

Analyzing Automatic Traffic Recorder Data



Issue brief: Summer 2011

Speed is one of many factors that increase the risk of serious or fatal injury in traffic crashes. This pilot project tested existing equipment and technology assets in monitoring driver decisions with regard to posted speed limits.

During the 2011 summer driving season, automatic traffic recorder (ATR) data was collected, in cooperation with the NDDOT, to better understand driver decisions with regard to speed at sites along selected travel corridors in the state. Analysis focused on vehicle speed examining posted limits and observed traffic speeds, and high-risk driver prevalence for systematic and special campaign assessment.

Results

Overall, traffic trends by hour show there are variations in speeding throughout the day — with the hours 2:00 a.m. to 7:00 a.m. having the highest percentage of speeders. The ATR data shows stable patterns among weekdays, varying by less than 1.0% total (19.3% versus 20.2%). Saturday and Sunday represent the high of 21.0% and low of 18.4% respectively. Individual sites do display statistically significant differences in the percentages of vehicles speeding. New Town had the largest share of drivers speeding and Garrison the smallest (Figure 1).

Traffic flow is considered to be optimized if driver decisions for travel patterns show 85% of vehicles are moving within posted speed limit range — this includes all vehicles moving at speeds under or at the posted limit plus five miles-per-hour. Figure 2 displays the percentage of passenger vehicles that were driving within the posted speed limit range or slower. Only the Ray, Max, and Garrison observed speeds were within the guideline rule.

Although there were no specific high visibility enforcement (HVE) campaigns conducted on either Memorial Day or Labor Day weekends, there was heightened awareness through additional media attention and increased patrol by law enforcement. Of the eight sites included in the analysis, five saw a decrease in the percentage of vehicles speeding with three of the decreases being statistically significant (Figure 3). Looking at the high-risk speeders overall shows a slight decrease during Memorial Day weekend when compared to the previous weekend. This decrease is not significant.

The HVE campaign conducted on August 26 and 27 did not significantly reduce the percentage of vehicles speeding at the New Town site. Share of vehicles speeding at the other four sites increased significantly, ranging from 12.4% to 14.4%.

When comparing the high-risk speeding percentages during the HVE campaign, the results are similar. Vehicles traveling more than 15 mph over the speed limit at the New Town site increased, although not significantly, while vehicles speeding at the other four sites increased significantly. The percentage of both speeders and high-risk speeders at New Town is greater than the other non-HVE sites. The lower speed limits at this site may partially explain the higher percentages. It may also suggest that even though the HVE did not significantly reduce the percentage of speeders and high-risk speeders, it may have prevented a statistically significant increase.

Conclusion

This pilot project used existing assets and technological infrastructure to establish metrics for assessing speed as a factor in traffic safety through systematic and programmatic analysis. Systematic results did show variation across time and geography with regard to driver decisions to drive at speeds beyond the expected 85th percentile range. In addition, the prevalence of high-risk drivers was highlighted, and provides information for education and enforcement resource allocations. The ability to test programs and campaigns targeted at speeding drivers was possible in the pilot.

In the future, specifically including outcomes measurements as part of the design of the HVE would ensure that multiple ATR data sites are included in the intervention group and would allow law enforcement to specifically travel ATR sites located in those areas. Proactive plans to address and assess crash risk from traffic speed on rural highways are valuable in overarching goals to improve road safety.

