



*Ohio State Highway Patrol  
Office of Strategic Services  
Statistical Analysis Unit*

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**Ohio Turnpike and  
Parallel Routes Project**

**Safety and Traffic Report**  
Final Evaluation

September 8, 2004 - March 7, 2006

February 14, 2007

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## Comparison of Major Findings

### Ohio Turnpike and Parallel Routes

Item	Ohio Turnpike	Parallel Routes
<i>Traffic Volume and Average Speeds</i>		
<i>Evaluation Period</i>	August 2006	
<i>Comparison Period</i>	August 2004	
<b>Total Volume</b>	2% increase (~3,500 more vehicles daily)*	3% decrease (~9,400 fewer vehicles daily)**
<b>Commercial Volume</b>	22% increase (~6,300 more vehicles daily)*	16% decrease (~12,800 fewer vehicles daily)**
<b>Speeds</b>	1% increase in average passenger speed to 74 mph 8% increase in average commercial speed to 67 mph	No change in average speed after two years
<i>Overall Crash Picture</i>		
<i>Evaluation Period</i>	September 8, 2004 – March 7, 2006	
<i>Comparison Period</i>	September 8, 2002 – March 7, 2004	
<b>Total Crashes</b>	10% increase (362 more crashes)	9% decrease (2,080 fewer crashes)
<b>Total Injury and Fatal Crashes</b>	18% increase (122 more crashes)	10% decrease (611 fewer crashes)
<b>Commercial Crashes</b>	32% increase (282 more crashes)	7% decrease (247 fewer crashes)
<b>Commercial Injury and Fatal Crashes</b> <i>(on Dry Road Conditions)</i>	56% increase (47 more crashes)	7% decrease (39 fewer crashes)
<b>Commercial At-Fault Rear-End Crashes</b>	172% increase (81 more crashes)	20% decrease (100 fewer crashes)

\* Vehicles are counted only when they enter or exit the Ohio Turnpike. Therefore, individual vehicle trips are counted only once in a given monitoring period.

\*\* Individual vehicle trips could be counted multiple times if they crossed more than one counter in a given monitoring period.



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## Background

In response to commercial traffic and safety concerns on routes running parallel to the Ohio Turnpike, the Governor of Ohio asked the Ohio Turnpike Commission (OTC), the Ohio Department of Transportation (ODOT), and the Ohio State Highway Patrol (OSHP) to identify and implement strategies to move commercial vehicles to the Ohio Turnpike and off the Parallel Routes. In October 2004, these agencies released the *Northern Ohio Freight Strategy*, which identified several strategies to increase commercial traffic volume on the Ohio Turnpike and decrease commercial crashes on the Parallel Routes.

Two strategies were adopted: 1) September 8, 2004, the OTC raised the speed limit for commercial vehicles on the Ohio Turnpike from 55 mph to 65 mph for the entire 241 miles of the Ohio Turnpike; and 2) January 1, 2005, the OTC instituted a series of toll reductions for commercial vehicles using the Ohio Turnpike. In addition to small toll reductions for vehicles in Classes 4-6, the OTC instituted significant reductions aimed at drawing heavier commercial vehicles from Parallel Routes to the Ohio Turnpike. These reductions included:

- a 26 percent toll reduction for Class 7 vehicles (53,001 lbs - 65,000 lbs)
- a 27 percent toll reduction for Class 8 vehicles (65,001 lbs - 78,000 lbs)
- a 57 percent toll reduction for Class 9 vehicles (78,001 lbs - 90,000 lbs)<sup>1</sup>

ODOT, OSHP, and the OTC agreed to evaluate the impact of these strategies on the volume and traffic safety of both the Ohio Turnpike and the Parallel Routes.

## Definitions and Acronyms

**ADT:** Average Daily Traffic

**Comparison Period:** September 8, 2002 – March 7, 2004

**Evaluation Period:** September 8, 2004 – March 7, 2006

**ITRS:** Ohio Integrated Traffic Records System

**ODOT:** Ohio Department of Transportation

**OSHP:** Ohio State Highway Patrol

**OTC:** Ohio Turnpike Commission

**Parallel Route:** A series of connected Interstate, U.S., or State Routes that parallel the Ohio Turnpike in Northern Ohio and are used by commercial drivers as an alternate to the Ohio Turnpike.

**Part I Report:** A report released by the Ohio State Highway Patrol detailing the 12-month effects of the Ohio Turnpike and Parallel Routes Project on traffic volume and safety on the Ohio Turnpike.

**Part II Report:** A report released by the Ohio State Highway Patrol detailing the 12-month effects of the Ohio Turnpike and Parallel Routes Project on traffic volume and safety on the Parallel Routes.

**VMT:** Vehicle Miles Traveled

<sup>1</sup> Classes 10 (90,001 lbs - 115,000 lbs) and 11 (115,001 lbs - 127,400 lbs) did not receive a toll reduction.



## Methodology

The *Northern Ohio Freight Strategy* identified the 25 highest fatal-crash rate sections for the state of Ohio from 1994 to 2003. Nine of these sections (four routes including SR2, US6, US20, and US224) are parallel to the Ohio Turnpike and were included in the study. ODOT, OTC and OSHP officials identified 16 other Interstate, U.S., and State Routes that commercial drivers use to bypass the Ohio Turnpike. In all, 23 routes across 29 Ohio Counties were included as “Parallel Routes” to the Ohio Turnpike (i.e., 1,235 miles of roadways in Northern Ohio) [see Table 1].

**Table 1. Parallel Route Locations, by Route and County.**

IR76	IR680	SR11	SR82	US20	US30	US224
Mahoning*	Mahoning*	Trumbull	Lorain*	Fulton*	Allen*	Ashland
Medina*			Portage*	Huron*	Ashland*	Medina*
Portage*	SR2	SR18	Summit*	Lorain*	Columbiana*	Summit*
Summit*	Erie*	Huron*	Trumbull*	Lucas*	Crawford*	
	Lorain	Lorain*		Sandusky*	Hancock*	US250
IR80 Non-Turnpike	Lucas*	Medina*	SR107	Williams*	Paulding*	Ashland
Mahoning*	Ottawa*	Summit*	Williams*	Wood*	Putnam*	Erie*
Trumbull*					Richland*	Huron*
	SR4	SR49	SR420	US20A	Stark*	
	Erie*	Williams	Wood*	Fulton*	Van Wert*	US422
				Lucas*	Wayne*	Geauga*
	SR5	SR53	US6	Williams*	Wyandot*	Portage*
	Trumbull	Ottawa*	Erie*			Trumbull
			Henry*	US24	US42	
		SR57	Sandusky*	Defiance*	Medina*	
		Lorain*	Williams*	Henry*		
		Medina*	Wood*	Lucas*		
				Paulding*		

\*Routes included are the whole route segment for the county specified.

