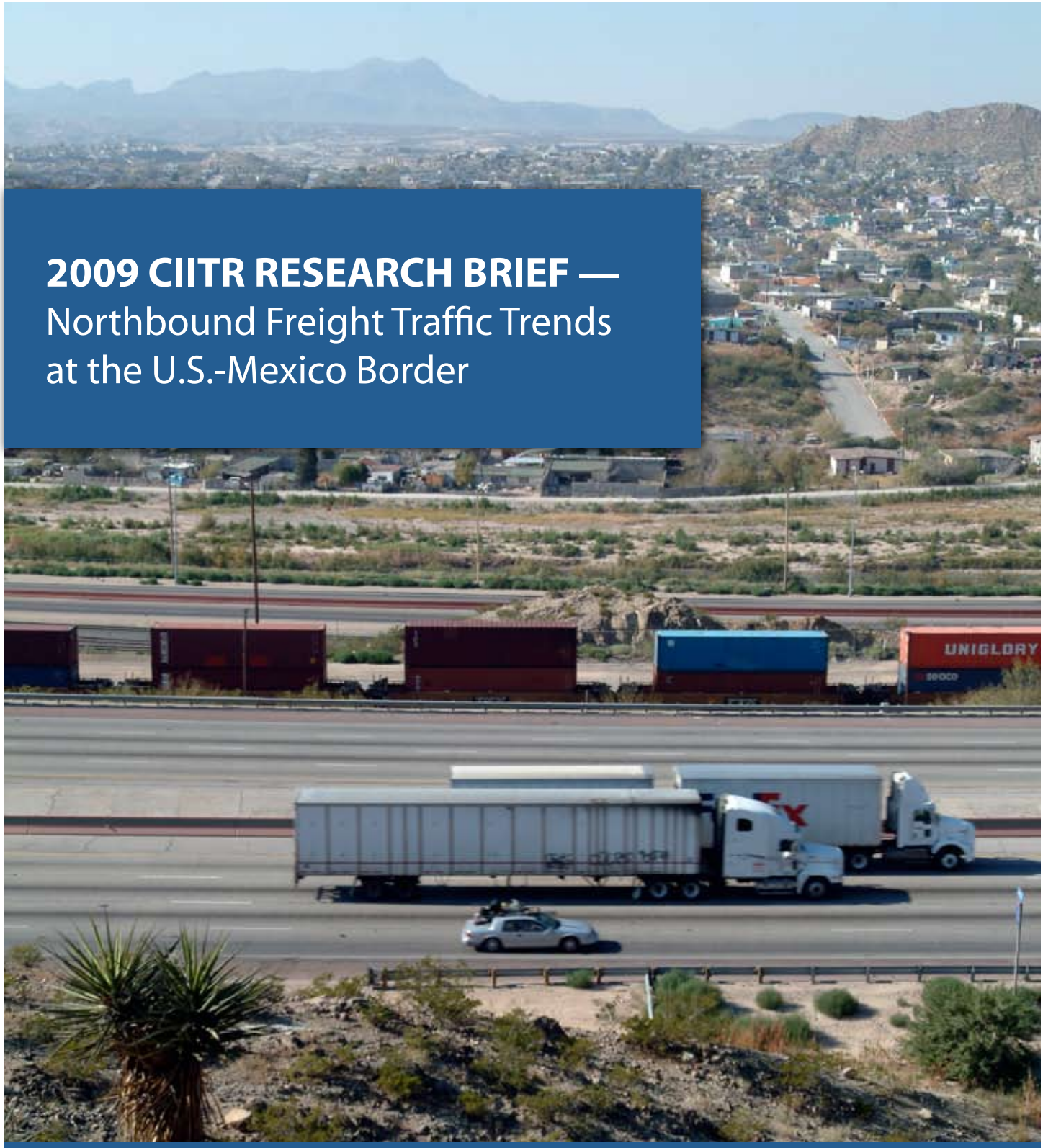
2009 CIITR RESEARCH BRIEF —
Northbound Freight Traffic Trends at the U.S.-Mexico Border