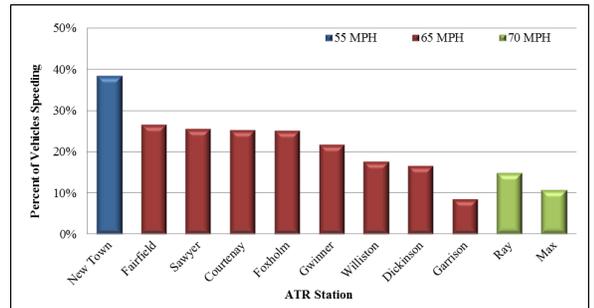


Figure 1: Percentage of Passenger Vehicles Speeding by Site from 5/19/10 to 5/31/10

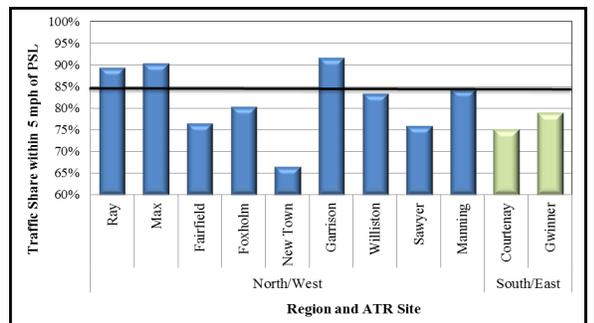


Figure 2: Traffic Speed in Relation to 85th Percentile Guideline for Posted Speed Limit

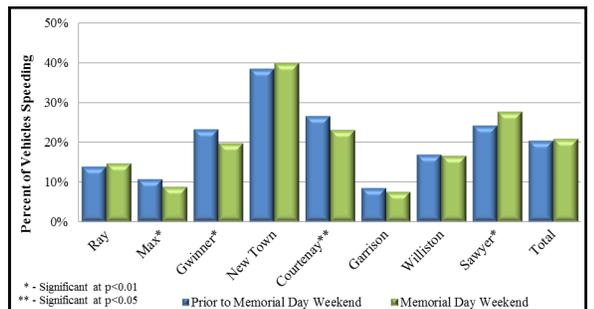


Figure 3: Percentage of Passenger Vehicles Speeding Prior to and on Memorial Day Weekend

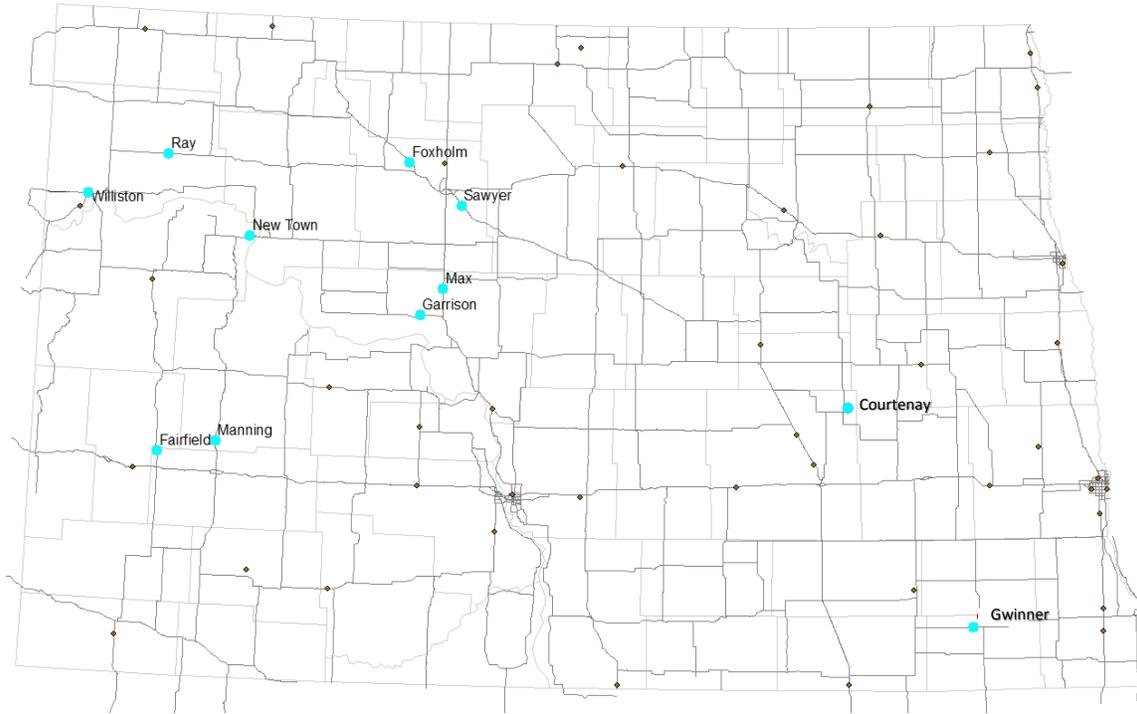
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For more information contact:
 Rural Transportation Safety and Security Center
 UGPTI, NDSU Fargo, ND 58105
 Email: rtssc@ugpti.org
 Phone: 701.231.7767