In order to measure the impact of the speed change and the toll reduction on the volume and safety of traffic on the Ohio Turnpike and Parallel Routes, data on four indicators were analyzed: Traffic Volume, Vehicle Miles Traveled, Vehicle Speed, and Traffic Crashes. Various methods were utilized to gather data on these indicators across both the Ohio Turnpike and Parallel Routes during the entire 18-month project period (September 8, 2004 to March 7, 2006).<sup>2</sup>

### Traffic Volume, Vehicle Miles Traveled, and Vehicle Speeds

Volume and vehicle miles traveled for the Ohio Turnpike were collected from monthly reports published by the Ohio Turnpike Commission. These measures are calculated from the number of vehicles entering and exiting the Ohio Turnpike and the distance those vehicles traveled. In addition, vehicle speed data on the Ohio Turnpike was collected from OSHP Aviation monthly speed monitoring reports, which began in August 2004. Monthly vehicle speed data is based on the average speed of 100 passenger and 100 commercial vehicles traveling on select sections of the Ohio Turnpike.

Volume and speed data on the Parallel Routes were collected by ODOT through a network of permanent and portable traffic counters at locations along the Ohio Turnpike corridor. Stations provided data on the average number of cars and trucks, as well as total average speeds of the vehicles.<sup>3</sup>

<sup>2</sup> Select data required an extension of the evaluation period in order to account for seasonal changes.

<sup>3</sup> Scheme F, developed by Maine Department of Transportation in the mid-1980s, is the most commonly used algorithm by Departments of Transportation for classifying vehicles. Vehicle types 1-3 are classified as “cars” and vehicle types 4-13 are classified as “trucks.”



## Crashes

The *Northern Ohio Freight Strategy* established a special crash monitoring protocol that included weekly visits by OSHP personnel to collect crash reports prepared by law enforcement agencies that occurred on Parallel Routes and the Ohio Turnpike. These crash reports include information on crash location, severity, contributing circumstance, and type of vehicle. Reports were forwarded to the OSHP Statistical Analysis Unit and entered into a special database designed for timely analysis of traffic safety information.<sup>4</sup> Previous assessments of this process concluded that the special data collection system was unable to capture a complete set of crashes that occurred on the Parallel Routes during the project (see Part II of the 12-Month Safety and Traffic Report) and therefore a new data capture system was established.

For the purposes of this report, researchers queried records from the Ohio Department of Public Safety’s Integrated Traffic Records System (ITRS) for crashes reported by law enforcement agencies that occurred on the Ohio Turnpike or Parallel Routes. Crashes that occurred on the Parallel Routes, on a route that overlaps a Parallel Route (e.g. Interstate 90 between State Route 57 and State Route 2), or less than 0.03 miles from the Parallel Routes were included in the analysis.<sup>5</sup> As a result, including both the Ohio Turnpike and the Parallel Routes, researchers analyzed 53,262 crash records for the project.

*Table 2. Data Sources.*

Item	Ohio Turnpike	Parallel Routes
<b>Crashes</b>	ODPS Integrated Traffic Records System	ODPS Integrated Traffic Records System
<b>Traffic Volume</b>	OTC Monthly Traffic and Revenue Reports	ODOT Traffic Count Stations
<b>Vehicle Miles Traveled</b>	OTC Monthly Traffic and Revenue Reports	<i>Data Not Available</i>
<b>Speed</b>	OSHP Monthly Aviation Speed Surveys	ODOT Traffic Count Stations

<sup>4</sup> A special database maintained by the OSHP and designed to allow more detailed analysis of crash data.

<sup>5</sup> Crashes that did not have an intersection type of “1 – Not an intersection” or “10 – Driveway,” and occurred less than 0.03 miles away from a Parallel Route were included.



## **Traffic and Safety Effects of the Northern Ohio Freight Strategy**

The *Northern Ohio Freight Strategy* outlined a series of measures that were designed to increase commercial volume on the Turnpike and improve the safety of two- and four-lane Parallel Routes. The effects of these strategies are detailed in the following four sections: traffic volume; traffic VMT; vehicle speeds; and traffic crashes.

### **Traffic Volume**

Overall, it appears that the *Northern Ohio Freight Strategy* had a positive impact on increasing traffic volume on the Ohio Turnpike. The total number of vehicles on the Turnpike increased six percent (4.3 million vehicles) during the evaluation period. This includes a three percent increase in passenger vehicles (1.8 million vehicles) and a 20 percent increase in commercial vehicles (2.7 million vehicles) when compared to a similar time period before the measures were implemented [see Table 3]. Commercial vehicles accounted for 21 percent of all volume during the evaluation period, an increase of two percent over the comparison period (19 percent of all volume).

Class 8 vehicles, the largest class of commercial vehicles, experienced the greatest increase in traffic volume (36 percent or one million vehicles) during the project. Overall, only two of the ten classes of commercial vehicles experienced declines during the 18-month evaluation (classes 9 and 10). While fewer class 9 vehicles traveled on the Turnpike during the evaluation period, overall the three classes of commercial vehicles that were targeted by the *Northern Ohio Freight Strategy* (classes 7, 8, and 9) experienced a combined 27 percent increase in traffic volume during the course of the project.

**Table 3. Ohio Turnpike Traffic Volume, by Vehicle Class.**  
Comparison and Evaluation Periods.

<b>Class of Vehicle</b>	<b>Comparison Period</b>	<b>Evaluation Period</b>	<b>% Change</b>
Class 1: 0 - 7,000 lbs.	57,085,939	58,831,579	3.06%
Class 2: 7,001 - 16,000 lbs.	2,028,322	2,048,618	1.00%
Class 3: 16,001 - 23,000 lbs.	690,591	889,044	28.74%
Class 4: 23,001 - 33,000 lbs.	2,151,896	2,612,442	21.40%
Class 5: 33,001 - 42,000 lbs.	1,629,895	1,875,278	15.06%
Class 6: 42,001 - 53,000 lbs.	1,805,220	2,193,991	21.54%
Class 7: 53,001 - 65,000 lbs.	1,841,476	2,201,979	19.58%
Class 8: 65,001 - 78,000 lbs.	2,888,901	3,920,340	35.70%
Class 9: 78,001 - 90,000 lbs.	290,487	254,652	-12.34%
Class 10: 90,001 - 115,000 lbs.	82,749	66,772	-19.31%
Class 11: 115,001 - 127,400 lbs.	12,475	12,995	4.17%
<b>Passenger Vehicles (Class 1)</b>	<b>57,085,939</b>	<b>58,831,579</b>	<b>3.06%</b>
<b>Commercial Vehicles (Classes 2-11)*</b>	<b>13,422,012</b>	<b>16,076,111</b>	<b>19.77%</b>
<b>Total Vehicles</b>	<b>70,507,951</b>	<b>74,907,690</b>	<b>6.24%</b>

Source: Ohio Turnpike Commission monthly "Traffic and Revenue Reports," September 2002-February 2006

\* Based upon commercial vehicle classification in Ohio Turnpike Commission's "Traffic and Revenue Reports" and Annual Reports

To assess the magnitude of commercial vehicle diversion off of parallel routes, ODOT collected speed and volume data through a network of portable and permanent count locations on select Parallel Routes beginning in August 2004, one month prior to the speed limit change on the Turnpike. To control for the presence of seasonal factors in traffic volume



measurements (e.g., variable weather conditions, holiday traffic patterns, and economic conditions), researchers extended the scope of the analysis to include volume data for up to 24-months after the project implementation.

