus
North Dakota	0.72	Surplus	0.31	Surplus	0.36	Surplus
Ohio	2.35	Shortage	0.96	Sufficient	1.12	Shortage
Oklahoma	1.41	Shortage	0.37	Surplus	0.45	Surplus
Oregon	1.89	Shortage	0.67	Surplus	0.79	Surplus
Pennsylvania	1.82	Shortage	0.54	Surplus	0.65	Surplus
Rhode Island	0.63	Surplus	1.35	Shortage	1.07	Sufficient
South Carolina	1.55	Shortage	0.50	Surplus	0.59	Surplus
South Dakota	0.54	Surplus	0.50	Surplus	0.51	Surplus
Tennessee	1.58	Shortage	0.63	Surplus	0.74	Surplus
Texas	12.70	Shortage	1.18	Shortage	1.49	Shortage
Utah	1.64	Shortage	0.53	Surplus	0.62	Surplus
Vermont	0.15	Surplus	0.20	Surplus	0.19	Surplus
Virginia	2.16	Shortage	0.80	Surplus	0.93	Sufficient
Washington	1.79	Shortage	1.02	Sufficient	1.14	Shortage
West Virginia	0.92	Sufficient	0.92	Sufficient	0.92	Sufficient
Wisconsin	0.97	Sufficient	0.35	Surplus	0.41	Surplus
Wyoming	0.56	Surplus	0.39	Surplus	0.42	Surplus

¹Alaska did not report the number of private parking spaces. However, the number of public spaces exceeded the estimated total demand.

NA = not available; NHS = National Highway System.

TABLE 7
PARKING SPACE UTILIZATION: NATIONAL SUMMARY OF DEMAND/SUPPLY RATIO
ALONG INTERSTATES AND OTHER NHS ROUTES CARRYING MORE THAN 1,000 TRUCKS
PER DAY

Level of Overcrowding	States		Total States
	Public Rest Areas	Commercial Truck Stops*	
Shortage of spaces	35	8	12
Sufficient spaces	4	6	8
Surplus spaces	10	34	29

*This column excludes Alaska, which did not report on the number of parking spaces available at commercial truck stops and travel plazas.
Source: Fleger et al. (13).

Table 7 shows a national summary of the results using the classification method for parking space utilization. These results provide a general sense of the level of unmet needs for commercial truck parking. A total of 35 states are rated as having a shortage of spaces at public rest areas, and 8 states are rated as having shortages at commercial truck stops and travel plazas. The combined rating (i.e., the sum of demand and supply for both public rest areas and commercial truck stops and travel plazas) shows that a total of 12 states are rated as having shortages. The results suggest a shortage of spaces in public rest areas, with a lesser shortage level at commercial vehicle parking facilities.

SURVEY RESULTS

The synthesis survey results provide further evidence of the extent of the commercial vehicle parking problem. As presented in Table 8, many of the states responding indicated that the level of demand for commercial vehicle parking has increased over the past 5 years.

TABLE 8
NATURE OF DEMAND INCREASE

Rate of Demand	States Reporting
Increased over the last 5 years	20
Decreased over the last 5 years	4
Remained the same over the last 5 years	0

TABLE 9
LOCATION OF OBSERVED COMMERCIAL VEHICLE
PARKING

Location	States Reporting
In public rest areas	20
At freeway interchange ramps	17
Along freeway shoulders	14
On conventional highway roadsides	8
On local streets near freeways	8
In local commercial areas	8
In private truck stops	7
At designated pullouts/vista points	6
At highway weigh stations	5
No significant problems	2
Other	0

Table 9 confirms that nearly all of the reporting states are experiencing shortages in public rest areas and that these problems are spilling over to interchange ramps and freeway shoulders.

States were asked to identify problems that have been observed because of unauthorized parking. Table 10 presents the results to this question. The most frequently reported problem was shoulder damage, followed by restriction of sight distance, obstacles in the recovery zone, and litter and sanitation problems.

TABLE 10
PROBLEMS OBSERVED BECAUSE OF UNAUTHORIZED
PARKING

Problem	States
Shoulder damage	21
Restriction of sight distance	19
Obstacles in clear recovery zone for errant vehicles	18
Litter	17
Sanitation	14
Fuel/oil spillage	11
Soil erosion	5
Noise	6
Dust	4
Illegal activities	4
Other	1

SUMMARY

This chapter has presented information regarding the magnitude of commercial vehicle parking demand and supply for the United States. Aggregate statistics that measure the number of public rest area spaces and spaces available at commercial truck stops and plazas are provided. An evaluation of supply and demand indicates that a number of states, at least in an aggregate sense, are experiencing severe shortages of commercial vehicle parking. Located throughout the nation, these states include those with large populations and traffic volumes as well as states with lower populations and traffic volumes. Indeed, it appears that the extent of the shortfall will require a dramatic increase in supply along with improved management of existing resources. The following chapter discusses how states are dealing with these shortfalls.