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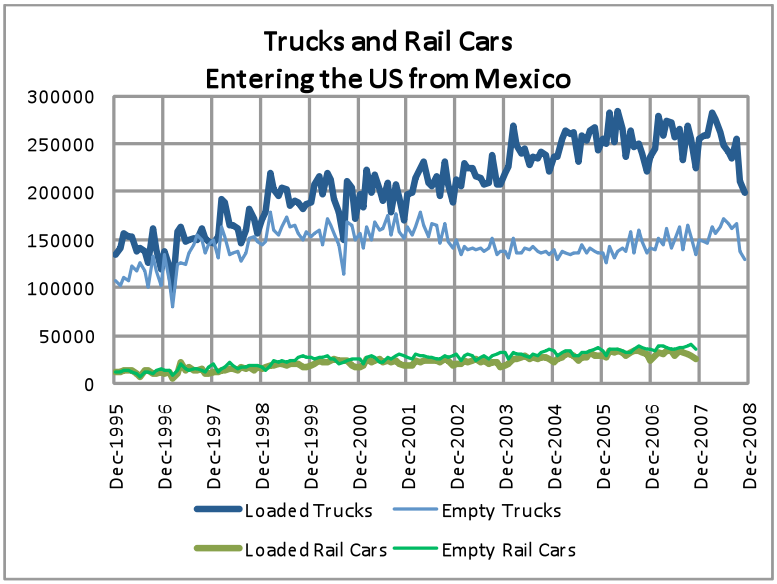
Texas Transportation Institute

Northbound Freight Traffic Trends at the Mexico-U.S. Border

Recent negative changes in the global economy have resulted in significant decline in trade and freight movement worldwide. Hence there is a growing interest in the United States to identify trends in foreign trade and freight movement across our borders. A study conducted by the Border Policy Research Institute at Western Washington State University[1] has examined the effect of the 2008 economic meltdown on the southbound freight at the Canada – US border. They compared the post-meltdown level of freight activity of December 2008 with conditions observed a year earlier in December 2007. This article uses a similar approach, but considers a longer time period to identify trends and quantify temporal and spatial variations in northbound freight movement across the Mexico-US border. The Trans-Border Surface Freight Database of the US Bureau of Transportation Statistics (BTS)[2] was the primary data source for the study. The analysis was limited to land ports-of-entry (POE) and focused on truck and rail transport, the two major shipment modes of freight at these locations.

There are 25 land ports of entry (POE) along the 1,969-mile US-Mexico border. They are important gateways for foreign trade with the United States. The monthly total number of loaded and empty trucks and rail cars entering the United States through these land ports between 1995 and 2008 are shown in Figure 1. Note that 2008 data for rail freight were not available and are not included in the analysis.

Figure 1: Monthly Total Number of Trucks and Rail Cars Entering the US from Mexico between 1995 and 2008.



An increasing trend can be observed in the number of loaded trucks until December 2005. Then it became relatively constant for about two years, until the end of 2007 when it began decreasing possibly due to the 2008 economic downturn. The number of empty trucks shows a different trend. It increased at approximately the same rate as the number of loaded trucks until 1998, and then became constant until 2001 when it slightly decreased and remained at the level of about 150,000 empty trucks per month until 2008. Loaded and empty rail cars show very similar increasing trends, although the monthly number of empty rail cars was generally about 5000 higher than the loaded ones after the end 1998.

These observations are based on spatially aggregated monthly data collected at all POEs, and do not provide any information on the spatial distribution of incoming freight along the US-Mexico border. To account for the spatial differences in northbound freight traffic a representative sample consisting of five land ports was considered. Although all 25 land POEs are important gateways for freight movement, more than 80 percent of the cross-border trade between the US and Mexico is concentrated at the following five ports:

- Laredo, TX (Port code: 2304)
- Hidalgo, TX (Port code: 2305)
- El Paso, TX (Port code: 2402)
- Otay Mesa Station, CA (Port code: 2506)
- Nogales, AZ (Port code: 2604)

The three ports in Texas, one in California, and one in Arizona are representative of the amount of northbound freight shipments through the southern borders of these states.