Traffic volume data was analyzed from ODOT count stations along parallel routes that were operational during the months of August 2004, 2005, and 2006. The comparison shows that Average Daily Traffic (ADT) on the Parallel Routes for commercial vehicles decreased 18 percent in one year (14,500 vehicles per day) and 16 percent in two years (12,800 vehicles per day) [see Table 4]. Commercial vehicles accounted for 25 percent of all volume in August 2005 and 24 percent in August 2006, a decrease of three and four percent, respectively, when compared with August 2004 (28 percent of all volume). It is important to note that the largest percentage decrease in volume occurred on major commercial vehicle routes (40 percent or more of total traffic), where the percentage of total volume from commercial vehicles dropped five percentage points.

**Table 4. Parallel Route Traffic Volume, by County and Route.**  
August 2004 - August 2006.

County	Route	August 2004		August 2005		August 2006		12-Month % Change		24-Month % Change	
		Cars	Trucks	Cars	Trucks	Cars	Trucks	Cars	Trucks	Cars	Trucks
Ashland	US 224	2,770	2,340	2,720	1,790	2,520	1,500	-2%	-24%	-9%	-36%
Erie	SR 4	4,770	1,020	6,060	1,160	5,000	1,230	27%	14%	5%	21%
Fulton	US 20	3,200	2,010	3,110	1,410	3,390	1,350	-3%	-30%	6%	-33%
Fulton	US 20A	5,790	1,150	6,420	890	6,660	950	11%	-23%	15%	-17%
Henry	US 6	4,560	2,205	4,340	1,705	4,265	1,745	-5%	-23%	-6%	-21%
Henry	US 24	6,400	5,500	6,610	5,110	7,090	4,990	3%	-7%	11%	-9%
Huron	SR 18	2,850	1,320	2,610	1,110	2,410	970	-8%	-16%	-15%	-27%
Huron	US 20	5,165	2,850	5,260	2,210	4,965	2,085	2%	-22%	-4%	-27%
Huron	US 250	6,830	3,600	6,770	2,270	6,360	2,510	-1%	-37%	-7%	-30%
Lorain	US 20	12,200	3,170	11,360	2,770	13,040	2,460	-7%	-13%	7%	-22%
Lucas	SR 2	9,400	2,860	12,690	1,620	12,110	1,260	35%	-43%	29%	-56%
Lucas	US 20	6,430	2,241	7,510	1,880	7,630	1,780	17%	-16%	19%	-21%
Medina	SR 18	6,490	1,110	5,380	1,050	5,160	1,030	-17%	-5%	-20%	-7%
Medina	US 224	9,600	2,630	9,560	1,750	9,770	1,980	0%	-33%	2%	-25%
Ottawa	SR 2	7,130	3,380	7,170	1,340	6,240	1,150	1%	-60%	-12%	-66%
Sandusky	US 6	4,105	1,550	4,075	1,135	4,135	1,435	-1%	-27%	1%	-7%
Summit	IR 76	65,680	10,908	51,730	9,310	66,330	9,623	-21%	-15%	1%	-12%
Trumbull	IR 80	17,100	15,140	15,500	14,430	16,770	14,540	-9%	-5%	-2%	-4%
Van Wert	US 30	7,170	5,095	7,130	5,355	7,280	5,040	-1%	5%	2%	-1%
Williams	SR 107	1,410	220	1,120	190	1,140	190	-21%	-14%	-19%	-14%
Williams	US 6	2,575	1,785	2,650	1,320	2,545	1,370	3%	-26%	-1%	-23%
Williams	US 20	1,990	2,040	2,000	1,350	2,070	1,430	1%	-34%	4%	-30%
Williams	US 20A	2,960	770	2,890	550	2,860	590	-2%	-29%	-3%	-23%
Wood	US 6	6,540	2,655	6,125	1,875	6,460	2,800	-6%	-29%	-1%	5%
Wood	US 20	8,300	3,910	9,130	3,380	8,610	4,650	10%	-14%	4%	19%
<b>ADT Total</b>		<b>211,415</b>	<b>81,459</b>	<b>199,920</b>	<b>66,960</b>	<b>214,810</b>	<b>68,658</b>	<b>-5%</b>	<b>-18%</b>	<b>2%</b>	<b>-16%</b>

Note: ADT from county-route combinations with more than one count station were averaged together for this analysis. Only those stations where counts from all three time periods were included.

Source: Ohio Department of Transportation monthly Average Daily Traffic Counts, August 2004 - August 2006.





## Vehicle Miles Traveled

Another measure used to identify the impact of the *Northern Ohio Freight Strategy* on Turnpike traffic is the change in vehicle miles traveled (VMT) by passenger and commercial vehicles. During the evaluation period, passenger VMT on the Turnpike decreased one percent (38 million miles), commercial VMT increased 24 percent (293 million miles), and total VMT for the Turnpike increased six percent (256 million miles) over the comparison period [see Table 5]. Commercial vehicles accounted for 34 percent of all VMT during the evaluation period, an increase of five percentage points over the comparison period (29 percent of all VMT).

The three classes of commercial vehicles targeted during the evaluation (classes 7-9) experienced a combined 33 percent increase in VMT (177 million miles). Class 8 vehicles, the largest class of commercial vehicles, saw a 43 percent increase in VMT during the evaluation period (134 million miles).

**Table 5. Ohio Turnpike Vehicle Miles Traveled, by Vehicle Class.**  
Comparison and Evaluation Periods.

Class of Vehicle	Comparison Period	Evaluation Period	% Change
Class 1: 0 - 7,000 lbs.	2,890,562,564	2,852,933,420	-1.30%
Class 2: 7,001 - 16,000 lbs.	149,462,923	148,017,636	-0.97%
Class 3: 16,001 - 23,000 lbs.	46,527,946	58,263,300	25.22%
Class 4: 23,001 - 33,000 lbs.	139,591,007	171,947,626	23.18%
Class 5: 33,001 - 42,000 lbs.	138,620,808	167,380,248	20.75%
Class 6: 42,001 - 53,000 lbs.	182,335,125	228,968,400	25.58%
Class 7: 53,001 - 65,000 lbs.	193,266,375	239,745,727	24.05%
Class 8: 65,001 - 78,000 lbs.	307,840,664	441,683,392	43.48%
Class 9: 78,001 - 90,000 lbs.	31,027,939	28,218,263	-9.06%
Class 10: 90,001 - 115,000 lbs.	13,115,474	10,809,281	-17.58%
Class 11: 115,001 - 127,400 lbs.	2,062,273	2,171,509	5.30%
<b>Passenger Vehicles (Class 1)</b>	<b>2,890,562,564</b>	<b>2,852,933,420</b>	<b>-1.30%</b>
<b>Commercial Vehicles (Classes 2-11)*</b>	<b>1,203,850,534</b>	<b>1,497,205,382</b>	<b>24.37%</b>
<b>Total Vehicles</b>	<b>4,094,413,098</b>	<b>4,350,138,802</b>	<b>6.25%</b>

Source: Ohio Turnpike Commission monthly "Traffic and Revenue Reports," September 2002-February 2006

\* Based upon commercial vehicle classification in Ohio Turnpike Commission's "Traffic and Revenue Reports" and Annual Reports

Researchers also note that commercial vehicles on the Turnpike are traveling more miles per trip. Average miles per trip for commercial vehicles increased four percent (three miles per trip), while passenger trips have decreased four percent (two miles per trip). Increased trip lengths provide additional toll revenue and suggest more commercial vehicles are traveling longer distances than before on the Ohio Turnpike.