The location of ATR sites included in the analysis are shown in the following map.



A detailed summary of traffic speed analysis for individual ATR sites is shown in Table 1.

Site	North/West						South/East				
	Ray	Max	Fairfield	Foxholm	New Town	Garrison	Williston	Sawyer	Manning	Courtenay	Gwinner
<i>PSL (mph)</i>	70	70	65	65	55	65	65	65	65	65	65
<=40.0	0.5%	0.1%	0.5%	0.2%	0.7%	2.1%	4.2%	0.4%	0.6%	1.9%	1.1%
40.1 - 45.0	0.1%	0.1%	0.2%	0.2%	0.7%	1.9%	2.4%	0.2%	0.1%	0.8%	0.7%
45.1 - 50.0	0.3%	0.4%	0.6%	0.5%	3.6%	3.6%	2.7%	0.6%	0.4%	0.9%	2.0%
50.1 - 55.0	1.0%	1.2%	2.0%	2.6%	22.8%	10.7%	3.9%	2.4%	1.3%	2.8%	4.8%
55.1 - 60.0	2.9%	3.9%	6.5%	9.9%	38.8%	21.5%	9.6%	6.7%	6.4%	8.0%	12.5%
60.1 - 65.0	9.7%	12.9%	24.6%	36.0%	19.5%	27.9%	23.9%	24.3%	28.7%	20.6%	26.7%
65.1 - 70.0	34.7%	35.5%	42.2%	31.0%	8.1%	24.0%	36.8%	41.5%	46.9%	40.0%	31.1%
70.1 - 75.0	40.3%	36.3%	15.6%	14.3%	3.3%	6.3%	11.2%	17.6%	10.9%	14.3%	15.2%
75.1 - 80.0	8.9%	7.4%	5.5%	3.9%	1.5%	1.4%	3.8%	3.7%	3.3%	6.8%	4.4%
80.1 - 84.9	1.2%	1.7%	1.4%	0.8%	0.5%	0.4%	1.1%	1.6%	0.8%	2.0%	0.8%
85.0 - 89.9	0.3%	0.3%	0.6%	0.3%	0.3%	0.1%	0.3%	0.7%	0.4%	1.0%	0.4%
> 89.99	0.2%	0.2%	0.3%	0.2%	0.3%	0.1%	0.1%	0.4%	0.2%	0.8%	0.2%
Total Vehicle Count	66,462	36,651	29,574	42,740	52,568	21,812	22,415	72,213	53,433	7,579	18,121
Observed 85th Percentile Range	70-75	70-75	70-75	70-75	60-65	65-70	70-75	70-75	70-75	70-75	70-75
PSL (+5 mph)= 85th Percentile Goal	89.5%	90.4%	76.6%	80.5%	66.6%	91.7%	83.4%	76.1%	84.5%	75.1%	79.0%
15 mph or more under PSL	1.8%	1.8%	1.3%	0.9%	1.4%	7.6%	9.3%	1.1%	1.2%	3.6%	3.8%
15 mph or more over PSL	0.5%	0.5%	2.3%	1.3%	5.9%	0.6%	1.5%	2.7%	1.4%	3.8%	1.4%