Freight traffic at the POEs in New Mexico is negligible compared to the total northbound freight traversing the southern border. Note that data for the port of Santa Teresa, NM are not included in the data for El Paso, TX.

To assess the temporal and spatial variations and possible trends in northbound freight flows, four types of analyses were performed:

- Changes in freight flow by mode
- Changes in freight flow by commodities
- Changes in freight flow by port and destination state
- Changes in wait time of commercial vehicles

Changes in Freight Flow by Mode

Variations in the volume of rail- and truck-borne freight and in the relative importance of these two freight shipment modes were evaluated by comparing the numbers of loaded and empty trucks and rail cars over the years 1995-2008. The time series plotted in Figure 2 and Figure 3 show monthly truck and rail car volumes traversing the US-Mexico border in the northbound direction at the five selected POEs. Figure 2 corresponds to the three ports with the highest volume of truck and/or rail freight in Texas, and Figure 3 to the top two ports in California and Arizona.

The figures indicate that trucks are significantly more important than rail in transporting freight at all of five ports. After 2001 the number of loaded trucks is generally significantly higher than the number of empty trucks at most ports. For example, in Hidalgo at least twice more loaded than empty trucks enter the US from Mexico. However, this difference somewhat narrowed in 2008.

There are similar trends in the numbers of loaded trucks at Laredo, El Paso, Hidalgo and Otay Mesa. They increased until about 2005, and then remained relatively constant (at Laredo and Otay Mesa) or decreased (at El Paso and Hidalgo). At the same four ports, the number of empty trucks increased at a similar rate as the loaded trucks until 2001. Then they began to decrease at Laredo and Otay Mesa, and stayed at approximately the same level at Hidalgo and El Paso until the end of 2005. From 2006 they began to increase again. For Nogales the graphs look somewhat different. After removing the seasonal variation (periodic component) from the time series, there is a slightly increasing positive trend in the number of loaded trucks. The number of empty trucks remains fairly constant for the entire 13-year period.

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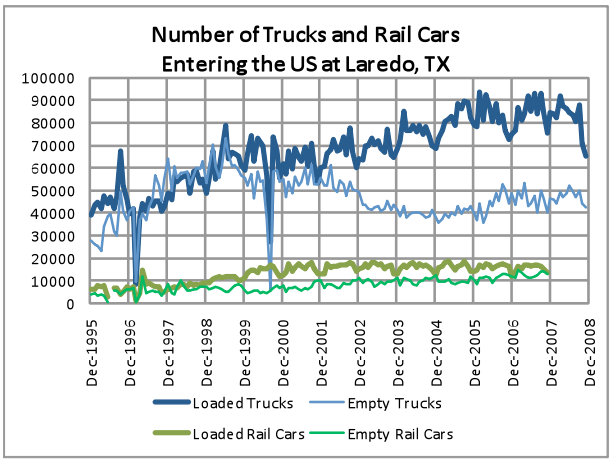