## Vehicle Speeds

On September 8, 2004, the speed limit across the entire length of the Ohio Turnpike (241 miles) was raised from 55 mph to 65 mph for commercial vehicles. To evaluate the impact of the speed limit increase on vehicle speeds, the OSHP Aviation Section conducted monthly surveys of commercial and passenger vehicles traveling on the Turnpike. Table 6 compares the average monthly speeds and the “85<sup>th</sup> percentile speeds” for passenger and commercial vehicles in August 2004 and August 2006.

The results indicate that since the speed limit increase on the Turnpike, the average speed of commercial vehicles increased eight percent, from 62 mph in August 2004 to 67 mph in August 2006. The “85 percentile speed”<sup>6</sup> for commercial vehicles increased eight percent during the time period, from 65 mph to 69 mph. The increases in the 85<sup>th</sup> percentile speed indicate that a small but increased number of commercial vehicles were traveling over 70 mph on the Turnpike following the speed limit change. Moreover, it appears that the higher commercial speeds on the Turnpike led to increased passenger vehicle speeds during the project period (often referred to as “speed creep”).

**Table 6. Average Speed on the Ohio Turnpike, Pre- and Post-Speed Limit Change.**

		August 2004	August 2006	%Change
<b>Passenger</b>	Average Speed	73	74	1.4%
	85th Percentile Speed	78	80	2.6%
<b>Commercial</b>	Average Speed	62	67	8.1%
	85th Percentile Speed	65	69	6.2%

Source: Ohio State Highway Patrol Aviation Speed Surveys

Pre-evaluation speed data on the Parallel Routes for August 2004 was compared with speed data from August 2005 and August 2006. The results indicate that the overall average speed on the Parallel Routes remained unchanged over the last two years [see Table 7]. Changes in average speeds on individual Parallel Routes varied, from a three percent decrease on State Route 4 in Erie County to a 30 percent increase on U.S. Route 6 in Sandusky County. Overall, the majority of Parallel Routes experienced only minor changes in vehicle speeds following the implementation of the *Northern Ohio Freight Strategy*.

<sup>6</sup> The “85<sup>th</sup> Percentile” speed includes the speeds of the slowest 85 percent of drivers. For more information, see: “A Study for the Selection of Maximum Speed Limits.” October 1970. Four (4) volumes, prepared for the National Highway Traffic Safety Administration (NHTSA), U.S. Dept. of Transportation, by the Indiana University’s Institute for Research in Public Safety. IRPS report number FH-11-7275; Volume 1 is also federally numbered as PB 197 373, and DOD HS-800 378.



**Table 7. Average Speed (MPH) on the Parallel Routes, Pre- and Post-Speed Limit Change.**

County	Route	August 2004	August 2005	August 2006	12-month Change	24-month Change
Ashland	US 224	57.0	55.0	58.0	-4%	2%
Erie	SR 4	59.0	58.0	57.0	-2%	-3%
Fulton	US 20A	58.0	58.0	58.0	0%	0%
Henry	US 6	58.3	58.0	58.0	-1%	-1%
Huron	SR 18	56.0	58.0	58.0	4%	4%
Huron	US 20	58.2	62.3	58.2	7%	0%
Huron	US 250	55.0	56.0	57.0	2%	4%
Medina	SR 18	51.0	53.0	56.0	4%	10%
Medina	US 224	64.0	65.0	63.0	2%	-2%
Sandusky	US 6*	45.0	58.6	59.0	30%	31%
Williams	SR 107	59.0	57.0	57.0	-3%	-3%
Williams	US 20	57.0	59.0	57.0	4%	0%
Williams	US 20A	57.0	59.0	57.0	4%	0%
Williams	US 6	63.6	59.0	63.5	-7%	0%
Wood	US 6	57.9	50.9	57.2	-12%	-1%
<b>Total</b>		<b>57.6</b>	<b>57.8</b>	<b>57.4</b>	<b>0.3%</b>	<b>-0.7%</b>

Source: Ohio Department of Transportation monthly Average Daily Traffic Counts.

\* This monitoring station has averaged 59 mph over the course of the evaluation. Therefore, it is very possible that extant circumstances (construction, etc.) could have affected the readings for the month of August 2004.



## Traffic Crashes

The primary concern of officials in implementing the *Northern Ohio Freight Strategy* was the impact that increased commercial volume and higher vehicle speeds would have on traffic safety on the Ohio Turnpike. Overall, the total number of crashes on the Turnpike increased 10 percent during the course of the project [see Table 8]. Passenger crashes increased three percent and commercial crashes increased 32 percent during the evaluation. When analyzing crashes by severity, researchers found that fatal and injury crashes during the evaluation period increased 18 percent on the Turnpike, including a 58 percent increase in commercial fatal and injury crashes.

**Table 8. Ohio Turnpike Crashes, by Severity.**  
Comparison and Evaluation Periods.

*Total Crashes*

Year	Total*	Fatal	Injury	Property Damage Only	Unknown
Comparison Period	3,462	15	649	2,787	11
Evaluation Period	3,824	17	769	3,032	6
Change	10%	13%	18%	9%	-45%

*Commercial Crashes*

Year	Total*	Fatal	Injury	Property Damage Only	Unknown
Comparison Period	879	7	159	709	4
Evaluation Period	1,161	10	253	895	3
Change	32%	43%	59%	26%	-25%

Source: Ohio Integrated Traffic Records System

\* Crash totals do not include crashes that occurred in service plazas.

Due to the shift of commercial vehicles to the Ohio Turnpike, modest declines in traffic crashes on parallel routes were expected. Overall, the total number of crashes on Parallel Routes decreased nine percent during the evaluation [see Table 9]. Passenger crashes decreased nine percent and commercial crashes decreased seven percent during the project. Total fatal crashes increased one percent, from 109 during the comparison period to 110 during the evaluation period. It is important to note that commercial fatal crashes declined 17 percent during the time frame (from 46 to 38 fatal crashes).

**Table 9. Parallel Route Crashes, by Severity.**  
September 8, 2002 - March 7, 2004 and September 8, 2004 - March 7, 2006.

*Total Crashes*

Year	Total	Fatal	Injury	Property Damage Only	Unknown
Comparison Period	24,028	109	6,157	17,416	346
Evaluation Period	21,948	110	5,545	16,003	290
Change	-9%	1%	-10%	-8%	-16%

*Commercial Crashes*

Year	Total	Fatal	Injury	Property Damage Only	Unknown
Comparison Period	3,314	46	757	2,485	26
Evaluation Period	3,077	38	713	2,295	31
Change	-7%	-17%	-6%	-8%	19%

Source: Ohio Integrated Traffic Records System.



**Q: Did crash reduction on Parallel Routes vary between rural (unincorporated) and urban (incorporated) areas?**

Overall, the seven percent decrease in commercial crashes was equally distributed between rural and urban portions of the Parallel Routes (eight and seven percent, respectively). It is important to note that rural fatal commercial crashes decreased 24 percent during the project, from 46 in the comparison period to 35 in the evaluation period. Statewide, fatal commercial crashes in rural areas increased three percent during the same period.

**Table 10. Commercial Crashes on Parallel Routes.**  
Comparison and Evaluation Periods.

*Rural*

Year	Total	Fatal	Injury	Property Damage Only	Unknown
Comparison Period	2,175	46	535	1581	13
Evaluation Period	2,013	35	497	1463	18
Change	-7%	-24%	-7%	-7%	38%

*Urban*

Year	Total	Fatal	Injury	Property Damage Only	Unknown
Comparison Period	1,139	0	222	904	13
Evaluation Period	1,064	3	216	832	13
Change	-7%	-----	-3%	-8%	0%

Source: Ohio Integrated Traffic Records System.

**Q: Did commercial crashes increase in proportion to Commercial Vehicle Miles Traveled on the Ohio Turnpike?**

During the evaluation period, the number of commercial crashes on the Ohio Turnpike increased 32 percent and the number of Commercial Vehicle Miles Traveled (CVMT) increased 24 percent.<sup>7</sup> The overall rate of commercial crashes per 100 million CVMT increased seven percent, from 85 crashes in the comparison period to 91 crashes per 100 million CVMT in the evaluation period. This includes a 29 percent increase in the injury crash rate, from 13 injury crashes to 17 injury crashes per 100 million CVMT.

**Table 11. Commercial\* Crash Rate per 100 Million Vehicle Miles Traveled\*\*.**  
Comparison and Evaluation Periods.

Year	Total	Fatal	Injury	Property Damage Only	Unknown
Comparison Period	84.9	0.6	13.3	70.5	0.5
Evaluation Period	90.9	0.7	17.2	72.8	0.2
Change	7%	17%	29%	3%	-60%

Source: Ohio Integrated Traffic Records System, Ohio Turnpike Commission "Traffic and Revenue Reports" for September 2002 - February 2006

\* Classes 2-11 on the Turnpike and Unit Types 9-17 and 20-23 on the OH-1 Crash Report

\*\* In order to accurately compare crashes to VMT, crashes occurring in the service plazas were included in the analysis.

<sup>7</sup> The evaluation period for the Ohio Turnpike project runs from September 8, 2004 to March 7, 2006, and includes a full year's worth of crash data. VMT data from the Ohio Turnpike Commission is compiled on a monthly basis. Therefore, VMT for the period March 1-7, 2006 are not included in the analysis.



## Crashes by Contributing Circumstance

The number of crashes where the commercial driver was at-fault increased 41 percent on the Ohio Turnpike during the evaluation period (from 482 crashes to 680 crashes) and decreased six percent on the Parallel Routes (from 2,089 crashes to 1,961 crashes) [see Table 12]. In addition, commercial at-fault injury crashes increased 92 percent on the Ohio Turnpike and decreased seven percent on the Parallel Routes.

**Table 12. At-Fault Commercial Crashes, by Contributing Circumstance.**  
Comparison and Evaluation Periods.

Contributing Circumstance	Turnpike			Parallel Routes		
	Comparison Period	Evaluation Period	% Change	Comparison Period	Evaluation Period	% Change
Followed Too Closely / ACDA	47	128	172%	503	403	-20%
Unsafe Speed	22	52	136%	71	71	0%
Failure to Yield	3	7	133%	103	129	25%
Fatigue / Asleep	6	13	117%	21	20	-5%
Swerving to Avoid (Due to Wind, Slippery Surface, Vehicle, Object, Non-Motorists in Roadway, etc.)	7	11	57%	25	23	-8%
Improper Backing	17	26	53%	82	83	1%
Operating Defective Equipment	69	105	52%	102	112	10%
Improper Start from a Parked Position	4	6	50%	9	8	-11%
Driver Inattention	18	25	39%	65	63	-3%
Unknown	22	29	32%	137	136	-1%
Load Shifting / Falling / Spilling	34	42	24%	187	157	-16%
Improper Turn	17	20	18%	107	121	13%
Improper Lane Change / Drove Off Road / Improper Passing	135	151	12%	325	285	-12%
Ran Red Light or Stop Sign	0	0	0%	41	32	-22%
Left of Center	3	3	0%	59	50	-15%
Stopped or Parked Illegally	0	0	0%	3	7	133%
Vision Obstruction	0	0	0%	3	6	100%
Failure to Control	60	50	-17%	195	204	5%
Other Improper Action	14	10	-29%	44	41	-7%
Operating Vehicle in Erratic, Reckless, Careless, Negligent, or Aggressive Manner	3	2	-33%	7	8	14%
Exceeded Speed Limit	1	0	-100%	0	2	-----
<b>Total Commercial Vehicle At-Fault Crashes</b>	<b>482</b>	<b>680</b>	<b>41%</b>	<b>2,089</b>	<b>1,961</b>	<b>-6%</b>
<b>Commercial Animal-Related Crashes</b>	<b>90</b>	<b>138</b>	<b>53%</b>	<b>199</b>	<b>145</b>	<b>-27%</b>

Source: Ohio Integrated Traffic Records System.

### Q: What effect did the speed limit increase have on commercial speed-related crashes?

For purposes of the study, crashes are considered speed-related when the commercial vehicle was cited as “at-fault” and when the contributing circumstance was either “unsafe speed” or “followed too closely / assured clear distance (ACDA).” During the evaluation period, “at-fault” speed-related commercial crashes on the Ohio Turnpike increased 157 percent over the comparison period (from 70 crashes to 180 crashes).

One element of unsafe speed is traveling too fast for the conditions. Factors such as rain, snow, and ice can compel drivers to travel below the legal speed limit. Additional analyses of the Ohio Turnpike crash data examined only crashes on dry roads. For the evaluation period, “at-fault” speed-related commercial crashes on dry roads increased 153 percent over the comparison period [see Table 13]. Moreover, the number of “at-fault” fatal and/or injury commercial crashes on dry roads that were speed-related increased 327 percent during the time period.



**Table 13. Number of “At-Fault” Speed-Related Commercial Crashes on the Ohio Ohio Turnpike on “Dry” Roads.**  
Comparison and Evaluation Periods.