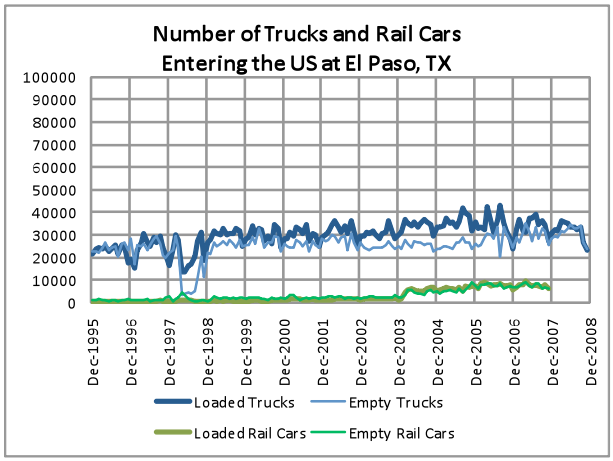
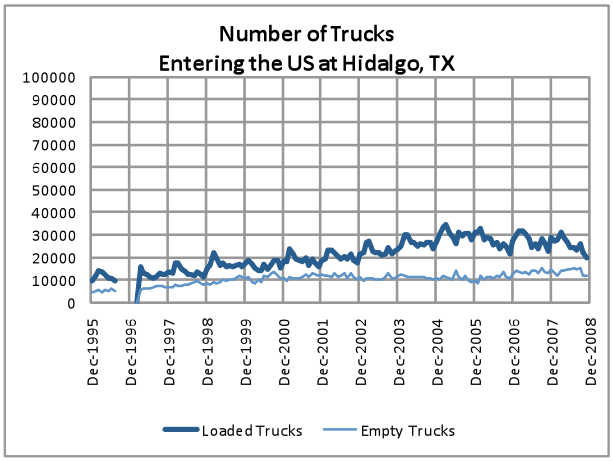
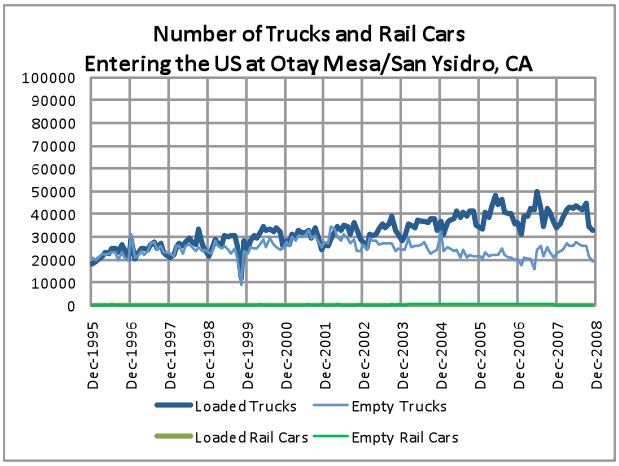


Figure 2: Trucks and Rail Cars Entering the US from Mexico at Three Major Texas POEs between 1995 and 2008.





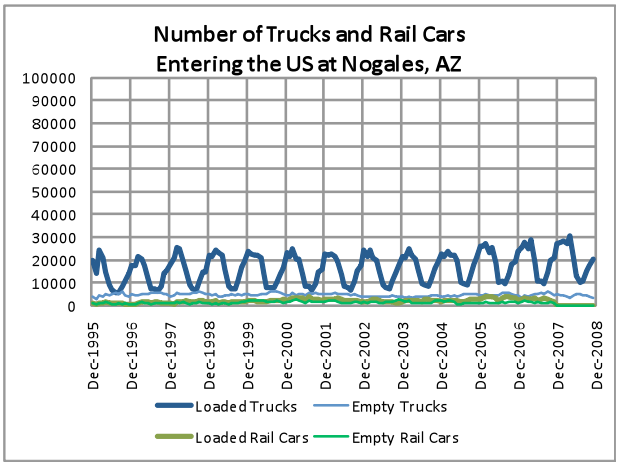


Figure 3: Trucks and Rail Cars Entering the US from Mexico at the Major POEs of Arizona and California between 1995 and 2008.

Changes in Freight Flow by Commodities

Temporal variations in the composition of incoming freight at each of the five POEs were evaluated by comparing the yearly weights (tons/year) of six commodity groups entering the US at these ports in 2007 and 2008. Similarly to the study conducted by the Border Policy Research Institute1, the 99 available commodity categories were classified into the following six groups:

- **Commodity Group 1:** Food, beverages, agricultural commodities (HS-code: 1-24)
- **Commodity Group 2:** Minerals, chemicals, plastic, fossil fuels (HS-code: 25-40)
- **Commodity Group 3:** Wood, fabrics, paper products, books (HS-code: 41-71)
- **Commodity Group 4:** Metals, metallic materials (HS-code: 72-81)
- **Commodity Group 5:** Manufactured goods (HS-code: 82-96)
- **Commodity Group 6:** Other goods (HS-code: 97-99)

The year-to-year changes in the weights of these commodity groups imported from Mexico from 2007 to 2008 are shown in Figure 4. The bar graphs indicate that manufactured goods (group 5) followed by food and agricultural products (group 1) are the two most important commodity groups imported from Mexico.

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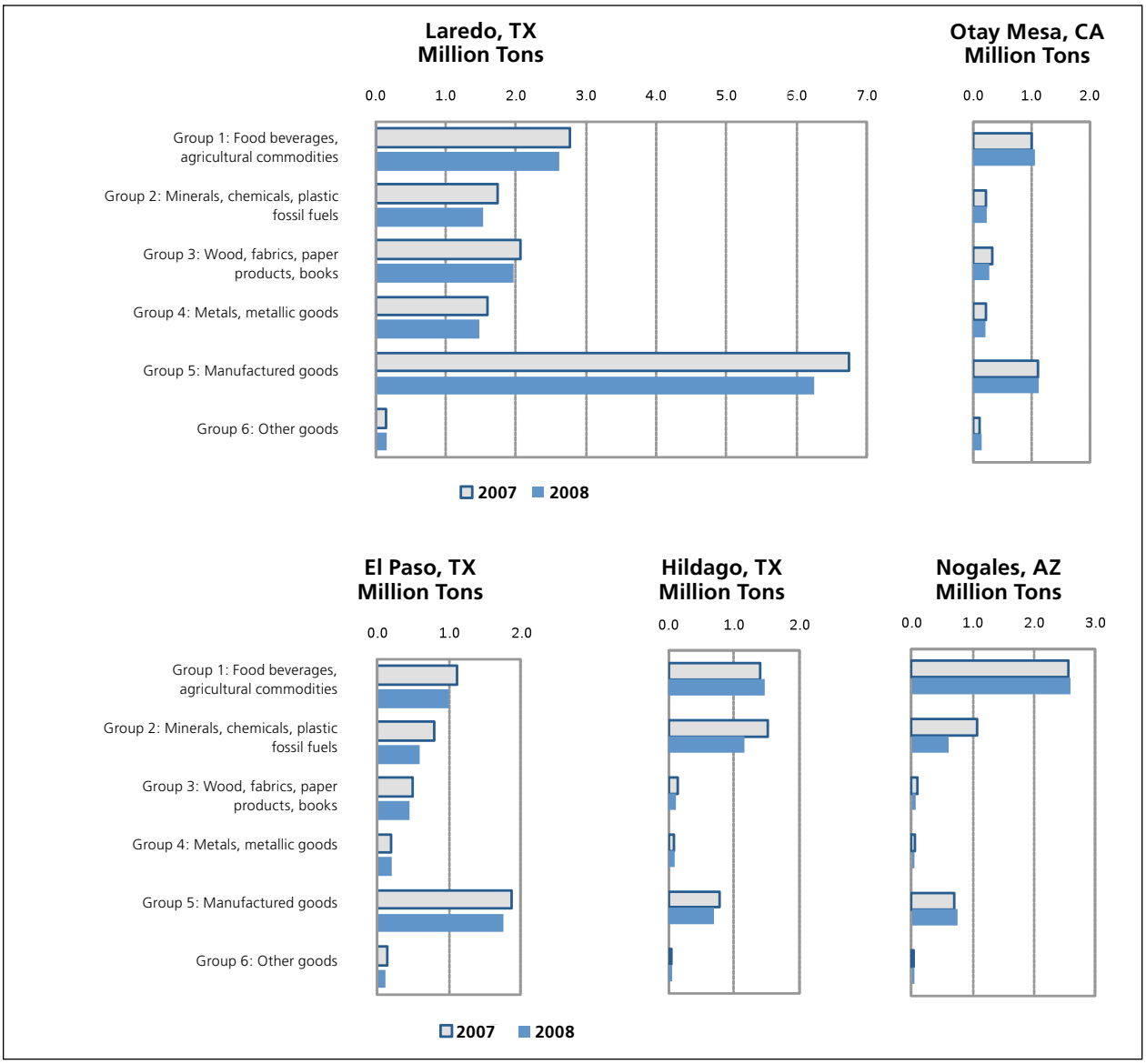


Figure 4: 2007-2008 Change in Incoming Northbound Freight by Commodities

From 2007 to 2008 there were slight, not too significant decreases in most of the commodity groups at all ports. Exceptions are the slight increases in food and agricultural products at Hidalgo, Nogales and Otay Mesa, and in manufactured goods at Nogales. The most significant decreases were in minerals, chemicals, and plastics (group 2) and manufactured goods (group 5).