<i>By Type</i>	Comparison Period	Evaluation Period	Percent Change
Unsafe Speed	4	16	300%
Following Too Closely / ACDA	36	85	136%
<b>Total</b>	<b>40</b>	<b>101</b>	<b>153%</b>

<i>By Severity</i>	Comparison Period	Evaluation Period	Percent Change
Fatal	1	3	200%
Injury	10	44	340%
Property Damage Only	29	54	86%
<b>Total</b>	<b>40</b>	<b>101</b>	<b>153%</b>

Source: Ohio Integrated Traffic Records System.

**Q: Did road conditions have any impact on the increase in Ohio Turnpike crashes?**

During the evaluation period, total crashes increased 10 percent and commercial crashes increased 32 percent on the Ohio Turnpike. After removing all crashes with “poor road conditions,” the total number of crashes increased 11 percent, which includes a 27 percent increase in commercial crashes. It is important to note that commercial fatal crashes on “dry” road conditions doubled and commercial injury crashes on “dry” road conditions increased 54 percent during the evaluation period [see Table 14].

**Table 14. Commercial Crashes on the Ohio Turnpike, by Road Condition and Severity.**  
Comparison and Evaluation Periods.

	Comparison Period	Evaluation Period	Percent Change
<b>Total Commercial Crashes</b>	<b>879</b>	<b>1,161</b>	<b>32%</b>
<b>Number of Commercial Crashes with Poor Road Conditions*</b>	<b>305</b>	<b>432</b>	<b>42%</b>
<b>Total Commercial Crashes with "Dry" Road Conditions</b>	<b>574</b>	<b>729</b>	<b>27%</b>
Fatal Crashes	4	8	100%
Injury Crashes	80	123	54%
Property Damage Only	489	596	22%
Other	1	2	100%

Source: Ohio Integrated Traffic Records System.

\* "Poor" road conditions are identified as all those crashes with road conditions that are not marked "1" under the Primary Road Condition field on the OH-1 (any condition other than dry).



**Q: Did environmental conditions contribute to the decrease in Parallel Route crashes?**

During the evaluation period, total Parallel Route crashes for all vehicles decreased nine percent and total commercial crashes decreased seven percent. After removing all crashes with “poor road conditions,” analysis shows that the total number of Parallel Route crashes decreased eight percent, which includes an 11 percent decrease in commercial crashes [see Table 15].

**Table 15. Commercial Parallel Route Crashes, by Road Condition and Severity.**  
 Comparison and Evaluation Periods.

	Comparison Period	Evaluation Period	Percent Change
Total Commercial Crashes	3,314	3,077	-7%
Number of Commercial Crashes with Poor Road Conditions*	1,008	1,009	0%
Total Commercial Crashes with "Dry" Road Conditions	2,306	2,068	-10%
Fatal Crashes	34	28	-18%
Injury Crashes	516	483	-6%
Property Damage Only	1,738	1,534	-12%
Other	18	23	28%

Source: Ohio Integrated Traffic Records System.

\* "Poor" road conditions are identified as all those crashes with road conditions that are not marked "1" under the Primary Road Condition field on the OH-1 (any condition other than dry).





## Distribution of Crashes

During the evaluation period, 130 of the 241 miles of the Ohio Turnpike (54 percent) had greater than a 25 percent increase in commercial crashes over the comparison period [see Figure 1]. In addition, 57 percent of Parallel Route-County combinations had a reduction in commercial crashes, ranging from one percent on Interstate 80 in Trumbull County to 67 percent on U.S. Route 250 in Ashland County [see Appendix One]. Parallel Routes in counties in North-central Ohio recorded the greatest reductions in commercial crashes, while results from counties South and East of Cleveland were mixed [see Figure 2].

Total crashes on the nine Parallel Route sections identified as High Fatality Crash Rate roadways in the *Northern Ohio Freight Strategy* decreased 10 percent, while commercial crashes on the routes decreased 16 percent [see Table 16]. Additionally, commercial fatal and/or injury crashes on these routes decreased 18 percent and rural commercial crashes on these routes decreased 23 percent during the project.

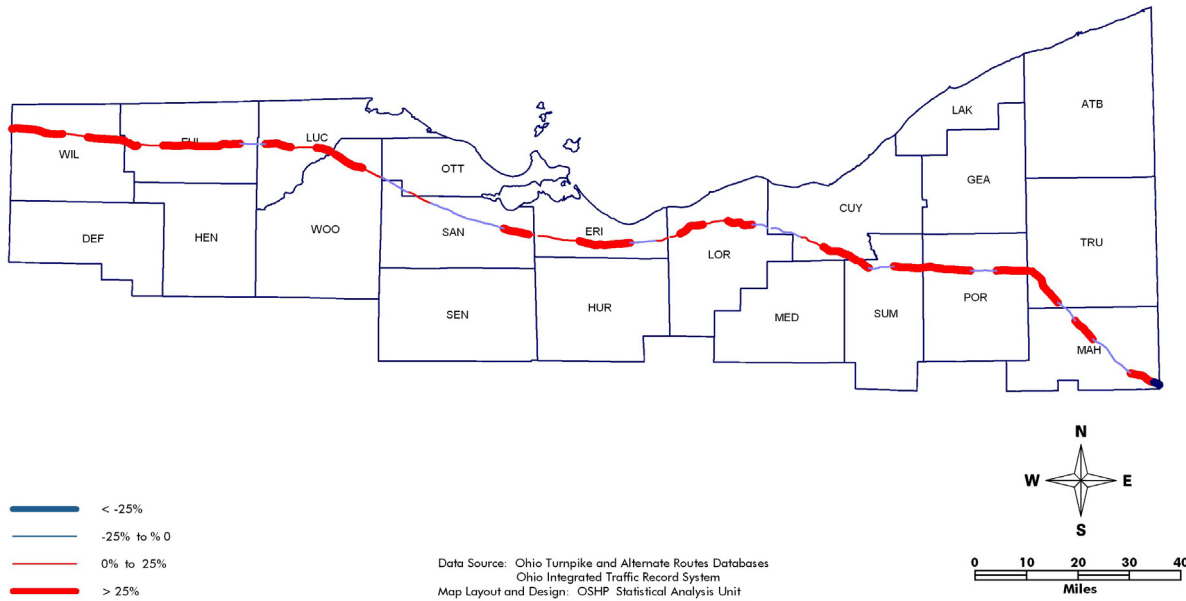
**Table 16. Commercial Crashes on ODOT-Identified High Crash Rate Route-County Segments, Total and Rural Crashes.**  
Comparison and Evaluation Periods.