Changes in Freight Flow by Port and Destination State

Freight flows from each port (origin) to various states (destinations) may significantly vary over time. The seasonal and year-by-year variations of these origin-destination type flow patterns are difficult to capture. In addition, the "destination" in the BTS data does not represent the true state of destination, but where the shipment was declared for customs purposes. Therefore the analysis presented in this section is only approximate and the results may not be appropriate for making decisions or drawing major conclusions. The maps shown in Figure 5 and Figure 6 provide snapshots of the change in freight distribution from the top five POEs comparing data from December 2007 and 2008.

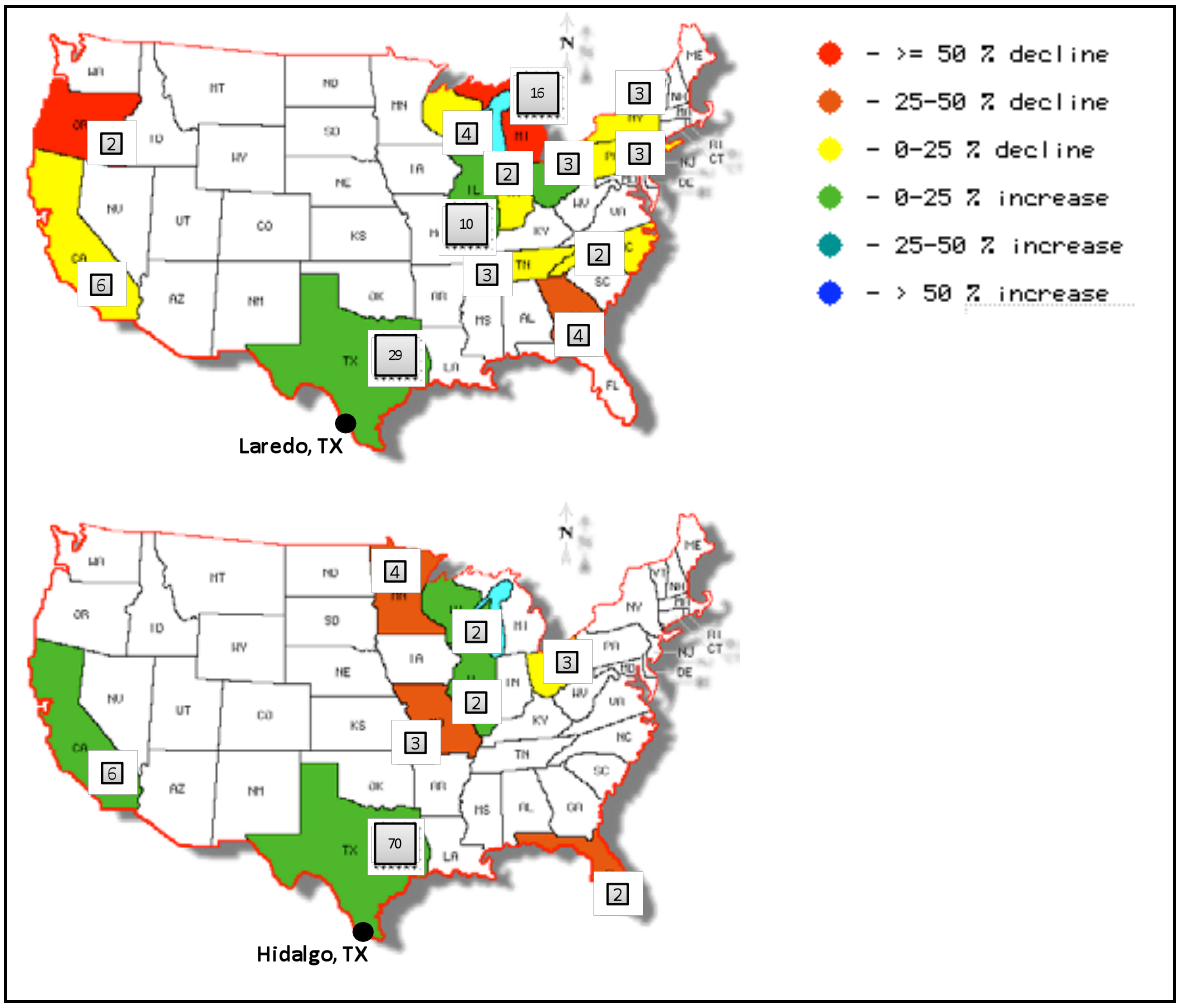
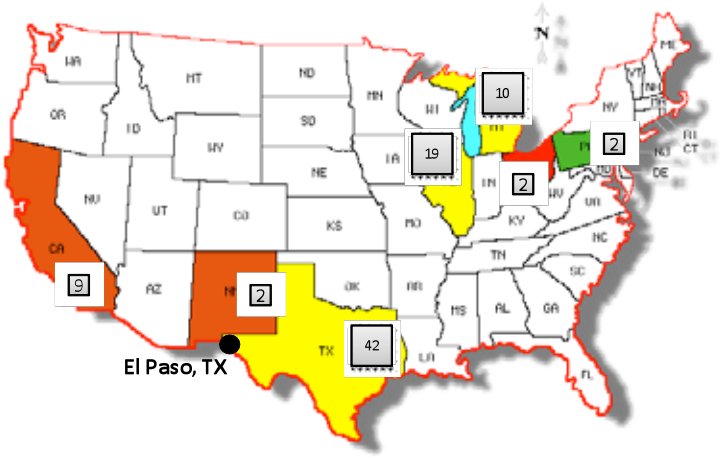
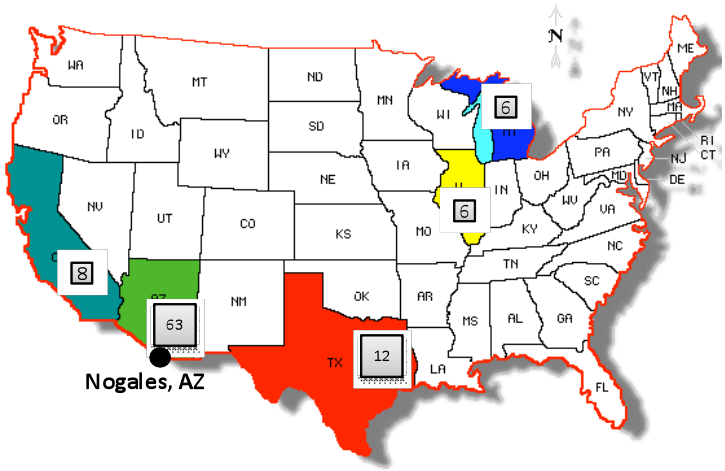
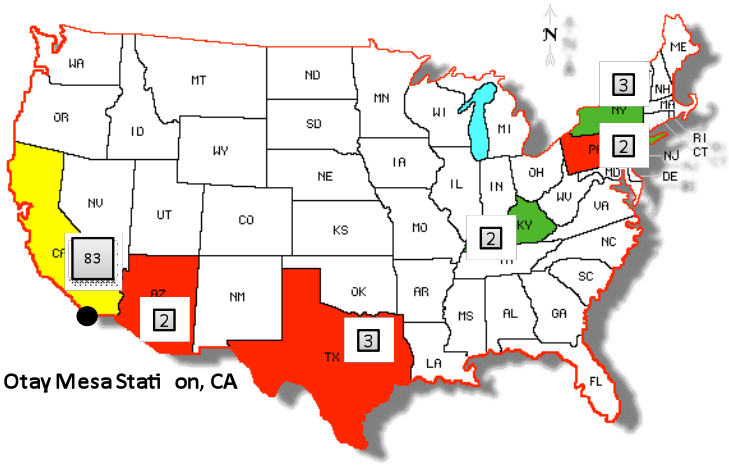


Figure 5: Change in Freight by Destination States – For Origin Ports - Laredo and Hidalgo, TX







- >= 50 % decline
- 25-50 % decline
- 0-25 % decline
- 0-25 % increase
- 25-50 % increase
- > 50 % increase

The color-coded maps indicate the percent change, decline or increase, in the weight of freight destined in various states after traversing the Mexico-US border at a particular port. The numbers in white boxes indicate the percentage of freight that certain states received from the northbound freight (import) crossing the border at a given port in December 2007. Note that only those states which received at least 2 percent of the freight are color-shaded and numbered. Therefore, the numbers in the boxes do not add up to 100 percent.