Route	County	Comparison Period		Evaluation Period		Percent Change	
		Total	Rural	Total	Rural	Total	Rural
SR2	Lucas	169	70	139	43	-18%	-39%
SR2	Ottawa	77	76	37	35	-52%	-54%
US20	Fulton	44	42	38	38	-14%	-10%
US20	Lorain	51	26	48	25	-6%	-4%
US20	Lucas	104	56	109	51	5%	-9%
US20	Wood	66	45	58	43	-12%	-4%
US224	Medina	32	31	29	29	-9%	-6%
US6	Sandusky	51	51	32	31	-37%	-39%
US6	Wood	38	38	41	41	8%	8%
<b>Grand Total</b>		<b>632</b>	<b>435</b>	<b>531</b>	<b>336</b>	<b>-16%</b>	<b>-23%</b>

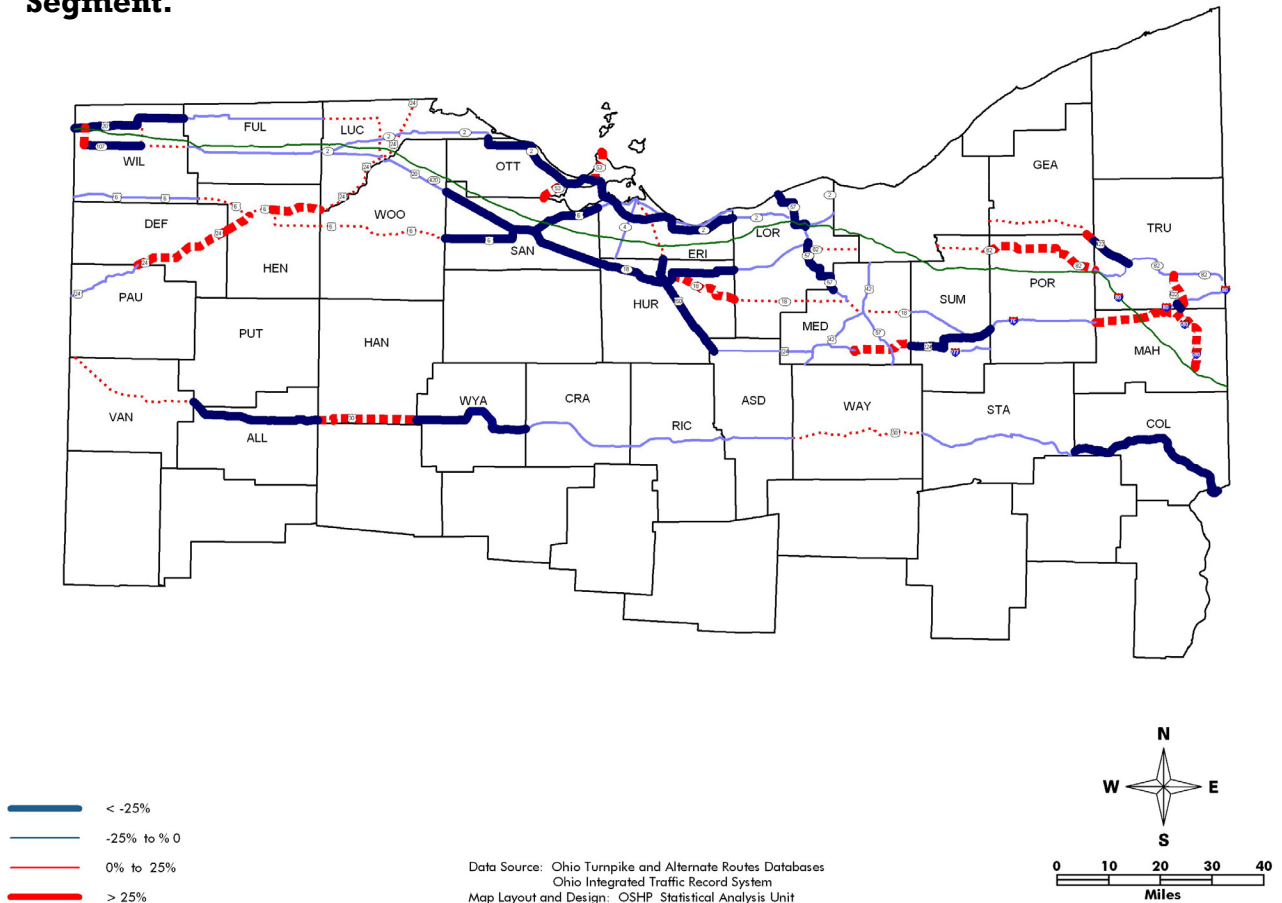
Source: Ohio Integrated Traffic Records System



**Figure 1. Percent Change in Commercial Crashes on the Ohio Turnpike, by Five Milepost Segments.**



**Figure 2. Percent Change in Commercial Vehicle Crashes, by Route-County Segment.**





**Q: Was the decrease in Parallel Route commercial crashes equally distributed across all commercial vehicle types?**

During the evaluation period, crashes involving small commercial vehicles decreased nine percent, semi-trailers decreased seven percent, and buses increased three percent. The largest decreases were seen with urban crashes involving small commercial vehicles (11 percent decrease) and rural crashes involving semi-trailers (eight percent decrease).

**Table 17. Commercial Crashes on Parallel Routes, By Vehicle Type and Locality.**  
Comparison and Evaluation Periods.

Type of Vehicle*	Comparison Period			Evaluation Period			% Change		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Small Commercial Vehicles (9-11,16)	468	561	1,029	417	518	935	-11%	-8%	-9%
Semi-Trailers (12-15, 17)	571	1,572	2,143	543	1,453	1,996	-5%	-8%	-7%
Buses (20-23)	100	42	142	104	42	146	4%	0%	3%
<b>Grand Total</b>	<b>1,139</b>	<b>2,175</b>	<b>3,314</b>	<b>1,064</b>	<b>2,013</b>	<b>3,077</b>	<b>-7%</b>	<b>-7%</b>	<b>-7%</b>

Source: Ohio Integrated Traffic Records System.

\* Based on OH-1 Vehicle Type.

**Q: Was the decrease in Parallel Route crashes equally distributed across all road types?**

Analysis of crash data for the evaluation period shows a greater impact for commercial crashes on U.S. and State Routes than Interstates. Commercial crashes decreased seven percent on U.S. Routes and 12 percent on State Routes during the evaluation period. This compares to a one percent decrease in commercial crashes on Interstates. Commercial crashes on “dry” roads decreased 11 percent on U.S. Routes and 15 percent on State Routes.

**Table 18. Total and Commercial Parallel Route Crashes, by Road Type.**  
Comparison and Evaluation Periods.

<i>Total</i>	Comparison Period	Evaluation Period	% Change
Interstates	2,936	2,655	-10%
U.S. Routes	12,377	11,523	-7%
State Routes	8,715	7,770	-11%
<b>Total</b>	<b>24,028</b>	<b>21,948</b>	<b>-9%</b>

<i>Commercial</i>	Comparison Period	Evaluation Period	% Change
Interstates	563	559	-1%
U.S. Routes	1,937	1,803	-7%
State Routes	814	715	-12%
<b>Total</b>	<b>3,314</b>	<b>3,077</b>	<b>-7%</b>

<i>Commercial on "Dry" Road Conditions</i>	Comparison Period	Evaluation Period	% Change
Interstates	372	373	0%
U.S. Routes	1,360	1,205	-11%
State Routes	574	490	-15%
<b>Total</b>	<b>2,306</b>	<b>2,068</b>	<b>-10%</b>

Source: Ohio Integrated Traffic Records System.



## Conclusions

The *Northern Ohio Freight Strategy* identified a number of measures that were designed to increase commercial traffic on the Ohio Turnpike and improve the safety of two- and four-lane Parallel Routes. During the evaluation period, commercial volume increased 22 percent and commercial vehicle miles traveled increased 24 percent over the comparison period on the Ohio Turnpike. In addition, commercial volume on the Parallel Routes decreased 16 percent after two years of the project. The reductions in commercial traffic on Parallel Routes significantly improved the safety of the roads. During the evaluation period, 57 percent of route-county combinations experienced decreases in commercial crashes from the comparison period. Total crashes on the Parallel Routes were down nine percent and commercial crashes decreased seven percent. Moreover, serious commercial crashes on the Parallel Routes (those involving injury or death) declined seven percent during the project. This includes a 24 percent decrease in fatal commercial crashes in rural areas. The strategies implemented by the Ohio Turnpike Commission, the Ohio State Highway Patrol, and the Ohio Department of Transportation were successful in shifting commercial traffic patterns on Northern Ohio roads and increasing the safety of the Parallel Routes.

In contrast, the increases in commercial traffic, combined with higher vehicle speeds, had a negative impact on traffic safety on the Ohio Turnpike. During the evaluation period, crashes involving commercial vehicles increased 32 percent, with commercial fatal and/or injury crashes increasing 58 percent during the project. Further analysis found that “poor weather conditions” did not play a significant role in these increases, as commercial injury crashes on dry roads increased 56 percent during the evaluation. Moreover, at-fault speed-related commercial crashes increased 153 percent during the project, highlighting the fact that increased traffic volume and higher vehicle speeds had a detrimental effect on traffic safety on the Ohio Turnpike.

Overall, the measures that were implemented increased commercial traffic on the Ohio Turnpike and improved the safety of Parallel Routes in Northern Ohio. While commercial volume increased 17 percent on the Ohio Turnpike during the evaluation, commercial crashes increased 40 percent (200 more crashes) during the time frame. This increase offset the positive impact that was seen on reducing crashes on the Parallel Routes (141 fewer crashes). While the Ohio Turnpike continues to be one of the safest highways in the State, the impact that increases in commercial volume and higher vehicle speeds had on traffic safety are cause for concern. Officials should continue to monitor the effects of the *Northern Ohio Freight Strategy* on Turnpike safety, and develop new measures to prevent any further escalation in traffic crashes on the road.



## Appendix One

# Total and Commercial Crashes on the Parallel Routes



**Table A. Parallel Routes Crashes, by County and Route.**

September 8, 2002 – March 7, 2004 and September 8, 2004 – March 7, 2006.

County	Route	All Crashes			Commercial Crashes		
		2002-2004	2004-2006	% Change	2002-2004	2004-2006	% Change
Allen	US30	147	97	-34%	37	27	-27%
Ashland	US30	120	105	-13%	17	17	0%
Ashland	US224	46	49	7%	16	15	-6%
Ashland	US250	9	10	11%	3	1	-67%
Columbiana	US30	406	378	-7%	51	40	-22%
Crawford	US30	225	196	-13%	75	67	-11%
Defiance	US24	112	154	38%	43	68	58%
Erie	SR2	362	321	-11%	64	36	-44%
Erie	SR4	278	232	-17%	30	29	-3%
Erie	US6	534	480	-10%	36	28	-22%
Erie	US250	498	398	-20%	31	33	6%
Fulton	US20	115	121	5%	44	38	-14%
Fulton	US20A	221	226	2%	38	34	-11%
Geauga	US422	244	217	-11%	39	48	23%
Hancock	US30	67	103	54%	39	55	41%
Henry	US6	117	135	15%	29	30	3%
Henry	US24	109	114	5%	28	44	57%
Huron	SR18	77	78	1%	8	15	88%
Huron	US20	321	232	-28%	88	64	-27%
Huron	US250	387	328	-15%	66	46	-30%
Lorain	SR2	338	336	-1%	41	40	-2%
Lorain	SR18	101	89	-12%	14	17	21%
Lorain	SR57	1,141	1,008	-12%	88	62	-30%
Lorain	SR82	164	154	-6%	17	21	24%
Lorain	US20	575	525	-9%	51	48	-6%
Lucas	SR2	2,050	1,819	-11%	169	139	-18%
Lucas	US20	1,687	1,529	-9%	104	109	5%
Lucas	US20A	211	165	-22%	26	21	-19%
Lucas	US24	1,303	1,283	-2%	152	168	11%
Mahoning	IR76	111	160	44%	34	62	82%
Mahoning	IR80	150	184	23%	50	72	44%
Mahoning	IR680	437	431	-1%	38	51	34%
Medina	IR76	279	301	8%	41	65	59%
Medina	SR18	565	509	-10%	66	83	26%
Medina	SR57	234	233	0%	24	21	-13%
Medina	US42	611	615	1%	53	46	-13%
Medina	US224	107	115	7%	32	29	-9%
Ottawa	SR2	294	224	-24%	77	37	-52%
Ottawa	SR53	110	106	-4%	7	12	71%
Paulding	US24	95	82	-14%	48	42	-13%
Paulding	US30	4	8	100%	1	2	100%
Portage	IR76	425	346	-19%	123	97	-21%
Portage	SR82	254	227	-11%	10	18	80%
Portage	US422	16	18	13%	1	3	200%
Putnam	US30	12	12	0%	3	2	-33%
Richland	US30	477	458	-4%	96	82	-15%
Sandusky	US6	247	197	-20%	51	32	-37%
Sandusky	US20	471	429	-9%	118	76	-36%
Stark	US30	672	632	-6%	88	86	-2%
Summit	IR76	1,276	1,007	-21%	204	140	-31%
Summit	SR18	1,494	1,229	-18%	84	68	-19%
Summit	SR82	497	522	5%	30	32	7%
Summit	US224	479	461	-4%	44	36	-18%
Trumbull	IR80	258	226	-12%	73	72	-1%
Trumbull	SR5	86	80	-7%	13	10	-23%
Trumbull	SR11	70	68	-3%	7	12	71%
Trumbull	SR82	471	425	-10%	48	41	-15%
Trumbull	US422	129	148	15%	30	21	-30%
Van Wert	US30	140	117	-16%	29	34	17%
Wayne	US30	421	409	-3%	84	98	17%
Williams	SR49	17	19	12%	2	4	100%
Williams	SR107	86	58	-33%	4	3	-25%
Williams	US6	116	99	-15%	21	21	0%
Williams	US20	59	71	20%	31	22	-29%
Williams	US20A	73	91	25%	16	20	25%
Wood	SR420	27	34	26%	12	15	25%
Wood	US6	179	171	-4%	38	41	8%
Wood	US20	409	406	-1%	66	58	-12%
Wyandot	US30	205	138	-33%	73	51	-30%
<b>Total</b>		<b>24,028</b>	<b>21,948</b>	<b>-9%</b>	<b>3,314</b>	<b>3,077</b>	<b>-7%</b>

Source: Ohio Integrated Traffic Records System.