Figure 6: Change in Freight by Destination States – Ports: El Paso, TX, Nogales, AZ and Otay Mesa, CA

Wait Times for Commercial Vehicles

Estimated average wait times may be valuable information for motorists, particularly those in the freight industry, who are frequent users of land POEs along the US-Mexico border. The information may also be indicative of the level of congestion and the effectiveness of border crossing operations at a certain POE. The average commercial vehicle wait times at selected U.S. Surface Border Gateways for the period of 2003–2007 are shown in Figure 7. The figure was prepared using data published in the Transportation Statistics Annual Report 20083. The five bars for each border gateway indicate the average wait times in minutes that a commercial vehicle encountered each year from 2003 through 2007. Increasing trends in wait time can be observed at all gateways, with some reduction in 2007 at Nogales, AZ, Otay Mesa, CA and Hidalgo, TX.

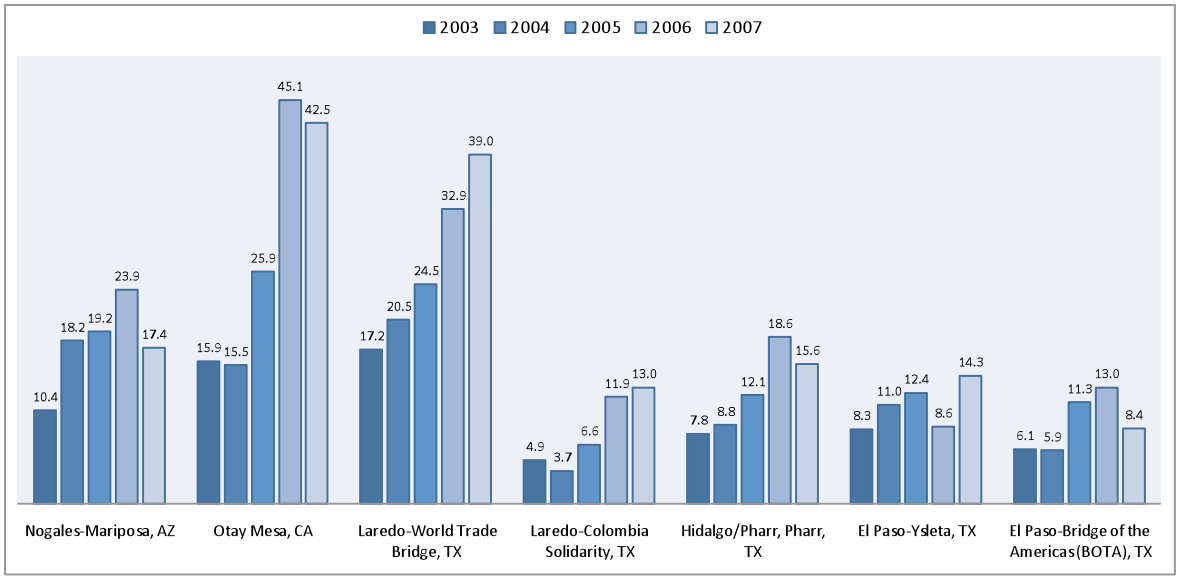


Figure 7: Average Daytime Wait Times (minutes) for Commercial Vehicles at Selected U.S. Surface Border Gateways: 2003–2007

References

1. The Year-over-Year Decline in southbound Freight at the Canada – U.S .Border. Border Policy Research Institute, Western Washington University. Border Policy Brief, Vol. 4. No. 2. Spring 2009.
2. Transborder Surface Freight Database, US Bureau of Transportation Statistics, www.transtats.bts.gov
3. U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics: Transportation Statistics Annual Report 2008, Washington, DC 2008

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